UNIVERSITY OF CALIFORNIA
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Tone and Prosodic Morphology in Kisukuma

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by

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Kwa mke wangu mpendwa, rafiki wa kweli mwema asiyelegalega, mwandani wa maisha na mama watoto wangu mpendwa - Sophia John Lyimo (Mama Kija). Asante kwa kunishika mkono, kunitia nguvu na kunikazisha macho upeoni kwenye pambazuko jema, ushindi maridhawa na matumaini mzomzo. Nagǿtogîlwe!

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ABBREVIATIONS

FH	=	Fixed High tone	NEG	=	Negation
MH	=	Mobile High tone	Asp	=	Aspect
L	=	Low tone	EXT	=	Extension
XL	=	Extra Low tone	UR	=	Underlying Representation
=>	=	is realized as	IFS	=	Inflectional Final Suffix
*	=	ungrammatical	BS	=	Basic Spreading
?	=	questionable	DL	=	Delinking
Ø	=	zero/null	OCP	=	Obligatory Contour Principle
RED	=	Reduplicant	OT	=	Optimality Theory
REDs	=	Reduplicants	CC	=	Consonant Clusters
Agr.	=	Agreement	SM	=	Subject Marker
TBU	=	Tone Bearing Unit	TM	=	Tense Marker
SR	=	Surface Representation	OM	=	Object Marker
FV	=	Final Vowel	GF	=	Glide formation
PD	=	Pre-prefixal Displacement	CGV	=	Consonant, Glide, Vowel
MR	=	Meeussen's Rule	iff	=	if and only if
R	=	Retraction	MSA	=	Metrical Structure Assignment
MIC	=	Morpheme Integrity Constraint	TF	=	Tone fusion
CV	=	Consonant, Vowel	HTS	=	High Tone Spread

PHONETIC TRANSCRIPTIONS

(The IPA symbols are used only when necessary)

sh	=	ʃ
ch	=	tʃ
j	=	dʒ
y	=	j
ny	=	ɲ
nj	=	ndʒ
ng’	=	ŋg
mv	=	ɱv

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I remember as if it was yesterday. It was the last day of orientation in Fall 1997. As new graduate students in the department of linguistics at UCLA, we were given at least three English sentences and asked to draw syntactic trees for each of them. The faculty wanted to know who knew what and at what level. When I turned in my trees to the first year graduate advisor, she looked at them and then at me. I could tell from her facial expressions that something was not right. And then came the question that I still remember “Matondo, is this how you draw syntactic trees in your country?” “Yes” I responded enthusiastically. Having done Kiswahili linguistics and literature (major) and Geography (minor) with Education in my undergraduate degree back home in Tanzania, those were my best trees. She then asked me if I had already heard anything about GB syntax. My answer, of course, was negative because I had not heard the word GB before. She pulled a huge volume from a shelf and gave it to me. It was Haegeman’s Introduction to Government and Binding Theory (second edition). She asked me to read the entire book carefully and slowly and go back to her if I had questions. When I was about to leave her office, sad and shaken, she called and assured me that everything was going to be fine and that I was going to get my Ph.D. in five or six years. I knew that this was the standard time for completing a Ph.D. program in the U.S but I did not believe that this was going to happen. As it turned out, she was right. After five academic years and two quarters, here I am, getting my Ph.D., a pure result of hard work, perseverance, positive outlook, my professors’ guidance and help; and, of course, God’s grace.

This Ph.D. dissertation is the result of moral and material support from many people. Below, I will attempt to mention few of them. First, I must thank my wonderful committee members. I express my deepest possible gratitude to Prof. Donca Steriade. Donca was involved in every stage of this work. From the very initial stages, she demonstrated her willingness to work with me and supported me in every way possible. I spent with her many hours, many times interfering with her busy schedule, but she was always there for me. When I mentioned to her that I wanted to develop a theoretical analysis for my work, her support was immeasurable. Donca never doubted my abilities and my commitments. She walked me through the basic stuff like collecting data and having meaningful paradigms all the way to developing the analysis in OT and ODT theories, carefully reading and providing very useful comments on all the drafts. Undoubtedly, without her help, commitment and dedication to see that I succeed; this work would not have reached this stage. I am forever indebted for her time, trust, wisdom and insights. Donca, I don't have anything to give you but to ask you to receive my hearty thanks. You are the best professor I have ever had and you will always remain my hero and role model.

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life but also on personal matters. Mwalimu, without you I wouldn't have succeeded and my life would have been very difficult here in America particularly in my first year. I thus thank you from the bottom of my heart. I also thank your family and particularly your wife Claudia, your daughter Cathy and her husband Mr. Campbell and their beautiful daughter Melissa for all their support and kindness they showed me, not only in the two weeks that I stayed with them, but throughout these five and a half years. "asanteni sana!"

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Professor Zuraw was my first teaching assistant at UCLA. I remember in my first phonological quiz ever at UCLA I scored 76%. I was very happy because 76% back home is an A and it is very difficult to get it. When I opened the last page, however, I was shocked to learn that 76% was not an A, not a B, not even a C but a D^+. Zuraw assured me that everything was going to be fine after I get acquainted with the American system.

Since when she joined my committee, she has been very helpful; usually reading all the drafts and providing very detailed and critical comments about my work.

Professor Alpers agreed to join my committee without knowing me very well and only on short notice. Apart from being a non-linguist, he has read all the drafts providing very good specific and general suggestions. This work has benefited from his expertise in (East African) History particularly when diachronic considerations were required in order to make sense of the data.

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ABSTRACT OF THE DISSERTATION

Tone and Prosodic Morphology in Kisukuma

by

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The introduction of Optimality Theory (Prince and Smolensky 1993) and its extension, Correspondence Theory (Prince and McCarthy 1995) has led to a significant interest in the study of prosodic morphology and reduplication in particular. Bantu languages, a group of 500+ languages spoken in Africa south of the Sahara, provide an excellent testing ground for both Optimality Theory and Correspondence Theory (Brassil 2000, Downing 1997, 1999, 2000, 2002; Hyman and Mtenje 1999; Odden 1996; Myers and Carleton 1996 and Mtenje 2002). The most important finding emerging from the ongoing research is that (Bantu) reduplication is essentially a morphological process. In more recent studies, (Bantu) reduplication is viewed as a morphological process that can be accounted for morphosyntactically without referring to the Base-Reduplicant correspondences (Hyman, Inkelas and Sibanda, 1998); or simply as morphological doubling (Inkelas and Zoll, 2000).

This study provides further evidence to support the view that (Bantu) reduplication is essentially a morphological process. By using the Lexical Conservatism model (Steriade 1997), the study shows that the reduplicant must be a listed morphological stem in Kisukuma. The truncation of stems is thus not preferred and nominal (nouns, adjective and number) stems must surface intact in the reduplicant regardless of their length or segmental composition. Stem truncation is tolerated in verb-stem reduplication but only to the extent that it produces a reduplicant that is a listed morphological stem. When the morphology is opaque (as in recent unassimilated loans), however, morphological constraints cannot be evaluated and the size of the reduplicant is determined by phonology.

As far as tonal transfer is concerned, the study demonstrates that none of the proposed models can fully account for tonal transfer patterns in Kisukuma particularly when the Mobile H tone is involved. The study also shows that Optimal Domains Theory (Cassimjee and Kisseberth 1998) cannot account for the Kisukuma wide domain because it is neither bounded nor unbounded. Moreover, Kisukuma requires that syllables, and not moras alone, be recognized as sponsors. It is our hope that this study will further our understanding of reduplication and how it interacts with tone, not only in Bantu languages, but also in languages from other families.

CHAPTER ONE

INTRODUCTION

1.0. Introduction

The topic of investigation for this dissertation is the prosodic morphology and tone in Kisukuma (Sukuma). By using Optimal Domains Theory (ODT), a version of Optimality Theory (OT) developed mainly by Cassimjee and Kisseberth (1998), the study provides an account of Kisukuma tone and how it interacts with reduplication. To the best of my knowledge, this is the first detailed study of Kisukuma tone and its interaction with reduplication. It is demonstrated that ODT cannot fully explain the complex nature of Kisukuma mobile H domain which is neither bounded nor unbounded in ODT sense.

Regarding the shape of the reduplicant, the study provides strong evidence to support the recently recognized role of morphology in determining the shape of the reduplicant in Bantu. By using the notion of Lexical Conservatism (Steriade 1997), it is shown that the reduplicant in Kisukuma must be a listed morphological stem regardless of the grammatical category being reduplicated or length of the unreduplicated stem. Truncation of the base stem is thus limited to verbal stem reduplication and whenever it occurs, the reduplicant must resemble a typical Bantu stem. As a result, nominals are rarely truncated. As in other Bantu languages, the reduplicant cannot be less than two syllables in Kisukuma.

The study also demonstrates that phonological factors take precedence in determining the size of the reduplicant only when the morphology is opaque thus rendering the whole notion of lexical conservatism impossible. This is indeed what happens when recent loans (mainly nouns) are reduplicated. Moreover, for the first time, a preliminary phonetic experimental study was conducted in order to highlight some of the controversial aspects of Kisukuma tone, e.g. the presence of the Extra Low tone and how it differs from the normal L tone, the difference between the fixed H and mobile H tone e.t.c. The phonetic experiment is provided in appendix I.

The first chapter introduces the basics of Optimal Domains Theory (ODT) as outlined in Cassimjee and Kisseberth (1998). In the second chapter Kisukuma tone is introduced and analyzed. The focus here is on tonal phenomena that are relevant in reduplication. A reader thus should not expect a total treatment of Kisukuma tone. The factors that determine the size of the reduplicant in native and nativized loans is the subject of Chapter 3. Chapter 4 is the extension of Chapter 3 and it deals with the factors that control the shape of the reduplicant in recent loans. All issues pertaining to tonal transfer are discussed in Chapter 5. In Chapter 6, the major findings are summarized, problematic cases are identified and suggestions for further studies are provided.

1.1. Kisukuma (Sukuma)

Kisukuma (Sukuma) is a western Tanzania Bantu language spoken by over seven million people (or 12.6% of the population) in the south and southeast of Lake Nyanza (Victoria) in the United Republic of Tanzania (Whiteley 1971). According to Guthrie's (1967) classification, Kisukuma (F. 21) belongs to Group 20 of Zone F of the Bantu languages, a group that also includes Kinyamwezi (F. 22), Kisumbwa (F. 23), Kikimbu

(F. 24) and Kibungu (F. 25)[1]. Relating to its group members and neighbors, Kisukuma is assumed to have 84% lexical similarity with Kinyamwezi, 59% with Kisumbwa and Kinyaturu, 57% with Kikimbu, 55% with Kinilamba and 49% with Kilangi (Batibo 1985). Although some scholars treat Kisukuma as a dialect of Kinyamwezi (cf. Doke 1943), Kisukuma and Kinyamwezi are regarded as separate languages (c.f. Bryan 1959, Guthrie 1948 and Kahigi 1988). In this work, Kisukuma is treated as a separate language and not as a dialect of Kinyamwezi.

1.2. Kisukuma Dialects

Kisukuma has four major dialects. These dialects are named according to their geographical orientations: *gɪmunasukuma* (Northern), *gɪmunangweeli* (Western), *gɪmunakɪɪyá* (Eastern) and *gɪmunadakama* (Southern). Each of these major dialects can also have minor sub-dialects. For example, one of the sub-dialects of the eastern dialect (*gɪmunakɪɪyá*) is Kinyantuzu, of which I am a native speaker. This is the sub-dialect that is described in this study. It is spoken by Banyantuzu people in Ntuzu ward in Eastern Bariadi district, Shinyanga region on the border with the Serengeti plains.

To the best of my knowledge, Kinyantuzu has not been studied before. What has been investigated in the literature is the Northern dialect (*gɪmunasukuma*). This dialect is

1. Guthrie (1948, 1967 – 71) classified Bantu languages in zones which he labeled with letters A, B, C, D, etc. Each zone consists of groups that are numbered in tens, e.g. 10, 20, 30, 40, etc. Each language in a zone is assigned a number. Kisukuma, for example, belongs to Zone F, the Kisukuma – Kinyamwezi group (F. 20) and is numbered 21. Thus it can be identified simply as F. 21. Guthrie's classification in zones was significantly based on geographical convenience, ease of reference, some typological criteria and not necessarily on purely linguistic features.

primarily spoken in Mwanza region and is considered the standard dialect. It is important to note that, the Northern dialect whose tonal system has been extensively studied by Batibo (1976, 1981, 1984, 1985, 1990, 1991) is mutually intelligible with the sub-dialect of the Eastern dialect (*gɪmunakɪɪyá*) studied in the present study (Kinyantuzu). In fact, the Kinyantuzu sub-dialect is mutually intelligible with all dialects mentioned above. However, some differences do occur between these dialects and the Kinyantuzu sub-dialect. Although no study has been conducted to systematically analyze any phonetic or phonological differences between these dialects, it is clear, that some of the Kisukuma generalizations made in the literature concerning the Northern dialect and particularly those involving tones are not shared by Kinyantuzu. It is common, for example, to hear a statement like this "The Banyantuzu people speak too loud and use a lot of force". When a non-linguist offers such a statement, he may be referring to such phonetic properties like high pitch and tones. My own observations also seem to indicate that Kinyantuzu is, to some extent, resistant to some of the commonest and widespread diachronic phonological processes like spirantization. It is thus safe to cautiously approach all generalizations made in the literature and particulary those involving tones because they may not necessarily be true in Kinyantuzu sub-dialect.

The data utilized in this study comes from several sources. First, much of the data comes from the author. Second, five subjects who are native speakers of Kinyantuzu were also used to help with the judgements on the tonal pattern of recent loan stems and how they pattern in reduplication (cf. appendix III). Third, relevant data has also been taken from the available literature. These includes Batibo's dissertation (1985), Richardson (1959) and Richardson and Mann (1966).

1.3. Noun Classes and Concordial Morphology

Kisukuma shares most of the basic structural properties that distinguish the Bantu languages from other language families. The first of these is the noun class system. It is the noun class system that first led Bleek (1862) and Meinhof (1899) to posit a genetic relationship among these languages.

In Kisukuma, every noun phrase belongs to one of up to 19 noun classes and every predicate or modifier that takes a nominal as an argument must agree with it in class. More than one convention exists for labeling and referring to these noun classes. The system adopted in this work is the one developed by Carl Meinhof (1899) and used in many scholarly works. This system allows for comparison of corresponding noun classes across Bantu languages. In the system, each noun class is referred to by number. Each number holds as the name of the cognate class in any Bantu language. It follows that "Class 2" for example, is the usual name in studies of any Bantu language for the class corresponding to "Class 2".

In Kisukuma, most of the classes can be set into pairs such that most nouns have a singular form in one class and a plural form in its corresponding class. For example, all nouns of class 1 (e.g. *munhʋ* "person", *nyánda* "young person", and *namugí* "husband") are singulars and have their plural counterparts in class 2 (e.g. *βaanhʋ* "people", *βayánda* "young people", and *βanamugí* "husbands). Below is a chart with an example noun for each of the noun classes of Kisukuma.

Table 1: Kisukuma Noun Classes

Class	Augment	Prefix	Noun Stem	Gloss
1.	(ʊ-)	mu-	ʊ-mu-nhʊ	"the person"
2.	(a-)	βa-	a-βa-nhʊ	"the people"
3.	(ʊ-)	m(u)-	ʊ-m-mɪlɪ	"the body"
4.	(ɪ-)	mi-	ɪ-mi-mɪle	"the bodies"
5.	(ɪ-)	li-	ɪ-li-góódi	"the shirt"
6.	(a-)	ma-	a-ma-góódi	"the shirts"
7.	(ɪ-)	gɪ-	ɪ-gɪ-láatʊ	"the shoe"
8.	(ɪ-)	si-	ɪ-si-láatʊ	"the shoes"
9.	(ɪ-)	n(i)-	ɪ-mbʊli	"the goat"
10.	(ɪ-)	n(i)-	ɪ-mbʊli	"the goats"
11.	(ʊ-)	lʊ-	ʊ-lʊ-goye	"the rope"
10.	(ɪ-)	n(i)-	ɪ-n-goye	"the ropes"
14.	(ʊ-)	βʊ-	ʊ-βʊ-lʊβa	"the cotton"
15.	(ʊ-)	gʊ-	ʊ-gʊ́-lya	"to eat"
16.	(ʊ-)	kʊ-	ʊ-kʊle	"at the distance"
17.	(ʊ-)	mu-	ʊ-mu-gátɪ	"in the center"

As shown in table (1), a typical Kisukuma noun can be preceded by two prefixes. The first of these is termed the "augment" or "preprefix". Unlike in Kinande and other Lacustrine Bantu languages[2] where the preprefix or augment is obligatory, in Kisukuma it is optional and conditioned by semantic factors: it marks definiteness, thus [βa-anhʊ] "people" vs **a**-βa-nhʊ "**the** people". The shape of the augment is predictable from the

[2] Basically these are Bantu languages that are spoken around Lake Victoria (Nyanza) in East Africa e.g. Kikerewe, Kirundi, Kinyarwanda, Luganda, Kihaya, Kinyankore and others.

vowel of the noun class marker: ʊ- before Cu and Cʊ, a- before Ca, and ɪ- before Ci and N(i) as in class (9) and (10) nouns. I will show in §2.4 that this definiteness marking preprefix blocks the rightward displacement of mobile high tones.

Historically, noun classes in Bantu languages were associated with specific semantic properties. For example, there were noun classes which contained only the names of human beings, another for animals, others for trees and plants, abstract nouns, locations, elongated objects, buildings and so forth. The semantic-determined system is still reflected to different degree in different Bantu languages but semantic shifts and borrowings from other languages have caused shifts and changes. In Swahili, for instance, Class (9) and (10) originally contained only names of animals and kinship terms but today it has a lot of borrowed nouns from Arabic, English, Portuguese, Indian languages and others. Other Bantu languages, particularly those in Tanzania, Kenya and Uganda have borrowed these words from Swahili thereby undergoing the same semantic shifts in their noun class system.

Each noun class governs the morphology on verbs, adjectives and numbers. The example of noun class concord in action is given in (1) where the numeral –<u>datʊ́</u> "three", the adjective <u>taale</u>– "big" and the verb <u>gʊ-seka</u> "to laugh (future)" all agree in class with the Class 2 noun <u>βaana</u> "children". Likewise, in (1b), they agree in class with Class 6 noun <u>ma-númba</u> "buildings"

(1) a. **<u>βa</u>**-ana **<u>βa</u>**-táále **<u>βa</u>**-datʊ́ **<u>βa</u>**-gʊ-séka
2-child 2-big 2-three 2-will-laugh
"three big kids will laugh"

b. **<u>ma</u>**-númba **<u>ma</u>**-táále **<u>a</u>**-datʊ́ **<u>a</u>**-gʊ-zéng-w-a
6-building 6-big 6-three 6-will-build-passive-a
"three big buildings will be built"

1.4. Verb Morphology

As is emblematic of Bantu languages, Kisukuma is also characterized by a distinctive verbal morphology. A typical Kisukuma verb structure is characterized as in (2).

(2) Prefixes – Root – Extensions – Final Vowel

As shown in (2), Kisukuma verb consists of prefixes, a root, derivational extensions and a morphologically empty final vowel which is generally /-a/. Downing (1997) calls all verb stems that end in this morphologically empty vowel as canonical stems. The root is the basic verbal morpheme and it is always preceded by a sequence of derivational morphemes including subject agreement markers, negative markers, tense and object markers. Subject and object markers carry either person or number features (for first and second persons) or noun class for third person. The root can also be augmented with one or more derivational suffixes and a final vowel. As pointed out by Myers (1987), many of these derivational suffixes are correlated with operations on argument structure like Causative, Applicative, Passive, Reciprocal, etc.

The final vowel also performs other functions in Kisukuma non-canonical stems. First, it marks verbal inflectional categories like the subjunctive [-e] and perfective [-ile]. Second, the final vowel also can act as a nominalizing suffix, changing the verb stem into a noun stem. Thus, [zug-**a**] "cook" becomes [n-zug-**i**] "a cook/chef" when nominalized. The use of derivational suffixes to build verb stems in Kisukuma is illustrated in (3).

(3) Derivational suffixes

a.	chagʊl-a	"choose"
b.	chagʊl-**el**-a	+ benefactive
c.	chagʊl-el-**w**-a	+ passive
d.	chagʊl-el-a-**nij**-iw-a	+simultaneous

Kisukuma verb form can also be thought of in terms of slots and template morphology in which a number of morphemes can be prefixed or suffixed to the verb stem but only in a fixed order. A template of the Kisukuma verbal complex is given in (4).

(4) Kisukuma verbal complex

SM - NEG - (TM) - [OM] - [root - EXT - FV]$_{stem}$
a - da - lá - n - som - el - a
"(s)he will not read to him/her"

Notice that it is possible to have more than one derivational suffix or extension. The derivational suffixes used in this dissertation are shown in (5). Only the root and the final vowel are obligatory. Usually, it is the root, optional extensions and the final vowel that define the stem domain, which is usually preceded by one or more prefixes.

(5) Relevant derivational suffixes

	Derivational Suffix	Meaning		Derivational Suffix	Meaning
(a)	/-ɪl-/ ~ /-el-/	Applicative	(d)	/-nɪj-/	Simultaneous
(b)	/-y-/ ~ /-ish-/	Causative	(e)	/-ʊl-/	Inversive
(c)	/-w-/ ~ /-iw-/	Passive			

1.5. Syllable Structure

As far as syllable structure is concerned, the most common surface syllable structure in Kisukuma is CV. The language allows only few CC clusters on the surface. The common ones are NC and CGV. The former are present underlyingly e.g. /n-bula/ => [mbula] "rain" while the latter derive from underlying vowel sequences e.g. /gu-ana/ => [gw-aana] "to cry", /li-ʊli/ => [ly-ʊʊli] "pumpkin". CC clusters of the form NCG also surface in the language, for example /n-kuaβi̯/ => [n-kwaaβi] "fortune seeker". There is no preference for heavy syllables in any position and generally, compared to light syllables (CV), heavy syllables are marked. A heavy syllable with a long vowel (CVV) is syllabified as CVV if both vowels have the same tonal specifications and as CV.V if the vowels differ in their tonal specifications. That is, a sequence of identical vowels counts as one syllable if both vowels have similar tonal specifications, i.e. [σσ] or [σ́σ́], but as two syllables if the two vowels differ in their tonal specifications, i.e. [σ́σ] or [σσ́]. This property is important because it affects the size of the mobile H domain.

1.6. Monosyllabic Roots and Syllabic Consonants

In Kisukuma, as in other Bantu languages, there is a disyllabic minimality requirement on the size of prosodic words. Monosyllabic roots in isolation thus have to be expanded to such an extent that they are at least disyllabic. In verbs, this is achieved by prefixing the infinitive marker [-gʊ-] to monosyllabic roots. This is shown in (6).

(6) a. gʊ-zwa "to sprout from the ground" g. gʊ́ -cha "to die"

b.	gʊ -gwa	"to fall"	h.	gʊ́-lya	"to eat"
c.	gʊ -lwa	"to fight"	i.	gʊ́-ŋwa	"to drink"
d.	gʊ-nya	"to defecate"	j.	gʊ́-pya	"to burn"
e.	gʊ-ja	"to go"	k.	gʊ́-kwa	"to pay dowry"
f.	gʊ-sha	"to grind"	l.	gʊ́-swa	"to spit"

In nominals, monosyllabic roots satisfy the disyllabic minimality requirement on prosodic words by prefixing the noun class marker (cf. 7).

(7)	a.	ma-we	"stones"	j.	mi-zi	"roots"
	b.	ì-zwì	"knee"	k.	lʊ-kwa	"portion of a farm to be cultivated"
	c.	mà-pù	"large intestine"	l.	βa-lwi	"fighters"
	d.	βa-li	"eaters"	m.	ma-gwa	"remains of potato plants"
	e.	βa-ji	"goers"	n.	i-sʊ̀	"bad body odor"
	f.	lʊ-me	"dew"	o.	lʊ̀-kʊ̀	"firewood"
	g.	lʊ̀-shʊ̀	"knife"	p.	mì-gʊ̀	"type of tree"
	h.	gʊ̀-tʊ̀	"ear"	q.	βʊ̀-pù	"small intestine"
	i.	lu-gɪ	"door"	r.	gɪ̀-kʊ̀	"thousand"

There are few cases, however, in which the prefixation of the noun class marker does not help in satisfying the disyllabic minimality requirement on prosodic words. This is common in noun classes 9/10 (N/N). In these noun classes the noun class nasal n- fuses with the first consonant of the nominal root to form a single syllable. In order to satisfy the disyllabic minimality requirement, the noun class nasal becomes syllabic. This is shown in (8).

(8)	a.	ŋ̩-gi	"housefly"	f.	n̩-zi	"root"
	b.	ŋ̩-ke	"wife"	g.	ŋ̩-gʊ	"type of a tree"
	c.	m̩-va	"dog"	h.	ŋ̩-chi	"a dying person"
	d.	ŋ̩-kwi	"dowry payer"	i.	m̩-vɪ	"gray hair"
	e.	m̩-bʊ	"mosquito"	j.	n̩-twe	"head"

When the disyllabic minimality requirement is automatically satisfied as in disyllabic stems, however, the same prefix fuses with the stem initial consonant but it is not syllabic.

Syllabicity of the nasal prefix in these cases is not motivated because it does not contribute in making the stem satisfy the disyllabic minimality requirement. This is shown in (9).

(9) /n-gimu/	=>	[n-gimu] *[n̩-gimu]	"a courageous person"
/n-βula/	=>	[m-bula] *[m̩-bula]	"rain"
/n-taale/	=>	[n-taale] *[n̩-taale]	"big, important person"
/n-kingo/	=>	[n-ghingo] *[n̩-ghingo]	"neck"
/n-gʊkʊ/	=>	[n-gʊkʊ] *[n̩-gʊkʊ]	"baboon"

Notice, however, that disyllabic minimality requirement is actually violated in Kisukuma. This happens when the prefix noun class nasal fails to fuse or to co-exist with the first consonant of the root. In such cases, the prefix nasal simply drops and the monosyllabic nominal root surfaces alone, violating the disyllabic minimality requirement.[3] One such case is provided by nominal roots that begin with a voiceless alveolar fricative [s], postalveolar fricative [ʃ] and lateral approximant [l]

(10) a. /n-sɪ/ =>	[sɪ] *[n̩-sɪ]	"land"	c.	/n-shʊ/	=>	[shʊ] *[n̩-shʊ]	"knives"
b. /n-shɪ/ =>	[shɪ] *[n̩-shɪ]	"fish"	d.	/n-lʊ/	=>	[lʊ] *[n̩-lʊ]	"dust from millet"

[3] Generally, these monosyllabic roots do not reduplicate. Some speakers, however, tend to reduplicate them by double copying the monosyllabic root (e.g. shi "fish" => shi + shi shi "some sort of fish)". These speakers also agree that reduplication in these roots is questionable.

1.7. The Goals and Significance of the Present Study

One of the central tenets of Optimality Theory (Prince and Smolensky 1993) is that constraints are universal and that language variations arise due to different ranking of the universal constraints. Bantu languages, a group of more than 500 languages spoken in East, Central and Southern Africa has attracted the attention of linguists as they provide a rich pool of data on which to test the validity of Optimality Theory (henceforth OT). One area that has attracted the attention of linguists and phonologists in particular is reduplication (Mutaka and Hyman 1990, Downing 1997, 2002, Odden 1996, Steriade 1997, Hyman and Mtenje 1998, Hyman, Inkelas and Sibanda 1998, Inkelas and Zoll 1999, Mtenje 2002 and others).

Two major findings emerge from these studies. First, although phonology plays a role in determining the size of the reduplicant (RED cannot be less than a foot), Bantu reduplication (and probably everywhere else) is essentially a morphological process. In their pioneering work on Kinande reduplication, Mutaka and Hyman (1990) demonstrated that Bantu reduplication tends to "respect" morphemic integrity of the base such that it never splits a morpheme. In a series of important studies, Downing (1997, 1998, 2000, 2001) went further and demonstrated that the widespread tendency of Bantu verbal reduplicants to end with the morphologically empty vowel [-a] can be accounted for if these reduplicants are treated as (canonical) stems themselves. In most recent studies, e.g. Hyman, Inkelas and Sibanda (1998), reduplication is viewed as a morphosyntactic process whereby the reduplicant and base *must* agree in morphosyntactic features or simply as morphological doubling (Inkelas and Zoll (2000)).

As far as tone transfer is concerned, several generalizations have been made in the literature. First, tone transfer in Bantu reduplication is determined by the grammatical category of the base stem: tone is usually transferred in nominal reduplication (nouns, adjectives and numbers) but not in verb reduplication. Second, tone transfer depends on the length of the base stem. If the base stem is monosyllabic or disyllabic, there is no tonal transfer. However, if the base is trisyllabic or longer, tone is usually transferred in the reduplicant. Third, only underlyingly linked tones get transferred in the reduplicant. This implies that floating H tones are not transferred in the reduplicant. As a general goal, therefore, this study is intended to contribute to the discussion regarding the factors that determine the size of the reduplicant in Bantu reduplication, the property of Bantu tone and its interactions with prosodic morphology. By using the same set of constraints that has already been proposed in other Bantu languages to account for Kisukuma tonology and reduplicative processes, this work provides a support for Optimality Theory. The crucial implication here is that different tonal and reduplicative patterns across Bantu languages arise from the different ranking of the same set of universal violable constraints.

The present study also has other theoretical implications: it adopts a specific version of OT known as Optimal Domains Theory (ODT) as outlined in Cassimjee and Kisseberth (1998) to account for Kisukuma tone and its transfer in reduplication. This version of OT is more appealing because the notion of tonal domains captures straightforwardly the tonal divisions and complexities we observe across Bantu languages in both reduplicated and unreduplicated stems (cf. 34). It is shown that, as formulated, ODT can not properly account for the Kisukuma wide domain generated by the mobile H tone because the Kisukuma wide domain is neither bounded nor unbounded-the only two types of wide domains that ODT is designed to handle (cf. §1.8.3.1). The problematic Kisukuma wide domain thus requires special treatment in ODT

The current study also has another implication for the study of Bantu reduplication. It provides evidence that the shape of the reduplicant in Kisukuma, for the most part, is determined by morphological factors rather than phonological factors alone. Drawing examples from both native words and nativized loans, I demonstrate that only when morphological factors fail to determine the shape of the reduplicant, then phonological factors take precedence. This is contrary to previous studies in which only phonological factors were considered and the reduplicant was characterized in prosodic terms, e.g. by reference to foot-, syllable-, and/or moraic structure (cf. Peng 1992). This study thus provides strong support to recent research on Bantu reduplication which has come to recognize the significance of morphological factors in determining the shape of the reduplicant (cf. Mutaka and Hyman 1990; Downing 1999, 2000, Hyman, Inkelas and Sibanda 1998; and Zoll 2000). The morphological view of reduplication in Kisukuma, however, is relevant only in native words and nativized loans. In recent loans where the morphology is opaque, the size of the reduplicant is determined by phonological factors. By recognizing the phonological and morphological factors in determining the size of the reduplicant in native words, nativized loans and recent (unassimilated) loans, it becomes possible to predict the shape of the reduplicant not only in native words and nativized loans but also in future loans in Kisukuma particularly those from English and Kiswahili.

As far as tone transfer in reduplication is concerned, this study shows that none of the accounts proposed earlier to account for tone transfer in Bantu can fully account for the rather surprising Kisukuma data. Contrary to popular approaches that put much emphasis on the length of the stem as the determining factor for tone transfer purposes (cf. Hyman and Mtenje 1999), what matters most in Kisukuma is the location of the sponsoring mora in the unreduplicated mobile H stem. Thus a disyllabic stem [n-zò̲kà] "snake" and a polysyllabic stem like [n-ghungulù̲mè] display the same reduplicative pattern regardless of their length differences, i.e. n-(zo̲ka + zó̲)ka and n-ghungu(lu̲me + kú)ngulume.

This study is the first one that deals with Kinyantuzu sub-dialect. I hope that, it will provide a new source of data on Kisukuma. Moreover, the preliminary phonetic experiment reported in Appendix I provides the first insights into how Kisukuma tone looks like phonetically. It is my hope that this experiment will trigger other detailed phonetic experiments on Kisukuma tone, with a positive effect on our quest to understand the complex nature of tone in Kisukuma.

1.8. Bantu Tonology

Many historical Bantuists agree that Proto-Bantu had two distinctive tone levels namely High (H) and Low (L); see for example, Greenberg (1948), Kähler–Meyer (1967, 1968), Guthrie (1967, 1971) and Meeussen (1967, 1980). These two proto Bantu tones have developed in various ways in different Bantu languages. In some languages like

Kinande (Mutaka 1984, Mutaka and Hyman 1990) and Kihaya (Hyman and Byarushengo 1984), these two tones are maintained. In other languages however, innovations have occurred. In some of these languages, a third tone has emerged, namely an Extra Low tone as in Kisukuma (Richardson 1959, Batibo 1985, 1990) and a Mid tone as in Duala (Mutaka 1993). In some languages like Swahili, Kimakua and Kinyakyusa, tonality has disappeared completely (Coupez 1980) or has been reduced to an accent as in Kinga and Safwa (Odden 1988). In some South African Bantu languages e.g. Tonga, Chichewa, Shona, Zulu and Siswati, depressor consonants have emerged. These depressor consonants donate a Low tone to an adjacent Tone Bearing Unit (TBU). In other languages, downstep and occasionally upstep have developed.

The following tonal processes have been shown to characterize Bantu tonology (Coupez 1980) and (Cassimjee and Kisseberth 1998):

(11) Tonal processes characterizing Bantu tonology

a. The spreading of a High tone. This spreading can be iterative or not. It can also be from left to right (e.g. Kizigua) or right to left (e.g. Tonga and Kikuyu).

b. The shifting or displacement of a High tone. This also can be rightward (e.g. Digo, Makua, Kibondei and Kisukuma) or leftward (cf. Zulu and Holoholo).

c. The spreading or shifting can affect just an immediately adjacent TBU (e.g. Setswana) or it may affect a succession of units (cf. Xitsonga, Kibondei and Digo).

d. OCP effects:

   i. Fusion of adjacent H into a single H tone (e.g. Namwanga)
   ii. Deletion or Lowering of a H tone adjacent to a H tone (e.g. Kisukuma and Chichewa)
   iii. Failure of a High tone to spread if it would yield adjacent H (e.g Kisukuma)

e. A range of effects associated with the final position such as:

i. Failure of a H tone to spread into a final syllable (e.g. Xitsonga)
ii. Failure of a H tone to be realized on a final syllable
iii. Failure of a final H to undergo fusion of Hs.
iv. Retraction of H tone from a final position to penultimate syllable (e.g. Kimatuumbi)

f. Decontouring effects:

i. Raising tone simplification
ii. Falling tone simplification
iii. Plateauing or bridging where HLH surfaces as HHH.

It is worthwhile to note that in many Bantu languages, verbs and nominals pattern differently as far as the contrastiveness of tone is concerned. Diachronically, Bantu verb roots were tonally contrastive only on the root-initial TBU while every TBU of a nominal was tonally contrastive (Guthrie 1971). This explains why syncronically Bantu verb-roots mirror the historical contrastiveness by exhibiting a two-way tonal contrast, with predictable surface H patterns. The syncronic consequence of this property is that everything being equal, any H tone in a Bantu verb-root surfacing on another syllable, apart from the root-initial, is assumed to have been displaced or spread to that position from the root-initial TBU.

That this generalization is sometimes not true comes from the fact that certain tenses and other grammatical morphemes assign grammatical or suffixal floating H tone that can dock into any syllable of the verb stem including the root-initial syllable itself. This may lead to wrong conclusions if it is blindly assumed that the root-initial TBU is the original source of any H in a Bantu verb-stem complex because grammatical morphemes can also be a source of H tones in a verb-stem complex. Studies of Bantu languages showing that certain grammatical morphemes, e.g. tenses, assign a grammatical H tone to some TBUs at a fixed position in the stem (e.g. the initial, the second, the penultimate or final syllable) depending on the tense include Goldsmith (1987) on different Lacustrine Bantu languages like Kihunde, Bukusu, Kihaya, Luganda and Shi; Odden (1988) on Kinga, Safwa, Kibena, Kihehe, Kimatumbi, Kimakua and Kikuria; Hyman and Katamba (1993) on Luganda; Hubbard (1994) on Runyambo and Kikerewe; Hyman and Ngunga (1994) on Chiyao and Hewitt and Prince (1989) on Shona. As I will show in §2.7 certain prefixes, tenses and final inflectional morphemes sponsor a grammatical H tone in Kisukuma that gets associated to different positions in the stem depending on its length.

As far as nominals are concerned, however, H tone contrastiveness need not be limited to root-initial syllable. Instead, every syllable could be a sponsor. It has been shown for example that in Proto Bantu [CVCV] nominal roots, all four logical patterns were attested i.e. LL, LH, HL, HH (Guthrie 1971). This diachronic contrastiveness of nominals is also mirrored in the present Bantu tonal systems: nominal tones are not predictable in Bantu. This unpredictability is compounded by the fact that many Bantu languages have extensively borrowed nouns from other foreign languages like Arabic, English, German, Portuguese, French, Hindi, Afrikaans and others. These borrowed nouns, to some extent, have obscured the historical tonal pattern of Bantu nominals. As a result, nominal tonal patterns in Bantu are generally more complex and obscure that those of verb stems.

1.9. Theoretical Framework

The onset of segmental phonology in mid 1970s as well as the recognition that there are deep connections between tone and other prosodic phenomena improved significantly our understanding of how tone works in Bantu languages. It became clear, for example, that all surface tonal values are not necessary underlyingly present, linking of tone to Tone Bearing Units (TBUs) is not automatic (Pulleyblank 1986) and tones can spread without necessarily being copied. This is the essence of tonal shifting or displacement which can be iterative or not, operating either leftwards or rightwards. It also became clear that many phonological processes are subject to parametrized constraints like the OCP (McCarthy 1986) and Structure Preservation (Kiparsky 1985). These constraints can be active in certain levels of phonology and their effects can be irrelevant in other levels.

In the late 1980s and early 1990s, however, some of the basic tenets of the previous phonological frameworks were being questioned and proved to be explanatorily unsatisfactory. This led to the birth of the most influential phonological theory of the 1990s - Optimality Theory (OT). This is the theoretical framework that will be adopted in the present study. I will adopt a specific version of OT known as Optimal Domains Theory (Cassimjee and Kisseberth 1998) to account for Kisukuma tone and its interaction with reduplication. Optimal Domains Theory (ODT) is very appealing because it accounts for many of the Bantu tonal processes characterized in (11) in a unified and straightforward manner. To account for the shape of the Reduplicant (RED), I will rely on Lexical Conservatism Model (Steriade 1997) and the basic correspondence theory as developed by McCarthy and Prince (1995). In §1.8.1-§1.8.3, I summarize the basic tenets of OT and ODT respectively. Since ODT is less known, my review here will be of considerable length. My purpose here is to give the reader the basic background about the theory as briefly as possible. For more detailed facts about ODT, the interested reader is encouraged to consult Cassimjee and Kisseberth's (1998) original work.

1.9.1. Optimality Theory (OT)

Optimality Theory (OT) was introduced by Prince and Smolensky (1993) mainly as a framework for generative Phonology although it has been applied successfully to a range of syntactic phenomena, semantics and pragmatics. It makes a radical departure from previous models of phonological structure by not posing a derivation based on series of sequential rules that convert an underlying form to an output phonetic form. Instead of deriving surface forms from underlying representations via a serial application of a number of phonological rules, in OT a form is grammatical if it satisfies a ranked set of constraints. The grammar of a language is thus determined by the interaction of a set of constraints. These constraints fall into two classes: markedness (phonotactic) and faithfulness constraints. The former reflects desirable surface properties of individual utterances, such as ease of articulation and acoustic clarity (Hayes 1995, Jun 1994, Flemming 1995, Steriade 1995a, 1995b). The latter class requires exactness between inputs and outputs (Prince and Smolensky 1995). These constraints "are the ones that say that sounds that are crucially present in underlying representations (UR) have contrastive value and the best outputs are the ones that faithfully employ the sounds for the purpose intended (i.e to contrast that word with all other words)" (Kisserberth and Cassimjee 1998).

The novel contribution of OT lies in the idea that these constraints are ranked in a hierarchy of relevance and are violable. So a certain transformation may be licit even if it violates some constraints, provided all alternative transformations lead to more serious constraint violations. Violation of higher ranked constraints counts as more severe than violations of lower ranked constraints. The failure on a transformation (called candidate) is fatal only when there are other competitors that pass it.

The analyst's role in OT is thus no longer to determine what rules apply and in what sequence in a given language, but instead to determine what ranking of these constraints generates the surface phonological patterns of a language. Moreover, these constraints are assumed to be present in all languages. It thus follows that the phonological differences between languages arise by giving some constraints higher priority over others through ranking. In OT that is based on autosegmental phonology, it is assumed that GEN - the OT component that generates permutations of the input can manipulate both autosegments and how they are related to TBUs. It follows that minimally, GEN can add and delete tones as well as extend or reduce the TBUs which bear that autosegment. Cassimjee and Kisseberth (1998) ODT, however, does not rely on autosegmental correspondence in expressing how tones relate to their TBUs. The basic principles of OT are given below:

(12) **Principles of Optimality Theory** (Prince and Smolensky (1993), McCarthy and Prince (1993a, b; 1994).

(a) *Universality*: UG provides a set of constraints that are universal and universally present in the grammar of all languages.

(b) *Violability:* Constraints are violable but the violation is minimal.

(c) *Ranking*: Constraints are ranked on a language-particular basis; the notion of minimal violation is defined in terms of this ranking.

(d) *Parallelism*: Best-satisfaction of the constraint hierarchy is computed over the whole hierarchy and the whole candidate set. There is no serial derivation.

1.9.2. Correspondence Theory.

To account for non-tonal properties of reduplication in Kisukuma, I will rely on Correspondence Theory –an important extension of OT that was introduced by McCarthy and Prince (1995). Briefly, correspondence theory constrains how outputs can vary infinitely from the inputs they are based on by requiring them to be as similar to their inputs as possible. The theory encompasses the family of constraints in (13). Other constraints will be added as the analysis requires them.

(13) Constraint families in Correspondence Theory

a. MAX constraint family:
MAX-BR: Every segment of the base (B) has a correspondent in the reduplicant (RED). There is a violation of MAX-BR for each segment of the base lacking correspondent in the reduplicant, including any prosodic element (McCarthy and Prince 1994a)

MAX-IO: Every segment of the input has a correspondent in the output. This constraint demands total exactness between the input and the output. It thus penalizes deletion.

b. DEP constraint family:
DEP-BR: Every segment of the reduplicant has a correspondent in the base. There is a violation of DEP-BR for each segment of the reduplicant lacking a correspondent in the base, including any prosodic element.

DEP-IO: Every segment of the output has a correspondent in the input. It penalizes epenthesis.

c. IDENT (F) Constraint family:

IDENT-BR: Reduplicant correspondents of a base segment are featurally identical to that Segment. In Kisukuma, like in many other Bantu languages, due to morpheme integrity effects, there is always a featural mismatch between the fixed vowel of the reduplicant and the corresponding vowel of the base.

IDENT-IO: Output correspondents of an input segment are featurally identical to that segment.

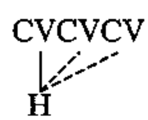
1.9.3. Optimal Domains Theory (Cassimjee and Kisseberth: 1999)

As known today, Optimal Domains Theory (ODT) is a non-autosegmental version of OT that was originally proposed by Kisseberth (1994) in derivational framework to account for tonal patterns in Xitsonga, a Bantu language spoken in South Africa. After the introduction of OT in 1993, the original proposals were incorporated into OT in a series of papers on harmony systems that Kisseberth wrote with Cole (Cole and Kisseberth 1995a, 1995b, 1995c). The version of ODT adopted in this work to account for tone in both unreduplicated and reduplicated forms is the one proposed in Cassimjee and Kisseberth (1998). Below is a brief summary of ODT as outlined in Cassimjee and Kisseberth (1998).

Cassimjee and Kisseberth (1998) provide a compelling account of many of the tonal generalizations characterizing Bantu languages tonology by using Optimal Domains Theory (ODT). Apart from assuming all the basic tenets of Optimality Theory (OT) as outlined above, the Optimal Domains Theory adds one additional ingredient: it assumes that just as segments are organized into domains (syllables), features are also organized into domains. It follows that, for a feature to be pronounced, it must be parsed into a domain. This is to say it is the domain that licenses the feature.

A segment may or may not be specified with a particular feature F in the underlying representation. The segment that is specified with the feature F is called a *sponsor* of F. Crucially, every feature at the surface structure has what Cassimjee and Kisseberth call "a sphere of influence", i.e. a domain. In many cases, this domain extends beyond the sponsoring element itself. This is the hallmark of Bantu tone. In ODT, the feature's spheres of influence (domain) is assumed to be an aspect of the structure of the output candidates. ODT thus does not rely on association lines between the input and the output structures in evaluating faithfulness. As its general goal, therefore, ODT aims at replacing autosegmental representations as a mechanism of expressing the realization of a feature on segments. Consider the representations in (14).

(14) a. Autosegmental Representation b. ODT Representation



$(C\underline{V}CVCV)_H$

In (14a) is an autosegmental representation of H tone spread whereby a H tone spreads two syllables to the right. The H is multiply linked to the three TBUs and each TBU that the H associates with realizes the H tone. In (14b) is an ODT representation. Here no association lines are involved and yet the feature H tone has the potential of being expressed in all moras in the domain. This is possible because the three TBUs are parsed into a trisyllabic H domain (indicated by brackets). The initial TBU in the domain is underlined and is the source of the spreading H. In ODT terms we say that the initial

TBU is a sponsoring TBU. Whether an element is pronounced with the feature H in the domain is determined by the interplay between the preference for feature H to be pronounced and the possibility of constraints banning it from being pronounced. This shows that the F-domain structure and pronunciation are connected but independent. Moreover, the domains in ODT are treated like other prosodic constituents and can be *either* binary or unbounded in size, subject to normal constraints like minimality and nonfinality. ODT also assumes that moras are the only elements that can bear tone. Although High Domains (HDs) are aligned with syllables, this is done just for simplicity's sake and the presence of a consonant in the domain is generally irrelevant. Domain in this work will be indicated by brackets and the sponsoring mora will be <u>underlined</u> as in (14b). Below I review a set of universal constraints that have been proposed to account for Bantu tonological processes.

In the first place, Cassimjee and Kisseberth's (1998) ODT replaces IDENT-IO with a set of faithful constraints. These constraints are given in (15) below:

(15) a. Domain Correspondence (F-sponsor): Abbr. DOMCOR (F)

For every F-sponsor (i.e. segment/mora specified as F) in the input, there is a corresponding F-domain in the output (Cassimjee 1998)

This constraint says that if there is an underlying feature F, then that feature must be expressed. DOMCOR (F) is essential in achieving full faithfulness. Notice however that this constraint does not require that the element that is specified with a feature (F – sponsor) is in the domain. DOMCOR (F) only requires that for every F specification, there must be a unique corresponding domain.

b. INCORPORATE (F-SPONSOR): Every F-sponsor must be in a domain.

c. UNIQUENESS (F-SPONSOR): There is only one F-sponsor in a domain.

c. EXPRESS F: Every element in the F-domain capable of expressing the feature F should express feature F.

d. Basic Alignment Constraints:
   i. BAL: Align the left edge of an F-domain with the left edge of the F-sponsor to which it corresponds.

   ii. BAR: Align the right edge of an F-domain with the right edge of the F-sponsor to which it corresponds.

EXPRESS F is violated when elements in the F-domain can't bear the feature due to some other high ranked constraints. This is the case, for example, in Bantu languages with shifting instead of spreading tonal patterns. BAL and BAR require that no other element than the sponsor itself be in the domain. The former requires that the sponsor be at the left edge of the domain while the latter requires that the sponsor be at the right edge of the domain. BAL and BAR thus prevent a feature from appearing other than on the sponsor (cf. McCarthy and Prince's DEP constraints). When BAL and BAR are ranked high in the grammar of a language, they create monomoraic domains as in Kisukuma fixed H tone. When BAL and BAR are ranked low, H tone spreading or shifting is attested. In ODT, spreading and shifting of a H tone involves a formation of wider domains than are demanded by faithfulness alone (cf. also Bickmore 1996).

The tableau in (16) illustrates how the constraints in (15) generates the optimal candidates by using an example from Setswana, a Bantu language spoken mainly in Botswana. In Setswana, a H tone domain expands by one mora to the right of the sponsor as in (ó̱á)tsamaya "(s)he is walking". MAX has been used to stand for the faithfulness constraints DOMCOR (F), INCOR and EXPRESS F. In Setswana DOMCOR (F), INCORPORATE, EXPRESS F, *MONOHD[4] and BAL are undominated while BAR is dominated by *MONOHD.

16. Candidates	MAX	*MONOHD	BAL	BAR
a. ☞ (<u>ó</u>á)tsamaya				σ (a)
b. (<u>ó</u>átsámáyá)				σσ!σσ (atsamaya)
c. (ó<u>á</u>)tsamaya			*!	
d. (<u>ó</u>)atsamaya		*!		
e. <u>o</u>(á)tsamaya	*!(INCORP)			
f. <u>o</u>atsamaya	*!DOMCOR (F)			
g. (o<u>á</u>)tsamaya	*! EXPRESS F			

Candidate (16b) satisfies *MONOHD and all faithfulness constraints. However, compared to the winner, it fatally violates BAR by there being four syllables between the right edge of the domain and the sponsor. Candidate (16c) is not optimal because it incurs a fatal violation of BAL by having a high domain that expands leftwards instead of rightward. Candidate (16d) is faithful but violates *MONOHD because its HD consists of one mora. Candidate (16e) fails because the sponsor is not in the domain and thus it incurs a fatal violation of INCORP(F). Candidate (16f) looses because it violates the undominated Faithfulness constraint DOM COR, which requires that there must be a HD corresponding to every H specification in the input. The input H specification thus needs to be parsed into a domain. Candidate (16g) fatally violates EXPRESS F because the sponsor does not express the feature (H) tone. The winner candidate, however, violates BAR by only one syllable.

[4] *MONOHD is active in languages like Setswana. In these languages, a H tone spreads one mora to the right (or left) from its sponsor. *MONOHD prohibits H-domains that consist of a single mora as in (16d). This constraint is formally introduced in (18).

1.9.3.1. Narrow and Wide Domain

Cassimjee and Kisseberth (1998) classify Bantu languages into two major groups: languages with narrow domains and those with wide domains. The former group includes languages whose H tone domain does not extend beyond the sponsoring mora. In these languages, the Basic Alignment aspect of faithfulness, i.e. the principle that excludes morae that do not sponsor H tone from being inside a H domain is not violated. The Basic Alignment constraints (BAL and BAR) therefore dominate any constraints whose satisfaction would necessitate incorporating non-sponsors into a High Domain (HD).

Many interlacustrine Bantu languages e.g. Ruciga (Kisseberth and Ndarabasa 1993), Kihaya (Hyman and Byarushengo: 1984) and Kinyambo (Bickmore: 1989) fall into this category. In these languages, a H tone can surface on any syllable in the noun stem, but tone realization is constrained in such a way that only one H-toned syllable can surface in a stem. There is no extension of the H tone onto an adjacent mora. The High Domain (HD) created by the fixed H tone in Kisukuma also falls into this category. As shown in (17), the H does not spread or shift to adjacent moras.

(17) Narrow domain in Kisukuma (Fixed H).

i-gʊ(ní̱)la	"sack"
ma-nu(ú̱)mba	"houses"
ame(é)lika	"America"

1.9.3.2. Wide-domain languages.

When Basic alignment constraints are low ranked in the grammar of a language, a feature F, sponsored by a given sponsor in a domain, can (a) extend its influence from the sponsor to the end of the word, (b) extend its influence from the sponsor to the beginning of the word or (c) extend its influence bidirectionally throughout the word. Many Bantu languages fall into categories (a) and (b). These languages display what Cassimjee and Kisseberth call *wide domains*. The H tones in these languages are not necessarily heard only on the sponsoring mora but may be heard some distance to the right and sometimes to the left. Languages with a wider domain are further subdivided into two basic categories. First are those languages in which a H tone spreads (or shifts) from one mora onto the immediately neighboring mora. This is bounded spreading or shifting and it is usually characterized by bimoraic domains. Second are those languages in which spreading or shifting is iterative. This is unbounded spreading or shifting.

1.9.3.3. Languages with Bounded Spreading (*MONO HD)

Bounded spreading languages are languages in which the H tone spreads or shifts one mora to the right or left of the sponsor to create a disyllabic domain. In ODT terms we say that the high domain expands one mora to the right or left of the sponsor. Cassimjee and Kisseberth (1998) propose that bounded spreading is driven by a constraint they call *MONOHD given in (18) below. *MONOHD is thus the equivalent of Reynold's (1997) MIN-BIN, a constraint requiring that domains be minimally bimoraic.

(18) *MONOHD: A HD should not be monomoraic.

In order to have bounded spreading, *MONOHD must outrank Basic Alignment. This makes the extension of domain onto a mora that is not a sponsor optimal. Kassimjee and Kisseberth (1999:48) consider only languages in which *MONOHD expands the H domain by one mora on the right (cf. Setswana).

(19)	a. go(ɾɛ̱ká)	"to buy"	golema	"to plow"
	b. go(bó̱lá)ya	"to kill"	gotsamaya	"to walk"
	c. (ó̱á)tsamaya	"(s)he is walking"	keatsamaya	"I am walking"

The Setswana examples in (19a-b) consist of a toneless infinitive prefix [go] and a following verb stem. Like in many Bantu languages, the H of the verb stem is associated with the first mora of the verb stem. This is the mora that sponsors a H tone in the underlying representation. In (19c) the H domain initiated by the subject prefix extends through the following [*a*] morpheme. Notice that in all examples the HD that is initiated by the sponsoring mora extends just to the immediately following mora and *not* further to the right. Cassimjee and Kisseberth argue that, in languages like Setswana, the domain extends only one mora to the right because Basic Alignment constraints (BAL and BAR) (cf. 15) dominates any other constraints that might demand wide domains. However, BAR is dominated by *MONOHD. This is to say, it is less important to have a High domain that is not aligned with the right edge of the H-sponsor to which it corresponds than to have a monosyllabic domain. The tableu in (16) represents a wide-domain languages where the high domain is motivated by *MONOHD and the HD *must* be bimoraic.

1.9.3.4 Languages with Unbounded Spreading (Align XR)

Not all wide domains are motivated by *MONOHD as shown above. In some Bantu languages, unbounded spreading (or shifting) of H tone is attested. Cassimjee and Kisseberth (1998) propose that in the latter languages, the wide domain is motivated by an alignment constraint requiring the right (or left) edge of a HD to be aligned with the right (or left) of some prosodic category. This prosodic category can be a prosodic word, prosodic phrase or an intonational phrase (IP). Cassimjee and Kisseberth label this constraint family as ALIGN XR or ALIGN XL where X refers to the prosodic categories already mentioned. If ALIGN XR dominates the member of Basic Alignment (BAR and BAL), perfect alignment is violated in order to obtain domains that end closer to the right edge of a Prosodic Category (PC).

Depending on the prosodic category, ALIGN XR yields a range of results. First, if X in ALIGN XR refers to the prosodic word, domain will extend in an unbounded fashion, but will be circumscribed by the word edge. This is to say, the HD will not cross over into the next word. An example of such a language is Kibondei, a Bantu language spoken in Tanzania. In this language, only one sponsor of H is allowed in the word and the domain initiated by that sponsor extends as far as the penultimate syllable of the word. In (20) are toneless verb stems. In the second column, however, the third person singular prefix [a] sponsors a H tone. Regardless of the length of the base, the tone is realized on the penultimate syllable. Note that Kibondei is a shifting language rather than a spreading language.[5]

(20)	ni-a-ia	"I am crying"	(a̲-a-í)a	"(s)he is crying"
	ni-a-senga	"I am cutting"	(a̲-a-sé)nga	"(s)he is cutting"
	ni-a-bawa	"I am stealing"	(a̲-a-bá)wa	"(s)he is stealing"
	ni-a-vunganya	"I am mixing"	(a̲-a-vungá)nya	"(s)he is mixing"
	ni-a-ambika	"I am cooking"	(a̲-a-ambí)ka	"(s)he is cooking"
	ni-a-fefea	"I am dancing"	(a̲-a-fefé)a	"(s)he is dancing"
	ni-a-digadiga	"I am going here and there looking for something"		

[5] Shifting languages are languages in which the high tone is realized on the rightmost (or leftmost) mora known as a head. Kisukuma is a shifting language. In spreading languages, all moras in a domain express the H tone. Kisukuma, like Kibondei is a shifting language e.g. (βu̲lugú)t-a and not *(βú̲lúgú)t-a

The same extension of the HD through the penultimate syllable is also attested in H-toned verbs:

(21)	ni-a-(bundú)ga	"I am pounding"	ni-a-(kaá)nga	"I am frying"
	i-a-(hagî)a	"I am sweeping"	ni-a-(bindiî)za	"I am finishing"

In Optimal Domains Theory, languages like Kibondei can be accounted for by ranking ALIGN PW R above BAR. More importantly, both constraints must be ranked below a constraint prohibiting a HD from extending to the final syllable of a word. This constraint is given in (22) below.

(22) NON-FINALITY: A final mora cannot be a head of a domain.

The word final here can be a prosodic word or phrase (prosodic or intonational). Phrased differently, this constraint bans the right edge of a HD from being aligned with the right edge of a prosodic word or phrase (prosodic or intonational). The interaction of ALIGN PW R, BAR and NON-FINALITY is illustrated in the tableau below.

23. Candidates	*MONOHD	NON-FINALITY	ALIGN PW R	BAR
a. ☞ (a-vungá)nya			*	**
b. (a-vunganyá)		*!		***
c. (á)-vunganya	*!		***	

The evidence that ALIGN XR in languages like Kibondei refers to a prosodic word and not Prosodic or Intonational phrase comes from words like those in (24). When these words have toneless noun complements, the HD from the sponsor in the verb does not cross the verb boundary to surface on the penultimate syllable of the toneless complement. Instead, the HD extends up to the penultimate syllable of the verb. This is interesting because, in unmarked environments, the verb and its complement in Bantu gather together to form a

Prosodic Phrase. This is evidence that the X in ALIGN XR refers to Prosodic word and not Prosodic Phrase (PP) or Intonational Phrase (IP). Thus, the relevant constraint in these cases is ALIGN PW R.

(24) HD do not cross the word boundary in Kibondei.

(asé)nga nyama	"(s)he is cutting meat"	*(asenga nyá)ma
na(bindií)za kuhanda	"I am finishing planting"	*na(bindiiza kuhá)nda

While in languages like Kibondei ALIGN XR refers to Prosodic word, in other Bantu languages, the alignment is with either the PP or IP. In these languages, HD extends rightward in a unit larger than the prosodic word and thus do not distinguish between ALIGN PP R and ALIGN IP R. One of these languages is Xitsonga, a Bantu language spoken in Mozambique and South Africa. As shown in (25), the HD extends rightward in an unbounded fashion (Cassimjee and Kisseberth 1998: 53). The left-hand column shows toneless verb-stems in the first person present tense while the right hand column shows the corresponding third person plural forms.

(25)	a. ndzati:rha	(vátí:)rha	"I/they work"
	b. ndzatsutsu:ma	(vátsútsú:)ma	"I/they run"
	c. ndzatlomute:la	(vátlómúté:)la	"I/they fish"
	d. ndzixava nya:ma	(váxává nyá:)ma	"I/they buy meat"
	e. dzixava tingu:vu	(váxává tíngú:)vu	"I/they buy clothes"
	f. ndzixava xihlambetwa:na	(váxává xîhlámbétwá:)na	"I/they buy pot"

It is clear from data in (25d-f) that the H tone of the third person subject prefix spreads through the penultimate syllable of the phrase. This shows that in languages like Xitsonga, it is ALIGN PP R, (cf. 26) and not ALIGN PW R that is ranked high enough to have an effect on the selection of the output.

(26) ALIGN PP R: Align the right edge of a H domain with the Right edge of a Prosodic Phrase.

It follows that, if this constraint outranks Align R part of Basic Alignment, a H tone will spread as far as possible toward the right edge of a PP.

Kishambaa, a Bantu language spoken in Tanga, Tanzania, provides another illustrative example of a Bantu language where wide domains are motivated by ALIGN XR where X is larger than a prosodic word. In Shambaa, like in Kibondei, a H tone spreads rightwards in an unbounded fashion from the sponsoring mora (cf. 27). Note that in languages like Shambaa, wide domains can be internal to the word or can occur across word boundaries.

(27) a.		ma-we	"stones"	(nî̱-má)-we	"they are stones"
b.		i-nu	"this"	nyu(mbá̱ î)nu	"this house"
c.	i.	ku-ghoshoa	"to do"	ku-(vî̱-ghóshó)a	"to do them"
	ii.	ku-ghoshoaghoshoa		"to do repeatedly"	
	iii.	ku-(chî̱-ghóshóághóshó)a		"to do it (cl.7) repeatedly"	
d.	i.	za-wa-ghanga		"of the doctors"	
	ii.	nyu(mbá̱ zá-wá-ghá)nga		"houses of doctors"	

In (27a-b), the words *ma-we* "stones" and *i-nu* "this" are toneless. When they are preceded by sponsoring moras from different words, however, they surface with a penultimate H tone. In (27ci, iii), the H tone sponsored by object markers (-vi-) and (-chi-) surfaces on the penultimate syllable of the toneless verb stem *ghoshoa* "to do". In (27d-ii), the toneless complement *za-wa-ghanga* "of the doctors" surfaces with a penultimate H tone sponsored by the second syllable of the preceding word. The

Shambaa data in (27) indicates that ALIGN XR outranks BAR. Moreover, like in Kibondei and Xitsonga, the HD is banned from extending rightwards to include the final syllable by NON-FINALITY, a constraint banning the Right edge of a H domain from being aligned with the Right edge of a prosodic word or phrase (prosodic or intonational).

1.9.3.5. Spreading versus Shifting languages

From the perspectives of tonal movement, Cassimjee and Kisseberth (1998) classify Bantu languages into two groups: spreading and shifting languages. A spreading language is a language in which a single underlying H tone sponsor results in a sequence of H-toned syllables in the optimal candidate. In autosegmental approaches, spreading involves the creation of a multiply-linked H tone by the addition of association lines between a H tone and the following mora. In ODT, however, a spreading language is one with H domains and where Express (H), a constraint requiring that every element in the domain must express the feature H is undominated. On the other hand, a shifting language is one where there is just a single H-toned mora in HD, usually to the right or left of the sponsoring mora. The mora that expresses the H tone is thus not the sponsor. The mora in which the H tone surfaces is referred to as the targeted mora or head.

The dominant account of shifting in Bantu literature involves two rules; spreading and deletion. The first rule spreads the H tone from the sponsoring mora to the targeted mora. The deletion rule follows and it delinks the now multiply-linked H from all moras except the targeted one.

ODT provides two possible explanations for why an element may fail to express a feature F. The first is when the element is not in an F-domain. If the feature is not parsed in a domain, then it cannot be expressed. The second explanation is that the element is in an F-domain but there is some constraint that is ranked above EXPRESS (F), the effect of which is to block the expression of F in that element. To exemplify these explanations, consider the following candidates: (t̲á̲tá)ta and (t̲á̲tá)(ta). In the first candidate, the last syllable is not organized into a domain and thus does not express feature F (in this case a H tone). In the second candidate, however, the last sponsor is organized into a domain (indicated by brackets) but does not express the feature H tone due to some other high ranked constraints, say NON-FINALITY.

From these explanations we see that ODT provides two possible accounts of tonal shifting process in Bantu. In the first account, the HD extends from the sponsor to the targeted mora but there is a constraint that prevents the expression of H on any mora but the targeted one (the head). In the second account, the constraint set bars the sponsor from the domain as well as all the intervening moras up to the targeted mora. Across Bantu, many cases fall into the first account (cf. Isixhosa and Shingazidja). This follows from the fact that INCORPORATE (H-SPONSOR), a constraint requiring that every H-sponsor be in a domain, is ranked high in Bantu.

In ODT, domains are right or left headed and that headedness is correlated with the direction of the expansion of a HD. This is to say, if domains expand rightwards, the domain is right-headed, and if the domain expands leftward, the domain is left-headed. The following constraints are proposed.

(28) *(H, NONHEAD): No express of H on a nonhead.

If *(H, NONHEAD) dominates EXPRESS (H) in the constraint system of the language, then only the head of the domain will realize the feature H. This will represent a shifting language. However, if EXPRESS (H) dominates *(H, NONHEAD), then all moras in the domain will express the H-tone. This represents a spreading language. Spreading or shifting languages can have their domain expanded under the pressure of *MONOHD or ALIGN XR. Setswana and Emakhuwa are examples of spreading languages in which the domain is expanded by *MONOHD.

1.9.3.6. Shifting languages, domain expanded by *MONO HD

Languages in which a wide domain is expanded by *MONOHD, a H tone shifts one mora to the right (or left) but then delinks from the sponsoring mora. Kikuyu, a Bantu language spoken in Kenya, provides an illustrative example of languages in which a wide domain is expanded by*MONOHD (cf. 29). Examples in (29b) and (29c) shows that the shifting process affects both the H on the verb root and the verbal prefix respectively.

(29) Bounded Shifting in Kikuyu (Clements 1984)
(Subject Marker – (Object Marker) – Root – Tense/Aspect)

a.	tʊ-teŋer-agha	"we run"
	tʊ-mʊ-ror-agha	"we look at him/her"
	tʊ-gharaghar-agha	"we roll"
b.	tʊ-mʊ-(tu̱m-á)gha	"we send him/her"
	tʊ-(he̱tʊ́)k-agha	"we go"
	tʊ-(ri̱rí)kan-agha	"we remember"
c.	tʊ-(ma̱-ró)r-aɤa	"we look at them"

Kijita, a Bantu language spoken in Northern Tanzania and extensively studied by Downing (1990), is another example of languages in which the H tone shifts one mora to the right but then delinks from the sponsoring mora. Moreover, in Kijita the H does not spread onto an Intonational Phrase final mora.

(30) Bounded Displacement in Kijita (Downing 1990)
(Subject Marker – (Object Marker) – Root – Tense/Aspect)

a. oku(fwá)	"to die"	d. oku(βó)na	"to see"
b. kumugera	"by the river"	e. oku(βoná)na	"to see one another"
c. oku(fwá kú)mugera	"to die by the river"	f. oku(βoná) i:nyonyi	"to see a bird"

It is apparent from examples like oku(fwá), a word with final H tone, retains its final H on this syllable. However, this H shifts into the first syllable of the following word in IP medial position; thus oku(fwá kú)mugera.

Verbs in Kijita, like in many other Bantu languages, can be either H-toned or toneless. In the high-toned verbs, the H tone docks on the first root syllable (e.g. /oku-(βó)na/. If the sponsor in the Intonational Phrase is penultimate, the H tone will remain on that syllable. Thus the H of the sponsor does not shift onto the final syllable of the IP. However, if the word is IP medial, then the penultimate H of the sponsor will shift one syllable to the right. This is shown by oku-(βó)na vs oku(βoná) i:nyonyi as well as oku-(βó)na vs oku(βoná)na.

As proposed by Cassimjee and Kisseberth, in languages like Kijita, *MONOHD >> ALIGN R but NON-FINALITY >> MONOHD. Also *(H, NONHEAD) >> EXPRESS H. The ranking of these constraints is illustrated in the following tableaux.

31a. Candidates	NON-FINALITY	*(H, NON HEAD)	*MONO HD	BAR	EXPRESS (H)
a. ☞oku(βó)na			*		
b. oku(βo)na			*		*!
c. oku(βóna)		*!		*(na)	*
d. oku(βóná)	*!	*		*(na)	
e. oku(βoná)	*!			*(na)	*

31b. Candidates	NON-FINALITY	*(H, NON HEAD)	*MONOHD	BAR	EXPRESS (H)
a. ☞oku(βoná)na				*(na)	*
b. oku(βó)nana			*!		
c. oku(βóná)na		*!		*(na)	
d. oku(βónáná)	*!	**		** (nana)	
e. oku(βonaná)	*!			**(nana)	**

1.9.3.7. Shifting languages, domains expanded by ALIGN X R

In languages like Kibondei, a H tone gets shifted to the right instead of spreading. In this language, Align XR refers to the prosodic word. Mijikenda, a group of nine "Sabaki" dialects spoken along the Kenyan coast and Northern Tanzania also provide a shifting pattern. In these languages, however, Align XR refers to the Prosodic Phrase and not a Prosodic Word. In Mijikenda, like in Xitsonga, a H tone that originates to the left in the mora surfaces on the penultimate mora. Unlike Xitsonga (cf. 25) where all the moras from the point of origin to the penultimate vowel are H-toned, in Mijikenda only the target mora (penult) is H-toned.

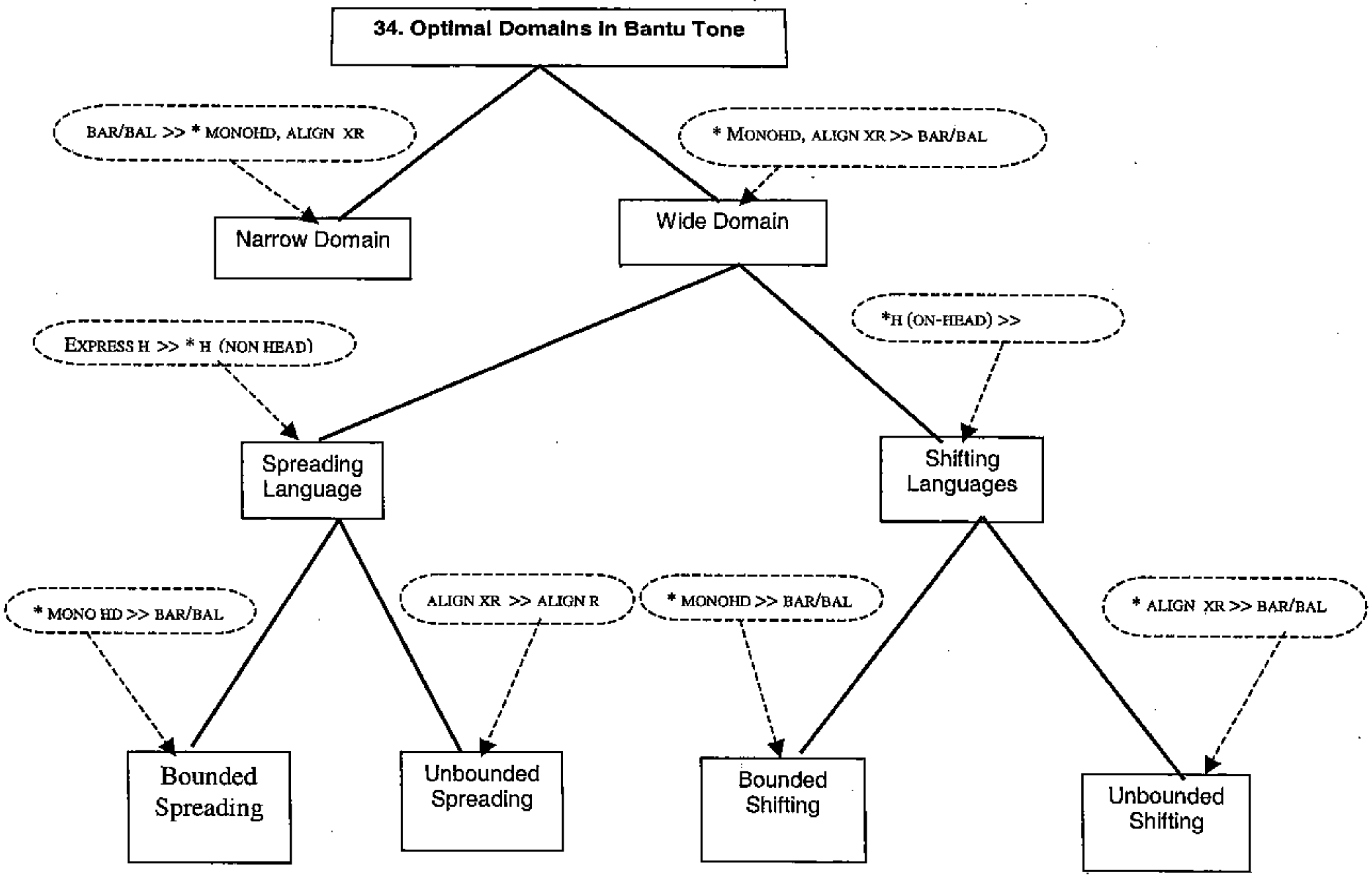
(32)	ninarima	(yunarí)ma	"I/he cultivate"
	ninagula	(yunagú)la	"I/he buy"
	ninalamusa	(yunalamú)sa	"I/he greet"
	ninavumikiza	(yunavumikí)za	"I/he agree"

ninagula nyama	(yunagula nyá)ma	"I/he buy meat"
ninalamusa muganga	(yunalamusa mugá)nga	"I/he greet doctor"

In languages like Mijikenda, NON-FINALITY outranks ALIGN PP R. This explains why the displaced H does not target the final mora but penult instead. Also ALIGN PP R outranks BAR. This enables the H to shift across word boundaries. Moreover, *(H, NONHEAD), a constraint banning the realization of H on nonhead mora, is ranked above EXPRESS (H). This is why only one H is realized in the HD and this H must be realized on the head of the domain. This ranking enables the domain to be as wide as possible but the H tone is only realized on the rightmost mora that is the head of the domain. This results in gross violation of EXPRESS (H). These observations are illustrated in the tableau below.

33. Candidates	NON-FINALITY	*(H, NON-HEAD)	ALIGN PP R	EXPRESS (H)	ALIGN R
a. ☞ (yunalamusa mugá)nga			*	******	******
b. (yunalamú)sa muganga			**!**	***	***
c. (yú)nalamusa muganga			**!*****		
d. (yúnálámúsá múgá)nga		*!*****	*		*****
e. (yunalamusa mugangá)	*!			*******	*******

From this discussion, the Optimal Domains in Bantu can be schematized as follows:


34. Optimal Domains in Bantu Tone
BAR/BAL >> * MONOHD, ALIGN XR
Narrow Domain
* MONOHD, ALIGN XR >> BAR/BAL
Wide Domain
EXPRESS H >> * H (NON HEAD)
Spreading Language
*H (ON-HEAD) >>
Shifting Languages
* MONO HD >> BAR/BAL
Bounded Spreading
ALIGN XR >> ALIGN R
Unbounded Spreading
* MONOHD >> BAR/BAL
Bounded Shifting
* ALIGN XR >> BAR/BAL
Unbounded Shifting

1.9.3.8. The OCP in ODT

In general terms, the Obligatory Contour Principle (OCP) forbids sequences of adjacent identical feature matrices in phonological representation

(35) The Obligatory Contour Principle
*FF, where F is a feature matrix.

As formulated, the OCP requires, for example, that the successive H-toned syllables be represented with a single tone and not with two or more tones in a row. It is a strong restriction on phonological representation. As shown by McCarthy (1986), the OCP functions as a constraint on morphemes in Arabic, Chaha (an Ethiopian-Semitic language spoken in Ethiopia) and other languages. In these languages, successive identical elements of morphemes must be represented in the form of a single multiply-associated feature matrix. The OCP also can block the application of any phonological rule that would lead to its violation. As shown by Clark (1986), vowel harmony is blocked in Zulu if it would lead to a sequence of identical representations. The OCP also can motivate operations that correct its violations. The common process of this nature in Bantu tone is the deletion of a high tone next to another high tone. This process converts a representation that violates the OCP into one that is consistent with it. In fact, many dissimilation rules like Dahl's Law and Grassman's law in Indo-European seem to be motivated by the OCP. Furthermore, the fusion of a sequence of two elements (e.g., two H tones) into a single multiply-linked feature matrix (cf. Leben 1978, Kenstowicz and Kidda 1985) is also motivated by the OCP.

In ODT, the OCP is actually a constraint family, the principle members of which are given in (36).

(36) NO ADJACENT DOMAIN EDGES.
Two domains may not be adjacent to one another i.e *( )( ).

Although there is abundant evidence to establish NO ADJACENT EDGES as an active constraint family accounting for many of the OCP effects prevalent in the autosegmental literature in Bantu, there are many cases in which NO ADJACENT EDGES fails to constrain the extension of High Domain (HD). Some of these cases are provided by Emakhuwa (37a), Kijita (37b-c) and Shambaa (37d) examples below.

(37) a.	u(kúmá)(ání)hera	"to cause two things to meet"
	u(hókó)(lyáá)niha	"to go and return the same day"
	u(lókó)(ttání)ha	"to pick up several things"
	u(móngó)(nyólá)	"to break something off"
b.	(takú)gwa	"(s)he is not falling"
	a(takú)liya	"(s)he is not paying"
	a(takú)goso:ra	"(s)he is not unweaving"
c.	a(takú)(lyá)	"(s)he is not eating"
	a(takú)(βó)na	"(s)he does not see"
	a(takú)(si:ndí)ka	"(s)he is not pushing"
d.	ni-o(n-ïyémá)(k!ú)i	"I saw dogs"
	ni-o(n-ïyényú)(mb!á)	"I saw the house"

In Emakhuwa examples in (37a), a primary H tone is placed on the first and the third mora of the verb stem. The first primary H tone spreads onto the following vowel even though this violates NO ADJACENT EDGES by creating adjacent H domains.

In Kijita examples in (37b), the HD shifts from the [ta] through the following prefix [ku]. In (37c), the HD initiated by [ta] still extends to the syllable [ku] regardless of the fact that there is a following HD (with a high pitch) thereby violating the NO ADJACENT EDGES. In Shambaa examples in (37d), a HD triggered by a high ranked Align XR extends rightward even if this leads to violation of NO ADJACENT EDGES.

1.9.3.9. The motivation for NO ADJACENT SPONSORS.

In some Bantu languages in which NO ADJACENT EDGES is not active, a more restricted version of NO ADJACENT EDGES has been proposed. This is given in (38)

(38) NO ADJACENT SPONSORS: [*µ)(µ]

NO ADJACENT SPONSORS, like NO ADJACENT DOMAINS, prohibits adjacent domains but just when the domain edges separate two sponsors (indicated by underlined morae). Emakhuwa is a Bantu language that has been cited to show the inactiveness of NO ADJACENT EDGES and the activeness of NO ADJACENT SPONSORS. As we will see in §2.3.3, Kisukuma also provides good evidence for motivating NO ADJACENT SPONSORS instead of NO ADJACENT DOMAINS.

1.9.4. Non-finality

As it was briefly demonstrated in §1.8.3.4, NON-FINALITY effects are common in Bantu languages. These effects can be observed independently of whether a language has narrow, binary or wide domains, and independently of whether it is a shifting or a spreading language. The most common effect of NON-FINALITY are cases in which a HD fails to extend onto the final mora. What needs to be stressed here is that Nonfinality in ODT is actually a constraint family. Members of this family may constrain (a) how wide domains may be, (b) whether there is a domain at all, and (c) whether a H tone is expressed in a domain. Members of this family may refer to the Prosodic Word, Prosodic Phrase and Intonational Phrase.

(39) NON-FINALITY (HD)
The Right edge of a HD may not be aligned with the Right edge of X, where X may be any of the following: Prosodic Word, Prosodic Phrase, Intonational Phrase.

If NON-FINALITY (HD) dominates ALIGN XR OR *MONOHD, then it will block the extension of domains in response to the need to satisfy BAR or *MONOHD. In Kibondei, for example, NON-FINALITY PW (HD) member of NON-FINALITY (HD) is crucially ranked above ALIGN PW R. This explains why, when a sponsor in subject position is followed by a toneless verb stem, the HD will extend only to the penult of the word. The same NON-FINALITY effects are observed in Kishambaa.

In other Bantu languages like Xitsonga, the relevant NON-FINALITY constraint is NON-FINALITY PP. This is shown in (40).

(40) a. ǹdzixavela xiphukuphuku fo:le "I am buying tobacco for the fool"
b. (vá̠xávélá xíphúkúphú)ku fo:le "they are buying tobacco for a fool"

The data in (40) shows that in Xitsonga double object constructions, the verb and the first object form a separate prosodic phrase from the second object. The HD thus extends only as far as the penultimate mora of the first object.

NON-FINALITY also can motivate final-H retraction as in Ruciga, a Bantu language spoken in Uganda. If the stem has a final H in Ruciga and if the stem appears in phrase final position, the H tone retracts to the penultimate syllable in a bid to avoid a violation of NON-FINALITY.

(41)	én-ku	"firewood"	ei-pápa	"wing"
	oru-kagáte	"sp. plant"		

With this background about ODT, we are now at a position to introduce and discuss Kisukuma tone in the next chapter.

CHAPTER TWO
KISUKUMA TONE

2. Introduction

In this chapter I lay down the basic descriptive facts regarding Kisukuma tonology. I will then highlight its controversial aspects, review the basic literature and finally provide an ODT analysis of some of the facts raised. I note here that it goes without saying that the tonal phenomena to be accounted for in this study represents only aspects of Kisukuma tonology. I thus make no claim of complete analysis of Kisukuma tone in this work. I will cover only those aspects that have direct consequences in reduplication. The analysis presented here is thus incomplete. An interested reader can find more information on Kisukuma tone in Batibo (1985, 1990, 1991), Sietsema (1989), Richardson (1959, 1960), Roberts (1992), Idsardi and Punell (1995) and Kang (1997). Notice, however, that none of these studies is based on the sub-dialect discussed here (Kinyantuzu). Many of these studies are based on Batibo's dialect (gemunangweeli - Northern dialect) as outlined in a series of papers already mentioned and his 1985 dissertation; and Richardson (1959) whose data is based on one informant from Maswa district (possibly a speaker of gemunadakama - the Southern dialect). Although Kinyantuzu shares the basic tonal properties with other Kisukuma dialects, some differences do occur. Kang (1997), for example, argues that the syllable is the TBU in Kisukuma nominals but mora is the TBU in verbs. Thus gu-(go̱kó)ola "to scoop into a net" but i-(go̱kooló) "a scoop net" in nouns. Kang then generalizes that in verbs the mora counts as a Tone Bearing Unit but not in nominals , and he uses this generalization as evidence to motivate a metrical analysis. In Kinyantuzu, however, such a difference between verbs and nominals is hard to find. Thus gʊ-(gokoolá) "to scoop into a net" and its nominal counterpart i-(gokooló) "a scoop net" have the same domain in Kinyantuzu.

2.1. Kisukuma tone

Kisukuma has been shown to have High (H), Low (L) and Extra Low (XL) tones. Regarding the H tone, two types have been identified: Fixed and Mobile H. The same tonal categories are also evident in Kinyantuzu. In this study, Extra Low tone will be marked by a grave accent (`) like in (1c). Following Cassimjee and Kisseberth (1998), I will refer to the syllable from which any type of H tone originates as a sponsoring syllable. As a visual reminder, all sponsoring moras in this work will be underlined and whether a mora is a head (i.e. is pronounced on a H tone) will be indicated by an accute accent (´) like in (1a). Normal L tones will not be marked as in (1b). Moreover, tonal high domains will be shown in brackets whenever possible.

(1)	a.	sók-a	"soccer"
	b.	sok-a	"type of fish"
	c.	sòk-à	"go very far"

2.2. Mobile High (MH)

The interest of Kisukuma tone centers around its mobile H. This tone is displaced or shifts two syllables to the right from its original TBU if it is within the same word. This is shown in the following examples.

(2) a. (βa-gʊ-gʊ́)-(βon-el-á)
3rd pl-FT-you-see-ben-FV
"they will see for you

b. a-gʊ-gʊ-(βon-el-á)
3rd sg-FT-you-see-ben-FV
"he will see for you"

c. a-gʊ-gʊ-sol-el-a
3rd sg-FT-you-choose-ben-FV
"he will choose for you"

In (2a), the mobile H that originates from the 3rd person plural morpheme /βá/ moves two syllables to the right to surface on the 2nd person singular object marker /-gʊ-/. Likewise, the mobile H that is sponsored by the verb root /βón-/ "see" is displaced two syllables to the right to surface on the final vowel of the entire verbal complex [-a]. Example (2b) shows that the third person singular marker /-a-/ does not have an inherent tone, and indeed, the mobile H associated with this morpheme in (2a) have shifted from a preceding morpheme (the third person plural βa). Likewise, (2c) shows that the final vowel of the verb complex [-a] does not have a H-tone of its own.

As shown in (2a), affixes can also sponsor a H tone. Subject and object agreement prefixes for noun classes 1 and 2 that sponsor a H tone are given below.

(3) Subject agreement markers for noun classes (1) and (2)

a.	(**na**-gʊ-chá)gʊl-a	"I will choose"	d.	(**m**-gʊ-chá)gʊl-a	"**you** (pl) will choose"
b.	(**ʊ**-gʊ-chá)gʊl-a	"**you** will choose"	e.	(**dʊ**-gʊ-chá)gʊl-a	"**we** will choose"
c.	**a**-gʊ-chagʊl-a	"**he** will choose"	f.	(**βa**-gʊ-chá)gʊl-a	"**they** will choose"

As can be seen in (3), all the pronominal agreement markers except the third person singular /-a-/ sponsor a H tone. Notice, however, that this tonal contrastiveness among subject markers is neutralized in the /-ga-/ past tense and all of them surface with a Low tone (cf. 4).

(4) Past tense -ga-: All pronominal agreements have a low tone.

a.	na-ga-chagʊl-a	"I chose"	d.	m(u)-ga-chagʊl-a	"you (pl) chose"
b.	ʊ-ga-chagʊl-a	"you chose"	e.	dʊ-ga-chagʊl-a	"we chose"

c.	a-ga-chagʊl-a	"he chose"	f.	βa-ga-chagʊl-a	"they chose"

Regarding the object agreement markers for Class 1 and Class 2, only the plural ones sponsor a H tone (cf. 5). The H tone sponsored by object markers moves only one syllable to the right instead of two as expected (see the ungrammatical i.e.,* examples in 5). Notice also that the H tone in these forms display the same pattern even when the past tense [-ga-] is involved.

(5) Only plural object markers sponsor a H tone. HD always disyllabic.

a.	a-gʊ-**ni**-chagʊl-a	"he will choose **me**"	
b.	a-gʊ-**gʊ**-chagʊl-a	"he will choose **you**"	
c.	a-gʊ-**n**-chagʊl-a	"he will choose **him**"	
d.	a-gʊ-(**dʊ̲**-chá)gʊl-a	"he will choose **us**"	*a-gʊ-**do̲**-chagʊ́l-a
e.	a-gʊ-(**m̲**-chá)gʊl-a	"he will choose **you (pl)**"	*a-gʊ-(**m̲**-chagʊ́)l-a
(f).	a-gʊ-(**βa̲**-chá)gʊl-a	"he will choose **them**"	*a-gʊ-(**βa̲**-chagʊ́)l-a

Certain tenses as well as word final and other final inflectional morphemes also sponsor H tones in certain contexts. This is briefly discussed in §2.7.

2.3. High Tone Displacement across Word Boundaries

The mobile H displacement process occurs not only within a word, but also across word boundaries. When the mobile H is sponsored by the penultimate or final mora, its target mora is determined by the grammatical category of the following word. Thus, its target is not always the second syllable from the sponsoring mora. Consider the examples below.

(6) a. n-dugʊ̲ á-gʊ-sol-a (cf. a-ga-sol-a)
9-relative 3rd sg-FT-choose-FV
"the relative will choose"

b. n-dugʊ̲ n-som-î (cf. n-sɔm-i)
9-relative 9-read-FV
"an educated relative"

c. a-ga-βon-a ma-hágala
3rd sg-PT-see-FV CL6-tree fork
"he saw tree forks"

d. n-tem-i sagâla (cf. sagala)
9-chief useless
"useless chief"

As shown by (6a), when the following word is a verb, the mobile H surfaces on the initial mora of the verb stem complex. However, when the following word is not a verb (e.g. a noun or adjective), the mobile H always skips the noun class morpheme and lands on the second TBU of the following noun or adjective. In such cases, it moves two or three moras to the right depending on its underlying location (cf. 6b and 6c respectively). In Kisukuma, everything being equal, noun class markers are treated as extraprosodic as far as the rightward mobile H displacement is concerned.

When the following noun or adjective has a definiteness marking preprefix, however, the further movement of the mobile H to the right is blocked. Example (7) is similar to (6c) except that the former has a definiteness marking preprefix. This is generally true across all noun class markers in Kisukuma.

(7) a-ga-βon-a á-ma-hagala cf. *a-ga-βon-a a-ma-hágala
3rd sg-PT-see-FV PPF-CL6-tree fork
"he saw the tree forks"

2.4. Blocking Effect of the Sponsoring Mora

Another interesting property of the sponsoring mora is its blocking effect. It prevents any mobile H originating with a preceding mora from appearing on the sponsoring mora itself or drifting further to the right. This is to say, a mobile H originating from a leftward sponsor cannot shift to or across a rightmost sponsoring TBU even if the H sponsored by the rightmost TBU has drifted further to the right. In (8a), for example, the mobile H of the 3rd pl. /βá̱-/ cannot move to the root initial vowel [βó̱n-] because the latter is a sponsor although now its mobile H has drifted two moras to the right. As a result, the mobile H of the former moves only one mora to the right instead of two as expected. In (8b), the second word [βa-tè̱mì̱] "chiefs" is a noun and the high tone from the first word would be expected to appear on the second syllable [-te-]. However, this mora happens to be a sponsoring mora itself and it thus blocks the rightward expansion of the mobile H domain initiated by a preceding morpheme. As a result, the displaced H from the preceding word appears on the first syllable (the noun class marker).

(8) a. βa̱-gʊ́-βo̱n-el-á — *βa̱-gʊ-βó̱n-el-á (cf. βa̱-gʊ-sól-el-a)
3rd-FT-see-ben-FV)
"they will see for them"

b. a-ga-βo̱n-a βá-te̱mi̱ βa-táále — *a-ga-βo̱n-a βa-té̱mi̱ βa-táále
he-PT-see-FV CL2-chief CL2-big
"he saw big chiefs"

Even more striking is the case where a sponsoring mora is immediately followed by another sponsoring mora. When two or more sponsoring moras occur in a sequence, only the H tone sponsored by the rightmost sponsor shows up two syllables to the right of the sponsor. In (9), only one H tone is realized, two syllables to the right of the rightmost sponsoring mora.

(9) a-gʊ-βa̱-βo̱n-el-á — *a-gʊ-βá̱-βo̱n-el-á
he-FT-they-see-ben-FV
"he will see for them"

When two sponsoring moras occur in sequence across word boundaries, the same high tone deletion occurs. In (10), the last mora of the first word and the initial mora of the second word are both sponsoring moras. Only one H tone is realized two moras to the right of the second sponsoring mora.

(10) βa-dugʊ̠ βa̠-gʊ-sól-a
CL2-relative they-FT-choose-FV
"the relatives will choose"

2.5. Extra Low Tone

When a sponsoring mora is followed by fewer than two moras in a word or phrase, there are not enough target moras on which the sponsored H can successfully land. In this case the mobile H surfaces extra lowered. In (11a), a mobile H is sponsored by the final syllable and it surfaces as an Extra Low tone (indicated by a grave accent (̀). As shown by (11b), the same pattern is attested when the mobile H is originally associated with a penultimate mora. In this case, the final two moras come out extra lowered. Example (11c) shows that when more than one mobile H sequentially occurs within the same morpheme, *only* the final two moras come out as extra low provided that there are not enough moras on which the mobile high domain (usually trisyllabic) can be realized. Example (11d) shows that the extra lowering process does not affect mobile Hs that themselves have been shifted to the penultimate or final moras from preceding sponsors.

(11) a. βa-dugʊ̠̀
CL2-relative
"relatives"

b. gʊ-βɔ̠̀n-à
inf-see-FV
"to see"

c. n-ku̱ŋgu̱lù̱mè
CL9-rooster
"rooster"

d. go-βo̱n-el-á *go-βo̱n-el-à
inf-see-ben-FV
"to see for them"

In Kisukuma, a phonemic distinction does exist between the normal Low and Extra Low tones. This is to say, there are perfect minimal pairs in the language whose only difference is the Extra Low tone. These minimal pairs are given in (12).

(12) Normal Low tone vs. Extra Low tone (Minimal Pairs)

	Low	Gloss	Extra Low	Gloss
a.	ŋʰolo	"sheep"	ŋʰò̱lò	"heart"
b.	nda	"stomach"	ndà̱	"lice"
c.	gʊ-lula	"to cool"	gʊ-lù̱là	"to whistle"
d.	gʊ-lʊka	"to weave"	gʊ-lʊ̱̀kà	"to vomit"
e.	gʊ-loβa	"to become wet"	gʊ-lò̱βà	"to fish"
f.	gʊ-sula	"to quench thirsty"	gʊ-sù̱là	"to wash clothes"
g.	ŋgoko	"tree forks"	ŋgò̱kò	"chicken(s)"
h.	nyama	"meat"	nyà̱mà	"bring back the animals"
i.	gʊ-pala	"to growl"	gʊ-pà̱là	"to clear, to weed"
j.	gʊ-ʊβa	"to peel (with teeth)	gʊ̱̀-ʊ̱̀βà	"to take shelter from rain/sun"
k	gʊ-kaanda	"to fill hole"	gʊ-kà̱andà	"feel with fingers"
l.	gʊ-βiimba	"to thatch the roof"	gʊ-βì̱ìmbà	"to swell"
m.	gu-kala	"to rest"	gu-kàlà	"to push against each other"
n.	gʊ-lʊʊnja	"to heal (wound)"	gʊ-lʊ̀ʊ̀njà	"to engage"
o.	gʊ-laamba	"to be scarce"	gʊ-lààmbà	"to lick"

Probably the Extra Low tone is the most controversial aspect of Kisukuma tone and the most poorly understood one. In the Kinyantuzu sub-dialect for example, it needs a trained ear to explicitly differentiate tokens with normal Low tone from those with Extra Low tone particularly in the near minimal pairs. When I started investigating this property, it was sometimes difficult for me to differentiate between the two tones even in the perfect minimal pairs like those in (12). To be sure that extra low tone is attested in the Kinyantuzu sub-dialect, preliminary phonetic experiments were conducted. The experimental findings seems to indicate that the extra low tone is also attested in Kinyantuzu. See Appendix I for a preliminary experimental report about this issue and the general phonetic characterization of Kisukuma tone.

2.6. Fixed H Tone

Kisukuma tone is also characterized by a fixed H. Morphemes containing a fixed H have a fixed tonal contour regardless of the syntactic, morphological or phonological contexts they appear in. Unlike the mobile H tone, the H in (13) is not sponsored by preceding moras and it is always realized on the sponsoring mora itself. The ungrammatical (*) examples in (13a) and (13b) respectively show that the fixed H does not get extra lowered even when it occurs utterance finally, and that it is not affected by the tonal displacement phenomenon.

(13) a.	talá̲	"lamp"	b.	talá̲ nhaale	"big lamp"
	*talà̲			*tala̲ nhaalé	

Like the mobile H, the fixed H also forms a domain that is opaque to the rightward displacement of the mobile H from preceding sponsors. In fact, a mobile H cannot move closer to the fixed H by fewer than two moras. This is to say, the two have to be separated by at least one mora. In (14a) the mobile H tone sponsored by the verb [βó̲n-a] "see" can not be displaced to the first syllable of the following word [talá] "lamp" because this will place a mobile H and a fixed H adjacent to each other i.e *[tálá̲]. Generally, the sequence of two H tones is not allowed in Kisukuma due to Meeussen's rule (Goldsmith 1984). Kisukuma employs two mechanisms to avoid HH sequences. The first is that whenever two H tones occur adjacently (regardless of whether these tones are fixed or mobile), one H, usually the leftmost, is deleted. Second, if deletion of the leftmost (H) does not happen, the rightmost H is downstepped as shown in (14b). The latter mechanism is most common across word boundaries while the former is common word internally. As I will show in Chapter 4, OCP however is systematically violated in recent loans.

(14) a. a-ga-βon-á talá̲ *a-ga-βɔn-a tálá̲
3rdsg-PT-see-FV lamp
"he saw a lamp"

b. a-ga-βon-á !gáá̲li *a-ga-βon-á gáá̲li
3rdsg-PT-see-FV car
"he saw a car"

2.6.1. Triggering Effects of the Non-final Fixed H tone

It has also been argued that the fixed H triggers a mobile H on the following neighboring mora (Batibo 1991). In (15d-f), for example, the H associated to the adjective [ma-taalɛ] "big" which is toneless in isolation is sponsored by the final moras of the preceding nouns ma-gʊ(nî)(là) "sacks", ma-(sháá)(dî) "shirts" and igɔ(ngɔ́)(lî). The moras immediately following the fixed H become sponsors by virtue of being preceded by a fixed H. Since there are not enough syllables for the trisyllabic high domain to be realized, the mobile H triggered by the fixed H surfaces as an extra low tone.

(15) Fixed H triggers a Mobile H on the following Mora

a.	ma-gʊníla	"sacks"	d. ma-gʊníla	ma-táalɛ	"big sacks"
b.	ma-sháádi	"shirts"	e. ma-sháádi	ma-táalɛ	"big shirts"
c.	i-gongóli	"millipede"	f. i-gongóli	taalɛ́	"big millipede"

2.7. Tense Markers and Final Morphemes

Tense markers and verb-final morphemes usually do not sponsor a H tone. However, some tenses and final inflectional morphemes sponsor a H tone. These sponsors include the habitual tense negative markers [–da–] (cf.16b), the distant future tense marker [-laa-] (cf. 16c) as well as word the final subjunctive markers [–e–] (cf.16d-g). Consider the following examples.

(16) a. a-gʊ-som-a
he-FT-read-FV
"he will read"

b. a-(da-só)m-a-ga
he-neg-read-FV-habitual
"he never reads"

c. a-(láá)-som-a
he-C-FT-read-FM
"he will read"

d. a-(sóm-e)
he-read-(sub)junctive
"let him read"

e. a-som-(él-e)
he-read-APL-sub
"let him read for/with"

f. a-som-(á-nɪj-e)
he-read-FV-ST-sub
"let him read simultaneously"

g. a-som-(él-a-nɪj-e)
he-read-APL-FV-ST-sub
"let him read for simultaneously"

In (16a), the verb stem is preceded by a toneless infinitive marker [gʊ-] and no H tones appear on the surface because neither the verb stem nor the suffixes sponsor a H tone. Example (16b) involves a present tense habitual negative marker [-da-]. This morpheme sponsors a H tone. Surprisingly, its mobile H drifts only one syllable to the right instead of two syllables as expected. In (16c), the distant future marker [láá] is H-toned. However, this H does not drift further to the right. This shows that the distant future H is fixed and thus does not move. In (16d), the mobile H that is sponsored by the word final subjunctive marking morpheme is retracted one mora to the left and is pronounced on the initial mora of the verb root [som-a] "read". Examples (16e-g) are very interesting. They show that the mobile H sponsored by the word final subjunctive marker will continue to drift further to the left as far as it can. Notice, however, that this leftward shifting does not go as far as to include the initial mora of the verb root. This is unusual because the initial mora of the verb root is indeed the canonical sponsor of H tones in Bantu and there is no reason to explain why it can not be a target of the leftward tonal shifting. It seems that by drifting leftwards, the mobile H in the forms wants to be associated with the root morphemes.

2.8 Monosyllabic Verbs

Monosyllabic verb-roots, like disyllabic and polysyllabic verb roots are either H-toned or toneless. They always surface preceded by a toneless infinitive marker [gʊ-] in isolation (cf. 17). In the H-toned stems, however, the H tone that is sponsored by the mora of the stem retracts one syllable to the left to surface on the prefixed infinitive marker [gʊ-] (cf.17a-f). Monosyllabic verbs thus display the same tonal pattern like those with final morphemes that sponsor a H tone e.g. subjunctives.

(17) Monosyllabic verbs.

a.	(gʊ́-ch-a)	"to die"	g.	gʊ-zw-a	"to sprout from the ground"
b.	(gʊ́-ly-a)	"to eat"	h.	gʊ-gw-a	"to fall"
c.	(gʊ́-ŋw-a)	"to drink"	i.	gʊ-lw-a	"to fight"
d.	(gʊ́-py-a)	"to burn"	j.	gʊ-sh-a	"to grind"
e.	(gʊ́-kw-a)	"to pay dowry"	k.	gʊ-j-a	"to go"
f.	(gʊ́-sw-a)	"to spit"	l.	gʊ-ny-a	"to defecate"

2.9. The Status of Mora as a TBU in Kisukuma

Apart from the extra low tone, there is another major twist in Kisukuma tone that makes any uniform analysis difficult. This is the status of the mora as a TBU in the language. It has been repeatedly suggested in the literature that the status of mora as a TBU in Kisukuma is determined by the grammatical category of a word (cf. Richardson 1959, 1966, 1971 and Kang 1997). In nominals (nouns, adjectives and numbers), the mora does not count as a TBUs. In verbs, however, moras count as TBUs. The evidence for this grammatical-determined division of the status of moras comes from the behavior displayed by the mobile H. When a long vowel immediately follows a sponsoring mora in the same word, the H tone falls on the initial mora of the long vowel if the word is a verb (cf. 18). If the word is a nominal, however, the H tone drifts further to the right, surfacing associated to the mora of the next syllable. The relevant generalization here is that the mobile H tone appears two syllables to the right of the sponsoring mora *only* in nominals but not in verbs. The most often cited example to support this generalization is given in (18) (cf. Kang 1997).

(18)	a.	gʊ-(gokó)ola	"to draw in a scoop net"
	b.	i-(gokooló)	"a scoop net"

In (18) is a cognate verb-noun pair. For both categories the initial mora of the stem is a sponsoring mora. What is interesting is that the position of the surface H tone differs. For the verb [go-gokóola] "to draw in scoop net" the H tone surfaces on the initial mora of the long vowel. For the noun [i-gokooló] "a scoop net", however, the H tone appears on the syllable after the long vowel. It is observations like this that have been used to motivate the use of metrical analyses in accounting for Kisukuma tonology (cf. Sietsema 1989, Idsardi and Punell 1995, Idsardi 1996 and Kang 1997).

I must insist here that the dialect discussed in this study (Kinyantuzu) does not provide strong evidence to support this much-publicized grammatical-determined division of the status of the mora between verbs and nominals. It seems that regardless of the grammatical category of the word in the Kinyantuzu sub-dialect, the mobile H target is the same, i.e. two syllables to the right. This is shown in (19) (for illustrations, [-] indicates morpheme boundaries while [.] represents syllable boundaries)

(19)	a.	gʊ-(go.koo.lá)	"to draw in scoop net"	*gʊ-(gokó)ola
	b.	i-(go.koo.ló)	"a scoop net"	
	c.	gʊ-(ko.moo.lá)	"to unplug (pegs)"	*gʊ-(ko.mó)o.la
	d.	lʊ-(ko.moo.l-ó)	"very powerful love medicine"	
	e.	gʊ-(sɪɪ.nzɪ.lá)	"to slaughter for"	*gʊ-(sɪɪnzí)la
	f.	i-(sɪɪ.nzɪ.ló)	"a place for slaughtering"	
	g.	gʊ-(suu.ngʊ.lá)	"to bring down"	*gʊ-(suungʊ́)la
	h.	i-(suu.ngʊ.lí).lɔ	"s.t you use to bring s.t down"	
	g.	gʊ-(pee.mbe.lá)	"to cook for a long time"	*gʊ-(peembé)la
	h.	i-(pee.mbe.lé).lo	"utensil used to cook s.t for a long time"	

All examples in (19) show that the grammatical-determined status of the mora between nouns and verbs does not hold in Kinyantuzu. The mobile H undergoes the same movement to the right regardless of whether the word is a verb or a nominal.

The moraic difference between verbs and nominals was first proposed by Richardson (1959) who was the first to describe the tonal system of Kisukuma. Subsequent researchers who have capitalized on this distinction are the ones that have used Richardson's data as the basis of their analysis. Batibo (1985) who is a native speaker of the Northern dialect (gemunasukuma) also does not agree with Richardson in many cases when a mora is involved particularly in disyllabic verbs. Consider the data in (20)

(20) The Mora controversy in Kisukuma.

	Batibo (1985)	Richardson (1959)[6]	Glossary
a.	gʊ-lòòmbà	gʊ-loombá	"to ask, to beg"
b.	gʊ-kààndà	gʊ-kaandá	"to press"
c.	gʊ-bɪ̀ɪ̀nza	gʊ-bɪɪnzá	"to break"
d.	gʊ-kòombà	gʊ-koombá	"to clean a pot/dish with a finger"
e.	gʊ-lèèmbà	gʊ-leembá	"to deceive, to lie"
f.	gʊ-kààǹzà	gʊ-kaanzá	"to wash"
g.	gʊ-kààǹgà	gʊ-kaangá	"to terrify"
h.	gʊ-tààǹgà	gʊ-taangá	"to precede"
i.	gʊ-chààǹjà	gʊ-chaanjá	"to vaccinate"
j.	gʊ-βòòǹjà	gʊ-βoonjá	"to taste"
k.	gʊ-βììmbà	gʊ-βiimbá	"to swell"
l.	gʊ-lèèndà	gʊ-leendá	"to stay still"
m.	gʊ-pààǹgà	gʊ-paangá	"to arrange"
n.	gʊ-tùùǹgà	gʊ-tuungá	"to attach in a string"
o.	gʊ-pèèmbà	gʊ-peembá	"to burn"

[6] Since Kisukuma has many sub-dialects, it is possible that the dialect or sub-dialect studies by Richardson behaves differently from Batibo's dialect or my sub-dialect (Kinyantuzu).

As shown in (20), Richardson generally assumes that if the first syllable of a verb stem is a sponsoring syllable and it happens to be of the (CVV) shape, each of the vowels (moras), will count as different TBUs i.e. (C<u>V</u>).V. The consequence for tone is that the mobile H will automatically surface on the vowel of the following syllable. To Richardson, each mora counts as a TBU and its realization on the first syllable of the following syllable is consistent with the generalization that the mobile H surfaces two moras to the right from the sponsoring mora. The question now becomes one of formalizing the scope of tonal movement. Does the mobile H move two syllables or two moras to the right? Richardson's answer is that the mobile H moves two syllables to the right in nominals but two moras in verbs. Batibo (1985), however, marks the data in (20) as having an Extra Low tone. The implication here is that the moraic structure of the first syllable of the verb stem (i.e. CVV) does not matter in computing the domain of the mobile H. Contrary to Richardson, the relevant generalization here is that the mobile H surfaces two syllables to the right from the sponsoring syllable regardless of the shape of the syllables involved.

Kinyantuzu is also consistent with Batibo's generalization. All the items in (20) have an Extra Low tone in Kinyantuzu. The evidence showing that Richardson's treatment of the mobile H in verbs of this form is questionable comes from the following crucial observation. When a toneless suffix or word is added, the mobile H in these forms drifts further to the right (cf. 21). This is in accordance with the general properties of Kisukuma tone (cf. §2.2 and §2.3). If Richardson's observations were true in Kinyantuzu, the mobile H in these forms would *not* continue to drift further to the right as shown by the ungrammatical (*) examples in (21). This suggests that these forms have an Extra Low tone in isolation as shown by Batibo (1985). All this evidence points to a generalization that moras do not count as TBU in Kinyantuzu but syllables are TBUs instead.

(21) a.	gʊ-bììnzà	"to break"	gʊ-bɪɪnza ma-hágala *gʊ-bɪɪnzá ma-hagala	"to break tree forks"
b.	gʊ-lèèndà	"to stay still"	gʊ-leenda nyangóómbe *gʊ-leendá nyangoombe	"to lay still like a cow"
c.	gʊ-kòòmbà	"to lick"	gʊ-koomba geeté *gʊ-koombá geete	"to lick a lot"
d.	gʊ-pààngà	"to arrange"	gʊ-paanga sagála *gʊ-paangá sagala	"to arrange carelessly"
e.	gʊ-lòòmbà	"to ask"	gʊ-loomba kalákala *gʊ-loombá kalakala	"to ask quickly"

The examples in (22) below further provide evidence that the moraic composition of the syllable does not matter in computing the mobile H displacement. In these cases, the mobile H sponsored by the first mora of the stem shows up two syllables to the right despite the fact that either the first (cf. 22a-f) or the second syllable (cf. 22g-k) is heavy (i.e. CVV).

(22) a.	gʊ-hoombokéla	"to fall into a ditch"	*gʊ-hoombókela
b.	gʊ-daandagána	"to stagger"	*gʊ-daandágana
c.	gʊ-kaangabála	"to become stiff"	*gʊ-kaangábala
d.	gʊ-daanganá	"to confuse"	*gʊ-daangána
e.	gʊ-lʊʊngalʊ́nga	"to talk"	*gʊ-lʊʊngálʊnga
f.	gʊ-βaandʊlá	"to uncover"	*gʊ-βaandʊ́la
g.	gʊ-nyenyeelá	"to show dissatisfaction"	*gʊ-nyenyéela
h.	gʊ-dadaabʊ́ka	"to stagger"	*gʊ-dadáabuka
i.	gʊ-piliingîta	"to roll"	*gʊ-pilîingita

j.	gʊ-kumiingá	"to gather, collect"	*gʊ-kumîinga
k.	gʊ-zumaalá	"to return empty-handed from hunting or fishing"	*gʊ-zumáala

There are cases, however, in which Richardson's observations hold in Kinyantuzu (cf. 23). In these cases, the H tone that is sponsored by the first mora of the first syllable of the verb stem surfaces on the following syllable.

(23) a.	gʊ-zuulá	"to undress"
b.	gʊ-tʊʊlá	"to put, to store"
c.	gʊ-zuuká	"to have no cloth"
d.	gʊ-yeelá	"to wander"
e.	gʊ-toolá	"to take a wife"
f.	gʊ-pʊʊlá	"to pound with heavy pestle"
g.	gʊ-βyaalá	"to give birth"
h.	gʊ-laalá	"to sleep"
i.	gʊ-kʊʊlá	"to extract thorns"
j.	gʊ-βiipá	"to be ugly, useless"
k.	gʊ-peelá	"to pay the traditional healer's fees"
l.	gʊ-giishá	"to greet"
m.	gʊ-βeelá	"to be attractive"
n.	gʊ-βiipyá	"to destroy"
o.	gʊ-βʊʊchá	"to carry"
p.	gʊ-ng'oolá	"to snore"

The evidence that the last syllable in these forms is indeed the head comes from the fact that the mobile H in these forms, unlike in (20), does not drift further to the right when a toneless suffix or word is added. This is shown in (24) below.

(24) a.	gʊ-βʊʊchá	"to carry"	gʊ-βʊʊchá ma-hagala "to carry tree forks" *gʊ-βʊʊcha ma-hágala
b.	gʊ-ng'oolá	"to howl"	gʊ-ng'oolá nyang'óómbe "to cry like a cow" *gʊ-ng'oola nyangɔ́ɔ́mbe

c.	gʊ-zuulá	"to undress"	gʊ-zuulá geete *gʊ-zuula geeté	"to undress completely"
d	gʊ-yeelá	"to wander"	gʊ-yeelá sagala *gʊ-yeela sagála	"to wander carelessly"
e.	gʊ-laalá	"to sleep"	gʊ-laalá kalakala *gʊ-laala kalákala	"to sleep quickly"

The task at hand at the moment is to explain the differences in the tonal displacement property of those forms in (20) from those in (23). In other words, given the similar moraic composition between (20) and (23), what makes the movement of the mobile H in the former cases insensitive to moraic composition of the syllable and sensitive in the latter cases. Three possibilities quickly come to mind.

First, the difference between (20) and (23) can be explained if we pay attention to what sponsors a mobile H tone. If we assume that in (20) both vowels of CVV are one syllable (hence one TBU) and both sponsor a mobile H, i.e. (CVV), we can explain why the mobile H surfaces as XL. Consistent with the generalization in §2.5, the mobile H surfaces as extra low in these forms because there are not enough syllables on which the H tone can be pronounced. It is not surprising therefore that when a toneless word is added, the H drifts further to the right to surface on the second syllable of the added toneless word. From what we know about the behavior of the mobile H, this is the pattern we expect. In (23) however, the syllabic structure is (CV.V) and only the first mora sponsors a H tone i.e. (CV.V). The movement of the mobile H in both (20) and (23) now is no longer surprising. In (20), both vowels of the initial CVV count as one TBU and hence one sponsor while only the first vowel in (23) i.e. CV.V is a sponsor. This is to say, in (20) the syllabic composition is C<u>VV</u>.CV as opposed to C<u>V</u>.V.CV in (23). The generalization that follows is that, in both cases the mobile H moves two syllables to the right from the sponsoring syllable, i.e. C<u>V</u>.V.CV in (23) or C<u>VV</u>.CV(CV) in (20). The trick however, is to determine when both vowels of the initial CVV sponsor H tones i.e. C<u>VV</u> and thus form a single syllable and when only the first vowel of CVV sponsor H tone i.e. C<u>V</u>.V thus forming two different syllables. The observation that CVV counts as one syllable (and hence one TBU) if both vowels have the same tonal specifications, i.e. CVV or CV́V́ and counts as two syllables (hence two TBUs) if the two vowels differ in their tonal specifications, i.e. CV́.V or CV.V́, is of no avail here because the first syllable in both (20) and (23) have a normal low tone and yet they pattern differently. In (20), the *initial syllable* (CVV) is the sponsor while in (23), *the initial mora* is the sponsor instead (C<u>V</u>).V. In order to account for Kisukuma's mobile H domain, the Optimal Domain Theory (ODT) must also recognize syllables (and not moras alone) as posible sponsors of H tones.

The second possibility is that, given the phonological difference between the two H tones in (20) and (23) – one drifts further to the right and one does not, it is possible that the two H tones are not the same to begin with. It is possible to think of the H tone in (20) as mobile while that in (23) is fixed. This is to say, the H in the latter cases has not been sponsored by the first mora of the first syllable of the verb stem as is usually assumed in Bantu. To shed light on this possibility, a simple preliminary experiment was performed. It is interesting to note here that the preliminary experimental findings seem to indicate that this observation is true and the H tone in (23) is indeed fixed. See Appendix I for a general preliminary experiment on the phonetic characterization of Kisukuma tone. If these experimental findings will be supported by further experiments using data from other Kisukuma (Kinyantuzu sub-dialect) speakers in the future, this will be evidence to contradict the general observation that any H in a Bantu verb root is sponsored by the first syllable of the verb root. It will show that in languages like Kisukuma, some H tones that surfaces in different syllables of the verb-root apart from the initial syllable may not be necessarily be the result of shifting from the first syllable of the verb root.

The third possibility is that, it may be the case that the behavior of mobile H in these forms (20) and (23) is tied to some idiosyncratic properties of the verb-root involved. We thus cannot correctly predict how the mobile H is going to behave, i.e. C<u>VV</u>.CV or C<u>V</u>.V.CV, in a CVVCV verb stem. I will not comment further on this possibility because it does not take us anywhere.

For the moment, I will entertain the first possibility because it enables us to systematically account for the behavior of the mobile H in disyllabic and polysyllabic verb roots carrying CVV somewhere in their roots. I will thus assume that the first vowel of the first syllable in a CVVCV stem counts as a sponsor iff the H tone involved does not move further to the right when toneless suffixes and words are added as in (23). Both vowels of the first syllable in a CVVCV stem, however, are sponsors iff the H tone involved drifts further to the right after toneless suffixes and words are added to the right. When tonal specifications are involved, it is helpful to assume that the first CVV counts as one syllable (thus one sponsor in ODT) when both vowels have the same tonal contrastiveness on the surface, i.e.C<u>V́V́</u> or CVV. However, CVV will count as two distinct syllables, i.e. C<u>V</u>.V.CV, when the two moras have different tonal contrastiveness.

The second possibility needs to be supported by experiments using representative data from other Kinyantuzu speakers. Since I was not able to make the much-needed trip home to collect data from other Kinyantuzu native speakers, the experiment reported on Appendix 1 was solely based on my own data. At the same time I was not able to trace even a single Kinyantuzu native speaker in the U.S. At the moment I do not feel comfortable in generalizing the findings based on my own data only. However interesting these results may look at the moment, it remains to be seen if they will be supported by future experimental studies using more representative data from other Kinyantuzu speakers.

2.10. On identifying the sponsoring syllables

Ever since I came across linguistic studies of Bantu tone during my undegraduate studies at the University of Dar es salaam, I was fascinated and puzzled by how Bantuists figured out what moras sponsor a H tone. In Kisukuma, for example, I could not figure out how Batibo (1990) was able to determine that the first three moras in the noun like [nghungul<u>ù</u>mè] "rooster" all are sponsors, i.e /ngh<u>u</u>ng<u>u</u>l<u>ù</u>mè/. Although the last two syllables sound lower, this could simply be the effects of the phonetic final lowering and not necessarily extra low tones. Also how do we know that in [βa-t<u>è</u>m<u>ì</u>] "chiefs" both syllables of the nominal stem are sponsoring syllables while in [βa-dʊg<u>ʊ̀</u>] "relatives" only the last syllable is a sponsor? Likewise, how do we figure out that there are three sponsoring syllables i.e /βa̱-gʊ́-βá̱-βó̱n-el-á/ in surface forms like [βa̱-gʊ́-βa-βo̱n-ɛl-á] "they will see for them"?

Although I was not taught in class how to identify sponsoring moras, now I have some ideas about the general principles that Bantuists follow in identifying sponsoring moras. I also know that some of these principles may be affected by the grammatical category of the item e.g. verb vs nominal.

The first principle is what I call diachronic principle. It is based on the historical fact that Bantu verbs can be divided into two classes, H-toned and L-toned. In H toned verbs, the H is always assumed to be associated to the first mora of the verb root. This is the position to which the H tone was associated in Proto Bantu (Goldsmith 1984). It follows that any H tone that surfaces on any other mora apart from the root initial one in the verb complex is assumed to have moved to that position. This explains why the H tone assignment in Bantu verbs is generally predictable.

It is worth noting that this generalization can lead to incorrect results because in many cases things are more complicated that they seem to be on the surface. One needs to pay attention to grammatical tones that may obscure the expected tonal patterns. In Kisukuma, for example, some verb final grammatical morphemes sponsor a H tone and the sponsored H sometimes moves leftward (cf.2.7). A researcher thus needs to be careful not to blindly assume that every H tone in the verb complex has been sponsored by the verb-root initial mora. At the same time, a H tone that is associated to the first mora of the verb root may have moved to that position from preceding or following grammatical sponsors (cf. 25f-h). These conclusions can be reached by carefully establishing patterns and paradigms and carefully trying to draw meaningful generalizations from the data.

(25) a.	gʊ-palagan-a	"to scream"	e.	a-pa(lágan-e)	"he should struggle"
b.	a-ga-sol-a	"he took"	f.	a-ga-(sól-e)	"he must go choose"
c.	a-ga-som-a-ga	"he reads"	g.	a-(da-só)m-a-ga	"he never reads"
d.	a-ga-som-a-ga	"he falls"			

The diachronic principle does not work well with nouns because nouns have heavily been affected by lexical borrowings from other languages. Like other Bantu languages, Kisukuma have heavily borrowed noun items from Arabic, English, Hindi and other languages mainly via Swahili. This has tended to obscure the diachronic patterns in many nominals. The process of figuring out what syllables sponsors a H tone in nouns is not predictable anymore. The question now is, how do we know that the first three syllables in the noun [nghungulùmè] "rooster" sponsor a mobile H?

We can also identify sponsoring syllables through careful examination of every possible pattern and paradigm. For example, if we have established that tonal displacement takes place across word boundaries, one way to test if the first syllable of [nghungulume] is a sponsor is to put a disyllabic verb whose a penultimate syllable is a sponsor. Everything being equal, we expect that the mobile H sponsored by the penultimate syllable of the preceding word will surface on the second syllable of the noun /nghungulume/. As shown in (26), however, this does not happen and instead the mobile H sponsored by the penultimate syllable of the preceding verb moves only one syllable to the right instead of two as expected to surface on the final syllable of the verb itself.

(26) a-ga-βon-á nghungulume "he saw a rooster" *a-ga-βon-a nghungúlume
a-ga-βon-a nghúngulume

From §2.4 we know that a sponsoring syllable marks a domain that is opaque to the rightward movement of the mobile H. Since the H sponsored by the preceding verb can not drift further to the right in (26), this is evidence that the first syllable of the noun [nghungulume] "rooster" is a sponsor i.e. /nghungulume/.

If there were no other sponsoring syllables in the noun /nghungulume/ we would expect the mobile H sponsored by the initial syllable to be pronounced on the third syllable yielding [nghungulúme]. This, however, does not happen and from this we know that even the penultimate syllable in the noun [nghungulume] is also a sponsor i.e /nghungulumɛ/. From §2.4 we also know that the mobile H can move only one syllable to the right instead of two if there is another sponsoring syllable, second to its right because not only do sponsors block the rightward expansion of the mobile H domain but also they can not be targets (i.e. heads) of a mobile H sponsored by preceding syllables. We thus establish that the second syllable is also a sponsor, i.e. [nghungulume]. If the second syllable in [nghungulume] were not a sponsor, the mobile H sponsored by the initial syllable would move into the second syllable yielding (nghungú)lume. Since this does not happen, it is apparent that even the second syllable is also a sponsor. We thus conclude that the first thre syllables in [nghungulume] are sponsors i.e. [nghungulume]. All the mobile H sponsored by the leftward sponsors are then deleted by Meeussen's rule.

The rightmost H sponsored by the penultimate syllable surfaces as Extra Low because there are not enough syllables for the trisyllabic domain to be realized. The surface form is thus [nghuŋgulùmè].

We can use the same method to figure out which syllable sponsors a H tone in nouns like [βa-tèmì] "chiefs" and [βa-dúgʊ] "relatives" in (cf. 27) by examining the tonal properties of the words in isolation and how the tonal patterns change when words with non-sponsors and sponsors are added before or after them. In (27a), for example, the words [βa-lɪmi] "cultivators" and [βa-taale] "big" are toneless in isolation. But when a verb stem [a-ga-βònà] with a sponsoring syllable is added in front, the word [βa-lɪmi] surfaces with a H tone. Likewise, in (27b) βa-taale also surfaces with a H tone. Since these words are toneless in isolation, the H tone in latters cases must be sponsored from the added preceding words. The same procedure can be used to identify the sponsoring syllables as in (27c) through (27e).

(27) An example of a paradigm for identifying sponsoring syllables (cf. Richardson 1960)

	Gloss	**Item**	**"big"**	**"he saw"**		
a.	"cultivators"	βa-lɪmi	βa-taale	a-ga-(βona	βa-lɪ́)mi	βa-taalɛ
b.	"chiefs"	βa-(temi	βa-táá)le	a-ga-(βona	βá)-(temi	βa-táá)lɛ
c.	"relatives"	βa-dʊ(gʊ	βa-táá)le	a-ga-(βona	βa-dʊ́)(gʊ	βa-táá)lɛ
d.	"stomach"	n-da	nhaale	a-ga-(βona	n-dá)	n-haalɛ
e.	"lice"	n-(da	nhaalé)	a-ga-(βoná)	n-(da	n-haalɛ́)

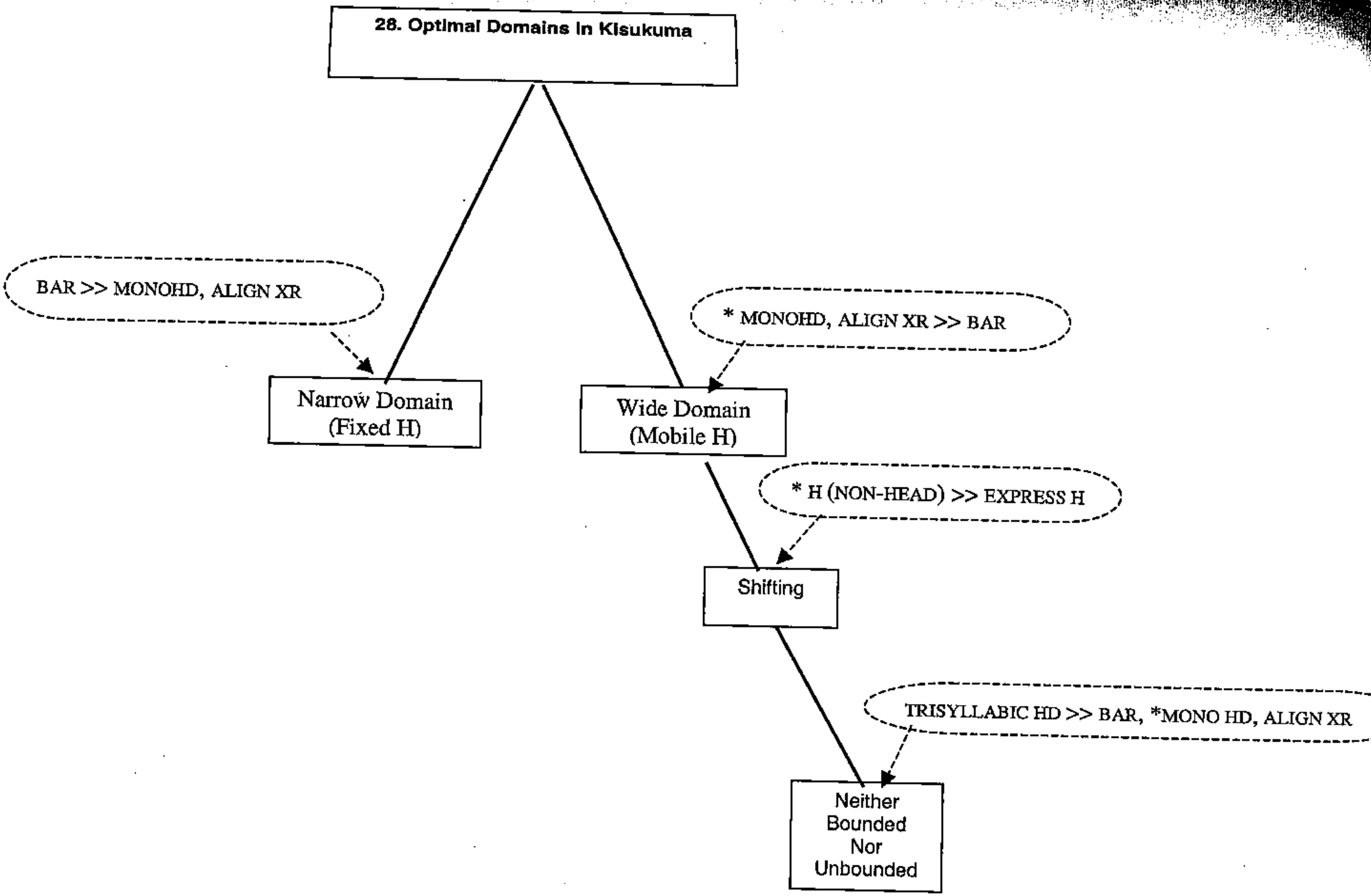
Third, if the item is of Bantu origin, sometimes it is useful to look at what syllables are marked as sponsors in other Bantu languages. If it is a Bantu root, then it is likely to have the same sponsors across Bantu. Guthrie's starred (*) reflexes are a good starting point. Among these methods, establishing tonal patterns and paradigms and careful examining them in order to draw proper generalizations is the most important method because it reveals the language specific complications that may be lost if the other principles are allowed to take precedence.

To summarize, Kisukuma has two types of H tones: Fixed and Mobile. The former does not move and it always surfaces on its sponsoring syllable regardless of the phonological, morphological or syntactic environments. This syllable is thus a sponsor and a target (or head) at the same time. The latter, however, can shift one, two or three syllables to the right (and sometimes to the left) of the sponsoring syllable. It shifts one syllable to the right if another H is pronounced to the second syllable to the right. When immediately followed by another H to the right, the mobile H's shifting is completely blocked and the leftmost H deletes. In Bantu literature, this phenomenon is attributed to Meeussen's rule. Sometimes the mobile H can move three syllables to the right of the sponsoring syllable. This happens when the mobile H shifts from one word to a following nominal (noun, adjective or number) that lacks pre-prefixes. Everything being equal, however, the common behavior of the mobile H is to shift two syllables to the right of the sponsoring syllable. This requirement is so reinforced to such an extent that if there are not enough number of syllables to the right, the mobile H surfaces as an extra low tone.

Although the most common shifting process for the mobile H is to move rightwards, there are few cases in which the mobile H surfaces to the left of the sponsoring syllable.

This is the case, for example, with the mobile H sponsored by word final morphemes like subjunctive markers and H-toned monosyllabic roots.

Translated into ODT language, Kisukuma has both narrow and wide high domains (HD). The narrow domain comes from the fixed H, which never moves, and always surfaces associated to the sponsoring syllable. As I have shown above, Kisukuma's wide domain comes from the mobile H which can shift one, two or three syllables to the right (and sometimes to the left) of the sponsoring syllable. Notice, however, that it is hard to characterize Kisukuma wide domain in terms of ODT because wide domains in ODT are either bounded (disyllabic) or unbounded. The wide domain in Kisukuma is neither strictly bounded nor unbounded but rather it is trisyllabic. This is summarized in figure (28) below. The constraints responsible for Kisukuma HD will be motivated in the following section.


28. Optimal Domains in Kisukuma
BAR >> MONOHD, ALIGN XR
* MONOHD, ALIGN XR >> BAR
Narrow Domain
(Fixed H)
Wide Domain
(Mobile H)
* H (NON-HEAD) >> EXPRESS H
Shifting
TRISYLLABIC HD >> BAR, *MONO HD, ALIGN XR
Neither
Bounded
Nor
Unbounded

2.11. The analysis of Kisukuma tone

The above being said, I now briefly review some of the important studies on Kisukuma tone. I will then propose new ideas in the line of ODT that may be useful for the analysis of *some* of the thorny issues in Kisukuma tonology.

The studies of Kisukuma tone are sharply divided into two categories –metrical and non-metrical ones. In order to understand why these studies are divided into these two categories, one needs to understand something about the study of Bantu tone and its progress in the 1980s and early 1990s. It has been observed that many Bantu languages do not neatly fit into a stress vs. tone dichotomy. In varying degrees, some Bantu languages have been shown to inhibit characteristics of both stress and tone systems. Subsequent researchers has concentrated on how to formally account for the hybrid prominence systems in these languages. In these studies it is postulated that in addition to a tonal tier, a need exists for a metrical tier which was formulated by line(s) of asteriks or grid marks. One justification for the metrical tier was drawn from the fact that certain syllables in certain Bantu languages tended to attract a H tone if one is present. Furthermore, it was shown that the H tone attracting syllables tended to occupy certain positions in the word (e.g. penult or antepenult). Metrical rules then were used to mark such positions. After metrical rules made certain syllables metrically prominent, tonal rules then would associate and reassociate H tones to these syllables. Such studies include Goldsmith (1987) on Kintandu, Kenstowicz (1983) on Kizigua, Pulleyblank (1983) on Kimatuumbi, Downing (1990) on the Nguni sub-group of Bantu, Goldsmith et al. (1989) on Xhosa, Kenstowicz and Kisseberth (1990) on Kizigua, Sietsema (1989) on Digo, Kisukuma, Kimatuumbi and Chiruri, Peterson (1987) on Chichewa, Hyman and Katamba (1993) on Luganda, Cassimjee and Kisseberth (1989) on Shingazidja and Kang (1997) on Kisukuma.

Other researchers, however, found the postulation of both a tonal and a metrical tier in the same language not uncontroversial. These researchers argued that the coexistence of both a tonal and a metrical tier was too powerful and descriptively too abstract and unnecessary. These researchers argued that, a variety of phenomena for which metrical tier was suggested (e.g. positional limitations on vowel length, binary tone patterns, long distance tonal displacement, and sensitivity of tone to vowel length) could be accounted for by only relying on the tonal tier. Some of these studies include Pulleyblank (1986, 1987), Hyman (1989), Hyman and Byarushengo (1984) as well as Roberts (1992).

Like in other Bantu languages, the metrical tier (in addition to a tonal one) has been proposed in accounting for Kisukuma tone mainly in the absence of any strong evidence of metrical structures in the language. These studies, as argued by Kang (1997), tend to be too abstract. They include Sietsema (1989), Idsardi and Purnnel (1995), Idsardi (1996) and Kang (1997). Although Goldsmith (1994) and Batibo (1991) assume an underlying LH melody, together with Roberts (1992), they do not assume a metrical tier in accounting for Kisukuma tone. In this work, I will neither assume an underlying LH melody nor a metrical tier.

2.11.1. Defining the Problem: Non-local and varied realization of Mobile H tone

Kisukuma tone is problematic for the current phonological theories because of its non-local character. The current phonological theories require phonological processes to observe a strict locality condition. Processes that require an interaction of non-adjacent elements are thus problematic for the theory. Rules like (29a) and (29b) are thus prohibited. Note also that these rules fail empirically because sometimes the mobile H in Kisukuma is displaced only one syllable to the right and sometimes three instead of two syllables as I have shown above.

(29) a. CVCVCV b. CV(CV)CV

H H

The successful analysis of Kisukuma tone thus has to redefine the non-local tone displacement as a local operation. In order to achieve this goal, many studies have resorted to metrical analyses. The problem, however, is that Kisukuma shows no strong evidence of a typical metrical structure and metrical analyses has thus appeared to be too abstract and thus undesirable. Due to the abstractness of these studies, many attempts have been made to avoid metrical analysis altogether.

2.11.2. Batibo 1991

Batibo (1991) was the first to propose a LH tone melody for mobile H. The L tone is underlyingly linked to the sponsoring syllable and the H is floating. When the floating mobile H is displaced to the right, the low tone is left linked to its original syllable to which it was associated. It is this linked L tone that blocks any further rightward displacement of another H from a preceding word. Batibo then proposed two pairs of H

Association rules and L spreading rules, one for word internal environments (30) and the other across word boundaries (31).

(30) a. H Association Rule (word internal)

```
CVCVCV   =>  CVCVCV(CV)
 |            |   |
 LH           L   H
```

b. L Spread Rule

```
CVCVCV   =>  CVCVCV
 |   |        \/  |
 L   H        L   H
```

(31) a. H Association Rule (across word boundaries)

```
..CV(CV)#CVCV(CV) => ..CV(CV)#CVCV(CV)
   |                    |        |
   LH                   L        H
```

b. L Spread rule

```
..CV(CV)#CVCV(CV) => ..CV(CV)#CVCV(CV)
   |         |         \ | /     |
   L         H           L       H
```

As can easily be observed, these rules are very powerful and they violate the strict locality condition.

2.11.3. Goldsmith (1990)

Goldsmith provides a diachronic explanation for the current mobile H domain. He argues that diachronically, there was a lexicalized process of H tone displacement by one TBU and this process was represented as LH tone melody. Even after its lexicalization, however, the tone displacement rule stayed in the language resulting in the synchronic situation i.e. double displacement. He calls this process rule replication or rule mitosis. Rule mitosis is a situation in which a single original rule (e.g. shifting of H tone one syllable to the right) has split or replicated within the grammar so that its effects are felt at two different points in the derivation. He proposes the following derivations to account for the tonal displacement phenomenon. In Goldsmith's analysis, the first step is the reanalysis of tone shift as an underlying LH tone melody and the second step is the shifting of the H tone.

```
(32) UR            /gʊ-βona-nij-a/        "to see simultaneously"
                       |
                       LH
 Association       gʊ-βona-nij-a
 Convention            |  |
                       L H
High Tone          gʊ-βona-nij-a
Displacement           |    |
                       L    H
SR                 gʊ-βo̱na-níj-a
```

To account for tonal displacement when the following word is a nominal, the rule in (33) is proposed. This rule moves the mobile H one TBU further to the right when it is in initial syllable of the nominal.

(33) Noun and Adjective High Tone Shift

```
    #CVCV' =>  #CVCV
     /            /
    /            /
  H#           H#
```

Goldsmith considers one case in which the mobile H moves only one syllable to the right. This is when the mobile H is originally associated to a word final syllable and the following word is a verb as in (34)

(34) n-dugʊ̱ á-gu-βo̱n-a-nɪ́j-a.

To account for these cases, he proposes a very powerful and complicated rule (given in 35). This rule says that a H tone preceded by a low tone shifts one TBU to the right if it is not in verb initial position. It is obvious that this complicated rule is too powerful and it is not clear how it can handle the cases in other contexts where the mobile H moves only one syllable to the right. e.g. when the mobile H is not in the word final position as in βa̱-gʊ́-βo̱n-a-nɪ́j-a or when the mobile H is sponsored by object markers as in (5).

(35)

```
V ┌──────── <#>α CVCₒV' =>VCVCₒV
|  |                  |          |   |
L  |  verb          H          L   H
   └────
```

Condition: where α is not present.

2.11.4. Roberts (1992)

Like Goldsmith, Roberts breaks down the movement of two TBU into two separate processes. Roberts, however, unlike Goldsmith proposes two spreading rules. Her central claim is that the displacement by two TBUs is the result of the application of two different spreading rules, Initial Spreading and Secondary Spreading. The former operates lexically while the latter operates only post lexically. The two spreading rules are followed by delinking rule that delinks all the left branches of a multiply-linked high tone. The whole process produces an effect of an underlying H moving two syllables to the right within a word. Mobile Hs are assumed to be underlyingly linked.

(36) Initial spreading X X X' (X'is a TBU that is not linked to a tone)
H

(37) Secondary Spreading X X
H

(38) Delinking (iteratively from L-R) X X
H

Derivation sample

(39) UR a-ga-βó̲n-el-a
H

Initial Spreading a-ga-βó̲n-él-a
H

Secondary Spreading a-ga-βó̲n-él-á
H

Delinking a-ga-βo̲n-el-á
H

SR a-ga-βo̲n-el-á

Initial spreading rule is lexical and thus it does not apply to the word final H. This provides a natural explanation for why H tones move only one TBU when they originally occur in word final position and the following word is a nominal.

(40)	UR	/gʊ-pá a-ma-hagala/ H
	Initial Spreading	NA
	Secondary Spreading	gʊ-pá á-ma-hagala H
	Delinking	gʊ-pá a-ma-hagala H
	SR	gʊ-pa á-ma-hagala

When two H tones occur in a sequence, the leftward H does not show up on the surface. This is due to a widespread rule in Bantu called Meeussen's rule. This rule, according to Robert, is ordered between the two spreading rules.

(41)	UR	a-gʊ-βá̱-βó̱n-el-a H H
	Initial Spreading	a-gʊ-βá̱-βó̱n-él-a H H
	Meeussen's Rule	a-gʊ-βá̱-βó̱n-él-a H H

Secondary Spreading   a-go-βá̲-βɔ̲́n-ɛ́l-á

H

Delinking   a-gʊ-βa̲-βɔ̲́n-el-a

H

SR   a-gʊ-βa̲-βo̲n-el-á

Robert's analysis is very impressive basically because of two reasons. First, it avoids the abstractness and complications encountered by metrical analyses and secondly, it successfully treats the non-local Kisukuma tonal displacement process as a local one. However, this analysis suffers from one major setback.

The major problem with Robert's analysis, also identified by Kang 1997, has to do with an ordering paradox that seems to exist in the rules she proposes. For example, the Meeussen's Rule applies only to H tones that are linked to adjacent syllables in the underlying representation. To prevent any of the spreading rules from feeding the Meeussen's Rule, the Meeussen's Rule has to apply before the Spreading rules. But as shown in (42), Meeussen's rule also applies across word boundaries. This implies that Meeussen's rule is a postlexical rule and should apply after the Initial Spreading Rule – a lexical rule. The derivations for the two alternative orderings of Initial Spreading and Meeussen's Rule is shown in (44). To get the correct results, Meeussen's Rule must be ordered before Initial Spreading (44b). However, this ordering, a postlexical rule before a lexical rule is not allowed.

(42) [βa-tɛ̲mi̲ βa̲-gʊ-sɔ́l-a]   "the kings will choose"

(43) [βa-gʊ́-βɔn-ɛl-á]   "they will see for them"

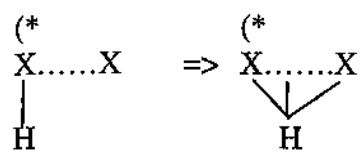
(44a) and (44b)

(44a)		(44b)	
UR	βá-gʊ-βón-el-a H H	UR	βá-gʊ-βón-ɛl-a H H
Initial Spreading	**βá-gʊ́-βón-él-a** **H H**	**Meeussen's Rule**	**NA**
Meeussen's Rule	**βa-gʊ-βón-él-a** **H H**	**Initial Spreading**	**βá-gʊ́-βón-él-a** **H H**
Secondary Spreading	βá-gʊ-βon-él-á H	Secondary Spreading	βá-gʊ́-βón-él-á H H
Delinking	βá-gʊ-βon-el-a H	Delinking	βá-gʊ-βón-el-a H H
SR	*[βa-gʊ-βɔn-el-á]	SR	[βa-gʊ́-βɔn-el-á]

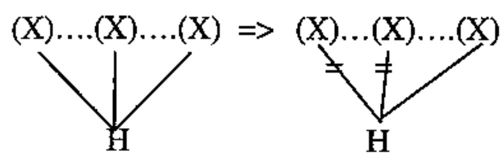
2.11.5. Sietsema (1989): A Metrical Account of Kisukuma Tone

Sietsema (1989) proposes that the tonal displacement process in Kisukuma can be explained in terms of feet. The primary task in this account is the assignment of the correct metrical structure that allows mobile H displacement to be stated as purely local rule referring to local elements. In his analysis, maximally binary feet are built starting at any point in the string where H tone is located. Once the proper metrical structure is constructed, a rule of High Tone Spread (HTS) applies to spread a mobile H to the right as far as possible, up to a vowel at the left edge of the foot. Then a Delinking Rule delinks all of the association lines except for the rightmost one. Like Roberts, Sietsema also assumes that the sponsoring syllable is linked to a High tone underlyingly.

(45) a. High Tone Spread (HTS)



b. Delinking: Delink all but the rightmost association line of a H tone



This works as follows.

(46) a. (*   *) (* *)
/βá̱-gʊ-sol-a/ => [βa̱-gʊ-sól-a] "they will choose"

b. (* *)(*   *)(*)
/a-ga-βo̱n-el-a/ => [a-ga-βo̱n-el-á] "he looked for"

To account for H tones that get deleted when two H tones are adjacent, Sietsema proposes a tone fusion rule (cf. 47). In this rule, adjacent underlying H tones fuse into one and, due to delinking, only the rightmost syllable realizes this H.

```
(47) a. Tone Fusion (TF) V   V         V   V
                         |   |   =>     \ /
                         H   H           H

     b. UR      /βa̲-gʊ- βa̲-βo̲n-el-a/
                 |       |  |
                 H       H  H

        MSA     [*    ] [*] [*   ]
                (*   *) (*) (*   *) (*)
                βa̲-gʊ-βa̲-βo̲n-el-a/
                 |      |
                 H      H

                [*   ]  [*] [*   ]
        TF      (*   *) (*) (*   *) (*)
                /βa̲-gʊ-βa̲-βɔ̲n-el-a/
                 |       \/
                 H        H
                [*    ] [*] [*   ]

        HTS     (*   *) (*) (*   *) (*)
                /βa̲-gʊ- βa̲-βo̲n-el-a/
                 \/       \\\\
                 H         H

                [    *]             [*]
        DL      (*   *) (*) (*   *) (*)
                /βa̲-gʊ-βa̲-βo̲n-el-a/
                 ‡/       ‡‡‡
                 H         H

        SR      [βa̲-gʊ́-βa̲-βo̲n-el-á]
```

To get the correct results when the mobile H spreads to a following noun or adjective, the first syllable of the following noun or adjective is marked extra metrical.

This implies that its first syllable is not included in the metrical system: it projects no metrical grid position, and is therefore ineligible to bear tone.

```
              [*   ]                                          [*   ]
(48) (* *) (*   *) (*) (*  *)(*)        (*  *) (*   *)        (*  *)(*)
     /a-ga-βón-a ma-hagala/ =>        [a-ga-βon-a <ma>-hágala]        "he saw tree forks"
              |                              \/
              H                              H
```

To account for the realization of the extra low tone, Sietsema proposes two rules, Final Lowering and Final High Modification. The first rule lowers a H linked only to final vowel of a phrase to an extra low. The second rule lowers a H linked to the penultimate and final vowel to a regular low tone. Unlike final lowering, this rule has no restrictions on the number of vowels the H may be linked to. Fixed H tones do not undergo tonal displacement, because, Sietsema proposes, these H tones are inserted after the tonal rules (HTS) and (TF) have applied.

Although Sietsema's analysis, for the larger part, generates the correct output for the data he discusses, there are few problems with some of his proposals and assumptions he makes. First, it is not obvious if there is tone fusion in Kisukuma and it is hard to find any such evidence. Second, like other studies reported in the literature, he does not recognize the leftward displacement of Kisukuma tone. It is not clear how the analysis proposed here can deal with tones that move leftwards, one, two or three syllables. Third, his extra metrical account of cases like those in (48) is very suspicious because it violates one of the basic constraint on extrametricality namely, the Peripherality Condition. This condition states that extrametricality may be assigned only at the edge of a domain. It is clear that in (48), the extrametrical syllable is in the center of a domain, not at the edge.

The justification for the treating this syllable as extrametrical is thus questionable. Kang (1997) also identifies an apparent rule ordering paradox between the rules of H Tone Shift (HTS) and Final Lowering: HTS appears to feed Final Lowering in forms where no syllable is skipped by HTS, but Final Lowering appears to precede HTS when one syllable is skipped by HTS.

Again, to refresh our memory, the mobile H appears two syllables to the right of its sponsoring syllable. The sponsoring syllable itself, however, blocks the rightward movement of the preceding mobile H. Fixed H always appear in the same position and it makes the stem it appears in opaque to the rightward displacement of mobile H tone from preceding words.

2.12. ODT and Kisukuma Tone

That now we have this much background about ODT, Kisukuma tone and some important previous studies, in this section I demonstrate how Kisukuma tone can be analyzed in Optimal Domains Theory. I start with a summary of universal constraints that have been proposed in ODT to account for tone in Bantu tonology. Optimality Theory (OT) predicts that the same constraints should be able to account for Kisukuma tone, probably with a different ranking.

The following constraints have been proposed to account for a varying degree of tonal phenomena in Bantu (cf. §1.8).

(49) Constraints pertaining to Domains

a. FAITHFULNESS: Every H-sponsor must be organized inside its own unique High Domain.

b. Basic Alignment: This constraint has two sub-components namely;

i. BASIC ALIGNEMENT LEFT (BAL): The left edge of a sponsor is aligned with the left edge of a HD.

ii.BASIC ALIGNMENT RIGHT (BAR): The right edge of a sponsor is aligned with the right edge of a HD.

c. NO MONOSYLLABIC HD (*MONO HD): A HD should not consist of a single syllable.

d. ALIGN R (HD, EDGE PC): Align the right edge of a HD domain with the right edge of a prosodic category (e.g. prosodic word, prosodic phrase or intonational phrase)

e. NON-FINALITY (IP): the right edge of HD should not be located at the right edge of a PC (e.g. prosodic word, prosodic phrase or intonational phrase).

f. NO ADJACENT EDGES: H-Domains can not be adjacent.

(50) Constraints pertaining to the realization of Tone

a. EXPRESS HEAD: The head of a HD must be H-toned. (The basic assumption behind this constraint is that High Domains are headed and that the head of Bantu domains is the rightmost H)

b. EXPRESS H: Every syllable in a HD should be pronounced with a H tone.

c. *(H, NONHEAD): syllables that are not domain-heads should not be pronounced on a H tone.

In the reminder of this section, I will show how these constraints along with a new constraint the authenticity of which needs evaluation and support from other Bantu languages form the basis for accounting for some of the thorny issues in Kisukuma tonology.

2.13. Redefining the Non-local Shifting as a Local Operation

It was argued in §2.2 that Kisukuma tone is problematic because its shifting process involves non-adjacent syllables. This is against the current phonological theories most of which require phonological processes to be strictly local. It is obvious that Kisukuma violates the locality requirement because its mobile H shifts two syllables to the right of the sponsoring syllable instead of just one. It follows that any successful analysis of Kisukuma have to redefine the mobile H non-local shifting as a local operation. To achieve this goal, many previous studies relied on metrical structure mainly in the absence of any strong evidence of a metrical structure in Kisukuma (cf. Sietsema (1989), Idsardi and Purnnel (1995), Idsardi (1996) and Kang (1997).

The version of OT adopted here i.e. Optimal Domains Theory (ODT) is silent about this issue. As it stands at the moment, ODT divides the wide domains into bounded and unbounded ones. The bounded domains are motivated by *MONOHD >> BAR. The consequence of this constraint is that domains has to be at least disyllabic if they are bounded. This is what we find, for example, in Setswana, Kikuyu and Kijita.

Wide domains in ODT can also be unbounded i.e. the H tone can spread or shift from the sponsoring syllable rightwards (or leftwards) in an unbounded fashion. This type of domains according to ODT, are motivated by ALIGN R (HD, PC); a constraint requiring that the H tone align with the right (or left) edge of a high domain. Depending on whether non-finality, a constraint banning the spread or shifting of a H tone to include the final syllable, is ranked higher than ALIGN R (HD, PC) some high domains may fail to expand to the final syllable. As I have shown in §1.9.3, this is what happens in languages like Kibondei, Digo, Xitsonga, Shambaa and Mijikenda. As can be seen here, ODT does not say anything about the locality condition although all unbounded wide domains may tend to contradict it. Since ODT does not crucially rely on input representations or associations as in autosegmental theory, it is possible that ODT vacuously avoids the violations of the locality condition. If we think of domains as simply High tones' "spheres of influence" then there is no need to force them to be only monosyllabic or disyllabic as dictated by the locality condition. Depending on the active constraints at work in a language, High tone domains can be expanded beyond the disyllabic requirement. Apart from this glitch, the theory captures the tonal phenomena we observe in Bantu tonology in a nice and straightforward way. At the moment, I will assume that ODT vacuously satisfies the locality condition.

This being said, Kisukuma poses another challenge for ODT. As formulated, ODT cannot handle Kisukuma wide domains because it recognizes only disyllabic (bounded) and unbounded domains. Everything being equal, Kisukuma wide domain, however, is neither disyllabic nor unbounded. Unless constrained by other higher ranked constraints, Kisukuma HD is typically *trisyllabic*. It is thus hard to characterize it as either bounded or unbounded. This means that the constraints and the ranking proposed to account for bounded domains (*MONOHD >> BAR) and unbounded domains (ALIGN R (HD, PW >> BAR) cannot derive the correct results in Kisukuma. The former ranking creates disyllabic HD while the latter expands the HD to the right as far as possible. *MONOHD thus cannot choose the optimal candidate between (C$\underline{\text{V}}$CV) and (C$\underline{\text{V}}$CVCV) because both satisfy it. Likewise, it is hard to apply (ALIGN R (HD, PW) because the HD in Kisukuma does not extend rightwards in an unbounded fashion to the right. Instead, Kisukuma HD is generally trisyllabic unless other higher ranked constraints dictate otherwise. Moreover, in reduplication, the mobile H domain is always trisyllabic.

Pursuing an ODT analysis, I account for Kisukuma's HD by using a conservative constraint called TRISYLLABIC HD defined in (51a). Moreover, I will replace *MONO HD with Reynold's (1997) MIN-BIN constraint defined in (51b).

(51) a. TRISYLLABIC HD (TRI HD): A high domain must be exactly two syllables
b. BIN-DOM: A high domain must be disyllabic.

Below I demonstrate how these constraints together with other constraints that have already been proposed in ODT literature (cf. §2.3.0) accounts for Kisukuma wide domain.

As I have shown in §2.2, the general structure of Kisukuma mobile H domain is TRISYLLABIC and it expands rightwards. This indicates that ALIGN R (HD, PW) is active in Kisukuma. Consider the following examples

(52)	a.	βon-el-á	"see for"	e. βulugút-a	"bustle around"
	b	pemb-el-á	"to burn for"	f. βulugút-ɪl-a	"+ applicative"
	c.	kuumbʊl-á	"desire to do s.t"	g. βulugút-ɪl-a-nɪj-a	"+simultaneous"
	d.	kuuming-á	"to collect"	h. βulugút-ɪl-a-nɪj-iw-a	"+passive"

Examples (52a-d) are trisyllabic and the H tone is aligned with the rightmost edge of the word. They thus satisfy both THE TRISYLLABIC HD and ALIGN R (HD, PW). However, when we examine other examples like those in (52e-h), we discover that the pattern displayed by former examples in (52a-d) is just a coincidence. It is clear in these examples that, while it is necessary for the HD to be trisyllabic, it is not necessary for the HD to be aligned with the rightmost edge of any prosodic category in Kisukuma. Once TRISYLLABIC HD is satisfied, the rightward expansion of the HD ceases, regardless of the length of the word. This shows that TRISYLLABIC HD is high ranked than ALIGN R (HD, PW).

We have also seen that sometimes the mobile HD expands only by one syllable to the right instead of two. Moreover, when fixed H is involved, narrow domains are attested because fixed H does not move. When the HD is monosyllabic as in fixed H tone, BAR >> BIN-DOM, TRISYLLABIC HD, ALIGN R (HD, PW). When the HD is disyllabic, BIN-DOM >> BAR, TRISYLLABIC HD, ALIGN R (HD, PW). When the mobile HD is trisyllabic, TRISYLLABIC HD >> BAR, BIN-DOM, ALIGN R (HD, PW). The three major types of HDs in Kisukuma are illustrated in the tableaux below.

(53) a. Monosyllabic HD: BAR >> BIN-DOM, TRISYLLABIC HD, ALIGN R (HD, PW).

Candidates	BAR	BIN-DOM	TRISYLLABIC HD	ALIGN R (HD, PW)
a. ☞ma-gʊ(nɪ́)la		*	*	*
b. ma-gʊ(nɪ̱lá)	*! (la)		*	

(53) b. Disyllabic HD: BIN-DOM >> BAR, TRISYLLABIC HD, ALIGN R (HD, PW).

Candidates	BIN-DOM	BAR	TRISYLLABIC HD	ALIGN R (HD, PW)
a. ☞a-gʊ-(dʊ̱-chá)gʊl-a		*(cha)	*	** (gʊla)
b. a-gʊ-(dʊ̱)-chagʊl-a	*!		**	***(chagʊla)
c. a-gʊ-(dʊ̱-chagʊ́)l-a		**!(chagʊ)		*(la)
d. a-gʊ-(dʊ̱-chagʊl-á)		**!*(chagʊla)	*	

(53) c. Trisyllabic HD: TRISYLLABIC HD >> BAR, BIN-DOM, ALIGN R (HD, PW).

Candidates	TRISYLLABIC HD	BAR	BIN-DOM	ALIGN R (HD, PW)
a. ☞(βυlugú)t-a		**(lugu)		*(ta)
b. (βυlú)gut-a	*!	*(lu)		**(guta)
c. (βυlugυt-á)	*!	***(luguta)		
d. (βύ)lugut-a	*!		*	***(luguta)

We can now add constraints for the realization of H tones in a domain. We have already established that Kisukuma is a shifting language instead of a spreading one. This can be accounted for by invoking the following constraints and ranking them accordingly: EXPRESS HEAD, *(H, NONHEAD) and EXPRESS H. EXPRESS HEAD requires that every head of a HD be H-toned while *(H, NONHEAD) prohibits the pronunciation of H tone on syllables that are not domain heads. EXPRESS (H) requires that every syllable in a HD be pronounced with a H tone. Since every HD in Kisukuma wide domain has a head (rightmost syllable in the domain) and that the H tone in a domain is pronounced on the head only instead of all syllables in a domain, it is clear that both EXPRESS HEAD and *(H, NON HEAD) outrank the faithfulness constraint (EXPRESS H). The following tableau illustrates.

(54) EXPRESS HEAD, *(H, NONHEAD) >> EXPRESS H

(55)

Candidates	EXPRESS HEAD	*(H, NONHEAD)	EXPRESS H
a. ☞ (βυlugú)t-a			**
b. (βύlúgú)t-a		*!*	
c. (βυlugu)t-a	*!		***

Candidate (54a) is optimal because it violates only the low ranked EXPRESS H constraint. Notice that it incurs two violations of EXPRESS H because two syllables in its domain are not pronounced with a H tone. However, this is what we expect because Kisukuma is a shifting language and not a spreading one. Candidate (54b) looses because it incurs a fatal violation of *H(NON HEAD) because two of the H tone in its HD are pronounced on non-head syllables. The head of HD in these cases is the rightmost H in the HD because the HD expands rightwards (i.e. the H tone shifts rightwards). The HD of candidate (54c) does not have a head and thus it fatally violates the high ranked EXPRESS HEAD. Since headless HDs are not allowed in Kisukuma, this candidate is also ruled out.

2.14. OCP Effects in Kisukuma

After establishing how Kisukuma canonical wide domain can be accounted in ODT, below I demonstrate how ODT can account for the different realizations of the mobile H. Before I proceed, however, several important remarks are in order here. I want the reader to remember that Kisukuma is a shifting language instead of a spreading one. As I have shown in (54) above, this is accounted for by ranking, EXPRESS HEAD, *(H, NON HEAD) above EXPRESS H. Moreover, other constraints like EXPRESS HEAD are also active even in the leftward displacement of Mobile H tone (cf. 2.7). The head of the domain in these cases is the leftmost syllable in the domain and it is this syllable that expresses the H tone. From now onwards, I will not include these constraints in computing the optimal (and non-optimal) candidates. The domain is right-headed if and only if (iff) the HD expands rightwards like in many cases in Kisukuma. The head in the right-headed domain is the rightmost syllable and this syllable must be pronounced with a H tone. Likewise, the domain is left-headed iff its HD expands leftwards like in the leftward displacement of the word final grammatical H in Kisukuma. The head in such domains is the leftmost syllable and this syllable must be pronounced with a H tone. Remembering these crucial facts will save us the hassle of having humongous tableaus that tend to be hard to comprehend.

In essence, the different realizations of the mobile H in Kisukuma can be viewed as OCP effects. We know at this point that the mobile H can shift only one syllable to the right instead of two as expected. One environment in which this occurs is when two sponsors of a mobile H are separated by one syllable in a word. We also know that when two sponsors of H tone occur adjacent to one another, the H sponsored by the leftmost sponsor disappears and the H sponsored by the rightmost sponsor undergoes the normal rightward shifting. I start with cases in which the mobile H moves only one syllable to the right. Consider the following examples.

(55)	a. (βa̱gʊ́)(βo̱n-el-á)	"they will see for"
	b. (βa̱gʊ́)(βu̱lugú)ta-nij-a	"they will bustle around simultaneously"
	c. (du̱gʊ́)(pe̱mb-el-á)	"we will burn for"

All examples in (55) involves verb stems with two sponsors - the initial pronominal agreement markers and the initial syllable of the verb root. The H sponsored by the pronominal agreement morphemes move only one syllable to the right violating TRISYLLABIC HD because the resulting HD in these cases is disyllabic.

As I mentioned in §2.4, both mobile and fixed H sponsors block the rightward shifting of the mobile H (expansion of the HD). In autosegmental literature this was accounted for by assuming an underlying LH melody. For the mobile H, the L of the LH melody is assumed to be underlyingly linked while in the fixed H, the H of the LH melody is underlyingly linked (Batibo1990, Goldsmith 1984 and Kang 1997). As a result, the underlyingly linked L of the LH melody in mobile H and the underlyingly linked H of the LH melody in fixed H rendered the LH melody of both mobile and fixed H opaque to the rightward shifting of H tone from preceding sponsors. This, in essence, is the effect of the Well Formedness Condition (WFC).

(56) Well Formedness Condition (Clements and Goldsmith (1984:10)

i. All vowels are associated with at least one tone.
ii. All tones are associated with at least one vowel.
iii. Association lines do not cross.

Structures like those in (57a) and (57b) are thus ruled out in autosegmental phonology because they tend to violate the WFC (the second sponsor is associated with more than one tone). In recent studies, the combination of the underlying LH melody, metrical structure and linking of the mobile and fixed H to respective TBUs by relevant constraints have been proposed.

(57) a. βa-gú- βɔn-el-á "they will see for them" b. βa-βɔn-el-á "they see for them"
LH LH LH LH

Optimal Domains Theory (ODT) also has a nice mechanism for accounting for cases in which the mobile H shifts only one syllable to the right. In ODT we neither assume an underlying LH melody nor a metrical structure. Instead, the failure of the H tone sponsored by the leftmost sponsor to move two syllables to the right (i.e. the blocking effect of the sponsoring syllable) is accounted for by the fact that High Domains *do not* overlap. In ODT, every H tone has its own "sphere of influence" and no another H is allowed to extend its "sphere of influence" to that of a neighboring H tone. Thus, H domains are unique and they never overlap. The relevant constraint is formalized below.

(58) NO OVERLAP: High Domains do not overlap.

Since NO OVERLAP results in disyllabic HD, violating TRISYLLABIC HD, it is obvious that it outranks TRISYLLABIC HD. This is illustrated in the tableau below.

(59) NO OVERLAP >> TRISYLLABIC HD

Candidates	NO VERLAP	TRISYLLABIC HD
a. ☞ (βa̱gʊ́)(βon-el-á)		*
b. (βa̱gʊ) (βó)n-el-á)	*!	

The first candidate violates TRISYLLABIC HD because its first HD is banned from extending further to the right by NO OVERLAP. This shows that it is better to have imperfect HD than to have them overlapped. The second candidate's HDs, however, do overlap and thus this candidate is non-optimal.

In §1.8.3.8 I mentioned that in some Bantu languages, adjacent HD are prohibited. In such languages, a H tone fails to shift (or spread) rightwards (or leftwards) if this shifting (or spreading) would bring two high domains adjacent to one another. The examples in (55), however, show that NO ADJACENT DOMAINS is violated in Kisukuma. In these cases, the HD expands to the right even though this expansion brings two high domains adjacent to one another. Since the motivation for the rightward shifting of H tone is to satisfy

TRISYLLABIC HD, it is clear that TRISYLLABIC HD is ranked higher than *ADJACENT DOMAINS while TRISYLLABIC HD is outranked by NO OVERLAP. This is shown in the following tableau

(60) NO OVERLAP >> TRISYLLABIC HD >> NO ADJACENT EDGES

Candidates	NO OVERLAP	TRISYLLABIC HD	NO ADJACENT EDGES
a. ☞ (βa̱gú)(βo̱n-el-á)		*	*
b. (βá̱)gʊ(βo̱n-el-á)		**!	
n. (βa̱gʊ(βo̱)n-el-á)	*!		

Both the first and second candidates satisfy the first constraint because their HDs do not overlap. However, the first candidate (60a) wins because unlike the second candidate (60b) incurs only one violation of TRISYLLABIC HD. The second candidate incurs two violations of TRISYLLABIC HD because its HD is monosyllabic (thus lacks more syllables to be optimal, i.e.trisyllabic) compared to that of the first candidate which is disyllabic. The HD of the first candidate is thus better that the HD of the second candidate. The first candidate is therefore optimal. Candidate (60c) is eliminated in the competition because its HDs do overlap and this is not allowed.

Although ADJACENT EDGES is violated, there is evidence to show that it is an active constraint in Kisukuma. Consider the following examples.

(61) a. a-ga-(βo̱n-a má)-go(ngó̱)li "(s)he saw a millipede"
cf. *a-ga-(βo̱n-a ma-gó)(ngó̱)li

b a-ga-(su̱ny-a má)-he(lá̱) "(s)he donated a lot of money"
cf.*a-ga-(su̱ny-a ma-hé)(lá̱)

The examples in (61) involve both wide and narrow domains (mobile and fixed H respectively). What is interesting here is that, the expansion of the (left) HD further to the right is blocked, forcing the H tone to be pronounced on noun class markers which under normal circumstances are treated as extrametrical and thus do not attract H tones. I propose that, the H tone fails to skip the noun class markers and move further to the right because this would bring two adjacent edges to each other thereby violating NO ADJACENT EDGES. The resulting fact is that, when both wide and narrow domains occur in the same phrase, the two High Domains can not be adjacent because this brings two heads i.e.(…H)(H) together.[7] The wide domain fails to move further to the right and the two must be separated by at least one "free" syllable i.e. a syllable that is not parsed into a domain. See (70) for the interaction of NO ADJACENT EDGES with other constraints including one that forces the wide domain to expand one syllable further to the right when the head happens to be a noun class marker.

2.14.1. Adjacent Sponsors

When two sponsoring syllables occur adjacent to one another in Kisukuma, all the H tones sponsored by the leftward sponsor(s) are deleted and the H sponsored by the rightmost sponsor shifts two syllables to the right as required by ALIGN H(R) and TRISYLLABIC HD (cf. 62).

(62)	a.	a-ga-(β<u>a</u>)-(β<u>o</u>n-el-á)	"(s)he saw for them"
	b.	a-(d<u>a</u>)-(β<u>a</u>)-(β<u>o</u>n-il-é)	"(s)he did not see them"
	c.	(β<u>a</u>)-(d<u>a</u>)-(β<u>a</u>)-(β<u>o</u>n-il-é)	"they did not see them"

[7] Coincidentally, however, the non-optimal candidates in (61) also violate TRIMORAIC HD.

The iterative deletion of the H sponsored by the left sponsors in ODT is attributed to a more refined version of NO ADJACENT EDGES namely NO ADJACENT SPONSORS formalized below. The surviving H tone in (62) happens to be sponsored by the verb root. Since this is the general pattern in Kisukuma (given the morphology of the language), one can claim that there is a preference for preserving the root H domain.

(63) NO ADJACENT SPONSORS[8]
H-sponsors cannot be adjacent.

Since the H tones sponsored by the left sponsors are deleted, this is evidence to show that NO ADJACENT HEADS is ranked higher than EXPRESS H. The tableau below illustrates.

(64) NO ADJACENT HEADS >> EXPRESS H

Candidates	NO ADJACENT HEADS	EXPRESS H
a. ☞ βa-da-βa-(βo̲n-il-e)		**
b. (βá̲)-(dá̲)-(βá̲)-(βo̲n-îl-é)	*!	

Candidate (64a) have no adjacent heads and thus is more optimal. All syllables in HD in candidate (64b) are pronounced with a H tone as required by EXPRESS H. This satisfaction of EXPRESS H, however, comes at the expense of violating a more important constraint NO ADJACENT HEADS. This candidate is thus ruled out.

In Kisukuma, noun class markers are (controversially) treated as extrametrical and thus are skipped over by the shifting H across word boundaries. In cases in which the H is sponsored by a penultimate syllable of the preceding word, this leads to the violation of TRISYLLABIC HD because the High Domain is expanded one syllable further to the right. This is shown in the following examples.

(65)	a.	gʊ-βon-a	ma-hágala	"to see tree forks"
	b.	gʊ-suny-a	si-hʊ́mbe	"to donate thousands"
	c.	gʊ-peemba	si-kóómɛ	"to lit evening fire"
	d.	n-temi	n-taalé[9]	"big chief"
	e.	βa-temi	βa-táale	"big chiefs"

The behavior of Kisukuma (prefixal) noun class markers not to be head of a HD is a common process in Bantu and is not confined to Kisukuma. There are many cases in Bantu languages where a H tone fails to be pronounced on certain prefixes. If the prefixes themselves are sponsors, the H tone they sponsor must move rightwards to be pronounced on the initial syllable of the root. One such language is Chichewa, a Bantu language spoken mainly in Malawi (Myers and Carleton 1996). In Chichewa, inflectional prefixal morphemes denoting past habitual /ma/, recent past /na/ and the infinitival marker /ku/ sponsor a H tone but this H is pronounced on the first syllable of the root. The examples in (66) are from Myers and Carleton (1996:46).

(66)	a.	ndi-ma-sángalats-a	"I used to please"
	b.	ndi-na-sángalats-a	"I pleased (RECENT PAST)"
	c.	ku-sángalats-a	"to please"

To account for the inability of these prefixes to be head themselves, Myers and Carleton (1996) propose a constraint that bans the pronunciation of H on the above mentioned prefixes (cf. 67).

(67) *DOMAIN: *Hα

[α…σ…] [α = Past habitual, Recent past, Infinitive]

[8] [8] Since the basic reason for this constraint is to avoid OCP violations, i.e. adjacent heads, I will replace it with a more empirical constraint namely that bans adjacent heads (HH), i.e. *ADJACENT HEADS

[9] The noun class marker fuses with the first consonant of the root rendering the entire initial syllable extrametrical.

I motivate a similar constraint to account for the pattern displayed by noun class markers or syllables that phonologically fuse with them in Kisukuma. Simply stated, this constraint is given below.

(68) *HEAD NOUN CLASS (*HEAD NC)
A noun class marker cannot be a head of a domain.

Since *HEAD NC forces the HD to be more that three syllables, this is evidence that it is ranked above TRISYLLABIC HD. This is shown in (69).

69. Candidates	*HEAD NC	TTRISYLLABIC HD
a. ☞ gʊ-(βon-a ma-há)gala		*
b. gʊ-(βon-a má)-hagala	*!	

Notice however that *HEAD NC is violated in Kisukuma. This occurs when both wide and narrow domain occur in the same phrase (cf. § 2.3.2). In these cases, the H tone of the wide domain is pronounced on the noun class marker violaTING *HEAD NC. This is the effect of the OCP constraint prohibiting adjacent heads, i.e. *ADJACENT HEADS. As shown in (70), the implication here is that NO ADJACENT HEADS is ranked higher than *HEAD NC.

70. Candidates	NO ADJACENT HEADS	*HEAD NC
a. ☞ a-ga-(βon-a má)-go(ngó)li		*
b. a-ga-(βon-a ma-gó)(ngó)li	*!	

The H tone of the winner candidate (70a) is forced to surface on the noun class marker (violating HEAD NC) because the further rightward expansion of the HD is prohibited by the high ranked NO ADJACENT HEADS. The loosing candidate (70b) violates the higher ranked NO ADJACENT HEADS by allowing the HD to expand further to the right, bringing two adjacent heads together.

2.15. The Leftward Shifting of H tone: Non-Finality Effects.

In this section I show the effects of NON-FINALITY constraint in Kisukuma because I will motivate it in accounting for the leftward displacement of the mobile H. Preliminary observations seems to indicate than NON-FINALITY affects the size of HD. It is possible, for example, to argue that the final extra lowering phenomenon in which a word final mobile H gets extra lowered is the effect of NON-FINALITY. Thus;

(71)	a.	ndʊgʊ̀	"relative"	c.	ma-wè	"stones"
	b.	ndamà	"calf"	d.	i-sʊ̀	"strong body odor"

However, as shown in (72), even Mobile H that are sponsored by penultimate syllables systematically get extra lowered, together with the final syllable. It is not clear if the extra Lowering of the H tone sponsored by penultimate sponsors is the effect of NON-FINALITY i.e. NON-FINALITY in Kisukuma refers to the last sponsoring syllables in a word or phrase.

(72)	a.	ntèmì	"king"	d.	gʊ-pààng-à	"to arrange"
	b.	nhʊmbììì	"monkey"	e.	gʊ-twààng-à	"to pound"
	c.	gʊ-βòn-à	"to see"	f.	gʊ-lèèmb-à	"to deceive"

That this formulation of NON-FINALITY is problematic comes from cases like those in (73) which all involve mobile H.

(73)	a.	gʊ-kalaang-á	"to fry"
	b.	gʊ-βʊʊjá	"to ask"
	c.	gʊ-giish-á	"to greet"
	d.	gʊ-dandagána	"to stagger"
	e.	gʊ-βulugút-a	"to bustle"

The mobile H examples in (73) show that indeed both penultimate and final syllables can be pronounced with a H tone i.e. they can be heads of a domain. Comparing with other cases like those in (71) and (72), we can make a generalization that while H sponsors *cannot* occur in the last two syllables of a domain and be heads of their respective high domains at the same time, H tones sponsored by preceding syllables can be displaced to the last two syllables. This seems to suggest that this generalization has nothing to do with NON-FINALITY. Instead, sponsors in the two final syllables of the wide domain can not be heads and sponsors at the same time because this leads to a crucial violation of TRISYLLABIC HD, a constraint requiring that the HD be exactly trisyllabic. Monosyllabic and disyllabic HDs thus are ruled out completely unless they are dictated by other high ranked constraints. The high ranked TRISYLLABIC HD is so persistent in these cases to such an extent that when there are not enough syllables in a word to make the HD trisyllabic, the HD ceases to exist and it becomes an extra low tone domain instead. When another word follows (and thus providing the missing syllables to which the HD can expand), TRISYLLABIC HD will extend the HD across word boundaries in order to make sure that the latter is trisyllabic. The challenge, however, is to explain why in some cases the disyllabic HD is possible (eg. the mobile H sponsored by object markers in (5)) and not in others (cf. 72).

Although NON-FINALITY is violated in above cases, there is evidence that it is still an active constraint in Kisukuma. Such evidence comes from word final H sponsored by grammatical morphemes. Examples in (27d-g) are repeated here as (74) for easy reference.

(74) a. a-(sóm-e̲)
he-read-(sub)junctive
"let him read"

b. a-som-(él-e̲)
he-read-APL-sub
"let him read for/with"

c. a-som-(á-nɪj-e̲)
he-read-FV-ST-sub
"let him read simultaneously"

d. a-som-(él-a-nɪj-e̲)
he-read-APL-FV-ST-sub
"let him read for simultaneously"

All examples in (74) show that the H sponsored by the word final subjunctive marker is retracted one syllable (74a-b), two syllables (74c), three syllables (74d) and so forth. I propose that this retraction of word final grammatical H is motivated by NON-FINALITY (GT)[10]. However, when we examine the examples in (74b-d) closely we discover that something interesting is going on; the retraction of the word final grammatical H does not expand leftwards to include the first syllable of the verb root except in disyllabic stems as (74a) where there is no other syllable on which the word final H can retract to. This is surprising because the root initial syllable is indeed the canonical sponsor of H tones in Bantu verb.

To account for the fact that the final H retraction excludes the initial syllable of the verb, I propose the constraints in (75). The constraint in (75b) makes sure that the HD expands leftwards i.e. the mobile H shifts leftwards.

(75) a. NON-INITIALITY H (VERB-STEM): The initial syllable of the verb cannot be pronounced with a H tone.

b. ALIGN L (HD, S): Align the left edge of the HD with the left edge of a stem

As shown by (75b-d), the leftward movement of the H tone excludes the initial syllable of the verb root. This shows that NON-INITIALITY H (VERB-STEM) is ranked higher than ALIGN L

[10] GT= Grammatical Tone

(HD, S). This is to say, it is better to have a non-perfectly aligned HD than to have it at the initial syllable of verb-root. This is illustrated in the following tableau.

76. Candidates	NON-INITIALITY H	ALIGN L (HD, S)
a. ☞a-som-(él-a-nıj-e̱)		*
b. a-(sóm-el-a-nıj-e̱)	*!	

The winner candidate (76a) satisfies NON-INITIALITY because the leftward movement of the H tone does not include the first syllable of the verb root. This results in a non-perfectly aligned HD but since NON-INITIALITY IS higher ranked than ALIGN L (HD, S), this is the winner candidate. Candidate (76b) have a perfectly aligned HD but this comes at the expense of fatally violating the high ranked NON-INITIALITY constraint. The candidate thus looses.

Now notice that the leftward shifting of the word final H sometimes creates a disyllabic HD as shown in (77a). This implies that NON-FINALITY in these case is ranked higher than TRISYLLABIC HD. This is shown in (77).

(77) NON-FINALITY >> TRISYLLABIC HD

Candidates	NON-FINALITY	NON-INITIALITY	ALIGN L (HD, S)	TRI HD
a. ☞a-som-(él-e̱)			*	*
b. a-(sóm-el-e̱)		*!		
b. a-som-(el-é̱)	*!		**	*

Candidate (77a) satisfies the first two high ranked constraints, even though this means having a non-perfectly aligned HD and a non TRISYLLABIC HD. The non-optimal candidates violate one of the first two higher ranked constraints. For example candidate (77b) incurs a fatal violation of NON-INITIALITY because its H tone is pronounced on the root initial syllable. Candidate (77c) fatally violates NON-FINALITY because the H tone is pronounced on the word final (sponsoring) syllable.

The clear evidence that NON-FINALITY is ranked higher than NON-FINALITY is provided by examples like (74a) in which the H tone shifts one syllable to the left forcing the H tone to be pronounced on the verb root initial syllable. This is shown in the tableau below in which the winner violates NON-INITIALITY in order to satisfy NON-FINALITY.

(78) NON-FINALITY >> NON-INITIALITY

Candidates	NON-FINALITY	NON-INITIALITY
a. ☞a-(sóm-e̱)		*
b. a-som-(é̱)	*!	

2.16. Other Interesting Issues about Kisukuma Tone.

In § 2.0 I promised to give only a partial account of the Kisukuma tone. I want to assure the reader here that I have kept that promise. My focus in this section has been to provide an account of Kisukuma wide domain (Mobile H) because this the most intriguing aspect of Kisukuma tonology. It also produces a range of interesting results in reduplication. I was specifically concerned with demonstrating how ODT provides new insights which, with minor modifications, might prove useful in accounting for the problematic Kisukuma wide domain which is neither strictly bounded nor unbounded. In order to achieve this goal I almost ignored the narrow domain, which is generated by the Fixed H. The analysis proposed here thus does not provide a whole story about Kisukuma tone and at some point, may appear fragmented. I believe, however, that I have provided enough information about Kisukuma tone and as a result we are at a good position to understand how it interacts with reduplication in the Chapter 5.

There are several important observations concerning the the fixed H in Kisukuma which might be interesting. First, it is not affected by almost all of the constraints we motivated here to account for the wide domain: it always surfaces on its sponsor (violating TRISYLLABIC HD) and does not get extra lowered (or retracted) even when it is sponsored by word final or penultimate syllable violating NON-FINALITY. Second, sometimes the fixed H interacts with the mobile H in an unexpected ways. Consider the following examples.

(79) a.	nghoo(mbá̱)	"porridge"	i.	i-nu(ú̱)mba	"big house"
b.	ta-(lá̱)	"lamp"	j.	ga(só̱)gone	"gonorrhea"
c.	ndwaa(lá̱)	"disease(s)"	k.	a(mé̱é̱)lika	"America"
d.	gii(nghí̱)	"owl"	l.	ma-go(ngó̱)li	"millipedes"
e.	naga(ná̱)	"infant"	m.	βʊ-(pá̱á̱)mba	"cotton"
f.	shilika(lé̱)	"soldier"	n.	βu-(hʊ̱́ʊ̱́)ni	"prostitution"
g.	i-taa(nó̱)	"five"	o.	so(gó̱ó̱)ni	"market"
h.	ma-(dʊ́ʊ̱́)tʊ	"leaves"	p.	(pá̱á)nga	"bush knife"

Examples (79a-g) have a fixed H in stem final position while the remaining examples have a Fixed H in non final position. In each of these cases, the fixed H interacts differently with the mobile H sponsored by preceding syllables. When the fixed H is word final like in (79a-g), no mobile H from preceding sponsors can be pronounced less than two syllables away from the sponsor of the fixed H. In other words, when a fixed H is pronounced on the final syllable, no H from the left sponsor can be pronounced on the penultimate or antepenultimate syllable. This is shown below.

(80)	a.	gʊ-βo̱n-a	βá-naganá	"to see infants"
	b.	βa-dugʊ̱	βá-naganá	"infant relatives"
	c.	i. gʊ-βo̱n-á	shilikalé̱	"to see a police"
		ii. gʊ-βo̱n-a	shîlikalé̱	
	d.	i. ndʊgʊ̱	shîlikalé̱	"police relative"
		ii. ndʊgʊ̱́	shilikalé̱	
	e.	ndʊgʊ̱́	naganá̱	"infant relative"
		cf. ndugu̱	sagála	"useless relative"

In (80a-b), the rightward expansion of the HD is blocked by the word final fixed H forcing the mobile H sponsored by preceding word to be pronounced on the noun class marker which under normal circumstances is not pronounced by a H tone. Depending on the position of the sponsor in a word, the mobile H can shift only one syllable to the right like in (80b). Likewise, in (80c) and (80d), the rightmost expansion of the Mobile H is also blocked by the word final fixed H. In extreme cases like those in (80d.ii) and (80e), the mobile H does not move at all and instead of being extra lowered as everywhere else in the language, it is actually pronounced on its sponsor. This is the only environment I know in which a mobile H sponsored by the word final syllable neither moves rightwards across word boundaries nor get extra lowered. This phrase final fixed H and its long range blocking effects on the rightward shifting of the mobile H sponsored by preceding syllables is surprising and it will be interesting to see how ODT can accommodate such cases.

When the fixed H is pronounced in non-final syllable like in (79h-l), a puzzling pattern is also generated: the fixed H makes the next syllable to the right a sponsor of a mobile H. This is shown below.

(81)	a.	am(éé̱)(li̱ka	nhaalé)	"big America"
		cf. ngholo	nhaale	"big sheep"
	b.	ma-go(ngó̱)(li̱	ma-tá)ale	"big millipedes"
		cf. ma-hagala	ma-taale	"big tree forks"
	c.	iβala(βá̱)(la̱	i-tá)ale	"big road"
		cf. i-guku	i-taale	"big baboon"

In these examples, the immediate syllable following the fixed H also becomes a sponsor as a result of being close to a fixed H. The adjective [-taale] "big" is not H-toned in isolation but in examples above it receives a H tone which is sponsored by the syllable immediately following the fixed H of the preceding word. The H tone sponsored by the right sponsor moves two syllables to the right as expected. This puts two sponsors which are also heads together.

When the fixed H is pronounced on the first syllable of a long syllable like in (79m-p), something unexpected occurs to the mobile H sponsored by the leftward sponsors. The Mobile H in these environments can be pronounced on the syllable on its immediate left of the fixed H. Potentially this creates a HH sequence. In §2.6, I illustrated that HH sequences are not allowed in Kisukuma and whenever they occur, the leftmost H disappears word internally and the rightmost H is downstepped across word boundaries. These are mechanisms to avoid the violation of the highly ranked OCP constraint namely *ADJACENT HEADS. In examples in (82), the latter option is adopted here and the rightmost H is stepped down.

(82)	a.	gʊ-βo̱n-á	!shééli	nhaale	"to see big oxen"
	b.	gʊ-βo̱n-a	má-!góódi	ma-taale	"to see big shirts"
	c.	gʊ-βo̱n-á	!gááli	nhaale	"to see big cars"
	d.	gʊ-βo̱n-á	!chúúmba	gi-taale	"to see a big room"

These are some of the most intriguing remnant issues of Kisukuma tone that needs to be integrated into future studies. Optimal Domains Theory (ODT) is very promising approach and it will be interesting to see how these remnants can be integrated into the theory. In the following chapter I examine the general principles of Kisukuma reduplication which hitherto remains unstudied. Reduplication from other Bantu languages, however, has been quite thoroughly described particularly in the last decade. In the next chapter I will show how Kisukuma reduplication fits into the general picture displayed by reduplication from other Bantu languages and what are its unique characteristics.

CHAPTER THREE
THE SIZE OF THE REDUPLICANT

3. Introduction

For a long time, partial reduplication has fascinated phonologists and morphologists alike. The challenge has always been to construct a theory that effectively characterizes how the base and the reduplicated portion of the base (called the reduplicant) are related (cf. Marantz 1982, Kiparsky 1986, McCarthy and Prince 1986 and Steriade 1988, among others). Traditionally, reduplication has been viewed as a phonological process despite the fact that both phonology and morphology are involved. In earlier studies, the reduplicant was defined in terms of prosodic constraints. In this respect, the reduplicant was frequently defined by reference to foot, syllable and moraic structure. In Bantu reduplication, for example, the reduplicant was characterized as minimally (and sometimes maximally) disyllabic cf. Kinande (Mutaka and Hyman 1990), Kikuyu (Peng 1992), Siswati (Kiyomi and Davis 1992, Downing 1997), Ndebele (Hyman, Inkelas and Sibanda 1998) and Kirundi (Brassil 2000). In recent years, however, researchers have recognized the importance of morphology in determining the size of the reduplicant. Researchers like Downing (1997), Urbanczyk (1996), McCarthy and Prince (1993, 1995) and Hyman, Inkelas and Sibanda (1998); and Inkelas and Zoll (2000) have clearly demonstrated that, sometimes, the size of the reduplicant can be influenced by morphology. In Bantu, for example, it has been demonstrated that morphemes do not get split or truncated in the reduplicant (cf. Mutaka and Hyman 1990). In other studies, the reduplicant in Bantu verb stem reduplication has been defined as a morphological unit – a minimal derivational stem that like other Bantu verb stems must end with the morphological default vowel [-a]. In more recent studies, e.g. Hyman, Inkelas and Sibanda (1998) and Inkelas and Zoll 2000, reduplication is viewed as a morphological process that can be accounted for morphosyntactically without referring to the base-reduplicant correspondences as in the popular Prince and McCarthy's Correspondence model (1985). In these studies, reduplication is simply stem juxtaposition (cf. §3.3.4).

After examining the tonal properties, reviewing some of the important literature on Kisukuma tone and proposing a new account of Kisukuma mobile high tone using Optimal Domains Theory (ODT) in the previous chapters, I now present the general background of Kisukuma reduplication in this chapter. I specifically pay special attention to the factors that determine and characterize the size of the reduplicant (RED) in Kisukuma. In the process, I will demonstrate how Kisukuma reduplication resembles or differs from reduplicative patterns displayed by other Bantu languages. I argue in this chapter, unlike in many previous studies of Bantu reduplication in which phonological factors were assumed to play a more decisive role than morphological factors in determining the size of the reduplicant, that Kisukuma provides strong evidence to the contrary. In Kisukuma, morphemes must surface intact in the base. It is thus impossible to split a morpheme and copy only part of it in the reduplicant. Likewise, roots are accordingly treated as monomorphemic and regardless of their length or segmental composition must surface faithfully in the reduplicant. Together with Downing (1997a, 1997b), Hyman, Inkelas and Sibanda (1998) and Inkelas and Zoll (2000), I argue that morphological factors play a crucial role in determining the size of RED in Kisukuma.

However, unlike the latter who view (Bantu) reduplication as a morphosyntactic process thereby ruling out any Base–Reduplicant correspondences, I account for the size of the Kisukuma reduplicant by using Lexical conservatism (Steriade 1997) and McCarthy and Prince (1995) Correspondence Theory.

The morphological view of Kisukuma reduplication advanced here, however, is relevant only to native words and nativized loans. As I will show in the next chapter, roots are truncated when polysyllabic recent loans are reduplicated in Kisukuma. My argument in this study is that, unlike native words and nativized loans, the morphological make up of recent loans is not transparent to Kisukuma speakers. Reduplication is thus purely phonological. The size of the reduplicant in these words is determined by prominence breaks in the unreduplicated stem particularly the edges of fixed high tone domains. Generally, the fixed H tone corresponds with the (primary) stressed syllable of the source language (English). The unmistakable generalization here is that reduplication in Kisukuma is mainly a morphological process. It follows that if the morphology of the unreduplicated words is opaque to speakers as in recent loans, the phonology takes precedence in determining the size of the reduplicant. In this chapter, I will not discuss any issues pertaining to the interaction of tone and reduplication because tone does not play any role whatsoever in determining the size of the reduplicant in native words and nativized loans. All tonal transfer processes will be thoroughly dealt with in Chapter 5.

In Kisukuma, four grammatical categories, i.e. verbs, nouns, adjectives and numbers, display a productive process of reduplication. Like in other Bantu languages, the Kisukuma reduplicant is also subject to a disyllabic minimality requirement. In all categories, the reduplicated forms incorporate prefixal materials only when the root of the base is monosyllabic or when there is phonological fusion between the prefix and the stem. When the root is disyllabic or polysyllabic, and it begins with a consonant, it is only the root that reduplicates. In Kisukuma, reduplication is sensitive to the morphological make up of the base to such an extent that reduplication never truncates a morpheme. Moreover, roots are accordingly treated as one morpheme and thus surface intact in the reduplicant regardless of their length or segmental composition. Below I present the account of the shape of the reduplicant in verbs and nominals (nouns, adjectives and numbers). I start with generalizations and proposals that have been advanced regarding the shape of the reduplicant in Bantu reduplication.

3.1 Factors determining the Shape of the Reduplicant in Bantu Reduplication

The following generalizations have been made regarding the shape of the reduplicant in Bantu reduplication:

First, the reduplicant in some Bantu languages is minimally and maximally disyllabic. These languages include Kinande (Mutaka and Hyman 1990, Downing 1999), Siswati (Kiyomi and Davis 1992, Downing 1999) and Kikuyu (Peng 1992, Downing 1999), Ndebele (Hyman, Inkelas and Sibanda 1999) and Kirundi (Brassil 2000). In some Bantu languages, however, the reduplicant can be of any length provided that it is not monosyllabic. Examples of such languages include Chiyao (Mtenje 2002), Chichewa (Myers and Carleton 1996, Hyman and Mtenje 1998), Kisukuma (Matondo, this work) and Kiswahili (Matondo, forthcoming).

Second (and as mentioned above), prefixes usually do not copy in the reduplicant except when the stem is subminimal or when they phonologically fuse with the stem. Examples here include Kikerewe (Odden 1996), Kinande (Mutaka and Hyman 1990, Downing 1999), Siswati (Kiyomi and Davis 1992, Downing 1999) and Kikuyu (Peng 1992). As I will show in §3.2 and §3.4, copying of prefixes in the reduplicant is not imperative in Kisukuma even when there is phonological fusion between them and the stem. Copying of prefixes in the reduplicant (e.g. noun class markers) is only tolerated when the stem is monosyllabic. However, noun class morphemes from Class 7 and Class 8 obligatorily copy in the reduplicant when the nominal stem is vowel-initial.

The third generalization, the Morpheme Integrity Constraint (MIC), was first proposed by Mutaka and Hyman in their analysis of Kinande (1990). This has to do with the widespread tendency in Bantu where the copying of the base material in the reduplicant is morpheme sensitive to an extent that it never splits a morpheme. Examples from Bantu languages pertaining to this generalization include Kinande (Mutaka and Hyman 1990), Kisukuma and Kiswahili (2002). In Kinande, for example, extension morphemes must surface intact in the reduplicant. In other Bantu language like Kisukuma, Chiyao (Mtenje 2002), Kiswahili (Matondo forthcoming) and Olusamia (Marlo 2002), roots are accordingly treated as one morpheme and thus surface faithfully in the reduplicant. In languages like Siswati (Kiyomi and Davis 1992, Downing 1999), Kikuyu (Peng 1992, Downing 1999) and Kirundi (Brassil 2000), however, roots get truncated in order to fit the reduplicant into the disyllabic reduplicative template. This truncation of the base always leads to the violation of MIC. Kisukuma shows a partial satisfaction of this condition. MIC is only observed in native words and nativized loans. Even here, there are few cases in which a morpheme is truncated in the reduplicant. In recent loans, however, MIC is completely discarded. This is the subject of the next chapter.

After identifying the generalizations pertaining to the shape of the reduplicant in Bantu, now I demonstrate below how Kisukuma is (in)consistent with these generalizations. I start with verb stem reduplication. I will follow the analysis of the Bantu verb adopted in most studies, e.g. Myers (1998) and Mutaka (1994) whereby the root and any number of derivational extensions, excluding the final inflection, is referred to as a "derivational stem". The derivational stem plus inflectional suffixes, e.g. subjunctive and perfective markers, including the final tense inflection vowel (full stem) is referred to as an "inflectional stem" (cf. §3.3.2 §3.3.4). In many cases, verb stem reduplication in Kisukuma copies the inflectional stem.

3.2. Verb Stem Reduplication

Like other Bantu languages, verb stem reduplication is a productive process in Kisukuma to such an extent that any verb root can potentially be reduplicated. The reduplicated form denotes the meaning of doing the action repeatedly but in little bits, "here and there" and probably with diminished vigor, intensity, care and seriousness. Thus [gʊ-**som**-a] is "to read" while [gʊ-**som-a**] + [**som**-a] can mean "to read here and there", "to read repeatedly and carelessly" etc. In this work, all reduplicated verb stems will denote the "here and there" meaning even if "here and there" does not appear in the gloss. The reduplicant is subject to the disyllabic minimality requirement such that it cannot be less than a foot. Usually the root is not truncated, derivational morphemes are not split; and derivational/inflectional suffixes surface in the reduplicant. Although all tone transfer issues will be accounted for in Chapter 5, it is important to note that tone is generally not copied in Kisukuma verb stem reduplication except in few morphological categories like the subjunctive. Generally, tone is not copied in verb stem reduplication from all Bantu languages studied so far. The only known exception is Chichewa (Myers and Carleton 1996, Hyman and Mutenje 1999). Below is a summary of the major patterns of reduplication in verb stems. In all forms, the prefix /gʊ-/ is an infinitive marker and like all prefixes, it does not copy in the reduplicant except when the reduplicant is monosyllabic, and optionally when it phonologically fuses ith the verbal root. Throughout this work, I will adhere to the notational conventions of separating the reduplicant and the base with the addition (+) symbol reserving the minus (-) symbol for internal morpheme breaks. The root is in **bold** and the reduplicant will be underlined.

(1) **Monosyllabic Roots (CV-, N-)**

In Kisukuma, as in many other Bantu languages, monosyllabic reduplicants are not permitted. Unlike in languages such as Kirundi (Brassil 2000), Siswati (Downing 1999), Ndebele (Hyman et al. 1999) and Kikuyu (Peng 1992) in which the reduplicant is minimally and maximally disyllabic, the reduplicant in Kisukuma, however, can be of any length provided that it is not monosyllabic.

	UR		SR	Reduplicated forms	Gloss
a.	/gʊ-**li**-a/	=>	[gʊ-**ly**-a]	gʊ-**ly**-a-**ly**-a + **ly**-a	"to eat"
				gʊ-**ly**-a + gʊ-**ly**-a	

b.	/gʊ-**ng'u**-a/	=>	[gʊ-**ng'w**-a]	gʊ-**ng'w-a-ng'w-a** + **ng'w**-a gʊ-**ng'w**-a + gʊ-**ng'w**-a	"to drink"
c.	/gʊ-**ku**-a/	=>	[gʊ-**kw**-a]	gʊ-**kw-a-kw-a** + **kw**-a gʊ-**kw**-a + gʊ-**kw**-a	"to pay dowry"
d.	/gʊ-**pi**-a/	=>	[gʊ-**py**-a]	gʊ-**py-a-py-a** + **py**-a gʊ-**py**-a + gʊ-**py**-a	"to be ready"
e.	/gʊ-**su**-a/	=>	[gʊ-**sw**-a]	gʊ-**sw-a-sw-a** + **sw**-a gʊ-**sw**-a + gʊ-**sw**-a	"to spit"
f.	/gʊ-**lu**-a/	=>	[gʊ-**lw**-a]	gʊ-**lw-a-lw-a** + **lw**-a gʊ-**lw**-a + gʊ-**lw**-a	"to fight"
g.	/gʊ-**zu**-a/	=>	[gʊ-**zw**-a]	gʊ-**zw-a-zw-a** + **zw**-a gʊ-**zw**-a + gʊ-**zw**-a	"to leak"
h.	/gʊ-**gu**-a/	=>	[gʊ-**gw**-a]	gʊ-**gw-a-gw-a** + **gw**-a gʊ-**gw**-a + gʊ-**gw**-a	"to fall"
i.	/gʊ-**chi**-a/	=>	[gʊ-**ch**-a]	gʊ-**ch-a-ch-a** + **ch**-a gʊ-**ch**-a + gʊ-**ch**-a	"to die"
j.	/gʊ-**ji**-a/	=>	[gʊ-**j**-a]	gʊ-**j-a-j-a** + **j**-a gʊ-**j**-a + gʊ-**j**-a	"to go"
k.	/gʊ-**si**-a/	=>	[gʊ-**sh**-a]	gʊ-**sh-a-sh-a** + **sh**-a gʊ-**sh**-a + gʊ-**sh**-a	"to grind"
l.	/gʊ-**ny**-a/	=>	[gʊ-**ny**-a]	gʊ-**ny-a- ny-a** + **ny**-a gʊ-**ny**-a + gʊ-**ny**-a	"to defecate"

As shown in (1), There are twelve (12) simple monosyllabic verb roots in Kisukuma. All examples in (1) except /gʊ-**ny**-a/ involve CV- roots underlyingly. On the surface, all examples in (1) except [gʊ-**ch**-a] "to die", [gʊ-**j**-a] "to go", [gʊ-**sh**-a] "to grind", and [gʊ-**ny**-a] "to defecate" result in CG-a stems. What is peculiar from these monosyllabic roots is the copying of the infinitive marker [gʊ-] in the reduplicant (RED) and the double copying of the monosyllabic roots in the reduplicant. This is unexpected because, as I will demonstrate in §3.2, prefixes usually do not get copied in Kisukuma reduplication and roots do not get copied twice. Usually the reduplicant contains only one content morpheme in Kisukuma. However, if the content morpheme is monosyllabic, double copying is possible. This follows from the second generalization above: the root is copied twice and the infinitive marker [gʊ-] gets copied in the reduplicant in order to satisfy the disyllabic minimality requirement on the size of the reduplicant. My intuition as a native speaker is that, the first option, i.e. the double copying of the stem, represents the more natural reduplicative pattern for monosyllabic roots. The same mechanism is also employed by Chichewa (Hyman and Mtenje 1999), Kinande (Downing 1999) and Chiyao (Mtenje 2002)[11]. In Chiyao, for example, the second option is not available.

Other Bantu languages employ different mechanisms to satisfy the disyllabic minimality requirement on the size of the reduplicant. For example, in Siswati and Ndebele, a morphologically-empty [–yi–] is epenthesized (cf. 2a and 2b-c respectively). In Kikerewe, however, the monosyllabic stem vowel is lengthened (cf. 2d).

[11] Mtenje (2002:4), however, mentions a less widely spoken dialect of Chiyao which reduplicates monosyllabic verbs by copying the stem only once. Thus [ku-ly-á] "to eat" reduplicates as ku-**ly-a** + **ly**-a not as *ku-**ly-a-ly-a** + ly-a, ku-**gw**-a "to fall" reduplicates as ku-**gw-a** + **gw**-a not as *ku-**gw-a-gw-a** + **gw**-a while ku-**mw**-a "to drink" reduplicated as ku-**mw-a** + **mw**-a and not as *ku-**mw-a-mw-a** + mw-a. This type of reduplication is very rare in Bantu.

(2) a. Monosyllabic verbal reduplication in Siswati (Downing 1999: 63)

Stem	**Reduplicated Form**	**Gloss**
-phá	**-phayî + pha**	"give"
-wa	**-wayi + wa**	"fall"

b. Monosyllabic verbal reduplication in Ndebele imperative (Hyman, Inkelas and Sibanda 1998:11)

Stem	**Reduplicated Form**	**Gloss**
dl-a-yi	**dl**-a-yi + dl-a	"eat!"
m-a-yi	**m**-a-yi + m-a	"stand!"
lw-a-yi	**lw**-a-yi + lw-a	"fight!"

c. Prefixation has no effect on [yi] augmentation (Hyman, Inkelas and Sibanda 1998:11)

Stem	**Reduplicated Form**	**Gloss**
uku-**dl**-a	uku-**dl**-a-yi + dl-a	"to eat"
uku-**m**-a	uku-**m**-a-yi + m-a	"to stand"
uku-**lw**-a	uku-**lw**-a-yi + lw-a	"to fight"

d. Monosyllabic verbal reduplication in Kikelewe (Odden 1996:130)

Stem	**Gloss**	**Reduplicated Form**	**Gloss**
ku-**gwa**	"to fall"	ku-**gwaa** + gwa	"to fall about"
ku-**sya**	"to grind"	ku-**syaa** + sya	"to grind here and there"
a-ka-**za**	"he went"	a-ka-zaa + za	"he went about"

To account for the prohibition of monosyllabic reduplicants in Bantu reduplication, the prosodic constraint in (3a) has been proposed. Although this constraint is undominated in languages like Ndebele (Hyman, Inkelas and Sibanda 1999) and Kirundi (Brassil 2000), where the reduplicant is both minimally and maximally disyllabic, FOOT BINARITY is only partially satisfied in languages like Kisukuma, Chiyao (Mtenje 2002), Olusamia (Marlo 2002) and Kiswahili. Maximally, in the latter languages, the reduplicant can be of any length and base stems are not truncated in reduplication. Minimally, however, the reduplicant can not be less than two syllables. I will thus use FOOT MINIMALITY (3b) instead of FOOT BINARITY to account for Kisukuma data.

(3) a. FOOT BINARITY: The reduplicant is both minimally and maximally binary
b. FOOT MINIMALITY: The reduplicant must contain at least a foot (RED< 2σ)

In Kisukuma, like in many other Bantu languages, prefixes such as infinitive markers usually do not copy in the reduplicant. The constraint banning the copying of prefixes in the reduplicant is given below.

(4) *AFFIX (RED): Assess a violation to every candidate that copies an affix in the reduplicant.

As shown in (2), prefixes, e.g. infinitive markers, are copied in the reduplicant in order to make the reduplicant at least disyllabic. This indicates that FOOT MINIMALITY is highly ranked above the constraint that prohibits the copying of prefixes in the reduplicant. Since prefixes are copied in order to avoid monosyllabic reduplicants, it is clear that the need to prevent the reduplicant from being monosyllabic is more important than not copying the prefixes in the reduplicant.

There is another crucial observation involving Bantu verb stem reduplication. It is a well documented fact that closed syllables are marked and are generally prohibited in Bantu. These languages prefer open syllables (CV and CVV). The constraint responsible for the prohibition of closed syllables in Bantu is given in (5) below. Since closed syllables never surface in Bantu, it is clear that this constraint is undominated.

(5) NO CODA: Codas are not allowed.

In order to satisfy NO CODA, a low vowel [-a] is a usually suffixed to Bantu roots. This is the most frequent verb ending in Bantu verbs. These observations can be captured by the appropriate ranking of the constraints proposed so far (cf. 3-5).

Since the avoidance of monosyllabic reduplicants is of higher priority than the prohibition of copying the prefixal morphemes in the reduplicant, it is clearly that FOOT BINARITY outranks *PREFIX (RED). The tableau in (6) gives the correct ranking in these stems.

(6) Monosyllabic stems: NO CODA, FOOT MINIMALITY >> *PREFIX (RED)

6. /gʊ-zw-a + RED/	NO CODA	FOOT MINIMALITY	*PREFIX (RED)
a. gʊ-zw-a + gʊ-zw-a			*
b. gʊ-zw-a + zw-a		*!	
c. gʊ-zw-a + zw	*!	*	

Candidate (6a) violates only the low ranked *PREFIX (RED) because it copies the infinitive marker in the reduplicant. Candidate (6b) looses because it incurs a fatal violation of FOOT MINIMALITY because the reduplicant is monosyllabic. Candidate (6c) is the worst of all because it violates the undominated NO CODA and FOOT MINIMALITY.

7. /gʊ-zw-a + RED/	NO CODA	FOOT MINIMALITY	*PREFIX (RED)
a. gʊ-zw-a zw-a + zw-a			
b. gʊ-zw-a + zw-a		*!	
c. gʊ-zw-a + zw	*!	*	

The tableau in (7) illustrated the other reduplicative possibility where the monosyllabic stem is copied twice. Candidate (7a) is the best of all because it satisfies all the constraints. This explains why this is the most natural reduplicative pattern in Kisukuma monosyllabic verb stem reduplication. Candidate (7b) incurs a fatal violation of FOOT MINIMALITY because its reduplicant is monosyllabic. Like candidate (6c), candidate (7c) is the worst because the reduplicant ends in a consonant (violating the undominated NO CODA) and it is also monosyllabic, violating the high ranked FOOT MINIMALITY. What we learn from tableau (7) is that, although the copying of prefixes is allowed in monosyllabic verbal stems, the double copying of the monosyllabic roots is the better option of satisfying the minimality requirement on the size of the reduplicant than copying of prefixes.

(8) Monosyllabic Roots (CVC-, CVVC-, CCVVC-)

a.	gʊ-**βal**-a	gʊ-**βal-a** + **βal**-a	"to count"
b.	gʊ-**lol**-a	gʊ-**lol-a** + **lol**-a	"to look, to watch"
c.	gʊ-**kaaβ**-a	gʊ-**kaaβ-a** + **kaaβ**-a	"to exchange (barter system)"
d.	gʊ-**saat**-a	gʊ-**saat-a** + **saat**-a	"to be in pain, to suffer"
e.	gʊ-**kwaal**-a	gʊ-**kwaal-a** + **kwaal**-a	"to scratch"
f.	gʊ-**ng'week**-a	gʊ-**ng'week**-a + **ng'week**-a	"to glitter"

Examples (8a-b) have CVC- roots while those in (8c-d) have CVVC- roots. In (8e-f) the roots are CCVVC-. In all examples, the reduplicant is disyllabic and thus the infinitive marker [gʊ-] does not copy in the reduplicant. Moreover, regardless of the shape of the stem, the base and the reduplicant are identical. Now examine the vowel initial roots below.

(9) Vowel initial Monosyllabic roots (VC-, VCC-)

	UR		SR	Reduplicated form	Gloss
a.	/gu-**iβ**-a/	=>	[gu-**β**-a]	gu-**β-a** + **iβ**-a	"to steal"
b.	/go-**ot**-a/	=>	[go-**ot**-a]	go-**ot-a** + **ot**-a	"to sun bath"
c.	/gʊ-**ʊβ**-a/	=>	[gʊ-**ʊβ**-a]	gʊ-**ʊβ-a** + **ʊβ**-a	"to take shelter"
d.	/go-**ol**-a/	=>	[go-**ol**-a]	go-**ol-a** + **ol**-a	"tobrand (animals)"
e.	/gʊ-**oŋh**-a/	=>	[go-**oŋh**-a]	go-**oŋh**-a + **oŋh**-a	"to breast feed"
				go-**oŋh**-a + go-**oŋh**-a	

f.	/gʊ-**ɪβ**-a/	=>	[gw-**ɪɪβ**-a]	gw-**ɪɪβ**-a + ɪβ-a	"to forget"
				gw-**ɪɪβ**-a + gw-ɪɪ**β**-a	
g.	/gʊ-**enh**-a/	=>	[gw-**eenh**-a]	gw-**eenh**-a + **enh**-a	"to bring"
				gw-**eenh**-a + gw-**eenh**-a	
h.	/gʊ-**ɪng**-a/	=>	[gw-**ɪɪng**-a]	gw-**ɪɪng**-a + **ɪng**-a	"to leave"
				gw-**ɪɪng**-a + gw-**ɪɪng**-a	
i.	/gʊ-**ɪmb**-a/	=>	[gw-**ɪɪmb**-a]	gw-**ɪɪmb**-a + **ɪmb**-a	"to sing"
				gw-**ɪɪmb**-a + gw-**ɪɪmb**-a	
j.	/gʊ-**andy**-a/	=>	[gw-**aandy**-a]	gw-**aandy**-a + **andy**-a	"to begin/start"
				gw-**aandy**-a + gw-**aandy**-a	
k.	/gʊ-**amb**-a/	=>	[gw-**aamb**-a]	gw-**aamb**-a + **amb**-a	"to make the bed"
				gw-**aamb-a** + gw-**aamb**-a	

Examples (9a-e) contain VC-a roots while the remaining examples have VCC-a roots. In examples (9a-d), the vowel of the infinitive marker and the initial vowel of the root do not result in glide formation while in the remaining examples, the combination of the infinitive marker vowel and root vowels leads to phonological fusion resulting in a glide. What is interesting in these examples is that apart from the phonological fusion of the infinitive marker and the initial vowel of the root in the base resulting in a glide, the infinitive prefix can optionally be copied in the reduplicant. In fact, the candidates that do not copy the infinitive prefix in the reduplicant are the most natural and number one choice. In some speakers, the candidates that copy the prefix are even questionable. This provides further evidence that

[12] The doubling of vowels on the surface forms in examples (9f-k) is the result of compensatory lengthening

prefixes are generally not preferred in the reduplicant. This non-optimality of prefixes in the reduplicant can cause correspondence violations between the base and the reduplicant. In (9), for example, the best reduplicants (the ones that exclude the prefixes in the reduplicant), are more faithful to the input than to the base.

Before I provide the analysis pertaining to the shape of the reduplicant in Kisukuma verb stem reduplication, it is important that I discuss other theoretical issues like the source and the realization of [-a] in Kisukuma and Bantu verb stem reduplication in general. Moreover, in order to provide a unified account, it is also important that I provide all the basic patterns and information regarding reduplication in other grammatical categories particularly nouns, adjectives and numbers. After introducing all the basic information and reduplicative patterns, I will then provide the analysis in §3.9.

3.3. The Fixed [-a] in Bantu verb stem reduplication

Although /-a/ is the general vowel that is invoked at the end of the reduplicant in order to satisfy the undominated constraint NO CODA, its realization and status in Bantu reduplication has always been of theoretical interests. This interest stems from the fact that sometimes its realization in the reduplicant is surprising and unexpected. Consider the examples in (11).

(11) Monosyllabic roots (with derivational suffixes)

a.	gʊ-**βal**-ɪl-a	gʊ-**βal-a** + **βal**-ɪl-a	"to count for"
		gʊ-**βal-ɪl-a** + **βal**-ɪl-a	
		*gʊ-**βal-ɪ** + **βal**-ɪl-a	
b.	gʊ-**lol**-el-a	gʊ-**lol-a** + **lol**-el-a	"to look for, to watch for"
		gʊ-**lol-el-a** + **lol**-el-a	
		*gʊ-**lol-e** + **lol**-el-a	

c.	gʊ-**som**-el-a	gʊ-<u>**som**-a</u> + **som**-el-a	"to read for"
		gʊ-<u>**som**-el-a</u> + **som**-el-a	
		*gʊ-<u>**som**-e</u> + **som**-el-a	
d.	go-**oŋh**-el-a	go-<u>**oŋh**-a</u> + **oŋh**-el-a	"to breast feed for"
		go-<u>**oŋh**-el-a</u> + **oŋh**-el-a	
		*go-<u>**oŋh**-e</u> + **oŋh**-el-a	
e.	gwɪ-**ɪmb**-ɪl-a	gwɪ-<u>**ɪmb**-a</u> + **ɪmb**-ɪl-a	"to sing for"
		gwɪ-<u>**ɪmb**-ɪl-a</u> + **ɪmb**-ɪl-a	
		*gwɪ-<u>**ɪmb**-ɪ</u> + **ɪmb**-ɪl-a	

Examples (11a-c) involve productively suffixed (CVC-) roots while those in (11d-e) involve (VCC-) suffixed roots. All of them are suffixed with an applicative morpheme [-el-]~[-ɪl-]. As shown in (11), the preferred reduplicant is disyllabic and surfaces with a fixed low vowel [-a]. Looking carefully at the reduplicative pattern in (11), two crucial important questions arise. First, where does the fixed low vowel [-a] come from? Second, if [-a] is suffixed in order to make the reduplicant disyllabic, why is the vowel of the applicative morpheme not copied in the reduplicant? In other words, why are ungrammatical (*) examples non-optimal?

Before I answer these questions, it is important to note that in certain morphological environments, other vowels (e.g. subjunctive –e) apart from [-a] do occur in the last syllable of the reduplicant. Consider the following examples.

(12) a.	a-**som**-e	a-<u>**som**-e</u> + **som**-e	"he ought to read, let him read"
		a-<u>**som**-a</u> + **som**-e	

b. a-**βilim**-e a-**βilim**-e + **βilim**-e "he ought to roll, let him roll"
a-**βilim**-a + **βilim**-e
*a-**βili** + **βilim**-e

c. a-**palagan**-e a-**palagan**-e + **palagan**-e "he ought to struggle, let him struggle"
a-**palagan**-a + **palagan**-e
*a-**pala** + **palagan**-e

In (12) two shapes of the reduplicant are possible. First, the reduplicant can either be identical to the base hence a-**som-e** + som-e and a-**βilim**-e + βilim-e. Second, the reduplicant can end in [-a] thus a-som-a + som-e and a-βilim-a + βilim-e even though the base does not end with [-a]. While all examples seen so far seem to suggest that the fixed vowel [-a] in the reduplicant always comes from the base, the examples in (12) provides evidence to the contrary. Although the base does not end with a fixed [-a], surprisingly the reduplicant can. From these examples, it is apparent that the final vowel [-a] in the reduplicant does not *always* come from the base. Thus, other sources for the reduplicant final [-a] must be sought.

Notice also that, the option of having the fixed [-a] in the reduplicant is not available if the verb is trisyllabic or longer (cf. 13). When longer stems are reduplicated in Kisukuma, the entire base must be copied. That is, total reduplication is preferred. In general, regardless of the length of the stem, roots never get truncated in Kisukuma reduplication. The disyllabic reduplicants in longer stems in these forms are thus impossible. This is showed by the ungrammatical (*) examples in (13).

(13) Longer Roots

	a.	gʊ-**βilim**-a	gʊ-**βilim**-a + **βilim**-a	"to roll"
			*gʊ-**βil**-a + **βilim**-a	
			*gʊ-**βili** + **βilim**-a	
	b.	gʊ-**lugʊl**-a	gʊ-**lugʊl**-a + **lugʊl**-a	"to open"
			*gʊ-**lug**-a + **lugʊl**-a	
			*gʊ-**lugʊ** + **lugʊl**-a	
	c.	gʊ-**gaagan**-a	gʊ-**gaagan**-a + **gaagan**-a	"to be hyperactive
			*gʊ-**gaag**-a + **gaagan**-a	
	d.	gʊ-**leembeel**-a	gʊ-**leembeel**-a + **leembeel**-a	"to be calm"
			*gʊ-**leemb**-a + **leembeel**-a	
			*gʊ-**leembe** + **leembeel**-a	
	e.	gʊ-**palagan**-a	gʊ-**palagan**-a + **palagan**-a	"to struggle "
			*gʊ-**pal**-a + **palagan**-a	
	f.	gʊ-**kaangalaβan**-a	gʊ-**kaangalaβan**-a + **kaangalaβan**-a	"to stiffen"
			*gʊ-**kaang**-a + **kaangalaβan**-a	

When longer stems are suffixed with productive suffixes as in (14) below, the most natural pattern is to copy the entire base in the reduplicant. Notice also that the suffix can disappear in the reduplicant. When this happens, the fixed [-a] occurs suffixed to the root occupying the slot that was supposed to be filled with the suffix vowel if exact correspondence between the base and the reduplicant were to be realized. Forms like *gʊ-βilim-ɪ + βilim-ɪl-a and all ungrammatical (*) examples in (14) are thus impossible. Moreover, like in (11) above, disyllabic reduplicants in these forms are impossible because root materials are never supplanted by the fixed [-a] or truncated.

(14) Longer roots with derivational suffixes

a.	gʊ-**βilim**-ɪl-a	gʊ-**βilim**-ɪl-a + **βilim**-ɪl-a	“to roll for”
		gʊ-**βilim**-a + **βilim**-ɪl-a	
		*gʊ-**βilim**-ɪ + **βilim**-ɪl-a	
b.	gʊ-**lugʊl**-ɪl-a	gʊ-**lugʊl**-ɪl-a + **lugʊl**-ɪl-a	“to open for”
		gʊ-**lugʊl**-a + **lugʊl**-ɪl-a	
		*gʊ-**lugʊl**-ɪ + **lugʊl**-ɪl-a	
c.	gʊ-**gaagan**-ɪl-a	gʊ-**gaagan**-ɪl-a + **gaagan**-ɪl-a	“to be hyperactive for”
		gʊ-**gaagan**-a + **gaagan**-ɪl-a	
		*gʊ-**gaagan**-ɪ + **gaagan**-ɪl-a	
d.	gʊ-**palagan**-ɪl-a	gʊ-**palagan**-ɪl-a + **palagan**-ɪl-a	“to struggle for”
		gʊ-**palagan**-a + **palagan**-ɪl-a	
		*gʊ-**palagan**-ɪ + **palagan**-ɪl-a	
e.	gʊ-**kaangalaβan**-ɪl-a	gʊ-**kaangalaβan**-ɪl-a +**kaangalaβan**-ɪl-a	“to stiffen
		gʊ-**kaangalaβan**-a + **kaangalaβan**-ɪl-a	for”
		*gʊ-**kaangalaβan**-ɪ + **kaangalaβan**-ɪl-a	

The longer root examples in (13) and (14) illustrate that, unlike in languages such as Kirundi, Ndebele, Siswati and Kikuyu where the reduplicant is both minimally and maximally disyllabic, the reduplicant in Kisukuma is not maximally disyllabic although minimally it must be at least disyllabic. Unlike in the former languages, materials from the root never get truncated in Kisukuma. Consider examples from Kirundi in (15a), Ndebele in (15b), Siswati in (15c) and Kikuyu in (15d).

(15) RED minimally and maximally disyllabic (Kirundi, Ndebele, Siswati and Kikuyu)

(a) Kirundi (Brassil 2000: 12)

Base	Reduplicated form	Gloss
ku-**fuungur**-a	ku-**fuungu** + **fuungur**-a	“smile repeatedly”

ku-**gaban**-a	ku-**gaba** + **gaban**-a	"share repeatedly"

(b) Ndebele (Hyman, Inkelas and Sibanda 1998:3)

Base	**Reduplicated form**	**Gloss**
nambith-a	**nambi** + **nambith**-a	"taste"
thembuz-a	**thembu** + **thembuz**-a	"go from wife to wife"

(c) Siswati (Downing 1996: 4)

Base	**Reduplicated form**	**Gloss**
u-ya-**bonis**-a	u-ya-**boni** + **bonis**-a	"you show"
u-ya-**futfumal**-a	u-ya-**futfu** + u-ya-**futfumal**-a	"you are getting warm"

(d) Kikuyu (Downing 1999:64)

Base	**Reduplicated form**	**Gloss**
andek-a	**and-a** + **andek**-a	"write"
hetok-a	**het-a** + **hetok**-a	"pass"

In these languages, the reduplicant is strictly disyllabic and longer stems thus get truncated. As I have shown above, this truncation of the stem is not possible in Kisukuma. In this respect, Kisukuma is like (standard) Kiswahili (16a), Chiyao (16b), Kikerewe (16c) and Chichewa (16d).

(16) a. Truncation of the verb stem is not possible in standard Kiswahili

Base	**Reduplicated form**	**Gloss**
ku-**zunguk**-a	ku-**zunguk-a** + **zunguk**-a	"go around"
ku-**tengenez**-a	ku-**tengenez-a** + **tengenez**-a	"make, fix"

b. Truncation of the verb stem is not possible in Chiyao (Mtenje 2002: 13)

Base	**Reduplicated form**	**Gloss**
ku-wu-**telek**-a	**telek**-a + **telek**-a	"to cook it repeatedly"
tu-ci-**leembile**	tu-ci-**leembile** + **leembile**	"we wrote it several times"

c. Truncation of the verb stem is not possible in Kikerewe (Odden 1996: 137)

Base	Reduplicated form	Gloss
ku-**kalaang**-a	ku-**kalaang**-a + **kalaang**-a	"fry"
ku-**heleeluk**-a	tu-**heleeluk**-a + **heleeluk**-a	"be last"

d. Truncation of the verb stem is not possible in Chichewa (Hyman and Mtenje 1999:108)

Base	Reduplicated form	Gloss
thandiz-a	**thandiz**-a + **thandiz**-a	"help (here and there)"
vundikir-a	**vundikir**-a + **vundikir**-a	"cover (here and there)"

After this much introduction, we are now at a position to answer the questions we raised above. If the reduplicant final vowel [-a] does not always come from the base as shown in (12), where does it come from? In addition, why does the vowel of the suffix in bases with productive suffixes not copy in the reduplicant (cf. 11 and 14)? Moreover, why is total reduplication preferred in longer stems like those in (13)?

There are several proposals that have been advanced in the literature to account for some of these questions. Below I briefly review some of these proposals. At the end of this section, it will be clear what proposal, with minor modifications, is able to account for Kisukuma reduplication.

3.3.1. Mutaka and Hyman (1990)

In their study of Kinande reduplication, Mutaka and Hyman (1990) assume that the entire stem is the base for reduplication but only the first two syllables can map into the disyllabic template. This assumption is based on the idea that partial reduplication is derived from total reduplication (cf. Steriade 1988). In Kinande, the reduplicant has to be disyllabic and longer stems are thus truncated in order to fit into the disyllabic template for the reduplicant. This truncation process is sensitive to morphemes to such an extent that it never splits a morpheme. Consider the following examples from Kinande.

(17) Kinande verbal reduplication (Mutaka and Hyman 1990; eri- is the infinitive prefix, [-ir-] is an applicative morpheme while –an– is a reciprocal morpheme.

Base	**Reduplicated form**	**Gloss**
eri-**hum**-a	eri-**hum**-a + **hum**-a	"to beat"
eri-**hum**-ir-a	eri-**hum**-a + **hum**-ir-a *eri-**hum**-i + **hum**-ir-a	"to beat for"
eri-**hum**-ir-an-a	eri-**hum**-a + **hum**-ir-an-a *eri-**hum**-i + **hum**-ir-an-a	"to beat for each other"

It is apparent that the vowel [-i] of the applicative morpheme [-ir-] can not be copied in Kinande verb reduplication because this would always split the applicative morpheme. Mutaka and Hyman (1990) propose a morphological constraint that prohibits the splitting of morphemes in the reduplicant. They call it, the Morpheme Integrity Constraint (MIC).

(18) **Morpheme Integrity Constraint** (Mutaka and Hyman; 1990:83)

Mapping of a melody to a reduplicative template takes place *by morpheme*. If the whole of a morpheme can not be successfully mapped into a bisyllabic template, then none of the morpheme may be mapped.

Since the splitting of a morpheme in order to make the reduplicant fit into the disyllabic template is impossible, the remaining part of the stem does not copy in Kinande and a default vowel [-a] is inserted to fill the empty final slot in the disyllabic reduplicant. Mutaka and

Hyman's (1990) answer to questions pertaining to the failure of the suffixal vowel to copy in the reduplicant is MIC and the source of [-a] in the reduplicant is simple: the suffixal vowel does not copy because this would split up a morpheme and [-a], itself a default segment, is inserted by default to fill the empty slot in the disyllabic reduplicant.

Simple examination of Kisukuma data reveals that Kisukuma also displays the similar pattern when productively suffixed bases are reduplicated. Examples in (11) and (14) partially repeated here as (19) and (20) respectively, for ease of reference, demonstrate the similarity between Kinande and Kisukuma. We can thus extend Mutaka and Hyman's (1990) proposal to account for the failure of the suffixal vowel to surface in the Kisukuma reduplicant and the source of the fixed [-a] in these forms. The ungrammatical examples in (19) and (20) are bad because the exact segmental correspondence between the base and the reduplicant comes at the expense of splitting a morpheme. This move, however, is prohibited by the Morpheme Integrity Constraint (MIC). The fixed [-a] is then inserted by default.

(19) Monosyllabic roots with productive derivational suffixes

a.	gʊ-**βal**-ɪl-a	gʊ-**βal**-a + **βal**-ɪl-a	"to count for"
		gʊ-**βal**-ɪl-a + gʊ-**βal**-ɪl-a	
		*gʊ-**βal**-ɪ + **βal**-ɪl-a	
b.	gʊ-**lol**-el-a	gʊ-**lol**-a + **lol**-el-a	"to look for, to watch for"
		gʊ-**lol**-el-a + **lol**-el-a	
		*gʊ-**lol**-e + **lol**-el-a	

(20) Longer roots with derivational suffixes

a.	gʊ-**βilim**-ɪl-a	gʊ-**βilim**-a + **βilim**-ɪl-a	"to roll for"
		gʊ-**βilim**-ɪl-a + **βilim**-ɪl-a	
		*gʊ-**βilim**-ɪ + **βilim**-ɪl-a	

b.	gʊ-**lugʊl**-ɪl-a	gʊ-<u>**lugʊl-a**</u> + **lugʊl**-ɪl-a	"to open for"
		gʊ-<u>**lugʊl**-ɪl-a</u> + **lugʊl**-ɪl-a	
		*gʊ-<u>**lugʊl-ɪ**</u> + **lugʊl**-ɪl-a	

While MIC analysis is able to account for the failure of the suffixal vowel to copy in the reduplicant, its proposal regarding the source of the fixed [-a] in bases with productive suffixes has been critically questioned. Specifically, it has been argued that the MIC analysis can not explain why it is the low vowel [-a] and not any other vowel that gets inserted into the disyllabic reduplicants. Mutaka and Hymans's (1990) argument is that [a] is preferred because it is a default vowel in Bantu. However, Hyman (1989) and Archangeli and Pulleyblank (1994) have shown that there is no strong evidence to prove that [a] is a phonologically unmarked vowel in Kinande and other Bantu languages.

Following Archangeli (1984, 1988) and McCarthy et al. (1997), the connection between reduplication and defaults is established by the fact that if a segment is a default in a language, it is the same segment that is epenthesized to break consonantal clusters that tend to violate the phonotactic constraints of the language. In the Bantu case, [a] is inserted to avoid the violation of NO CODA, the undominated markedness constraint that requires all syllables end with a vowel. The available evidence strongly suggests that the epenthetic vowel in Bantu is the high front vowel [i]. Odden (1996), Mutaka and Hyman (1990, Downing 1999), Myers (1987), Kiyomi and Davis (1992) and Downing (1999) have provided evidence to show that it is the high front vowel [i] that is epenthesized to break illegal consonant clusters when foreign words with complex CC sequences are borrowed in Kikerewe, Kinande, Kishona, Siswati and Kikuyu respectively. Although it is difficult to prove this in Kisukuma, it is very likely that

[i] is also epenthetic in Kisukuma because many borrowed words get into the language via Kiswahili which also, to a larger extent, simplifies illegal CC clusters through [i] and other vowels epenthesis. There are few loanwords that seem to have entered into Kisukuma directly. Even if these words have been borrowed in Kisukuma via Kiswahili, their syllable structure is further simplified in Kisukuma through [i] epenthesis. As shown in (21), Kiswahili is more liberal in its syllable structure than Kisukuma. While Kiswahili allows a variety of CC sequences, the Kisukuma's syllable structure is strictly CV. However, Kisukuma allows a few CC clusters and the most common ones are Nasal + glide, Nasal + stop and Stop + glide. Obstruent sequences like [-sp-] in Kiswahili "hospitali" (cf. 21d) never occur in Kisukuma and are resolved by [i] epenthesis.

(21) English borrowing into Kisukuma (probably not via Kiswahili)

	English	**Kiswahili**	**Kisukuma**
a.	Mark	"Marko"	"máliko"
b.	Christmas	"krismasi"	"kîsimaasî"
c.	Gabriel	"gabrieli"	"gabiliéli"
d.	hospital	"hospitali"	"sibitááli

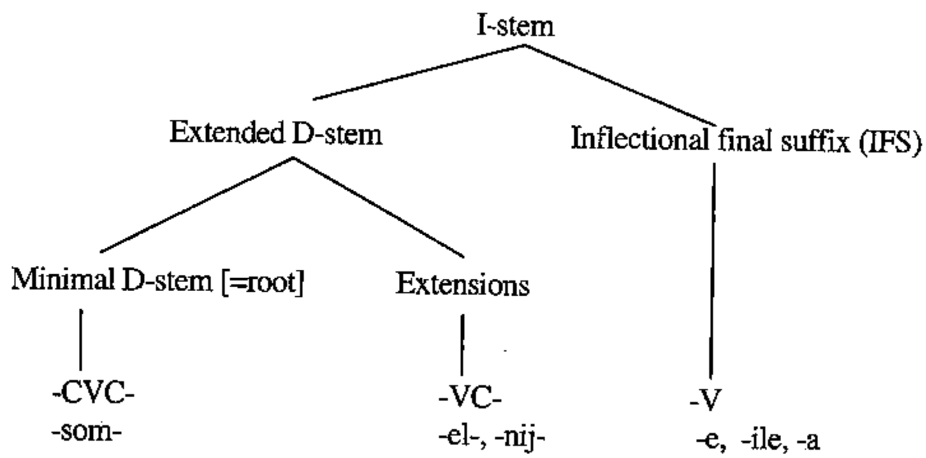
This suggests that [a] is not a default vowel in Kisukuma and Bantu languages in general. Its appearance in the reduplicant of bases with productive suffixes is thus problematic and MIC analysis is unable to account for its source.

3.3.2. Downing (1997, et seq.)

In order to account for the source of [a] in the reduplicant, Downing (1997) proposed a morphological account. Her study marks the initial radical attempts to view Bantu reduplication much more as a morphologically-determined process than a phonological process. Downing proposed the following verb stem structure.

(22) Bantu verb stem (Downing 1997, et seq. cf. Myers 1987)

a.	I-stem	=	Inflectional stem	c.	Root	=	Minimal D-stem
b.	D-stem	=	Derivational stem	d.	X + a	=	"canonical stem" (CS)



As shown in (22), the full verb stem is referred to as an inflected stem (I-stem). The I-stem has two parts: (i) an extended derivational (D) stem which can be potentially extended by derivational suffixes like applicatives, simultaneous, causatives, reciprocals and (ii) an inflectional final suffix. The root in (22) is characterized as a minimal D-stem. In (22), Downing's verb structure is exemplified with the root [-som-] "read", the applicative (-el-), simultaneous (-nij-) and the inflectional final vowel [-a], subjunctive [-e] and perfective [-ile]. Any stem that ends in [-a] is referred to as a canonical stem.

Regarding the source of [-a] when bases with productive suffixes are reduplicated, Downing proposes a morphological account. She argues that, while [a] is phonologically a marked vowel and its realization as a fixed vowel in the reduplicant is completely arbitrary, its realization morphologically is not surprising. She argues that reduplicants in Bantu verb stem reduplication are canonical stems themselves and thus must end in [-a]. This implies that the final [-a] is morphologically unmarked. Bantu reduplicants are canonical stems and are parsed into two constituents: the root and the *unmarked* inflectional final suffix (IFS) [-a]. The crucial implication in this analysis is that [-a] is an unmarked morphologically empty IFS and thus appears in the reduplicant no matter what the IFS of the base is. Since default segments in the reduplicant are generally the unmarked segments (cf. McCarthy and Prince 1994, Alderete et al. 1997), the occurrence of the morphologically empty default IFS [-a] in Bantu reduplication is thus not surprising.

If the reduplicants in Bantu are indeed canonical stems and must end in the unmarked morphologically empty IFS [-a], why does the canonical stem sometimes alternate with the exact copy of the base? That is, why do disyllabic stems that end with some other IFS, as those in (23), also copy the last vowel of the base (subjunctive-e) instead of the canonical stem alone?

(23)	a. a-**som**-e	a-**som**-e + **som**-e	"he ought to read, let him read"
		a-**som**-a + **som**-e	
	b. a-**βilim**-e	a-**βilim**-e + **βilim**-e	"he ought to roll, let him roll"
		a-**βilim**-a + **βilim**-e	
	c. a-**palagan**-e	a-**palagan**-e + **palagan**-e	"he ought to struggle, let him struggle
		a-**palagan**-a + **palagan**-e	

In the Mutaka and Hyman Morpheme Integrity Constraint (1990) analysis, the final vowel of the base in subjunctive forms like those in (23) is copied in the reduplicant because this does not split any morpheme. Thus the copying of the subjunctive marker [-e] is not problematic. The canonical stem analysis, however, predicts that a-<u>**som**-a</u> + **som**-e is the only possible shape of the reduplicant (cf. 23a).

As argued by Downing (1997), the reduplicant will come out as an exact copy of the first two syllables of the base instead of a canonical stem (Root-a) only for disyllabic stems. This is to say, it is optimal to copy the IFS of the base if and only if (iff) the base is the same size as the reduplicant. This is possible because, perfect correspondence is possible between the reduplicant and the base. However, if copying the entire base is in conflict with the maximality condition on the reduplicant to such an extent that exact correspondence between the base and the reduplicant is impossible, the reduplicant is optimally a canonical stem (CS) ending in [-a]. That is, the default [-a] is pre-empted by the base's final vowel only if this would lead to perfect exactness between the base and the reduplicant. Everywhere else, the reduplicant will come out as a canonical stem. From this discussion, the reduplicant's [-a] is motivated by morphological factors: it surfaces in the reduplicant because reduplicants are canonical stems and [a] itself is morphologically unmarked. In this analysis, long stems whose reduplicants do not correspond to canonical stems are thus problematic (cf. 23b-c). In these forms only a-<u>**βilim**-a</u> + **βilim**-e and a-<u>**palagan**-a</u> + **palagan**-e is predicted.

Another question that was raised above concerns the non-availability of disyllabic canonical reduplicants when long stems are reduplicated. That is, why are disyllabic canonical reduplicants possible only with CVC-VC-V stems but not with CVCVC- or CVVCVVC-V stems? Simply stated, why are the forms in (24) possible while the starred (*) examples in (25) are impossible as reduplicants.

(24) Only productive derivational suffixes can be replaced by the FV-a in CVC- Roots

a. gʊ-**βal**-ɪl-a gʊ-<u>**βal**-a</u> + **βal**-ɪl-a "to count for"

b. gʊ-**lol**-el-a gʊ-<u>**lol**-a</u> + **lol**-el-a "to look for, to watch for"

c. gʊ-**som**-a gʊ-<u>**som**-a</u> + **som**-el-a "to read for"

(25) Disyllabic canonical reduplicants are impossible with longer stems

a. gʊ-**lugʊl**-a gʊ-<u>**lugʊl**-a</u> + **lugʊl**-a "to open"

*gʊ-<u>**lug**-a</u> + **lugʊl**-a

b. gʊ-**gaagan**-a gʊ-<u>**gaagan**-a</u> + **gaagan**-a "to be hyperactive"

*gʊ-<u>**gaag**-a</u> + **gaagan**-a

c. gʊ-**leembeel**-a gʊ-<u>**leembeel**-a</u> + **leembeel**-a "to be calm"

*gʊ-<u>**leemb**-a</u> + **leembeel**-a

Downing's (1997) proposal is that in case of CVC-a reduplicants like those in (24), the CVC- string *corresponds* to an independently existing minimal D-stem (cf. 22). All the stems in (24) are indeed minimal D-stems.

(26) Downing (1997 et. seq): CVC- of CVC-a must be a corresponding minimal D-stem.

In forms like those in (25), the CVC-a reduplicants are impossible because [**lug**-a] of [**lugʊl**-a] "open" (cf. 25a), [**gaag**-a] of [**gaagan**-a] "be hyperactive" (cf. 25b) and [**leemb**-a] of [**leembeel**-a] "be calm" (cf. 25c), do not independently exist as D-stems. While this proposal works well in languages like Kisukuma, in some languages the CVC-a reduplicants do not need to correspond with an existing D-stem. This includes languages like

Siswati, Kirundi, Ndebele and Kikuyu (cf. 15) above. Moreover, Hyman et al (1998) provide evidence to show that this proposal is unsatisfactory in accounting for the full range of verb stem reduplication in Ndebele.

3.3. 3. Lexical Conservatism (Steriade 1997)

Steriade's (1997) theory of lexical conservatism is an extension of the blocking phenomenon first studied in generative phonology by Halle (1973) and Aronoff (1976). Simply stated, blocking is a phenomenon "whereby a pre-existing, listed word blocks productive word formation processes from creating potential synonyms to it" (Steriade 1997:1). In essence, therefore, blocking reflects the speaker's tendency to use known words instead of creating novel ones. This is what Steriade (1997) calls lexical conservatism.

Expanded to phonology, lexical conservatism asserts that in many instances phonological processes are blocked from creating novel phonological variants to a listed stem. This is a familiar stem sufficient to give the speaker the confirmation that the respective stem has been sanctioned by past linguistic usage. In this sense, phonological conservatism reflects the speakers' tendency to recycle already existing allomorphs instead of generating novel ones. This allomorph recycling sometimes takes place even if the recycled allomorph does not give full satisfaction to the applicable phonological and morphological conditions.

A listed word can be a word whose morphological and phonological properties are predicted by speakers provided that the speakers have a wide knowledge of the grammar and the lexicon of the language. Since the grammar and the lexicon differ from speaker to speaker, the status of word listedness also varies from speaker to speaker. Listedness thus is a matter of individual linguistic experience. Steriade (1997) successfully uses this notion of lexical conservatism to account for French liaison, English Level II phonology, Sanskrit perfect reduplication, Global Identity conditions in Austronesian reduplication, and Bantu reduplication.

To account for why CVC-a reduplicants are possible in CVC-VC-V stems but not in CVCVC-V in Bantu reduplication, Steriade (1997) proposes that the reduplicant between the two stems is determined by whether it corresponds to an existing word. She correctly argues that the CVC-a reduplicants are possible in CVC-VC-a stems because the reduplicants themselves correspond to existing words. Thus [**βal**-a] "count", [**lol**-a] "look, watch" and [**som**-a] "read" in (24) are optimal reduplicants because they exist as corresponding imperative verbs. In CVCVC-a stems, however, disyllabic reduplicants do not correspond to any existing word. Thus [**lug**-a], [**gaag**-a] and [**leemb**-a] in (25), are not optimal reduplicants because they do not correspond to existing words. The sweeping generalization here is that the canonical disyllabic reduplicants are possible only if they correspond to an existing word in Bantu. If we translate Steriade's proposal into a constraint (e.g. MAX WORD), Bantu languages will differ depending on its ranking status. In languages like Kisukuma, Kiswahili, Chiyao, Chichewa and Olusamia where the reduplicant in verb stem reduplication always corresponds to existing words, MAX WORD is inviolable. However, in languages like Siswati, Ndebele, Kirundi and Kikuyu, MAX WORD is violated. In the latter languages, long roots are truncated in order to fit the reduplicant into the disyllabic reduplicative template thereby violating MAX

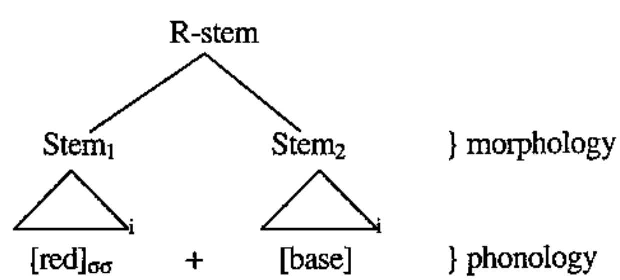
WORD. It is thus not necessary for the reduplicants to correspond to existing words in these languages.

Lexical conservatism is attractive in both its theoretical premises and empirical applicability. Due to this reason, I will adopt it in my analysis of the shape of the reduplicant in Kisukuma. For detailed information and applicability of lexical conservatism, an interested reader can consult Steriade's (1997) original manuscript on the subject.

3.3.4. Hyman, et al. (1998)

Building on Downing's (1997) account, Hyman, Inkelas and Sibanda (1998) provide a radical account of Bantu verb stem reduplication based on Ndebele, a Bantu language spoken in Zimbabwe (see also Inkelas and Zoll 2000). They treat reduplication as a morphological process that can be accounted for without referring to any corresponding relationship between the base and the reduplicant. Rather, the reduplicant in their framework does not correspond to a stem. Instead the reduplicant "is a stem, which is in morphosyntactic featural agreement with the following 'normal' stem that it appears to reduplicate" Hyman, et al. (1998:5). The reduplicant stem is a full copy of the base stem if there are no prosodic size constraints on the reduplicant stem (e.g. RED = σσ). In this view, reduplication is simply stem juxtaposition. This is shown in (27).

(27) Reduplication as stem juxtaposition (Hyman, et al. 1998)



As shown in (27), reduplication is stem juxtaposition. $Stem_1$, the reduplicant is subject to a disyllabic size constraint and is in perfect featural agreement with $stem_2$, the base. This is shown by the coindexing subscript ($_i$) on the reduplicant and base morphosyntactic structure.

Hyman et al. (1998) identifies two inviolable morphological properties of base verb stems. The first is the requirement for verb stems to contain a verb root and the second is that verb-stems in Bantu must be morphologically complex. While the first property is self explanatory, the second property requires verb stems to be suffixed. Moreover, unlike Downing (1997 et. esq.) they identify [-e], [-i] and [-ile] as inflectional endings. As in Mutaka and Hyman (1990), [-a] is treated as a default stem suffix in Bantu (cf. 28).

(28) The Bantu default stem suffix –a (Hyman et al. 1998:6)

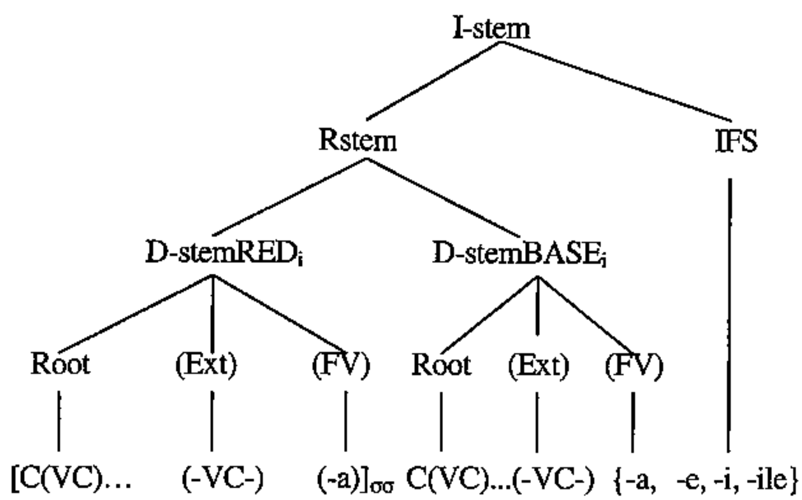
$$[\quad [\quad X \underset{\substack{\downarrow \\ [\text{-a}]}}{\_\_\_}]_{stem}$$

Hyman et al. (1998) crucially argue that [-a] can be invoked in final positions to fill out any kind of stem: D-stem, I-stem and R-stem. In their analysis, the suffix [-a] is different from other verb and noun endings because it has no corresponding morphosyntactic features that need to be spelled out. Unlike the other endings e.g. [-e], [-ile] and [-i], [-a] does not directly realize tense, aspect, mood or polarity distinctions in verbs. While the former morphemes spell out features like [+subjunctive], [+negative] or [+perfective], the latter occurs only in their absence, i.e. as default. Thus, final vowel (FV) in this analysis only refers to [-a] while all other endings, [-e], [-ile] and [-i], are referred as inflectional final suffixes (IFS).

To explain why [-a] can appear in the reduplicant while IFS [-e], [-ile] and [-i], may not, Hyman et al (1998) argue that IFS can occur only in an I-stem, while the reduplicant is a D-stem process. Since [-a] does not carry inflectional features, it may appear as a default ending on any kind of stem.

Relating to disyllabic subjunctive stems like those in (23), Hyman et al. argue that in case the D-stem is simplex, e.g. **/som-/**, it will need FV-a. However, the high ranked requirement that the IFS be spelled out takes precedence and in the subjunctive, the reduplicant comes out as [**lim**-e] instead of [**lim**-a]. The full articulated structure of a reduplicated verb stem according to Hyman et al. (1998) is given in (29).

(29) Articulated structure of reduplicated verb stem in Bantu (Hyman et al. 1998:8)



Notice that, unlike all previous studies, the FV morpheme [-a] in Hyman et al's (1998) analysis belongs to FV and *not* IFS category and the two are disassociated. The FV [-a] belongs to the D-stem while all other endings [-e], [-ile] and [-i], marking subjunctives, negatives and perfectives in Ndebele are associated with an I-stem. The FV [-a] is able to occur in D-stem of the reduplicant without disrupting the required morphosyntactic featural agreement between D-stem$_{RED}$ and D-stem$_{RED}$.

Hyman et al. (1998) also propose phonological (or size restrictor) constraints that ensure that the reduplicant is of the proper size. These constraints also determine which elements from the morphological materials under the reduplicative D-stem will occur in the disyllabic reduplicant. These constraints are given in (30).

(30) **D-stemRED cophonology (Hyman et al 1998:8)**

[σσ]:	The reduplicant is bisyllabic (=a minimal prosodic word)
MAX (ROOT):	The reduplicant should parse the root
MAX (EXT):	The reduplicant should parse extension suffixes (if any)
MAX (FV):	The reduplicant should be faithful to FV-a (if any)

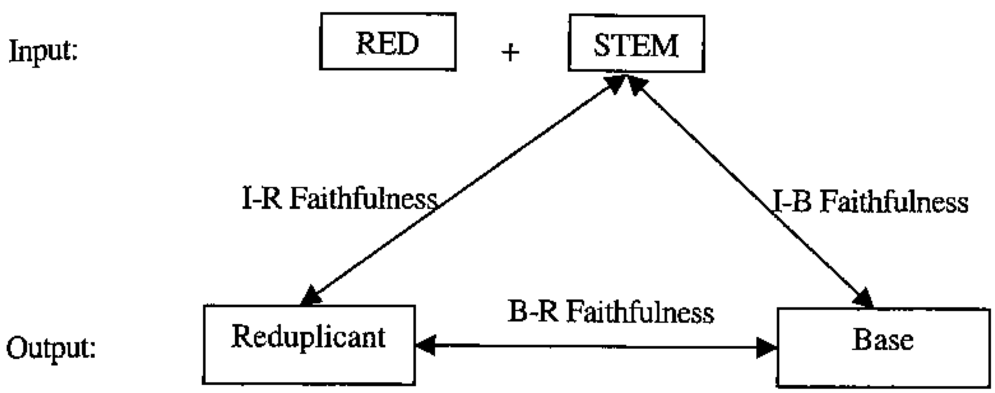
These constraints can account for many of the observed shapes and sizes of the reduplicant in Bantu (verb stem) reduplication. If [σσ] is ranked higher than MAX (ROOT), the reduplicant must be disyllabic. In multisyllabic roots this results in truncation of the root materials. This represents languages like Kirundi, Siswati, Ndebele and Kirundi (cf.15). If MAX (ROOT) outranks [σσ], truncation of the root is impossible and regardless of its length, the root must surface in the reduplicant. This ranking represents languages like Kisukuma and Luganda. In both ranking, the MAX (FV) is also ranked high. MAX (EXT) and MAX (FV) come into play when the root is smaller than CVCV as is the case in CVC- root /**som**-/ "read". If there are suffixes, the reduplicant may parse the vowel of the suffix or may invoke the FV morph, [-a]. Ndebele is known to allow both options thus the root [**lim**-el-a] "cultivate for" reduplicate as [**lim**-e] + [**lim**-el-a] or [**lim**-a] + [**lim**-el-a]. This can be expressed in OT by freely ranking the corresponding constraints i.e. MAX (EXT) and MAX (FV) (cf. Ito and Mester 1997). This represents languages like Ndebele, Siswati, Ndebele and Kirundi. In languages like Kisukuma, however, the extension vowel does not copy in CVC- suffixed roots (cf.11). Instead, the FV-a is realized in the reduplicant. This indicates that MAX (FV) outranks MAX (EXT). This is the reason why, for example, [gʊ-**lol**-el-a] "to look for" reduplicates as [gʊ-**lol**-a] + [**lol**-el-a] and not as *[gʊ-**lol**-e] + [**lol**-el-a]. In some languages, MAX (ROOT) is outranked by [σσ] and FV-a. One such language is Kikuyu (31). This accounts for the replacement of the root materials by the disyllabic canonical stem (cf. 31b-c).

(31) Kikuyu (Downing 1999)

	Base	Reduplicated form	Gloss
a.	**kor**-a	**kor**-a + **kor**-a	"grow"
	cin-a	**cin**-a + **cin**-a	"burn"
b.	**koor**-a	**koor**-a + **koor**-a	"pull out"
	βuut-a	**βuut**-a + **βuut**-a	"depose"
c.	**βocor**-a	**βoc**-a + **βocor**-a	"be indented"
		***βoc**-o + **βocor**-a	
d.	**hɔɔrɛr**-a	**hɔɔr**-a + **hɔɔrɛr**-a	"be quiet"
		***hɔɔr**-ɛ + **hɔɔrɛr**-a	
e.	**hwɛrɛrɛk**-a	**hwɛr**-a + **hwɛrɛrɛk**-a	"tilt"
		***hwɛr**-ɛ + **hwɛrɛrɛk**-a	
f.	**ciɤerer**-a	**ciɤ**-a + **ciɤerer**-a	"encircle"
		***ciɤ**-e + **ciɤerer**-a	

The Hyman et al. (1998) morphosyntactic analysis is impressive in two major ways. First, by accounting for Bantu reduplication without referring to Base-Reduplicant relationships, as all previous models, this analysis is theoretically desirable because it requires fewer constraints than postulated by, say, the McCarthy and Prince (1995) correspondence model illustrated in (32). In this respect, Hyman et al's (1998) model is superior to previous models.

(32) McCarthy and Prince (1995) Correspondence Model.



Second, as I have briefly illustrated above, the model is simple and straightforward. Its ability to account for different sizes of the reduplicant in Bantu by using such few constraints (cf.30) is impressive and amounts to theoretical significance.

Apart from the advantages of Hyman et al's (1998) model, there are several problems that need to be addressed. The first problem has to do with the applicability of the model in all grammatical categories with productive reduplication, i.e. nouns, adjectives and numbers. While the model correctly predicts the facts in Kisukuma verb stem reduplication, it is not clear how it can be applied to nominal and adjectival reduplication. In both nouns and adjectives, prefixal materials are only incorporated in the reduplicant when the root is monosyllabic. However, when the root is polysyllabic, prefixal materials do not appear in the reduplicant but only the root reduplicates. It is thus unclear as to what level nouns and adjectives reduplicate (D-stem vs. I-stem). If we assume that prefixes attach at D-stem level and that this is the level of reduplication as in verbs, we have to account for the failure of prefixal materials to copy in polysyllabic root reduplication. Notice that a size constraint like [σσ] given in (30) is questionable because trisyllabic and longer roots do reduplicate in Kisukuma, e.g. **[i-βambahili]** "black mamba" reduplicates as [i-**βambahili**] + [βambahili]. The same problem is encountered if we assume that the I-stem level is the level of reduplication and prefix attachment. If prefixes attach at the I-stem level and reduplication takes place at the D-stem level, it is hard to have a unified account of verb reduplication on one hand and nominal reduplication (noun, adjectives and numbers) on the other. Monosyllabic root reduplication will have to take place at the I-stem level in order to enable the copying of prefixes. On the other hand polysyllabic roots would have to reduplicate at the D-stem level in order to avoid incorporating prefixes.

The second problem is concerned with reduplication in recent loans. As I will demonstrate in the next chapter, the size of the reduplicant in recent loans is determined by the base-prominence breaks and H-tone domains edges in particular. As a result, the left edge of the reduplicant corresponds with the (rightmost) edge of the base high tone domain and all materials to the right (cf. 57). It is not clear how the reduplication of recent loans can be accounted for without paying attention to Base-Reduplicant correspondences as proposed by Hyman et al's. (1998) morphosyntactic model.

Finally, it is not clear if Hyman et al's model can be generalized to languages from other families outside Bantu. This is to say, it is not clear yet if reduplication in languages from other language families can be accounted for without referring to Base – Reduplicant correspondences. Certainly, we do not want to have a theory that only works for Bantu languages. Until this is proven otherwise, I will rely on Lexical conservatism theory (Steriade

1997) and the McCarthy and Prince's (1995) correspondence model to account for all issues pertaining to the size of the reduplicant in Kisukuma (cf. 32).

To summarize, the following generalizations can be made regarding Kisukuma verb reduplication:

(1) The reduplicant cannot be less that two syllables. To achieve this goal, simple monosyllabic roots can either copy prefixal materials or double copy the verb root in the reduplicant.

(2) Partial truncation of extension morphemes is not allowed. You either copy the entire morpheme or you do not copy anything.

(3) Regardless of length and segmental composition, root materials are not truncated in the reduplicant.

As far as verb stem reduplication is concerned, Bantu languages can be grouped into the following major groups depending on the size of the reduplicant.

(33) Patterns of Reduplication in Bantu

(I) RED is disyllabic and *must* end in the low vowel [-a]; e.g. Kikuyu (Downing 1999)

	Un-reduplicated	**'X here and there'**	**Gloss**
a.	andek-a	and-a + andek-a	"write"
		*and-e + andek-a	
b.	hetok-a	het-a + hetok-a	"pass"
		*het-o + hetok-a	

(II) RED is disyllabic and must be derived from the base (unreduplicated) stem; Ndebele (Hyman at al. 1998) and Siswati (Downing 1994) and Kirundi (Brassil 2000)

	Un-reduplicated	**'X here and there'**	**Gloss**
a.	kalel-a	kale + kalela	"weigh"
		*kal-a + kalela	
b.	khulum-a	khulu-khuluma	"talk"
		*khul-a + khuluma	

c.	khulum-an-a	khulu + khulum-an-a	"talk to each other"
		*-khul-a + khulum-an-a	

(III) Disyllabic REDs are possible only with derived polysyllabic stems; e.g. Kinande (Mutaka and Hyman 1990)

	Un-reduplicated	**'X here and there'**	**Gloss**
a.	hum-a	hum-a + hum-a	"beat"
b.	hum-ir-a	hum-a + hum-ir-a	"beat for"
		*hum-i + hum-ir-a	
c.	hum-ir-an-a	hum-a + hum-ir-an-a	"beat for each other"
		*hum-i + hum-ir-an-a	
		BUT	
d.	bugul-a	(no reduplication)	"find"
		*bug-a + bugul-a	
e.	huhuman-a	(no reduplication)	"be sad"
		*huhu + huhuman-a	

(IV) Disyllabic REDs are possible only with derived polysyllabic stems. Only *one* derivational morpheme can be skipped; e.g. Kisukuma.

	Un-reduplicated	**'X here and there'**	**Gloss**
a.	leembeel-a	leembeel-a + leembeel-a	"be calm"
b.	leembeel-el-a	leembeel-el-a + leembeel-el-a	[+applicative]
		leembeel-a + leembeel-el-a	
c.	leembeel-el-nij-a	leembeel-el-nij-a + leembeel-el-nij-a	[+simultaneous]
		*leembeel-a + leembeel-el-nij-a	
d.	leembeel-el-nij-iw-a	leembeel-el-nij-iw-a + leembeel-el-nij-iw-a	[+passive]
		*leembeel-a + leembeel-el-nij-iw-a	

(V) Disyllabic RED are impossible: The entire stem *must* be copied; e.g. Chichewa (Mutaka and Mtenje 1998), Shona (Downing 1996), Chiyao (Mtenje 2002), Kikerewe (Odden 1996) and Kiswahili (Matondo, forthcoming). The examples below are from Kiswahili and Shona respectively.

	Unreduplicated	"X here and there"	Gloss
a.	tu-na-imb-a	tu-na-imb-a + imb-a	"we are singing"
b.	tu-na-imb-i-a	tu-na-imb-i-a + imb-i-a	"we are singing for"
c.	tu-na-imb-ish-a	tu-na-imb-ish-a + imb-ish-a	"we are causing to sing"
d.	tu-na-imb-ish-i-a	tu-na-imb-ish-i-a + imb-ish-i-a	"we are causing to sing for"
e.	tu-na-imb-ish-an-a	tu-na-imb-ish-an-a + imb-ish-an-a	"we are causing each other to sing"
f.	tu-na-imb-ish-i-an-a	tu-na-imb-ish-i-an-a + imb-ish-i-an-a	"we are causing each other to sing for"

	Unreduplicated	"X here and there"	Gloss
a.	bikis-a	bikis-a + bikis-a	"I didn't make cook"
b.	bikis-ir-a	bikis-ir-a + bikis-ir-a	"I didn't make cook for"
c.	tores-a	tores-a + tores-a	"I didn't make take"
d.	tores-er-a	tores-er-a + tores-er-a	"I didn't make take for

In order to provide a unified account, below is a summary of reduplicative patterns in nouns, adjectives and numbers. Again, all tonal issues are ignored here because tone is irrelevant in computing the size of the reduplicant in native words and nativized loans.

3.4. Noun and Adjective Reduplication

Apart from verbs, nouns and adjectives can also be productively reduplicated. Generally, reduplicated nouns denote the meaning of "not real N". Thus [n-**somi**] is an educated person while [n-**somi**] + [**somi**] can mean, "somehow educated, not really educated etc." Likewise, a reduplicated adjective gives the meaning of "not real X". Thus [n-**suumba**] is "a beautiful person" while [n-**suumba**] + [**suumba**] can mean "somehow beautiful, not really beautiful, just beautiful" etc. In both categories, the reduplicant is a suffix. Notice also that the number on the right of each noun and adjective represents a noun class to which the noun or adjective belongs.

3.4.1 Monosyllabic Nouns and Adjectives

As in monosyllabic verbs, monosyllabic nouns and adjectives copy the prefixal morpheme (noun class marker) in the reduplicant. This is unusual because, everywhere else noun class markers do not get copied in the reduplicant. As I have demonstrated in monosyllabic verbs, the copying of the noun class marker in the reduplicant, when monosyllabic nouns and adjectives are reduplicated, is a strategy to satisfy the disyllabic minimality requirement on the size of the reduplicant. To achieve the same goal, the nominal root can be reduplicated twice.

(33) Monosyllabic nouns (CV)

Surface	Base RED	Gloss
a. ma-**we**	ma-we + ma-we ma-we + wewe	"stones" (6)
b. lʊ-**jo**	lʊ-jo + lʊ-jo lʊ-jo + jojo	"piece of broken pottery" (11)
c. lʊ-me	lʊ-me + lʊ-me lʊ-me + meme	"dew" (11)
d. βʊ-gwe	βʊ-gwe + βʊ-gwe βʊ-gwe + gwegwe	"wasp" (14)

e.	mɪ-tɪ	mɪ-tɪ + mi-tɪ mɪ-tɪ + tɪtɪ	"traditional medicine" (4)
f.	i-sʊ	i-sʊ + i-sʊ i-sʊ + sʊsʊ	"nasty body odor" (5)
g.	ma-zwi	ma-zwi + ma-zwi ma-zwi + zwizwi	"knee" (6)

(34) Monosyllabic adjectives.

	Surface	Base RED	Gloss
a.	βa-βi	βa-βi + βa-βi βa-βi + βiβi	"kind of bad" (2)
b.	gɪ-pya	gɪ-pya + gɪ-pya gɪ-pya + pyapya	"kind of new" (7)
c.	βa-do	βa-do + βa-do βa-do + dodo	"kind of small" (2)

3.4.2. Disyllabic Nouns and Adjectives

When disyllabic nouns and adjectives are reduplicated, noun class markers do not appear in the reduplicant and the stem is not copied twice. This is what we expect because the stem in these nouns and adjectives is already disyllabic. The disyllabic minimality requirement on the size of the reduplicant is automatically satisfied and thus there is no reason to augment these nouns and adjectives by copying the noun class markers or copying the stem twice in the reduplicant (cf. 35a-d).

(35) Disyllabic nouns

	Surface	Base RED	Gloss
a.	i-βega	i-βega + βega	"shoulder" (5)
b.	si-laanga	si-laanga + laanga	"weapons" (8)

To remind ourselves, when multiple-word numbers and noun compounds are reduplicated, it is only the rightmost number or compound member that surfaces in the reduplicant. Moreover, the (rightmost) reduplicated stem is governed by the same constraints and ranking like its single counterparts.

This right copying of the reduplicant stem in these forms is not surprising because the reduplicant stem in nominals is a suffix and not a prefix like in verbs. Since there are two stems in these forms, it is logical to copy only the rightmost stem because this is congruent with the reduplicant being a suffix. In fact copying both stems of the base is unexpected because at most, reduplication in Kisukuma copies only one content morpheme. That is to say, only one listed stem is required in the reduplicant. The only instance where there is double copying of the base stem in the reduplicant is when the base stem is monosyllabic. In this case the reduplicant stem has to be augmented in various ways in order to satisfy the disyllabic minimal requirement on the size of the reduplicant as required by (FOOT MINIMALITY). Everywhere else, double copying of the base in the reduplicant is not allowed because it is not necessary and unmotivated.

In order to account for these forms, two possible accounts quickly come to mind. First, we need a constraint like the one given in (102) to prohibit the copying of two content morphemes (i.e. two stems) in the reduplicant.

(102) INTEGRITY-BR: No element of the base has multiple correspondents in RED.

The satisfaction of the constraint in (102) requires a gross violation of MAX-BR because it demands that one stem of the base compound be left out in the reduplicant. Since only one stem surfaces in the reduplicant, INTEGRITY must outrank MAX-BR. ALIGN R constraint (given in 99) makes sure that it is the second member of the compound that surfaces in the reduplicant. The interaction of ALIGN R, INTEGRITY and MAX-BR constraints is illustrated in the following tableau.

103. n-zoka i-heenge + RED	RED$_{(\mu_i)}$=L STEM$_{(\mu_i)}$	ALIGN R	INTEG RITY	*AFFIX RED	MAX-BR
a. ☞n-zoka i-heenge + <u>heenge</u>					******
b. n-zoka i-heenge + <u>i-heenge</u>				*!	*****
c. n-zoka i-heenge + <u>n-zoka i-heenge</u>			*!	**	**
d. n-zoka i-heenge + <u>zoka</u>		*!			********

The second account is based on the idea first proposed by Niepokuj (1991) that reduplicants tend to form contiguous strings with the base. As shown in (104), in the optimal candidate [n-zoka] [i-heenge] + [<u>heenge</u>], the reduplicant [<u>heenge</u>] forms a contiguous string with the rightmost member of the unreduplicated nominal compound [<u>i-heenge</u>]. In the non-optimal candidates [n-zoka] [i-heenge] + [<u>n-zoka</u>] and *[n-zoka] [i-heenge] + [<u>n-zoka</u>] [i-heenge], however, the reduplicant does not form a contiguous string with the last member of the unreduplicated stem. The second member of the unreduplicated compound stem [i-heenge] intervenes between the reduplicant and the first member of the unreduplicated stem to which it was supposed to be contiguous. The contiguity constraint is given in (105). In the contiguity analysis illustrated in (106), CONTIGUITY must outrank MAX-BR. The arrows in (104) illustrate the contiguity effects between the base compound and the reduplicant.

(104) a. [n-zoka] [i-heenge]

b. [n-zoka] [i-heenge] + [heenge]

c. *[n-zoka] [i-heenge] + [n-zoka]

d. *[n-zoka] [i-heenge] + [n-zoka] [i-heenge]

(105) CONTIGUITY B-R: No medial intrusion or skipping in reduplicant (Kager 1999:250)

106. n-zoka i-heenge + RED	RED$_{(\mu)}$=L STEM$_{(\mu)}$	CONTI GUITY	INTEG RITY	*AFFIX RED	MAX-BR
a. ☞n-zoka i-heenge + heenge					******
b. n-zoka i-heenge + i-heenge				*!	*****
c. n-zoka i-heenge + n-zoka i-heenge		*!	*	**	**
d. n-zoka i-heenge + zoka		*!			****** **

Consider now the long number and noun compounds with monosyllabic stem as shown in (107) below.

		Surface			Base + Red	
(107)	a.	gɪ-sɪmb-a	mɪ-tɪ	(i)	gɪ-sɪmb-a	mɪ-tɪ + mɪ-tɪ
		7-dig-FV	6-tree	(ii)	gɪ-sɪmb-a	mɪ-tɪ + tɪ-tɪ
					"traditional healer's fee"	
	b.	i-kʊmi na βa-ne			i-kʊmi na βa-ne + βa-ne	
		CL-ten and 2-four			CL-ten and 2-four 2-four	
		"fourteen" (2)			"fourteen by fourteen" (2)	

When the second member of the unreduplicated nominal compound stem is monosyllabic, two options of the reduplicant are possible. First, the prefix can copy in the reduplicant [gɪ-sɪmb-a] [mɪ-tɪ] + <u>[mɪ-tɪ]</u> or the root can be reduplicated twice, i.e. [gɪ-sɪmb-a] [mɪ-tɪ + tɪ-tɪ]. In number reduplication, only copying of the prefixal morpheme in the base is allowed. In both cases, there is no violation of CONTIGUITY. The copying of the prefixal material in the reduplicant is aimed at augmenting the monosyllabic stem to make it at least disyllabic satisfying FOOT MINIMALITY. The copying of the noun class prefix, however, violates *AFFIX RED. This shows that FOOT MINIMALITY outranks *AFFIX RED. Likewise, the double copying of the nominal root in the reduplicant is also aimed at making the reduplicant at least disyllabic. This is the violation of INTEGRITY and it shows that *AFFIX RED is also ranked higher than INTEGRITY. These observations are illustrated in the two tableaux below.

(108) Derivation of [gɪ-sɪmb-a] [mɪ-tɪ]+<u>[mɪ-tɪ]</u>: FOOT MINIMALITY, INTEGRITY >> *AFFIX RED

108.[gɪ-sɪmb-a] [mɪ-tɪ] + [RED]	CONTIGUITY	FOOT MINIMALITY	INTEGRITY	*AFFIX RED
a.☞[gɪ-sɪmb-a] [mɪ-tɪ] + <u>[mɪ-tɪ]</u>				*
b. [gɪ-sɪmb-a] [mɪ-tɪ] + <u>[tɪ tɪ]</u>			*!	
c. [gɪ-sɪmb-a] [mɪ-tɪ] + <u>[tɪ]</u>		*!		
d. [gɪ-sɪmb-a] [mɪ-tɪ] + <u>[sɪmba]</u>	*!			

As shown in the tableau below, the forms in which the nominal root is copied twice, INTEGRITY is ranked lower than FOOT MINIMALITY.

(109). Derivation of [gɪ-sɪmb-a] [mɪ-tɪ] +<u>[tɪ-tɪ]</u>: FOOT MINIMALITY, *AFFIX RED>> INTEGRITY

109.[gɪ-sɪmb-a] [mɪ-tɪ] + [RED]	CONTIGUITY	FOOT MINIMALITY	*AFFIX RED	INTEGRITY
a. ☞ [gɪ-sɪmb-a] [mɪ-tɪ] + <u>[tɪ-tɪ]</u>				*
b. [gɪ-sɪmb-a] [mɪ-tɪ] + <u>[mɪ-tɪ]</u>			*!	
c. [gɪ-sɪmb-a] [mɪ-tɪ] + <u>[tɪ]</u>		*!		
d. [gɪ-sɪmb-a] [mɪ-tɪ] + <u>[sɪmba]</u>	*!			

3.9.5. Vowel Initial Stems.

In all the data analyzed so far, reduplication has been shown to involve stems which begin with consonants. In this section I address the issue of reduplication in vowel initial stems. I specifically demonstrate that the shape of the reduplicant in these stems is determined by the interplay of Onset principle (Ito 1989) and the dispreference of affix-copying in the reduplicant (*AFFIX RED).

Kisukuma has a regular glide formation rule that changes the high back vowel [u] to a labial-velar approximant [w] when followed by other vowels except itself. Likewise, the high front vowel [i] becomes a palatal approximant [j] (orthographically presented here as [y]) when followed by any other vowel except itself. Both cases are shown below. For more examples see (9), (37) and (38).

		SR		SR	Reduplicated	Gloss
(110)	a.	/gu-ɪng-a/	=>	[gw-ɪɪng-a]	gw-ɪɪng-a + ɪng-a gw-ɪng-a + gw-ɪɪng-a	"to leave"
		/gʊ-andɪka/	=>	[gw-andɪka]	gw-andɪka + andɪka gw-andɪka + gw-andɪka	"to write"
	b.	/li-angʊ/	=>	[ly-aangʊ]	ly-aangʊ + ly-aangʊ ly-aangʊ + angʊ	"kind of quick"
	c.	/li-ɪmbo/	=>	[ly-ɪɪmbo]	ly-ɪɪmbo + ly-ɪɪmbo ly-ɪɪmbo + ɪmbo	"kind of a song"

Sometimes glide formation interacts with other phonological rules to produce interesting results. One relevant case involves nouns in classes seven and eight (marked by ki-/vi- prefixes respectively). In Class 7, for example, the high front vowel of the noun class marker [ki-] undergoes the glide-formation rule to become [ky] when followed by other vowels except itself. The resulting form [ky] then undergoes palatalization to become [tʃ] orthographically presented here as [ch]. Likewise, in Class 8, the high front vowel of the noun class morpheme /si/ undergoes glide formation to become [sy]. Then [sy] undergoes total palatalization to become [ʃ] orthographically presented here as [sh]. What is interesting is that, unlike in (110) above where the reduplicant can optionally copy the prefixal material in the reduplicant, nouns in Class 7 and Class 8 must copy the prefixal material in the reduplicant. This is shown in (111). For more examples see (46).

(111) Nouns in Classes 7& 8: prefixal material *must* copy in RED

	SR		SR	Reduplicated	Gloss
(a)	/ki-onza/	=>	ch-oonza	ch-oonza + <u>ch-oonza</u>	"fox"
				*ch-oonza + <u>oonza</u>	
(b)	/si-onza/	=>	sh-oonza	sh-<u>oo</u>nza + <u>sh-oonza</u>	"foxes"
				*sh-oonza + <u>oonza</u>	

Derivational theories using rule ordering statements would account for the optional copying of the prefixal material in (110) by optional ordering between Glide formation and reduplication. In lyaangʊ + lyaangʊ, glide formation is ordered before reduplication while in lyaangʊ + angʊ, the latter is ordered before the former. This is shown below.

(112) a. Derivation of [lyaangʊ] + [lyaangʊ]. (b) Derivation of [lyaangʊ] + [angʊ]

/li-angʊ + RED/	UR		/li-angʊ + RED/	UR
a. ly-aangʊ + RED	**Glide formation**		li-angʊ + angʊ	**Reduplication**
b. lyaangʊ + lyaangʊ	**Reduplication**		ly-aangʊ + angʊ	**Glide formation**
c. [lyaangʊ + lyaangʊ]	SR		[lyaangʊ + angʊ]	SR

In deriving [choonza] + [choonza] in ki-/vi- cases, glide formation must be ordered before both palatalization rule and reduplication and this ordering is not optional (cf. 113). In OT framework, however, the ordering devices are not necessary. These forms must therefore be accounted by using the ranking of constraints.

(113) Derivation of [chonza] + [chonza].

113. /ki-onza + RED/	UR
a. ky-onza + RED	Glide formation
b. choonza + RED	Palatalization
c. chonza + chonza	Reduplication
d. [chonza + chonza]	SR

In many Bantu languages, the onsetless reduplicants in vowel initial stems are not available. That is, when there is phonological fusion between the prefix and the stem, the prefix is always copied in the reduplicant. This is shown in Kinande (114a), Kikerewe (114b) and Chiyao (114c).

(114) a. Obligatory onset satisfaction in Kinande (Mutaka and Hyman 1990)

Underlying	**Noun**	**Reduplicated**	**Gloss**
/o-mu-ana/	o-mw-ana	o-mw-ana + mw-ana *o-mw-ana + ana	"child"
/e-ki-umba/	e-ky-umba	e-ky-umba + ky-umba *e-ky-umba + umba	"room"
/e-ri-oli/	e-ry-oli	e-ry-oli + ry-oli *e-ry-oli + oli	"cucumber"

b. Obligatory onset satisfaction in Kikerewe (Odden 1996)

Underlying	**Noun**	**Reduplicated**	**Gloss**

/o-mu-ozo/	o-mw-oozo	o-mw-oozo + mw-oozo	"fellow"
		*o-mw-oozo + oozo	
/o-mu-agazi/	o-mw-aagazi	o-mw-aagazi + mw-aagazi	"virgin goat"
		*o-mw-aagazi + aagazi	
/e-li-eyo/	e-ly-eeyo	e-ly-eeyo + ly-eeyo	"broom"
		*e-ly-eeyo + eeyo	

d. Obligatory onset satisfaction in Chiyao (Mtenje 2002)

Underlying	**Noun**	**Reduplicated**	**Gloss**
/ku-aang-a/	kw-aaanga	kw-aaanga + jaanga	"to answer"
		*kw-aaanga + aanga	
/ku-iiv-a/	kw-iiva	kw-iiva + jiva	"to steal"
		*kw-iiva + iiva	

The analysis of the shape of the reduplicant in these languages was centered on the idea of stem misalignment. It was pointed out that when vowel initial stems are reduplicated, the reduplicant does not correspond to the morphological stem (which usually serves as the base for reduplication in consonant initial stems). Instead of the left edge of the reduplicant being aligned with the left edge of the morphological stem, the reduplicant in such cases includes a consonant which falls outside the left edge of the morphological stem. As pointed out by Mtenje (2002), the reason for allowing the newly derived stem containing the reduplicant (which Downing (1997) refers to as a morpho-prosodic stem) to be misaligned with the morphological stem is to ensure that the morpho-prosodic stem begins with an onset syllable rather than with an onsetless one (as would have been the case if the initial vowel of morphological stem was the left edge of the morpho-prosodic stem).

To account for the misalignment between the Morphological stem (Ms) and Phonological stem (Ps) or (RED), an alignment constraint that forced the reduplicant to begin with a syllable was invoked. Mtenje (2002), for example, adopts Downing's (1997) constraint on Mstem-Pstem correspondence to account for stem misalignment in Chiyao. The misalignment constraint and other constraints are given in (115).

(115) a. MAX M-P: Every element in the Mstem has a correspondent in the Pstem (RED)

b. DEP M-P: Every element of the Pstem (RED) has a correpondent in the Mstem.

c. ALIGN L, PSTEM (RED), σ: The left edge of the Pstem must be aligned with a syllable

d. ONSET: Every syllable should begin with an onset.

The overall effect of the correspondence constraints in (115) is that the Mstem and the reduplicant are equal. The Mstem is required to have all its segments reflected in the reduplicant (115a). At the same time, the reduplicant should be composed of only those segments which are in the Mstem (115b). The constraint in (115c) requires that the left edge of the reduplicant begin with a syllable. ONSET (115d) makes sure that the initial syllable begins with a consonant.

We could invoke the same constraints to account for Kisukuma data. It is clear that ONSET forces the reduplicant to align with a consonant in Class 7 and Class 8, e.g. [choonza] + [choonza] and all other cases where the reduplicant copies prefixal materials, e.g. [gw-aandɪka] + [gw-aandɪka]. These forms can be viewed as involving a misalignment of the reduplicant to the morphological stem. The morphological stem begins with a vowel while the reduplicant begins with a consonant. The crucial ranking in these forms is that ONSET must outrank both ALIGN and DEP M-P constraints.

116. /li-angʊ + RED/	ONSET	DEP-MP	ALIGN PSTEM
a. ☞ ly-aangʊ + ly-aangʊ		**(ly)	*
b. ly-aangʊ + <u>angʊ</u>	*!		

By having an onsetless reduplicant, candidate (116b) is not optimal because it fatally violates the highly ranked ONSET constraint. This candidate, however, satisfies both DEP-MP and ALIGN PSTEM constraints because all Pstem (RED) segments have correspondents in the Mstem and the two stems (Mstem and Pstem) are perfectly aligned. The winner candidate (116a) only violates the lowly ranked constraint DEP-MP. Here two segment in the reduplicant (ly) lack correspondents in the Morphological stem violating DEP-MP.

Since candidate (116b) is also an optimal candidate in Kisukuma (only for non KI-/VI- cases), it must be the case that the two constraints, i.e. ONSET and DEP-MP, are freely ranked. This is shown in (117)

117. /li-angʊ + RED/	DEP-MP	ALIGN	ONSET
a. ☞ly-aangʊ + <u>angʊ</u>			*
b. ly-aangʊ + <u>ly-aangʊ</u>	*!*(ly)	*	

Although the misalignment analysis sketched above is attractive and seems to work in the languages it has been proposed for, Kisukuma data can also be accounted for by the simple analysis proposed earlier in this work. All we need is an interplay between ONSET and *AFFIX RED. In onsetful reduplicants like [ly-aangʊ] + <u>[ly-aangʊ]</u>, ONSET outranks *AFFIX RED because the noun class prefix copies in the reduplicant. In onsetless reduplicants, however, *AFFIX RED outranks ONSET. Unlike in other Bantu languages where ONSET *always* outranks *AFFIX RED (thus onsetless reduplicants are not attested), the ranking of the two constraints in Kisukuma is not stable (except in the KI-/VI- noun classes). That is, the two constraints, i.e. ONSET and *PREFIX RED, are free ranked in Kisukuma. This is illustrated in (118) and (119) respectively.

118. /li-angʊ + RED/	ONSET	*PREFIX RED
a. ☞ ly-aangʊ + ly-aangʊ		**(ly)
b. ly-aangʊ + angʊ	*!	

119. /li-angʊ + RED/	*PREFIX RED	ONSET
a. ☞ ly-aangʊ + angʊ		*
b. ly-aangʊ + ly-aangʊ	*!	

As shown in (120), the ranking of ONSET and *AFFIX RED in [ki-/vi-] nouns, however, is stable: ONSET always outranks *AFFIX RED.

120. /ki-onza/ + RED/	ONSET	*PREFIX RED
a. ☞ chonza + chonza		**(ch)
b. chonza + onza	*!	

The last question that remains to be addressed is the differences between forms like those in (111) and the [KI-/VI-] cases where prefixal materials obligatorily copy in the reduplicant. Why are ONSET and *PREFIX RED *freely* ranked in the former cases but not in the latter? My answer to this question is simple: glide formation and palatalization in [KI-/VI-] cases produce *total* phonological fusion between the nominal prefixes and the root to such an extent that the resulting stem is lexicalized and thus treated as one morpheme. Since morphemes never get truncated in Kisukuma reduplication, the entire stem must be copied in the reduplicant. Candidates like *[choonza] + [onza] are thus non-optimal because they split up a lexicalized base stem, violating the undominated lexical conservatism constraint (RED$_{(\mu)}$=LSTEM$_{(\mu)}$). This explains why the onsetless reduplicants are impossible in these forms.

121. /ki-onza/ + RED/	(RED$_{(\mu)}$=LSTEM$_{(\mu)}$)	ONSET	*PREFIX RED
a. ☞ chonza + chonza			**(ch)
b. chonza + onza	*!	*	

In cases like those in (110), only one phonological rule (glide formation) is involved. The morphology of these forms is transparent to Kisukuma speakers and the morphemic boundaries can be easily sorted out. The prefixal materials and the root are transparently different morphemes. The reduplicant can thus copy the root only (violating ONSET but satisfying *AFFIX RED) or can parse the root along with the prefixal materials (satisfying ONSET but violating *AFFIX RED). The onsetless stems are recognized as listed stems and there is no violation of (RED$_{(\mu)}$=LSTEM$_{(\mu)}$).

3.13. Chapter Summary

The central argument in reduplication of native words and nativized loans advanced in this chapter is that reduplication in Kisukuma is, largely, a morphological process: reduplication is sensitive to morphemes in that it never splits a morpheme. Unlike other Bantu languages such as Kirundi (Brassil 2000), SiSwati (Downing 1999), Kikuyu (Peng 1992) and Ndebele (Hyman et al. 1999), where stems are usually truncated to fit into a disyllabic template, stems in Kisukuma must surface faithfully in the reduplicant regardless of length and segmental composition. Where truncation is tolerated, the reduplicant must resemble a (listed) stem. These results are predicted in lexical conservatism (Steriade 1997), the framework adopted in this work to account for the shape of the reduplicant. Thus [som-el-a] "read for or with" can reduplicate as [som-el-a] + [som-el-a] or [som-a] + [som-el-a]. The latter reduplicant [som-a] is possible because it is a listed stem of [som-el-a] and it resembles a cited (canonical) verb stem in Kisukuma. For the same reasons, a nominal stem like [ma-sanzagata] "trash" can not be truncated because any attempt to do so (e.g. by forcing it to fit into the disyllabic phonological parse *[ma-sanzagata] + [gata]) will result in a stem that Kisukuma speakers do not recognize. Total reduplication of the nominal root, i.e. [ma-sanzagata] + [sanzagata], is thus the only option here. Generally, therefore, nominal stems in native words and nativized loans are not truncated in Kisukuma. Phonologically, the reduplicant in Kisukuma cannot be less than two syllables.

Like in other Bantu languages, prefixal morphemes usually do not copy in the reduplicant except in monosyllabic roots where they copy in order to satisfy the disyllabic minimality condition on the size of the reduplicant in Bantu. Thus [gʊ-soma] "to read" can reduplicate as [gʊ-soma] + [soma] and not as *[gʊ-soma] + [gʊ-soma] but [gʊ-lya] "to eat" can reduplicate as [gʊ-lya] + [gʊ-lya] and not as *[gʊ-lya] + [lya]. In order to satisfy the disyllabic minimality requirement on the size of the reduplicant, the monosyllabic nominal stem can also be copied twice. For example, the monosyllabic stem [gʊ-lya] can also reduplicate as [gʊ-lya] + [lya lya]. Moreover, prefixes can occasionally copy when they phonologically fuse with the stem at prefix-stem boundaries. For example, the underlying form /gʊ-amba/ "to prepare a bed" surfaces as [gw-aamba]. When reduplicated, the fused prefixal infinitive marker [gʊ-] can optionally copy in the reduplicant producing [gw-aamba] + [gw-aamba]. Notice, however, that the reduplicant in which the prefixes do not copy like [gw-aamba] + [amba] are more natural than the former cases in which the prefix is copied particularly in verbs. Interestingly, in some cases, however, the shape of the reduplicant is purely determined by morphosyntactic factors. For example, Root-a (canonical) reduplicants in verbs are impossible when a morphosyntactic disagreement (resulting in meaning inconsistency) between the base and the reduplicant is likely to emerge. For example, [gʊ-fuunga] "to close" reduplicates as [gʊ-fuunga] + [fuunga] "to close here and there". However, when an inversive marker [-ʊl-] is infixed in the verb stem [gʊ-fuung-**ʊl**-a] "to open", the canonical reduplicant *[gʊ-fuunga] + [fuung-ʊl-a] is not possible anymore. Thus, [gʊ-fuung-ʊl-a] + [fuung-ʊl-a] is the only possible form in these cases. Generally, therefore, morphology and phonology play a role in determining the size of the reduplicant in Kisukuma. In terms of constraint ranking, the crucial ranking that guarantees the basic reduplicative pattern observed in native words and nativized loans is $(\text{RED}_{(\mu_i)}=\text{LSTEM}_{(\mu_i)})$ >> FOOT MINIMALITY >> * AFFIX (RED) >> INTEGRITY B-R.

CHAPTER FOUR

THE REDUPLICANT IN RECENT LOANS

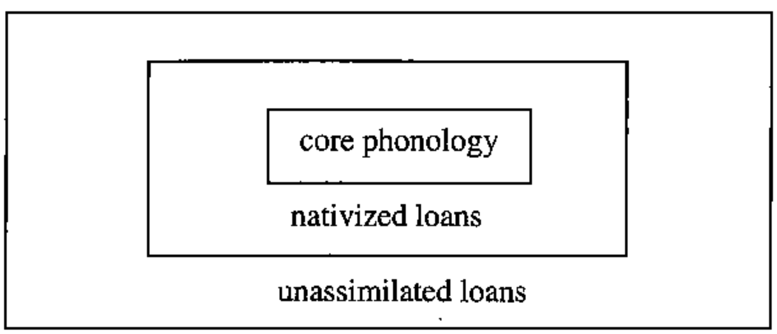
4.0 Introduction

Ito and Mester (1995) argue that a language's lexicon is not partitioned into mutually exclusive sub-lexica as in (1). Instead, a language's lexicon is organized into strata. These strata can be categorized in terms of core – periphery structure. The deepest stratum (the core) contains the most native lexical items that obey the most phonotactic constraints of the language. Moving away from the core, lexical items in each successive peripheral stratum obey smaller subsets of phonotactic constraints. This is schematized in (2).

(1) Partition of the lexicon into distinct sub-lexica

Native lexicon	Unassimilated loanwords
Assimilated loanwords	Foreign words

(2) Core-Periphery model of the lexicon (Ito and Mester 1995)



This chapter deals with unassimilated loans and foreign words. The majority of the words used in this chapter are place names, which may be treated as unassimilated loans. In the first part, the factors that determine the shape of the reduplicant in native words and assimilated loans are summarized. It is shown that the location of the H tone of the unreduplicated stem does not play any role whatsoever in determining the size of the reduplicant in these words because reduplication, to a large extent, is determined by morphological factors. In the remaining part of the chapter, factors that determine the shape of the reduplicant in recent loans are discussed. It is demonstrated that the shape of the reduplicant in recent loans is determined by the H tone of the unreduplicated stem. Etymological or semantic factors, however, can intervene and block the applicability of the base H tone in computing the size of the reduplicant. Phonologically, the reduplicant cannot be less than two syllables. This leads to augmentation of monosyllabic stems in the reduplicant. The major point of this chapter is that reduplication in Kisukuma is essentially a morphological process. However, if the morphology is opaque (as in recent loans), morphological constraints cannot be evaluated and phonology takes precedence in determining the size of the reduplicant. This shows that morphology, phonology and sometimes semantic factors are involved in Kisukuma's reduplication process.

In this chapter, I provide evidence that the analysis of reduplication advanced in the previous chapter applies only to native and nativized loans. It is here that the morphological make-up of words is transparent and lexical conservatism effects can be evaluated. Apart from being able to figure out the morphemic boundaries, thereby differentiating the root from affixes (which are generally excluded in RED), Kisukuma speakers have a working knowledge of stems and their listed allomorphs.

The morphology of recent loans, however, is opaque to Kisukuma speakers. When a word like *America* is borrowed, speakers cannot determine if should undergo morphemic analysis [*a-merika*], which is plausible given the shape of noun class markers in the language. Since the morphology is opaque, the morphemic boundaries of recent loans cannot be consistently sorted out. Speakers are not sure what part of the recent loans can function as a (prefixal) noun class marker and thus be excluded from the reduplicant. As a result, the constraints that prohibit the copying of affixes in the reduplicant (*AFFIX IN RED) and truncation of stem materials in the reduplicant (if truncation leads to lexical conservatism violations i.e. EXT LEX (RED)) cannot be evaluated.

When the morphology is opaque and thus useless in computing the size of the reduplicant, I argue, Kisukuma speakers rely on the H-toned syllable of the base to segment the reduplicant from the base stem (cf. Cutler and Norris 1988). The location of the H-tone of the base in Kisukuma recent loans is derived from the primary stress of the source language (in our case English). Generally, therefore, a syllable that carries the primary stress in English will be H-toned (with a fixed H) in Kisukuma. It is this fixed H-tone in the unreduplicated Kisukuma version of the word that determines the shape of the reduplicant. To be more specific, the segmentation of the base materials that are guaranteed to appear in the reduplicant is initiated at the H-toned syllable of the unreduplicated stem. As a result, the left edge (the initial syllable) of the reduplicant always corresponds to the strong (H-toned) syllable of the base. Moreover, all segments to the right of the base H-toned syllable are also copied in RED. Thus *Wiscon'sin* is [wisikónsini] in Kisukuma and it reduplicates as [wisikónsini] + [kónsini]. As I will demonstrate in §4.6.1 however, this can be overruled by high ranked constraints like FOOT MINIMALITY – a very powerful constraint that requires all reduplicants to be at least disyllabic. This is shown by recent loans with two H tones. In these forms, it is the rightmost H-toned syllable of the unreduplicated word that determines the size of the reduplicant. When the rightmost H-toned syllable is word final, however, the strategy of aligning the left edge of the reduplicant with the rightmost H-toned syllable is abandoned because this would produce monosyllabic reduplicants which are not acceptable (cf. 28a-d).Thus [hóliwuudî] reduplicates as [hóliwuudî] +[wúudi] and not as [hóliwuudî] + [dî]). The suggestive generalization here is that reduplication in Kisukuma is principally a morphological process but phonology takes precedence in determining the size of the reduplicant when morphology is opaque, rendering lexical conservatism effects impossible to evaluate. In the following sections, I demonstrate that this is indeed the case in Kisukuma.

4.1. Important Observations

Before we proceed, several important observations are in order here. First, almost all nouns used in this chapter are place names. This is a uniform class of nouns that provide a good testing ground for Kisukuma speaker's lexicon and how is reflected in recent loans' reduplication process. To support my native-speaker judgments, five native Kisukuma (Kinyantuzu sub-dialect) speakers with different levels of education were used as subjects. One subject is a primary school graduate, while three others have an undergraduate degree from the University of Dar-es-salaam in Tanzania. Apart from Kisukuma, these three also speak Kiswahili and English as their second and third language respectively. Their ages range from the early 20s to the mid 30s. The fifth subject (my mother) is in her late 70s and she only speaks Kisukuma. Consultation was done face to face with her when she was visiting my family in the US from August 2001-April 2002. The other four subjects live in Tanzania and consultation was done by telephone and in written form. A place name was read to them and they were asked to reduplicate the noun. As a follow up procedure, I sent a hard copy of the entire list of place names to the literate subjects and asked them to provide every possible reduplicated form and send their written responses back to me. For literate subjects, the oral and written responses were generally consistent with the facts established above. The responses from the subject who speaks Kisukuma only and is illiterate, however, were generally not conclusive (cf. Appendix 11-E.M)

As a general observation, many recent loans in Kisukuma are nouns and almost all of them fall into Class 9 (N-singular) and Class 10 (N-plural). Classes 9 and 10 are the two noun classes in Kisukuma and other Bantu languages that are known to accommodate the majority of borrowed nouns. In the majority of these nouns, the noun class prefixes (N/N) are not realized on the surface. Without going into detail, all the recent loans used in this study (mainly place names) do not allow the surface realization of the (N/N) prefix. These nouns therefore have a zero prefix (ø) as their noun-class marker[18].

Second, as in other East African (Bantu) languages, borrowing in Kisukuma is mainly via Kiswahili - the lingua franca of East Africa. Swahili stress is predominantly penultimate. Since Kiswahili stress also translates into a fixed H in Kisukuma, it is no

[18] It seems that a noun needs to stay in Kisukuma for sometime before it is assigned an overt noun class marker (if this is possible) or moves away from Class 9 and 10. Thus [βʊjumbúla] "Bujumbura" (the capital city of Burundi) reduplicates as [βʊjumbúla] + [júmbula] and not as *[βʊjumbúla] + [βʊjumbúla] because the first syllable [βʊ-] has been reanalyzed as a noun class prefix. Also [li-sháadi] "shirt" plural [ma-sháadi] is now in Class 5 and 6 (LI/MA) instead of Class 9 and 10 (N/N).

wonder that many Kisukuma recent loans have a penultimate fixed H tone. As these words move towards the core phonology, the penultimate H tone may shift further to the right, first by one syllable as shown in 4. This tonal shift represents the initial H tone domain expansion in Kisukuma, which is usually trisyllabic. Compared to recent loans where there is no shift at all, this is a more native pattern.

There are few cases in Kiswahili where stress is not penultimate. One such instance involves words with long antepenultimate syllables. As shown in (3), these words have stress associated with the second mora of the long antepenultimate syllable. As shown in the Kisukuma examples on the right, the H tone corresponds to the stressed mora in the source language (Kiswahili). As shown in 3b, the antepenultimate stress in Kiswahili version of the word can also correspond to the entire initial syllable in Kisukuma.

			Swahili	Gloss	Kisukuma
(3)	a.	i.	[loo'ndoni]	"London"	lo(ó)ndoni
		ii.	[hoo'landi]	"Holland"	ho(ó)landi
		iii.	[amee'rika]	"America"	ame(é)lika
		iv.	[paa'dri]	"priest"	pa(á)dili
		v.	[paa'sta]	"pastor"	pa(á)sita
		vi.	[ree'dio]	"radio"	le(é)diyo

			Swahili	Gloss	Kisukuma
(3)	b.	i.	[loo'ndoni]	"London"	(lóó)ndoni
		ii.	[hoo'landi]	"Holland"	(hóó)landi
		iii.	[amee'rika]	"America"	(amée)lika
		iv.	[paa'dri]	"priest"	(páá)dili
		v.	[paa'sta]	"pastor"	(páá)sita
		vi.	[ree'dio]	"radio"	(léé)diyo

The third observation has to do with the H tone in Kisukuma recent loans: all of them have a fixed H tone. As mentioned above, loan words need to stay in the recipient language for some time before they move from the peripheral stratum toward the core and become more integrated into the grammar of the recipient language. In Kisukuma, for example, recent loans have a fixed H tone, which is derived from the primary stress of the source language. After staying in the language for sometime, the fixed H tone in some of the borrowings begin to shift first by one syllable to the right as shown in (4).

		Kiswahili	Gloss	Kisukuma
(4)	a.	si'gala	"cigarette"	si(galá)
	b.	ma-shi'ndano	"competition"	ma-shi(ndanó)
	c.	suru'ali	"pants"	sulu(βalé)
	d.	wa'limu	"teachers"	βa-(limú)
	e.	as'kari	"soldier"	shili(kalé)
	f.	'hela	"money"	(helá)
	g.	'simu	"telephone"	(simú)
	h.	'chupa	"bottle"	(jupá)
	i.	'tano	"five"	i-(taanó)

If we assume that the H tone in these words was at one point realized on the penultimate syllable in correspondence with the Kiswahili stress from which it was borrowed, it is possible to argue that diachronically the H tone in these nouns have in fact shifted one syllable to the right in Kisukuma. Notice that, although the penultimate syllable is the sponsor in (4), the H tone does not move further to the right even if we add toneless words (cf. 5a). The high domain in these words is therefore disyllabic

It is possible that the disyllabic domain in (4) represents the initial domain expansion in Kisukuma. If this is true, we can then logically predict that with time, the H tone in (4) will also shift one syllable further to the right, completing the Kisukuma's trisyllabic high domain cycle. As shown in (5b), the current HD in (5a) is expected to expand one syllable further to the right in the future. The source words are given in (4).

(5)

	a. Current HD: Bimoraic	b. Predicted future HD	Gloss
a.	si-(g̲alá) nhaale	si-(g̲ala nhaalé)	"big cigarette"
		cf. si-(g̲ala nhaalé)	"big rocks"
b.	ma-shi(nda̲nó) ma-taale	ma-shi(nda̲no ma-táá)le	"big competition"
c.	sulu(βa̲lé) nhaale	sulu(βa̲le nhaalé)	"big trousers"
d.	βa-(li̲mú) βa-taale	βa-(li̲mu βa-táá)le	"big teachers"
e.	shili(ka̲lé) ntaale	shili(ka̲le ntaalé)	"great soldier"
g.	(si̲mú) nhaale	(si̲mu nhaalé)	"big telephone"
h.	(ju̲pá) nhaale	(ju̲pa nhaalé)	"big bottle"

The assumption that the words in (4) and (5a) were probably borrowed in Kisukuma via Kiswahili and that the H tone in these nouns has shifted one syllable further to the right has significant consequences for our understanding of the nature and properties of the Mobile High Domain, which is always trisyllabic. It shows that the Kisukuma's mobile HD is not that puzzling after all. It is motivated by *MONOHD constraint as in other Bantu languages such as Kikuyu, Kijita and Setswana (Cassimjee and Kisseberth 1998). Recall from §1.5 that *MONOHD bans monomoraic high domains, preferring bimoraic high domains instead. This represents languages with bounded shifting (or spreading) like Kijita below. Kijita is a shifting language.

(6) HD motivated by *MONOHD in Kijita (Downing 1990)

a.	oku(fwá̲ kú)mugera	"to die by the river"
b.	oku(βo̲ná)na	"to see"
c.	oku(βo̲na) i:nyonyi	"to see a bird"

The disyllabic high domain in Kijita is exactly like the evolving Kisukuma domain in (4) and (5a). The only difference between Kijita and Kisukuma domain then is that unlike in Kijita, the disyllabic Kisukuma domain expands one syllable further to the right in the core phonology. This implies that Kisukuma's High Domain is actually a result of two consecutive disyllabic domains. That is, Kisukuma's trisyllabic HD is actually a result of double disyllabic HD cycles, the first involving the first and second syllables, and the second involving the second and third syllables). This provides evidence for studies that have proposed two spreading rules to account for the trisyllabic HD in Kisukuma such as Roberts (1992) and Matondo (2000). Roberts' first rule is lexical and it moves the mobile H one syllable to the right. This corresponds to the diachronic pattern in (4) and (5a). The second rule is both lexical and postlexical and it moves the mobile H tone one syllable further to the right. This corresponds to the predicted pattern in (5b). The examples in (4) and (5) thus, provide diachronic evidence to support the validity and evolution of the two spreading rules proposed by Roberts (1992). Likewise, Hyman and Mathangwane (1998) propose three different H tone spread (HTS) rules in Ikalanga, a Bantu language spoken in Botswana. They demonstrate that tonal spread (or shifting) is cumulative in Ikalanga and it applies once per every domain. The prediction here is that HTS rules can apply as many times as there are domains. The observations in (5) indicate that these HTS rules' evolution and the domain in which they cumulatively apply can be diachronically investigated. The tough question concerning these cases, also raised by Hyman and Mathangwane (1998: 227) is this: "how can phonological theory realistically constrain the number of applications of a process such as HTS? For example, could one have 4 rules of HTS that would spread a H tone 4 times – possibly within the same domain?"

It is possible for loan words to have two different tonal specifications. For example, the Kisukuma cases in (4) where the H tone has shifted one syllable to the right can still have the H tone associated to the penultimate syllable like in Kiswahili. However, as shown in (7), the items that have retained the old association of tone have a fixed meaning in Kisukuma: they are interrogatives. Everywhere else, the H tone has shifted one syllable to the right as shown in (4). This is unusual because interrogatives in Kisukuma are usually formed by a rising intonation toward the end of utterances. It is possible that what we have in Kisukuma version in (7) is just a remnant of the diachronic head (H tone) that will disappear with time. The intonation pattern in these forms are thus expected to be formed through normal mechanism in the future stage of the language i.e. rising intonation.

		Swahili	Gloss	Kisukuma	Gloss
(7)	a.	siˈgala	"cigarette"	si(gá)la	"cigarette?"
	b.	ma-shiˈndano	"competition"	ma-shi(ndá̠)no	"competition?
	c.	suruˈali	"pants"	sulu(βá̠)le	"pants?"
	d.	waˈlimu	"teachers"	βa-(lí̠)mu	"teachers?"
	e.	asˈkari	"soldier"	shili(ká̠)le	"soldier?"
	f.	ˈhela	"money"	(hé̠)la	"money?"
	g.	ˈsimu	"telephone"	(sí̠)mu	"telephone?"
	h.	ˈchupa	"bottle"	(jú̠)pa	"bottle?"

As shown in (8), some borrowed nouns have lost the H tone altogether (8a). The examples in (8b) rule out the possibility that the H tone in these nouns may have shifted two syllables to the right. As shown by the ungrammatical (*) examples in (8b), if the H tone had shifted two syllables to the right, it would surface on the following word. This is the general pattern of mobile H in Kisukuma (cf. §2.1). As shown in (8b), however, the following toneless adjective [-taale] "big" remains toneless even after being suffixed to items in (8a). Assuming that these words were borrowed in Kisukuma via Kiswahili (where stress is penultimate) resulting in penultimate H tone that remained associated to the penultimate syllable for sometime, it appears that they have lost their H tone in Kisukuma. It is also possible that, for some reason, these words were borrowed in Kisukuma without the fixed H tone. Without detailed diachronic studies, it is hard to tell what option might in fact account for the lack of tone in these nouns. For now, I will entertain the idea that Kiswahili stress failed to translate into a fixed H in Kisukuma in these words and they were thus borrowed as toneless items.

			Kiswahili	**Gloss**	**Kisukuma**
(8)	a.	i.	m-taka'tifu	"holy person"	n-tagadiifu
		ii.	n-'dege	"airplane"	n-dege
		iii.	ki-'tabu	"book"	gɪ-taβo
	b.	i.	n-tagadiifu ntaale	"very holy person"	*n-taga(d̲iifu ntaalé)
		ii.	n-dege nhaale	"big airplane"	*n-(d̲ege nhaalé)
		iii.	gɪ-taβo gɪ-taale	"big book"	*gɪ-(t̲aβo gɪ-táá)le

There is one more property of recent loans that is worth mentioning. There are borrowed words with fixed H on an antepenultimate H-toned syllable that is short in the Kiswahili source word. Again, assuming that these words were borrowed in Kisukuma via Swahili, these words indicates that the H tone which was originally associated on the penultimate syllable as in Kiswahili, has shifted one syllable to the left instead of right. Representative examples of these words are given in (9).

	Swahili	**Kisukuma**	**Gloss**
(9)	moto'kaa	mo(óndo̲)ka	"motorcar"
		*mo(ondó̲)ka	
		*moo(ndo̲ká)	
	mjeru'mani	njele(éma̲:)ni	"German"
		*njele(emá̲:)ni	
		*njelee(ma̲:ní)	

The relevant question now is this: were these words borrowed directly to Kisukuma from English and not via Swahili? If they were borrowed via Kiswahili, is it possible that sometimes the H tone shifts leftwards diachronically? In order to answer these questions, a detailed diachronic study of loan words needs to be undertaken in Kisukuma. We need to know, for example, when a particular group of words (with a distinctive tonal pattern) was borrowed to Kisukuma and if the borrowing was direct or via Kiswahili.

In fact, the items in (9) represent a particular pattern in Kisukuma. There is a class of polysyllabic Kisukuma loans in which the fixed H has been associated with the first mora in a long penultimate syllable but with a second mora in a long antepenultimate syllable. This is shown in (10a) and (10b) respectively.

(10) a.	i.	ma-sháadi	"shirts"	b.	i.	ø-ameélȉkà[19]	"America"
	ii.	ø-βasikéeli	"bicycle(s)"		ii.	ø-moóndòkà	"car"
	iii.	n-siláamu	"muslim"		iii.	ø-leédȉò	"radio"
	iv.	βa-deléefa	"drivers"		iv.	ø-paásȉtà	"pastor"
	v.	ø-sanáamu	"statue"		v.	ø-paádȉlȉ	"priest"
	vi.	ø-sokóoni	"market"		vi.	ø-loóndònȉ	"London"
	vii.	ø-kaláamu	"pen, pencil"		vii.	ø-hoólààndȉ	"Holland"
	viii.	i-dafutáali	"exercise book"		viii.	ø-βaángȉlȉ	"bracelet"

Kenstowicz (p.c.) quoting Batibo (p.c) pointed out to me that the H tones in (10a) and (10b) differ on the way they affect the tonal pattern of the following syllables. When the fixed H tone is associated with a first mora of a long penultimate syllable in multisyllabic loanwords as in (10a), no mobile H tone is triggered on the following syllable. However, when the fixed H tone is associated with the second mora of a long

[19] The grave accent (̏) represent extra Low tone (XL). See the details concerning the generation of this tone in these forms below.

antepenultimate syllable as in (10b), a mobile H tone is triggered on the following syllable. The triggered mobile H tone shifts two syllables to the right because its High Domain (HD) is usually trisyllabic. Since there are only two syllables to the right, the triggered mobile H surfaces as an Extra Low tone indicated here by a grave accent (̀). This is the general pattern that was demonstrated in §2.3.

While the above observation may be true in Batibo's dialect, it is only optionally true in my subdialect (Kinyantuzu). In Kinyantuzu, the fixed H tone in both (10a) and (10b) triggers a mobile H tone on the following syllable. However, there is a slight difference between the two patterns. While the fixed H in (10b) *must* trigger a mobile H on the following syllable, the fixed H in (10a) can *optionally* trigger a mobile H on the following syllable. Representative nouns in (10) are repeated below to illustrate these observations. Note that the H tone associated with the second syllable of the toneless adjectives [sagala] "useless" and [-taale] "big" results from the triggered mobile H associated with preceding words. The property of the triggered mobile H is discussed in some detail in §4.6.2

(11) a. i.	ma-(shá̲)adi[20]	"shirts"	b. i. ø-ame(é)(l̃ikà)	"America"
	ma-(shá̲)(a̲di ma-tá)ale	"big shirts"	ame(é)(li̲ka nhaalé)	"big America"
	ma-(shá̲)adi ma-taale		*ame(é)lika nhaale	
ii.	βa-de(lé)efa	"drivers"	ii. ø-paás̃ità	"pastor"
	βa-de(lé)(e̲fa sa-gá)la	"useless drivers"	pa(á)(si̲ta sa-gá)la	"useless pastor"
	βa-de(lé)efa sa-gala		*pa(á)sita sa-gala	

[20] The extra low (XL) tone is not marked in this column and in (10a) because it is optional.

4.2. Tone in reduplicated native words and nativized loans.

It was demonstrated in the previous chapter that in native words and nativized loans, nominal roots usually surface faithfully in the reduplicant regardless of their length or segmental composition. Moreover, noun class prefixes usually do not copy in the reduplicant except in monosyllabic stems. Tone was ignored in the previous chapter because it *does not* play any role whatsoever in determining the size of the reduplicant in Kisukuma native words and nativized loans. In this section, I provide evidence that tone is irrelevant in computing the size of the reduplicant in native words and nativized loans. As I will show in §4.3, however, the H tone of the unreduplicated stem plays a crucial role in determining the size of the reduplicant in recent loans. Examine now the data in (12a) and (12b).

(12) a. Toneless multisyllabic native words and nativized loans

	BASE	**BASE + RED**	**Gloss**
i.	ma-hagala	ma-hagala + hagala	"tree forks"
		*ma-hagala + gala	
ii.	ma-piliŋga	ma-piliŋga + piliŋga	"caves"
		*ma-piliŋga + liŋga	
iii.	ma-gugulu	ma-gugulu + gugulu	"cooked dry corn"
		*ma-gugulu + gulu	

b. H-toned multisyllabic native words and nativized loans

	BASE	**BASE + RED**	**Gloss**
i.	mi-so(ngó)ma	mi-so(ngó)ma + (só)ngoma	"type of a tree"
		*mi-so(ngó)ma + (ngó)ma	
ii.	ma-ga(mbá)la	ma-ga(mbá)la + (gá)mbala	"scales"
		*ma-ga(mbá)la + (mbá)la	

iii. ma-da(ndá)li]	ma-da(ndá)li + (dá)ndali *ma-da(ndá)li + (ndá)li	"tyres"

The data in (12a) represents multisyllabic toneless nominal roots while the data in (12b) represents long stems with a penultimate H tone. Despite the tonal differences between the data in (12a) and (12b), the shape of the reduplicant is characteristically the same: the entire nominal root of the base is copied regardless of the base's length, segmental composition or H tone. The ungrammatical (*) candidates in (12) are bad because they truncate the nominal base root from which the reduplicant stem is derived, yielding a reduplicant that is not a listed stem in Kisukuma such as *[ngóma] (12b-i) or *[mbála] (12b-ii). As demonstrated in the previous chapter, these forms incur a fatal violation of the lexical conservatism constraint (RED$_{(\mu_i)}$=LSTEM$_{(\mu_i)}$). This constraint and its interaction with other constraints that account for the size of the reduplicant will be discussed in §4.6.

Although the shape of the reduplicant in both toneless and H-toned nominal stems is principally determined by (RED$_{(\mu_i)}$=LSTEM$_{(\mu_i)}$), there is one important property associated with the H-toned stems. The H tone of the unreduplicated stem is always transferred in the reduplicant and is *always* associated with the initial syllable. If the unreduplicated stem is toneless, however, no H tone surfaces on the initial syllable of the reduplican (cf. 12a). To account for these facts we need the following constraints.

(13) Constraints pertaining to the realization of the H tone in the Reduplicant.

a. DEP H-BR: Every H tone of the reduplicant has a correspondent in the Base
b. IDENT H-BR: Every H-toned syllable of the base must be H-toned in the reduplicant
c. ALIGN (RED, L, H, L): The left edge of the reduplicant is aligned with a H tone.

Since no H tone is inserted in the (suffixal) reduplicant (cf. 12a) in order to satisfy ALIGN (RED, L, H, L), it must be the case that DEP H-BR is ranked higher than ALIGN (RED, L, H, L). This is illustrated in (14).

14. /ma-gılıgımba + RED/	(RED(μ_i)=LSTEM(μ_i))	DEP H-BR	ALIGN (RED, L, H, L)
a. ☞ma-gılıgımba + gılıgımba			*
b. ma-gılıgımba + gílıgımba		*!	
c. ma-gılıgımba + gımba	*!		*

In H-toned nominal stems, however, ALIGN (RED, L, H, L) outranks IDENT H-BR because the former forces the H tone to surface on the initial syllable of the reduplicant regardless of its location in the base. This is illustrated in (15).

15. /ma-gambála + RED/	(RED(μ_i)=LSTEM(μ_i))	ALIGN (RED,L, H, L)	IDENT H-BR
a. ☞maga(mbá)la + (gá)mbala			*
b. maga(mbá)la + ga(mbá)la		*!	
c. maga(mbá)la + (mbá)la	*!		

To complete this introductory part, examine now the tonal pattern in the following nouns. What is peculiar in the examples in (16) is that, even though the unreduplicated stem is H-toned, the reduplicant surfaces toneless.

(16) a. n-(z<u>a</u>gaambá) n-(z<u>a</u>gaambá) + zagaamba "bull"
*n-(z<u>a</u>gaambá) + (zá)gaamba

b. i-(k<u>o</u>maangó) i-(k<u>o</u>maangó) + komaango "stone mortar"
*i-(k<u>o</u>maangó) + (kó)maango

c. (s<u>a</u>nagú) (s<u>a</u>nagú) + sanagu "ants"
*(s<u>a</u>nagú) + (sá)nagu

d.	βa-(n̲amugɪ́)	βa-(n̲amugɪ́) + namugɪ *βa-namu(gɪ́) + (ná)mugɪ	"husbands"
e.	ta(lá)	ta(lá) + tala *ta(lá) + (tá)la	"lamp(s)"

In the discussion of Kisukuma tone in §2.4, it was demonstrated that Kisukuma, like Chichewa (Mutaka and Mtenje 1998), disfavors a sequence of two H tones. When two H tones occur sequentially in Kisukuma, two things can happen. First, the rightmost H can be deleted by Meeussen's rule, which in essence is a manifestation of the Obligatory Contour Principle (OCP). Second, the rightmost H tone can also be downstepped. The examples in (16) show that Meeussen's rule is active across Base + Reduplicant boundaries. In Optimal Domains Theory (ODT), Meeussen's rule is viewed as a family of OCP constraints that ban the sequence of adjacent sponsors. The OCP constraint relevant in these cases is given in (17)

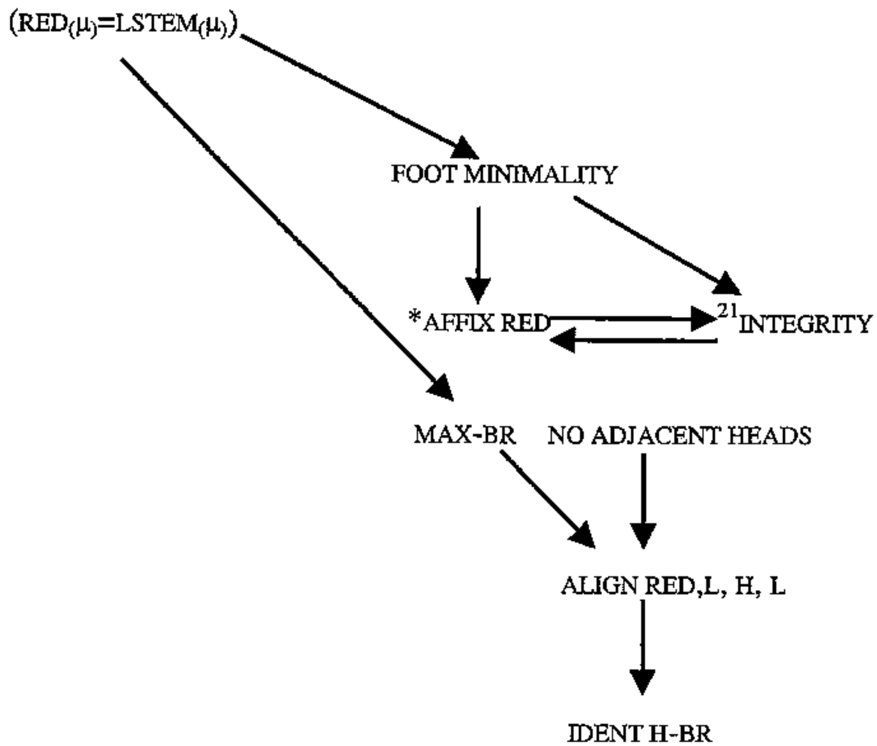
(17) NO ADJACENT HEADS: Two domain heads can not be adjacent i.e. *(x́)(x́).

Since the H tone does not surface at the left edge of the reduplicant as expected (because this would violate NO ADJACENT HEADS), NO ADJACENT HEADS must be ranked higher than ALIGN (RED, L, H, L). This is illustrated in the tableau in (18). As we will soon see, in recent loans, however, NO ADJACENT HEADS can be violated (cf. 20).

18. /βa-namu(gɪ́) + RED/	(RED$_{(\mu_1)}$=LSTEM$_{(\mu_1)}$)	NO ADJACENT HEADS	ALIGN RED,L, H, L
a. ☞βa-namu(gɪ́) + namugɪ			*
b. βa-namu(gɪ́) + (ná)mugɪ		*!	
c. βa-namu(gɪ́) + mugɪ	*!		*

The summary of the crucial constraint ranking in native and nativized loans is given in (19)

(19) Ranking summary in native words and nativized loans.



4.3. The Reduplicant in Recent Loans

After the above introduction concerning the size of the reduplicant in native words and nativized loans, I now present the data that bears on the failure of lexical conservatism ($RED_{(\mu)}$=$LSTEM_{(\mu)}$) computations in recent loans, leading to the ascendancy of purely phonological factors in computing the size of the reduplicant. The majority of the words used in this section are place names, and it is possible that some of these nouns have not been borrowed to Kisukuma yet. The findings here may, thus, predict the shape

[21] The arrows pointing in opposite directions indicate that these constraints are freely ranked.

of the Kisukuma reduplicant in future loans, particularly those from English. I carefully pronounced these words in their English citation form and asked Kinyantuzu native speakers (the Kisukuma sub-dialect studied here) to reduplicate them. In a followup procedure, Kinyantuzu speakers were given the entire corpus and asked to read these words aloud in isolation. The subjects were then asked to provide all the possible reduplicants, both orally and in written form (except for one subject who is illiterate). Both the oral and written responses were then compared and analyzed.

	BASE	BASE + RED	Gloss
(20) a.	siáto	siáto + átɔ	"Seat'tle"
b.	kolúmbia	kolúmbia + lúmbia	"Colu'mbia"
c.	luumánia	luumánia + mánia	"Ruma'nia"
d.	tolónto	tolónto + lónto	"Toron'to"
e.	saiβélia	saiβélia + βélia	"Sibe'ria"
f.	wisikónsini	wisikónsini + kónsini	"Wisco'nsin"
g.	kalifónia	kalifónia + fónia	"Califor'nia"
h.	minesóta	minesóta + sóta	"Minneso'ta"
i.	kangarúu	kangarúu + rúu	"kangaroo'"
j.	tenesíi	tenesíi + síi	"Tennessee'"
k.	pensilovénia	pensilovénia + vénia	"Pennsylva'nia"
l.	sikandinávia	sikandinávia + návia	"Scandina'via"

The subjects generally agreed upon the data in 20 (cf. Appendix II.5). The data shows that the lexical conservatism constraint ($RED(\mu_i)=LSTEM(\mu_i)$) is systematically violated in recent loans. Obeying ($RED(\mu_i)=LSTEM(\mu_i)$) in these forms would necessitate that nominal stems be copied in their entirety because they are treated as one stem morpheme. What we observe here, however, is the systematic truncation of the stem. This is contrary to the pattern of reduplication displayed by native words and nativized loans where nominal stems usually are not truncated (cf. 16).

Initially, it looks as if it is the first syllable of the stem that does not show up in the reduplicant (20a-d). This may lead us to think that Kisukuma speakers systematically treat the first syllable of any recent nominal loan in their language as a noun-class marker, which is generally excluded in the reduplicant except for monosyllabic stems. However, in the remaining examples in (20e-j) and (20k-l), two or three syllables of the base do not show up in the reduplicant respectively. Given the shape of the noun class markers in Kisukuma (cf. table 1), there is no way one can think of the excluded syllables in (20e-l) as being reanalyzed as noun class markers by Kisukuma speakers leading to their truncation in the reduplicant. Other reasons must thus be sought to account for the truncation of the base stem in recent loans.

The shape of the reduplicant in these words is determined by the location of the H tone of the base. The rightmost edge of the Base HD marks the leftmost edge of the reduplicant's High Domain. The reduplicant then copies the H-toned syllable of the base and everything to its right. Unlike in native words and nativized loans, the nominal stem in these forms is consistently truncated. For example, in (20f) [wisikónsini], the domain of the stem that is guaranteed to appear in the reduplicant is demarcated by the H tone that is associated with the antepenultimate H-toned syllable [kó]. The reduplicant includes the syllable to which a H tone is associated with and all the following syllables, to produce [kónsini] as a reduplicant. I claim here that in recent loans, Kisukuma speakers cannot pinpoint the morphological make-up of recent loan stems. When this happens, it becomes impossible to establish the listedness of potential reduplicants.

Lexical conservatism computations are thus generally problematic. To form a reduplicant, speakers rely on other phonological and phonetic cues like prominence boundaries, in our case the H tones of the base. Below I demonstrate that other languages outside the Bantu family also apply the same mechanism in computing the size of the reduplicant. One of these languages is Malagasy.

4.4. Malagasy

The relevance of base primary stress in computing the size of the reduplicant is not an exotic process that is confined to Kisukuma. In Malagasy, an Austronesian language mainly spoken in Madagascar, the size of the reduplicant is also determined by the position of the primary stress of the base stem (Ying 2002). This is shown in (27) below:

(21) Reduplication in Malagasy (Ying 2002): The size of RED determined by the base primary stress. (No gloss in the original manuscript).

Base	**Base**	**+**	**RED**
teté	tetè	+	té
lèhibé	lèhibè	+	bé
máso	màso	+	máso
fók	fòk	+	fók
manáo	manào	+	náo
saláma	salàma	+	láma
manófin	manòfin	+	nófin
latábatr	latàbatr	+	tábatr
mangálatr	mangàlatr	+	ngálatr

As in Kisukuma, the strategy of forming reduplicants in Malagasy seems to be simply this: "find the primary stress of the string, copy everything from the stressed syllable to the right edge, and concatenate the copied string after the original string" (Ying 2002:4).

The observed pattern of stress in Kisukuma recent loans and Malagasy can be attributed to the Metrical Segmentation Strategy (MSS), a speech segmentation model for stress-timed languages (e.g. English) proposed and experimentally proven by Cutler and Norris (1988). In this strategy, continuous speech is segmented at the onset of strong syllables. Such segmentation is motivated by the need to find the most efficient starting points for lexical access attempts.

Notice, however, that MSS' applicability in English is motivated by the English lexicon. As pointed out by Cutler and McQueen (1995), in a typical English speech, more than 90% of content words do begin with a strong syllable, and approximately 75% of all strong syllables are indeed the initial syllables of content words. Such lexicon evidence is lacking in Kisukuma even if we substitute the strong syllable in Cutler and Norris' MMS with H-toned syllable. Although the initial syllable in H-toned verb stems sponsor a mobile H tone, this H tone surfaces on the second syllable from the sponsor. As far as fixed H is concerned, Batibo (1991) notes that only 34% of nouns in Kisukuma have a fixed H tone and there is no tendency for it to fall on the initial syllable. The only evidence that the initial syllable is preferred as far as H tone association is concerned in Kisukuma is provided by reduplication of fixed H-toned stems where the initial syllable of the reduplicant is always H-toned.

Apart from these drawbacks in Kisukuma, The Cutler and Norris (1988) model may be relevant in forming reduplicants when Kisukuma recent loans are reduplicated. Here speakers are faced with new words whose morphology is opaque to them. Given the morphological structure of their language, they are not sure how to sort out possible prefixal (noun class) morphemes from the nominal stem. The H-toned syllable of the base provides the much-needed cue for the segmentation of the reduplicant from the morphologically opaque base. One can then observe that although MSS in English is motivated by lexical statistics, something like it still holds in languages where the lexical statistics are different.

4.5 The Source of H tone in Recent Loans

Before we proceed, one question must be answered: where does the fixed H tone in Kisukuma recent loans come from? This question is crucial because if answered correctly, it has the potential of enabling us to correctly predict the shape of the reduplicant in Kisukuma recent (and probably future) loans from English because it is the H tone of the base that determines the shape of the reduplicant.

There are at least three possible sources of the fixed H tone in Kisukuma recent loans: the stress of the source language, the H-toned word-final vowels that are added to avoid codas, and avoidance of lapse violations. In the following section I briefly review each one of these sources. After establishing the validity of each source, it will then be possible to develop an analysis.

It is very likely that the fixed H tone in Kisukuma recent loans comes from the source language, in our case English (and Kiswahili). Careful examination of the data in (20) indicates that this is indeed the case: the H tone in recent loans comes from the stressed syllable of the source language. It follows that if borrowing is via Kiswahili, as is usual for many languages in East Africa where Kiswahili is a lingua franca, Kisukuma loans will have a fixed H tone associated with the penultimate syllable because Kiswahili stress is predominantly penultimate. The place names used in this study, however, are assumed to have been borrowed directly from English and not necessarily via Kiswahili. This explains why the reduplicant is not necessarily disyllabic. Disyllabic reduplicants occur only when the fixed H of the base is penultimate, which itself corresponds with the stressed syllable in the source language.

To account for stress transfer from the source language (English and/or Kiswahili) to the recipient language (Kisukuma), the constraint in (22) is proposed. Ranking this constraint high enough guarantees the transfer of stress from the source language (English) to Kisukuma recent loans.

(22) IDENT STRESS S -R: A stressed syllable in the source language must be stressed in the recipient language[22].

Kisukuma, like other Bantu languages, does not allow codas. Codas from recent loans are usually avoided through vowel epenthesis. It seems that the vowels that are added at word-final position contribute a H tone. This is shown in (23) where it is clear that the first H tone in (23) corresponds to the stressed syllable in the source language (English).

		Noun	Base + RED	Gloss
(23)	a.	míchigaaní	míchigaaní + gááni	"Mi'chigan"
	b.	ókilaandí	ókilaandí + láándi	"Oak'land"
	c.	óregooní	óregooní + góóni	"O'regon"
	d.	hóliwuudí	hóliwuudí + wúúdi	"Hol'lywood"
	e.	losánjeleesí	losánjeleesí + léési	"Los An'geles"
	f.	isilámaβaadí	isilámaβaadí + βáádi	"Islam'abad"

[22] Since the primary stressed syllable in the source language (English) is also fixed H-toned in Kisukuma, I am assuming that the two (primary stress and fixed H tone) are somehow related.

However, as shown in (24a), word-final syllables can have a (fixed) H tone even when there is no coda in the source language. Moreover, in (24b-c), a second H tone occurs on both the penultimate and the final syllables. As in (24a), it is not likely that the H tones in (24b-c) is associated with a vowel that is added in order to avoid codas because there are no codas in (24). This suggest that there are other sources of the second H in polysyllabic recent loans. Abandoning the second source, this leads us to the third source of the H tones in recent loans: the need to avoid long lapses toward word-final position.

(24)	a.	sîlilaanká	sîlilaanká + láánka	"Sri La'nka"
	b.	págisitáání	págisitáání + tááni	"Pa'kistan"
	c.	pîtisiβáágá	pîtisiβáágá + βáága	"Pitts'burgh"
	d.	afugánisitáání	afugánisitáání + táání	"Afghan'istan"

The mechanism at work here seems to be this: if the H tone is "too far" to the left in a polysyllabic word, a second H tone is added to the right, usually on the third syllable from the leftmost H. In (24b-d), for example, a H tone is assigned to the third syllable from the first H tone. As a general rule, a sequence of three stressless syllables preceded by a H tone is not allowed in Kisukuma recent loans. In native words and nativized loans, however, long lapses are tolerated. This is shown by polysyllabic words like [ma-sanzagata] "trash" and [i-βambahili] "black mamba". Moreover, the second H tone is added only if there is a H tone to the left. In [pensilovénia] (reduplicates as [pensilovénia] + [vénia]), there are three stressless syllables to the left of the H tone but no H tone is added.

The addition of the second H-tone on word-final and penultimate syllables in (23) and (24) respectively triggers a chain of events that ends up producing disyllabic reduplicants. Here is how it works: Given that the reduplicant is suffixal in nominal reduplication, it is predicted that it is the rightmost H-toned syllable that will correspond to the leftmost edge of the reduplicant. The consequence of this observation is that in unproblematic forms like those in (24b-d), the reduplicant will come out disyllabic. The cases in which the rightmost H is word-final like those in (23) and (24a) are problematic and need further explanation. Since the second H is word-final, the reduplicant in these forms is expected to be monosyllabic. From our discussion in the previous chapter and the summary above, however, we know that monosyllabic reduplicants are not allowed in Kisukuma and other Bantu languages for which data is available. Since monosyllabic reduplicants are impossible in Kisukuma, in order to make the reduplicant at least disyllabic, one syllable to the left of the base H tone is copied in the reduplicant, together with the H-toned final syllable, thereby satisfying the disyllabic minimality requirement. In this case, the H-toned syllable of the reduplicant (which is usually aligned with the left edge of the reduplicant) surfaces on a syllable that was not H-toned in the base, as in native words. This shows that although Kisukuma is not like Ndebele (Hyman et al. 1999) and Kirundi (Brassil 2000) where the reduplicant is usually disyllabic, disyllabic reduplicants in Kisukuma are still preferred, at least in long loans like those in (23) and (24).

To summarize, we have observed the following basic facts regarding the properties of the reduplicant in Kisukuma recent loans that must be accounted for by the analysis in the following section.

(25) Properties pertaining to RED in recent Kisukuma loans

a. RED copies the H-toned syllable of the base and everything to its right.
b. The H tone of the reduplicant is always aligned with the Left edge
c. If the leftmost H-toned syllable is followed by two or more toneless syllables, a H tone is assigned to the third syllable.

4.6. The Analysis

I will be assuming in this section that the shape of the reduplicant in recent loans is not determined by lexical conservatism. It is not clear if the reduplicants in recent loans are listed stems. My intuition is that recent loans' reduplicants are not listed allomorphs of their listed stem. All the educated informants (including the researcher) who might have listed knowledge of the place names used in this study indicated that, recent loan reduplicants do not mean anything. For example, the reduplicants [gáâni] and [βáága] in (23a) and (24c) respectively are not stems, they are meaningless and arguably not morphologically related to the base stems from which they are derived. It is thus logical to argue that these reduplicants cannot be listed allomorphs of mîchigaanî and [pîtisiβáágá] respectively.

The observation above is in fact predicted due to the fact that for lexical conservatism to be evaluated (at least in Bantu), the morphological composition of the bases must be transparent and accessible. Since the morphology of recent loans is opaque to Kisukuma speakers, lexical conservatism is suspended in computing the size of the reduplicant. Phonological factors (H tone) thus steps in to determine the size of the reduplicant. (RED$_{(\mu)}$=LSTEM$_{(\mu)}$) is ranked the same in recent loans but can not be evaluated and so is irrelevant.

We are now at a position to account for the facts established in (26). To account for the fact that RED copies the H-toned syllable of the base and everything to its right, I will rely on the alignment constraint ALIGN (RED, L, H, L) and IDENT H-BR. The alignment constraint optimizes the leftward alignment of the H tone in RED. Moreover, MAX-BR enforces the notion of copying everything after IDENT H-BR and ALIGN (RED, L, H, L) have determined the base segments that show up in RED.

Apart from the above constraints, there are size-restrictor constraints that work together to limit the size of the reduplicant. In reduplication of native words and nativized loans, for example, the reduplicant cannot be less than two syllables. Since truncation of the base segments is not possible due to the high ranked (RED$_{(\mu)}$=LSTEM$_{(\mu)}$), there is no maximum limit to the size of the reduplicant. Thus [i-galagalılo] "a place for rolling, sitting room" reduplicates as [i-galagalılo] + [galagalılo] because any attempts to truncate the (underlined) nominal stem will fatally violate EXT LEX (RED). In reduplication of recent loans, however, the reduplicant cannot be longer than three syllables. The size restrictor constraint is given in (26). Together with FOOT MINIMALITY, the constraint in (26) determines the minimal and maximal length of the reduplicant in recent loans: it can neither be less than two syllables nor longer than three syllables. This is evidence that although the reduplicant in Kisukuma is not both minimally and maximally disyllabic like in Ndebele (Hyman, Inkelas and Sibanda 1999) and Kirundi (Brassil 2000), polysyllabic reduplicants are dispreferred particularly when the size of the reduplciant is determined by phonological constraints like in recent loans.

(26) *RED > σσσ: The reduplicant cannot be larger than three syllables

The proposed constraints can account for the size of the reduplicant in recent loans with one H tone like those in (20). The tableau below illustrates a representative form of one H tone recent loan stem [wisikónsini].

27. /wisikónsini + RED	ALIGN	IDENT	FOOT MINIMALITY	MAX-BR	*RED>σσσ
a. ☞wisikónsini + kónsini				****	
b. wisikónsini + kónsi				*****!*	
c. wisikónsini + kó			*!	*********	
d. wisikónsini + wísikonsini		*!			*
e. wisikónsini + wisikónsini	*!				*

The reduplicant [kónsi] in (27b) is a serious competitor and it looses only because, compared to the winner, it incurs more violations of MAX-BR. This constraint is evaluated gradiently and candidates that copy more from the base segments like the winner in (27) are better than those with fewer segments.

4.6.1. Stems with two H tones

After accounting for stems with only one H tone, we are now in a position to account for recent loans with two H tones like those in (23) and (24). As we established above, it is the second H tone of the base that determines the size of the reduplicant in these forms.

In Kisukuma recent loans, this observation is further supported by the fact that the reduplicant in nominals is a suffix and not a prefix. This is consistent with the assumption that it is the rightmost H tone that will determine the segmentation of the reduplicant materials. As shown in (28), this is indeed what happens when recent loans with two H tones are reduplicated in the language. The ungrammatical (*) examples with a disyllabic RED in (28) would be more optimal if the size of the reduplicant were determined by the H tone associated with the first syllable or if the reduplicant were a prefix. The second ungrammatical (*) examples with total reduplication in (28), e.g. [*mîchigaanî] + [mîchigaanî] are not optimal because the reduplicant is too long and it violates *RED>σσσ.

(28)	a.	mîchigaanî	míchigaanî + gááni *míchigaanî + míchi *míchigaanî + míchigaanî	"Mich'igan"
	b.	ókilaandî	ókilaandî + láándi *ókilaandî + óki *ókilaandî + ókilaandî	"Oak'land"
	c.	óregoonî	óregoonî + góóni *óregoonî + óre *óregooni + óregooni	"O'regon"
	d.	hóliwuudî	hóliwuudî + wúúdi *hóliwuudî + hóli *hóliwuudî + hóliwuudî	"Hol'lywood"
	e.	sîlilaanká	sîlilaanká + láánka *sîlilaanká + sîli *sîlilaanká + sîlilaanká	"Sri La'nka"

f.	págisitáánî	págisitáánî + tááni	"Pa'kistan"
		*págisitáánî + págí	
		*págisitááni + págisitááni	
g.	afugánisitáánî	afugánisitáánî + tááni	"Afghan'istan"
		*afugánisitáánî + áfu	
		*afugánisitáánî + afugánisitáánî	
h.	pîtisiβáágá	pîtisiβáágá + βáága	"Pitts'burgh"
		*pîtisiβáágá + pîti	
		*pîtisiβáágá + pîtisiβáágá	

It has already been argued that the second H tone in unreduplicated nominal stems in (28) is added in order to avoid a sequence of more than two stressless syllables. This is further exemplified in (29) below. The examples on the left in (29) represent the pattern that is not affected by *LAPSE. There is only one H tone, which is derived from the primary stress of the source language i.e. English. As shown in (29), without *LAPSE, total reduplication would be preferred (except in 29g) where the leftmost H is not word initial, i.e. [afugánisitaani] + [gánisitaani]. These reduplicants, however, are too long. The examples on the right are affected by *LAPSE and a second H tone is associated with the third syllable from the leftmost H. It is this H tone that determines the size of the reduplicant. If other syllables are available to the right of the second H, they also become H-toned as in (29f-h). This pattern is not only problematic but also it is unexpected and unmotivated. If the second syllable in these stems is added in order to avoid *Lapse, why is the following syllable after the second H tone in (29f-h) also H-toned? For now I don't have the answer to this question and I reserve it for further inquiry.

(29) Lapse effects in Kisukuma recent loans

(29) Lapse effects in Kisukuma recent loans

	-*LAPSE	+*LAPSE	**Gloss**
a.	*mîchigaani	mîchigaanî	"Mich'igan"
b.	*ókilaandi	ókilaandî	"Oak'land"
c.	*óregooni	óregoonî	"O'regon"
d.	*hóliwuudi	hóliwuudî	"Hol'lywood"
e.	*sîlilaanka	sîlilaanká	"Sri La'nka"
f.	*págisitaani	págisitáánî	"Pa'kistan"
g.	*afugánisitaani	afugánisitáánî	"Afghan'istan"
h.	*pîtisiβaaga	pîtisiβáágá	"Pitts'burgh"

From this discussion we can now add a constraint (given in 30a) that bans the sequence of more than two stressless syllables.

(30) a. *LAPSE > σσ: The sequence of more than two stressless syllables after another H tone is not allowed.

b. IDENT H-IO: A H-toned mora in the output must be H-toned in the input.

Since *LAPSE introduces a H tone on RED that has no correspondent in the base, it must be the case that *LAPSE is ranked higher than IDENT H-IO. This is shown in the tableau below.

31. mîchigaani	*LAPSE > σσ	IDENT H-IO
a. ☞mîchigaanî		*
b. mîchigaani	*!	

At this point we can now account for the reduplication processes that follow after the second H tone has been inserted in order to avoid *LAPSE. Since tone identity between the base and RED is impossible (this would create monosyllabic reduplicants) FOOT MINIMALITY must outrank IDENT H-BR. This is illustrated in (32).

32. /mîchigaani + RED/	FOOT MINIMALITY	IDENT H-BR
a. ☞mîchigaanî + gááni		*
b. mîchigaanî + nî	*!	

Moreover, as shown in (33), *ADJACENT HEADS, an OCP constraint prohibiting the realization of adjacent heads is outranked by ALIGN (RED, L, H, L) because the H tone in RED is adjacent to the H tone of the base. The big picture of all constraints involved so far and their ranking is illustrated in (34).

33. /mîchigaani + RED/	ALIGN (RED,L,H,L)	*ADJACENT HEADS (OCP)
a. ☞mîchigaanî + gáání		*
b. mîchigaanî + gaani	*!	
b. mîchigaanî + gaanî	*!	

34. /hóliwuudi + RED/	FOOT MIN	ALIGN	*LAPSE	*RED >σσσ	IDENT	OCP	MAX-BR
a.☞hóliwuudî + wúúdi					*	*	****
b.hóliwuudî + wúúdî					*	**!	****
c.hóliwuudî + lîwuudi					**!	*	**
d.hóliwuudî + hóliwuudî				*!		*	
e.hóliwuudi + wúúdi			*!		*		****
f.hóliwuudî + wuudî		*!					****
g.hóliwuudî + dî	*!					*	******

A few candidates require explanation. Candidate (34b) looses only because it incurs more violations of OCP. Compared to the winner, candidate (34b) has two violations of OCP because the two adjacent syllables of the reduplicant are H-toned. Assuming that IDENT H-BR is gradiently evaluated, candidate (34c) has more violations of IDENT H-BR because, compared to the winner candidate (with one IDENT H-BR violation), there are two syllables between the H tone of RED in candidate (34c) and the rightmost H tone of the base. Candidate (34c) thus has two violations of IDENT H-BR accounting for its non-optimality.

There is another question that must be addressed here. Why is it not possible to satisfy FOOT MINIMALITY by double copying the last strong syllable of the base in the reduplicant? That is, why [hóliwuudî] cannot reduplicate as [hóliwuudî] + [dîdi]? First, [hóliwuudî] + [dîdi] satisfies FOOT MINIMALITY, ALIGN (RED, L, H, L) and IDENT H-BR. The reduplicant [dîdi] is disyllabic (satisfying FOOT MINIMALITY), its left edge is aligned with a H tone (satisfying ALIGN (RED, L, H, L)). Moreover, the H tone in the reduplicant is linked to the same syllable like the H tone of the base. The two H tones are thus in exact correspondence (satisfying IDENT H-BR). The question thus remains: why is [dîdi] non optimal? I suggest that [dîdi] is not optimal because it violates INTEGRITY. Unlike in native words and nativized loans where INTEGRITY is violated, INTEGRITY is inviolable in Kisukuma recent loans. That is, while the native [mi-tɪ] "medicine" can reduplicate as [mi-tɪ + tɪtɪ] "some sort of medicine", violating INTEGRITY, [hóliwuudî] cannot reduplicate as [hóliwuudî] + [dîdi] but as [hóliwuudî] + [wúudi] thereby satisfying FOOT MINIMALITY and INTEGRITY but violating IDENT H-BR. It follows that INTEGRITY in Kisukuma recent loans is ranked higher than IDENT H-BR. This is illustrated in the tableau in (35).

35. /hóliwuudí + RED/	FOOT MIN	ALIGN	*LAPSE	*RED> σσσ	INTEG RITY	IDENT	OCP	MAX-BR
a.☞hóliwuudí + wúúdi						*	*	holi
b.hóliwuudí + wúúdí						*	**!	holi
c.hóliwuudí + líwuudi						**!	*	ho
d.hóliwuudí + dídi					*!		*	holiwuu
e.hóliwuudí + hóliwuudí				*!			*	
f.hóliwuudi + wúúdi			*!			*		holi
g.hóliwuudí + wuudí		*!						holi
h.hóliwuudí + dí	*!						*	holiwuu

The summary of the constraint ranking in Kisukuma recent loans is given in (36)

(36) Ranking summary in Kisukuma recent loans

(REDμ_j=LSTEM(μ_j))

FOOT MINIMALITY, *LAPSE 2σ, ALIGN (RED, L, H, L), *RED>σσσ, INTEGRITY

IDENT H-BR, NO ADJACENT HEADS (OCP)

MAX-BR

There is, however, bad news for the analysis sketched above. Although it can account for the shape of the reduplicant in recent loans with one H tone (cf. 20) and initial and final H tone (cf. 28a-e), it cannot account for the puzzling tonal behavior in multisyllabic stems with more than two H tones like those in (24b-d) and (28f-h). This is clear in the following tableau. Only the controversial candidate is considered.

37. /pîtisiβa:ga + RED/	*RED <σσ	ALIGN	*LAPSE	*RED >σσσ	INTEGRITY	IDENT H-BR	OCP	MAX-BR
a. ☞pîtisiβá:ga + βa᷄:ga						*		******
b. ☛pîtisiβá:gá + βa᷄:ga						**!	**	******

Candidate (37b) is the actual form but given the constraint ranking established, it incurs fatal violation of IDENT H-BR because two H tones of the base have no correspondents in the reduplicant. This candidate also has two violations of OCP because there are three adjacent heads. The wrong winner (37a) seems to be fine because compared to the actual form (37b) it only incurs one violation of IDENT H-BR. Therefore, the constraints and their ranking in (37) cannot account for the winner candidate. This complication, I believe, stems from the unusual property of the High Domain (HD) of the triggered mobile H (or *Lapse effects) as demonstrated above and in §4.6.2 (e.g. 37b-c). In order to figure out why there are two H tones in the unreduplicated stem in these nouns further research is needed. Maybe after we understand the motivation for the additional H tone, it will then be possible to account for this unexpected pattern more precisely.

4.6.2. Alternative Source of the second H tone in Recent Loans

In this section, I explore alternative sources of the second H tone in recent loans like those in (23) and (24). It is possible that the second H tone in these forms can also result from the mobile H triggered by non-final fixed H. It was demonstrated in §2.6 that non-final fixed H tone triggers a mobile H on the following syllable. This triggered mobile H domain expands three syllables to the right. Across word boundaries, it skips the first syllable of the second word to surface on the second syllable. The mobile H also skips the noun class marker if the following word is a nominal (noun, adjectives and numbers). If the noun class marker fuses with the nominal stem at prefix-root boundary, the entire syllable becomes extrametrical and is skipped over. This is the case, for example, with the toneless adjective [taale] "big". When [taale] modifies nouns in class nine and ten whose noun-class prefix is (N-), its first consonant fuses with the noun-class marking prefix, rendering the first syllable extrametrical for the rightward expansion of the mobile H domain. The autosegmental notations in (38c) and (38e-g) illustrate the property of the non-final fixed H and its mobile H triggering effects. The dotted association lines represent a (triggered) mobile H.

(38) a. ma-gʊ(nɪ́)la "sacks" b. sagala "useless"
H

c. ma-gʊ(nɪ́)la sagala => ma-gʊ(nɪ́)(la sagá)la "useless sacks"
H H H

d. mo(ó)ndoka "car" e. -taale "big"
H

e. mo(ó)ndoka n-taale => mo(ó)(ndoka nha:lé) "big car"
H H H

f. lɪ-mo(ó)ndoka li-taale => lɪ-mo(ó)(ndoka -tá:le)"very big car"
H H H

g. lɪ-mo(ó)ndoka sa-gala => lɪ-mo(ó)(ndoka <sa>-gála)"very big car"

H H H

The toneless adjectives [taale] "big" and [sagala] "useless" surface with a H tone when they follow nouns with non-final fixed H tone as in (38c) and (38e-g). As indicated by the dashed association lines, the H tone in these words is mobile and is sponsored by the syllable that immediately follows the fixed H tone. In (38e), the noun class prefix [N-] fuses with the nominal root [-taale] making the first syllable extrametrical to the rightward expansion of the mobile H domain. The first syllable is thus skipped over. In (38f), however, there is no fusion between the noun class prefix [li-] (which also functions as an augmentative marker) and the nominal root. In this case only the prefix is skipped over and the mobile H tone is realized on the second syllable of the adjective [-taale] and not on the final syllable as in (38e). In (38g), the first syllable of [sagala] is skipped over and the triggered mobile H tone is realized on the second syllable.

Since the H tone in recent loans is fixed, it is expected to trigger a mobile H. If this is true, the second H tone in recent loans like those in (23) and (24) may not be the result of *LAPSE as argued in §4.6.1. Instead, the second H tone in (23) and (24) might also result from the triggered mobile H. This is shown in (39) below. What is not clear in (39) is the unusual expansion of the mobile H domain. As shown in (39), it seems that the triggered mobile H domain expands three syllables to the right instead of two. The example in (39c) represents the possibility that the mobile H expands in cycles. After completing the canonical trisyllabic cycle, a new HD expansion cycle is initiated on the following syllable. This is very unlikely because there is no evidence of this happening elsewhere in Kisukuma. The typical property of Kisukuma mobile H domain is that once it expands two syllables from the sponsor, it stops. I will thus assume that the example in (39b) represents the valid property of the triggered mobile H in these cases..

(39) a. (hó)(liwu:dî)
H H

b. afu(gá)(nisitá:nî)
H H

c. afu(gá)(nisitá:)(nî)
H H H

d. wisi(kó)(nsini nha:lé) "big Wisconsin"
H H

e. (hó)(liwu:dî) nha:le
H H

*(hó)(liwu:di nha:lé) "big Hollywood"
H H

Now compare examples (39d) and (39e). In (39d) the toneless adjective [taale] "big" surfaces with a H tone. This tone is triggered by the non-final fixed H of the preceding stem. In (39e), however, the adjective [taale] surfaces toneless. This shows that the triggered mobile H does not cross the word boundaries if enough syllables are available in the first stem on which the trisyllabic HD can be realized.

If we assume the entire reduplicative structure is one domain for tone assignment, the H tone that always aligns with the left edge of the reduplicant may also be the result of the triggered mobile H. This is shown in (40a). In (40b) the triggered mobile H domain fails to expand further to the right because of ALIGN (RED,L,H,L), the undominated constraint requiring that the initial (leftmost) syllable of the reduplicant be aligned with a H tone.

(40) a. wisi(kó)(nsini + kó)nsini b. kanga(rú)(u + rú)u

H H H H

However, in examples in (41) below, the base has enough syllables for both the non final fixed H and the triggered mobile H to surface, and yet, the reduplicant surfaces with a H tone. Based on this evidence, I will assume that the initial H in the reduplicant is the result of ALIGN RED,L, H, L as I have shown in the previous section.

(41) a. (hó)(liwu:dí) + (wú:)di d. afu(gá)(nisitá:ní) + (tá:)ni

H H H H H H

At this point, I would like to comment on the account of the non-final H and its mobile H triggering effects on the following syllable. It is not clear at this point of this research why the non-final fixed H triggers a mobile H tone on the following syllable. However, it seems that by triggering a mobile H on the following syllable, the non-final fixed H wants to be adjacent to another H tone. However, this is overruled by *ADJACENT HEADS, which is an active constraint in Kisukuma. The triggered mobile H domain thus has to expand further to the right. The question now is why the triggered mobile H domain expands by two syllables to the right instead of one? That is, why is *(hó)(liwú:)di preferred than (hó)(liwu:dí). Two possible accounts quickly come to mind. The first account has to do with the normal trisyllabic HD that is canonical in native words and nativized loan stems with a mobile H tone as was demonstrated in Chapter 2. It is thus possible that (hó)(liwu:dí) is better than *(hó)(liwú:)di because the second HD in the former candidate satisfies the high ranked TRISYLLABIC constraint.

Secondly, it is possible that Kisukuma, like Chichewa (Myers and Carleton 1996) obeys an OCP_{GRID} constraint defined in (42) and (43).

(42) Two elements associated with grid columns are GRID-ADJACENT if the two grid columns have adjacent entries at the highest grid level at which both columns have an entry (Myers and Carleton 1996: 61)

(43) OCP_{GRID}: Identical grid-adjacent elements are prohibited (Myers & Carleton 1996: 61)

The structure that will satisfy the condition in (43) is given in (44a). The configurations in (44b) and (44c) violates the condition in (43) because the grid columns they are associated with have their highest entries at the second grid level and there are no intervening entries between them at that level.

```
(44) a. (*  ) (*  )        b. (*  ) (*  )        c. (*  ) (*  )
        (* *) (* *)           (* *) (* *)           (* *) (* *)
         |      |              |     |                 |  |
         H      H              H     H                 H  H
```

To achieve the pattern in non-final fixed H and its triggered mobile H, OCP_{GRID} must be ranked above whatever constraint motivating the non-final fixed H tone to trigger a mobile H on the following syllable. OCP_{GRID} and TRISYLLABIC HD then causes the triggered mobile HD to expand by two syllables to the right. The assumption here is that without OCP_{GRID}, the mobile H on the following syllable will not move resulting on adjacent heads.

4.7. Etymological factors

It was argued in the previous chapter that sometimes the shape of the reduplicant is determined by morphosyntactic factors, which are also reflected in the meaning generated between the base and the reduplicant. Reduplication of recent loans provides evidence of lexico-semantic identity or etymological factors in determining the shape of the reduplicant. In (45), for example, the strategy of segmenting the base materials based on the (second) H-toned syllable of the base is abandoned and instead segmentation follows etymological or morphemic boundaries of the base. All four of my educated consultants were very consistent in marking the reduplicant in these forms. This may be attributed to the fact that all of them speak English and thus know the etymology and hence the morphemic (semantic) boundaries in these words. Results from the subject who neither speaks English nor Kiswahili were not conclusive because she was very inconsistent (cf. Appendix II. 7). It would be interesting to see how speakers who do not speak English would reduplicate these forms. Based on speakers who also speak English, however, IDENT H-BR is violated in favor of etymological identity between the base and the reduplicant.

		BASE	BASE + RED	Gloss
(45)	a.	télegiláámú	télegiláámú + gîlaamu	"tel'egram"
			*télegiláámú + láámu	
	b.	télesikóópú	télesikóópú + síkoopu	"tel'escope"
			*télesikóópu + kóópu	
	c.	miniápolisi	miniápoliisî + póliisi	"Minneap'olis"
			*miniápolisî + lîisi	
			(polîsi = police)	
	d.	dalisalááma	dalisalááma + sálaama[23]	"Dar es salaam"
			*dalisalááma + lááma	

[23]. Salama = peace (from Arabic) is a common greeting all over East Africa. It literally means peace. Also Dalisalama (Dar-es-salaam) – the house of peace – is the largest city in Tanzania.

4.8. Core phonology vs. unassimilated loans

Below is a summary of the major differences and similarities between core phonology and unassimilated loans. This may highlight how far the two are different grammars. The summary in (46) can also be illustrated in Hasse diagrams diagrams as in (19) and (36).

(46) Differences between native words, nativized loans and unassimilated loans.

	Core phonology		Peripheral (recent loan) phonology
1	Lexical entries are available as inputs. The shape of the reduplicant is determined by lexical conservatism. (REDμ_i)=LSTEM(μ_i) is thus inviolable.	1	Recent loans are not available as inputs. It is impossible to establish their listedness. Lexical conservatism, though still highly ranked, is irrelevant in computing the size of the reduplicant. Phonological constraints determine the size of the reduplicant.
2	Total reduplication is preferred. Truncation is only possible if the resulting RED stem resembles a listed stem	2	Total reduplication is impossible. Stems usually truncated.
3	Integrity is violated. Thus (mɪ-tɪ) can reduplicate as (mɪ-tɪ + tɪ-tɪ).	3	Integrity is inviolable. (hóliwuudî) can *not* reduplicate as (*hóliwuudî + dîdî)
4	The location of the H tone in the unreduplicated stem plays no role whatsoever in determining the size of the reduplicant. Feature Identity constraints are low ranked.	4	The location of the H tone is crucial in determining the size of the reduplicant. Feature Identity constraints are thus high ranked.
5	OCP is inviolable. Preference of one H tone per stem (ma-βeelé) reduplicates as (ma-βeelé + βeele) and not as *(ma-βeelé + βééle)	5	OCP is violated. Thus (hóliwuudî) reduplicates as (hóliwuudî + wúúdi) and not as *(hóliwuudî + wuudi)
6	No maximum limit for the size of RED.	6	RED can not be longer than three syllables.
7	The mobile HD is always trisyllabic in reduplicative complex.	7	No mobile HD. Monomoraic HD is common.

Apart from these differences there are some similarities between the core phonology and recent loans. First, in both phonologies, the reduplicant cannot be less than two syllables. Monosyllabic reduplicants are thus impossible. This is the disyllabic minimality requirement on the size of RED and is prevalent in all Bantu languages studied so far. Second, the non-final fixed H tone in both phonologies trigger a mobile H tone on the following syllable. The triggered mobile HD expands two syllables to the right. That is to say, whenever a mobile H is realized in both phonologies, the HD must be trisyllabic.

I would like now to comment on the notion of a listed stem and the predictions it makes regarding the recent loans like the one used in this study. A listed stem is a familiar stem sufficiently to give the speaker the confirmation that that stem has been sanctioned by past linguistic usage. A listed word can be a word whose morphological and phonological properties are predictable by speakers provided that they have a wide knowledge of the grammar and the lexicon of the language. Since the knowledge of the grammar and the lexicon differ from speaker to speaker, the status of listedness also varies from speaker to speaker. What exactly leads one speaker to view a stem as listed different from another speaker is not known. However, one can suspect that different exposure to different words and their frequency may have an influence. For example, we can expect that educated young Kisukuma speakers who also speak Swahili and English and live in urban areas may have more exposure to some (if not all) of the place names used in this chapter than older illiterate speakers living in rural areas. From this exposure, one can expect different levels of listedness resulting in different performances. It was surprising to discover that this difference was not reflected in subjects' performance: educated speakers consistently truncated the nominal stem based on the H tone of the base. The responses from the illiterate speaker who also only speaks Kisukuma were not conclusive because sometimes the reduplicant was determined by the H tone of the base and sometimes she preferred total reduplication. Total reduplication of recent loans makes sense to me because, if you are faced with a novel form that matches nothing in your lexicon, it is safe to copy everything than attempting to truncate it based on prominent cues like H tones and stress. This is more plausible because copying everything satisfies ($\text{RED}_{(\mu)}$=$\text{LSTEM}_{(\mu)}$).

The above observations can be explained in Zuraw's (1997, 2000) computational model of hearer-speaker interaction. Central to Zuraw's model is the notion of *gradient listedness*, the notion that a "lexical entry does not change instantaneously from being nonexistent to being fully available. Rather, its listedness is a function of how many times it has been heard" (1999:7). Listedness thus determines the probability that a lexical entry will be available. It follows that if a word is only partially listed, sometimes it will be available as an input and sometimes not. If it is available as an input, lexical conservatism determines the shape of the reduplicant and when it is not available, phonological constraints which are low ranked in the core phonology determines the shape of the reduplicant. Since lexical frequency plays a role in availability of lexical items, we would then expect that recent loans like the ones used in this study would sometimes be available as inputs to young educated speakers living in urban areas and total reduplication which is the common pattern in core phonology would be preferred. The

c.	βa-sese	βa-sese + sese	"slave" (2)
d.	i-gʊlʊ	i-gʊlʊ + gʊlʊ	"heaven" (3)
e.	mi-goongo	mi-goongo + goongo	"back, type of a tree" (4)
f.	βʊ-lʊβa	βʊ-lʊβa + lʊβa	"cotton" (14)
g.	lʊ-goye	lʊ-goye + goye	"rope" (11)
h.	ma-saangu	ma-saangu + saangu	"cooked corn" (6)
i.	n-dama	n-dama + dama	"calf" (9/10)
j.	n-kima	n-kima + kima	"woman" (9/10)
k.	ŋ-gweekwe	ŋ-gweekwe + gweekwe	"girl's eloping fee" (9/10)

(36) Disyllabic Adjectives

	Surface	Base RED	Gloss
a.	li-daasa	li-daasa + daasa	"kind of sterile (animals)" (5)
b.	βa-aŋgʊ	βa-aŋgʊ + aŋgʊ	"kind of quick" (2)
c.	i-gʊʊmba	i-gʊʊmba + gʊʊmba	"kind of sterile (human/trees)" (3)
d.	βa-api	βa-api + api	"kind of black"(2)
e.	ma-taale	ma-taale + taale	"kind of big" (6)
f.	βʊ-βɪsɪ	βʊ-βɪsɪ + βɪsɪ	"kind of raw" (13)
g.	gɪ-dito	gɪ-dito + dito	"kind of heavy" (7)
h.	βa-koondu	βa-koondu + koondu	"kind of slim" (2)
i.	n-ziingi	n-ziingi + ziingi	"kind of womanizer" (1)
j.	n-tiimbu	n-tiimbu + tiimbu	"kind of confident" (9/10)
k.	ŋ-gimu	ŋ-gimu + gimu	"kind of brave" (9/10)

Now consider the examples in (37). In these examples, the noun class marker for Class 9 and Class 10 phonologically fuses with the nominal stem. When this happens, two possible shapes of the reduplicant are possible: the reduplicant can ignore the phonological fusion and come out without the noun class marker or it can copy the noun class marker. In the former cases, the reduplicant is more faithful to the input than the base and in the latter cases, it is more faithful to the base than it is to the input. The generalization that follows from these examples is that the noun class marker can be copied if it becomes part of the first syllable.

(37) Disyllabic Nouns (Phonological fusion)

	UR		Surface	Base + RED	Gloss.
a.	/li-ɪmbo/	=>	ly-ɪɪmbo	ly-ɪɪmbo + ɪɪmbo ly-ɪɪmbo + ly-ɪɪmbo	"song" (5)
b.	/li-ʊβa/	=>	ly-ʊβa	ly-ʊβa + ʊβa ly-ʊβa + ly-ʊβa	"God/Sun" (5)
c.	/n-gweekwe/	=>	ŋ-gweekwe	ŋ-gweekwe + ŋ-gweekwe ŋ-gweekwe + gweekwe	"girl's eloping fee" (9/10)
d.	/n-dezu/	=>	n-dezu	ndezu + n-dezu ndezu + dezu	"beards" (9/10)
e.	/n-limu/	=>	n-dimu	n-dimu + n-dimu ndimu + limu	"animal" (9/10)

Adjectives with noun class markers undergoing phonological fusion with the stem also display the same pattern: the reduplicant can be more faithful to the input or the base. This is shown in (38).

(38)
(39) Disyllabic Adjectives (Phonological fusion)

	UR		Surface	Base + RED	Gloss.
a.	/n-suumba/	=>	n-suumba	n-suumba + suumba n-suumba + n-suumba	"kind of cute" (9)
b.	/n-saβi/	=>	n-saβi	n-saβi + saβi n-saβi + n-saβi	"kind of rich" (9)
c.	/li-angʊ/	=>	ly-aangʊ	ly-aangʊ + angʊ ly-aangʊ + ly-aangʊ	"kind of quick" (5)
d.	/n-gaandu/	=>	ŋ-gaandu	ŋ-gaandu + gaandu ŋ-gaandu + ŋ-gaandu	"kind of thin" (9/10)

e.	/n-lipu/	=>	n-dipu	n-dipu + lipu n-dipu + n-dipu	"kind of tall" (9/10)
f.	/n-paaŋga/	=>	m-paanga	m-paanga + paanga m-paanga + m-paanga	"kind of healthy" (9/10)

3.4.2. Longer Nouns and Adjectives

When longer nouns and adjectives are reduplicated, as expected, the noun class marker does not copy in the reduplicant (cf. 39 and 40 respectively). More importantly, the stem is not truncated and must surface faithfully. In this respect, long nouns and adjectives are like polysyllabic verb stems: regardless of the length of the root, materials from the root are not truncated and must surface faithfully in the reduplicant.

(39) Multisyllabic nouns

	Surface	Base + RED	Gloss
a.	i-hagala	i-hagala + hagala	"a tree fork" (5)
b.	ma-halage	ma-halage + halage	"beans" (6)
c.	ma-gugulu	ma-gugulu + gugulu	"cooked dry corn (6)"
d.	i-telegani	i-telegani + telegani	"type of bird" (5)
e.	i-kongomilo	i-kongomilo + kongomilo	"esophagus" (5)
f.	ma-sanzagata	ma-sanzagata + sanzagata	"tree trash" (6)

(40) Multisyllabic Adjectives

	Surface	Base + RED	Gloss
a.	βa-sikaanu	βa-sikaanu + sikaanu	"kind of perfect" (2)
b.	n-daŋganu	n-daŋganu + daŋganu	"kind of crazy" (1)
c.	ga-βɪnzɪku	ga-βɪnzɪku + βɪnzɪku	"kind of fragile" (11)
d.	n-kenagʊzi	n-kenagʊzi + kenagʊzi	"kind of destroyer" (1)
e.	βa-kilikimbi	βa-kilikimbi + kilikimbi	"kind of active" (2)
f.	βa-tagadiifu	βa-tagadiifu + tagadiifu	"kind of holy" (2)

As a summary, the following generalizations can be made regarding Kisukuma nominal and adjective reduplication:

(1) As in verbs, the reduplicant can not be less than two syllables. To achieve this goal, monosyllabic roots can either copy the noun class marker or double copy the nominal root in the reduplicant.

(2) When the noun class prefix phonologically fuses with the first vowel of the nominal root, the noun class prefix can appear in the reduplicant.

(3) Regardless of length and segmental composition, root materials are not truncated.

3.5. Numbers Reduplication

Numbers can also be productively reduplicated in Kisukuma. The reduplicated numbers denote the meaning of "X by X". Thus [i-gana] is a "hundred" while the reduplicated form [i-gana] + [gana] is "hundred by hundred". Like nouns and adjectives, numbers are also prefixed with a noun class marker. As in nouns and adjectives, the noun class marker also does not copy in the reduplicant except in monosyllabic numbers. The reduplicant is a suffix.

3.5.1. Monosyllabic Numbers

As in nouns and adjectives, monosyllabic numbers copy the noun class marker in the reduplicant in order to satisfy the disyllabic minimality requirement on the size of the reduplicant. Unlike the former categories, however, the option of copying the root twice in order to satisfy the disyllabic requirement is not available in number reduplication. This is shown in (41).

(40) Monosyllabic Numbers

(41)

	Surface	Base +RED	Gloss
a.	gɪ-mo 7-one	gɪ-mo + gɪ-mo 7-one 7-one *gɪ-mo + mo mo	"one by one (7)"
b.	βa-ne 2-four	βa-ne + βa-ne 2-four 2-four *βa-ne + ne ne	"four by four (2)"

3.5.2. Disyllabic Numbers

As in verbs, nouns and adjectives, when disyllabic numbers are reduplicated, the noun class marker does not copy in the reduplicant because there is no motivation for overcopy. Disyllabic numbers are shown in (42).

(42) Disyllabic numbers

	Surface	Base +	Red	Gloss
a.	i-βɪlɪ 9/10-two	i-βɪlɪ + 9/10-two	βɪlɪ 9/10-two	"two by two (10)"
b.	ma-gana 6-hundred	ma-gana + 6-hundred	gana hundred	"hundred by hundred "
c.	βa-datʊ 2-three	βa-datʊ + 2-three	datʊ three	"three by three (2)"
d.	i-kʊmi 8-ten	i-kʊmi + CL-ten	kʊmi ten	"ten by ten (10)"
e.	a-taano 6-five	a-taano + 6-five	taano five	"five by five (6)"
f.	βa-naanɛ 2-eight	βa-naane + 2-eight	naane eight	"eight by eight (2)
g.	keenda	keenda +	keenda	"nine by nine"

h.	gɪ-hʊʊmbɪ 7-thousand	gɪ-hʊʊmbɪ + hʊʊmbɪ 7-thousand thousand	"eight by eight" (7)

3.5.3. Trisyllabic Numbers

When trisyllabic numbers are reduplicated, the noun class marker does not copy in the reduplicant. Moreover, like in verbs, nouns and adjectives, the root is *not* truncated.

(43) Trisyllabic Numbers

	Surface	Base + Red	Gloss
a.	βa-taandatʊ 2-six	βa-taandatʊ + tandatʊ 2-six six	"six by six (6)"
b.	m-puŋgatɪ 10-seven	m-puŋgatɪ + puŋgatɪ 10-seven seven	"seven by seven" (10)

3.5.4. Multiple-word Numbers

When multiple-word numbers like those in (44) are reduplicated, it is only the rightmost member that appear in the reduplicant. Thus, no matter how long the number is, it is only the rightmost member that gets copied in the reduplicant. The number that gets reduplicated displays the same pattern when in isolation. If the last number is monosyllabic, the noun class marker is copied in order to satisfy the disyllabic requirement on the size of the reduplicant (cf. 44a). Everywhere else, the noun class marker is excluded in the reduplicant and the stem of the rightmost member surfaces faithfully in the reduplicant regardless of its length or segmental composition. For the sake of clarity, the reduplicant is bold and underlined while the rightmost member stem is bolded in (44).

(43) Long Numbers (Only the Rightmost Member is Reduplicated)

	Surface	Base + Red
a.	i-kumi na βa-**ne** C.10-ten and C.four "fourteen" (2)	i-kumi na βa-**ne** + **βa-ne** C.10-ten and C.2-four C.2-four "fourteen by fourteen" (2)
b.	i-kumi na βa-**datʊ** C.10-ten and C.2-three "thirteen" (2)	i-kumi na βa-**datʊ** + **datʊ** C.10-ten and C.2-three three "thirteen by thirteen" (2)
c.	sihuumbɪ **keenda** C.8-thousand nine "nine thousands"	si-huumbi **keenda** + **keenda** C.8-thousand nine nine "nine thousands by nine thousands"
d.	i-kumi na i-**tandatʊ** C.10-ten and C.10-six "sixteen"	i-kumi na i-**tandatʊ** + **tandatʊ** C.10-ten and C.10-six six "sixteen by sixteen"
e.	i-kumi na m-**puŋgatɪ** C.10-ten and seven "seventeen"	i-kumi na m-**puŋgatɪ** + **puŋgatɪ** C.10-ten and seven seven "seventeen by seventeen"
f.	**laaki** "100,000"	**laaki** + **laaki** "100,000 by 100,000"
g.	laaki i-**tandatʊ** "100,000 C.10-six "600,000"	laaki i-tandatʊ + **tandatʊ** "100,000 C.10-six six "600,000 by 600,000"
h.	si-hoombe ma-gana **keenda** 8-1,000 C.8-100 nine "900,000"	si-hoombe ma-gana **keenda** + keenda C.8-1,000 C.8-100 nine nine "900,000 by 900,000"

i. miilyooni keenda laaki naane na si-huumbɪ ma-kumi a-**taano**
1,000,000 9 100,000 8 and C.8-1,000 C.6-ten C.6-five
"9,850,000"

miilyooni keenda, laaki naane na si-huumbɪ ma-kumi a-**taano** + **taano**
"9,850,000 by 9,850,000"

Other Bantu languages show different patterns as far as number reduplication is concerned. In Kikerewe (Odden 1996), for example, the noun class prefix is usually copied in reduplication regardless of whether the stem is monosyllabic or not (45a). Moreover, even in multiple-word numbers like those in (45b), the entire base is copied. Odden's argument is that the reduplication process in Kikerewe numbers involves two strategies – word formation and syntactic concatenation of similar phrases. The two strategies are available to every unreduplicated stem regardless of its length (i.e. regardless of whether it is a single number or multiple-word number). Although the word formation strategy is preferred, it is only available when a single number is involved. Single numbers, therefore, display reduplication proper. When a number is longer than a single word, "the expression of a derived number construction cannot be accomplished using only the resources of morphology. Therefore, syntactic concatenation is required for such numbers" (Odden 1996:115). Kisukuma seems to provide evidence to the contrary: regardless of whether the base is a single number or not, the reduplication process is governed by morphology. Syntactic concatenation is thus not attested in Kisukuma.

(45) a. Prefixes are copied in single number reduplication in Kikerewe (Odden 1996:116)

bá-bîli	"two (Cl.2)"	bá-bîli + bá-bîli	"two by two (Cl. 2)"
bá-sátu	"three (Cl.2)	bá-sátu + bá-sátu	"three by three (Cl.2)"
bá-táanu	"five (Cl.2)	bá-táanu + bá-táanu	"five by five (Cl. 2)"

b. Syntactic concatenation in multiple-word number reduplication in Kikerewe (Odden 1996:115)

Unreduplicated:	bihuumbi bî-ná thousands Cl.8-four	"4,000"
Reduplicated:	bihuumbi bi-ná + <u>bîhuumbi bî-ná</u>	"4,000 by 4,000 (Cl.8)

Unreduplicated	maganá mwéénda na bá-ná		"904 (Cl.2)"
Reduplicated	maganá mwéénda na ba-ná + <u>máganá mwéénda na bá-ná</u>		"904 by 904 (Cl.2)"

To summarize, the following generalizations hold in Kisukuma number reduplication:

(a) The noun class marker is copied in the reduplicant in order to satisfy the disyllabic minimality requirement on the size of the reduplicant. However, unlike in nouns and adjectives, double copying of the monosyllabic number root in order to satisfy the disyllabic requirement is not allowed.

(b) In longer numbers, only the rightmost member of the unreduplicated number complex is copied in the reduplicant. The copied number displays the same reduplicative pattern like single numbers.

3.6. Prefixes in the Reduplicant

From what I have demonstrated in the previous section, prefixes usually do not copy in Bantu reduplication. However, there are three contexts in Bantu reduplication in which prefixes appear in the reduplicant. The first context is when the stem is monosyllabic. As I have shown above, this is true in all grammatical categories that display productive reduplication process in Kisukuma. Grammatical morphemes appear in the reduplicant in order to augment monosyllabic stems and make them (be) at least disyllabic.

The second context is when there is phonological fusion between the stem and the reduplicant e.g., Kikerewe (Odden 1996) and Kinande (Mutaka and Hyman 1990). In (46a) and (46b) are examples from Kikerewe and Kinande respectively.

		UR	**SR**	**Reduplicated**	**Gloss**
(46)	a.	/o-mu-ózó/	[o-mw-óózó]	[o-mw-oozó!] [mw-óózó]	"fellow"
		/o-mu-ána/	[o-mw-áána]	[o-mw-áána!] [mw-áána]	"child"
		/e-li-eyo/	[e-ly-eeyo]	[e-ly-eeyo] [ly-éeyo]	"broom"
		/e-ki-ála/	[e-ch-áála]	[e-ch-áálá!] [ch-áála]	"finger"

b.	/ó-mu-ana/	[ó-mw-aná]	[ó-mw-aná]	[mw-ana]	"child"
	/o-mu-iti/	[ó-mw-iti]	[ó-mw-itî]	[mw-iti]	"killer"
	/é-ri-oli/	[é-ry-oli]	[é-ry-olî]	[ry-oli]	"cucumber"
	/e-ki-úmba/	[e-ky-úmbà]	[e-ky-úmba]	[ky-úmbà]	"room"

As shown in (46), when the nominal stem is vowel initial, the V + V sequence arising at the juncture between the prefix and the stem is resolved into a single syllable in conformity with the general principles of syllable structure in Kikerewe and Kinande. When the nominal is reduplicated, the segmental material of the prefix is copied along with the stem syllable. In Kisukuma, when the V-initial stems like those in (37) are reduplicated, the segmental material of the prefix can *optionally* copy in the reduplicant.

Notice, however, that the option of not copying the nouns class prefixal marker in the reduplicant is not available for nouns in Class 7 and Class 8 nouns (prefix gɪ- and si- respectively). As shown by examples in (47), when followed by onsetless nominal roots (e.g. VCV or VNCV), nouns in class 7 and Class 8 must *obligatorily* copy the noun class-marking morpheme in the reduplicant. Ignore all issues involving tones for now.

		UR		SR	BASE +	RED	Gloss
(47)	a.	/ki-ʊga/	=>	[ch-ʊʊga]	ch-ʊʊga +	ch-ʊʊga	"hoof" (7)
					*chʊʊga +	ʊʊga	
	b.	/si-ʊga/	=>	[sh-ʊʊga]	sh-ʊʊga +	sh-ʊʊga	"hooves" (8)
					*shʊʊga +	ʊʊga	
	c.	/ki-onza/	=>	[ch-oonza]	ch-oonza +	ch-oonza	"fox" (7)
					*ch-oonza +	oonza	
	d.	/si-onza/	=>	[sh-oonza]	sh-oonza +	sh-oonza	"foxes" (8)
					*sh-oonza +	oonza	

e.	/ki-ʊma/	=>	[ch-ʊʊma]	ch-ʊʊma + ch-ʊʊma *ch-ʊʊma + ʊʊma	"iron" (7)
f.	/si-ʊma/	=>	[sh-ʊma]	sh-ʊma + sh-ʊma *sh-ʊʊma + ʊʊma	"iron (pl)" (8)
g.	/ki-eŋga/	=>	ch-eeŋga	ch-eeŋga + ch-eeŋga *ch-eeŋga + eeŋga	"corner" (7)
h.	/ki-umba/	=>	ch-umba	ch-umba + ch-umba *ch-umba + umba	"room" (7)
i.	/si-umba/	=>	sh-uumba	sh-uumba + sh-uumba *sh-uumba + umba	"rooms" (8)

The obligatory copying of the prefixal noun class morpheme in these nouns may have an independent explanation. Looking at these nouns closely, we discover that all of them undergo further phonological simplification after glide formation has taken place i.e. /ki/ => [ky]/---V. The resulting form [ky] then undergoes total palatalization to become /tʃ/ orthographically represented here as "[ch]". Likewise, /si/ => [sy]/---V. Then [sy] undergoes further phonological processes that end up producing /ʃ/ orthographically presented here as "[sh]". Compared to nouns in other classes whose phonological processes between the stem and class marker are certainly simple, e.g. glide formation in /li-ʊβa/ => [lyʊβa], it is clear that there is a lot of phonology in nouns in these two classes (7/8). It is possible that the end result of this phonology (i.e. glide formation and palatalization) are completely homogenized forms whose morphemes can not be reanalyzed. If this is true, the surface forms in these nouns are lexicalized and are hence are one monomorphemic and thus must surface intact in the reduplicant.

The third context in which prefixes appear in Bantu reduplication is when the nominals appear in Class 9 or Class 10, which are characterized by the class prefix N-. In many Bantu languages, the tendency is to copy the noun class marker (N-) in the reduplicant. In (48a) and (48b) are examples from Kikerewe (Odden 1996) and Kinande (Mutaka and Hyman 1990) regarding the over-copy of the noun class prefix in the reduplicant.

(48) Nasal (N-) overcopy in Kikerewe (Odden 1996) and Kinande (Mutaka and Hyman 1990

	Noun	Reduplicated nominals	Gloss
a.	ɪ-n-zóka	ɪ-n-zókáá! + n-zóka	"snake"
	ɪ-m-pîlyá	ɪ-m-pilyáá! + m-pîlyáá	"money"
	e-n-gábe	e-n-gábéé! + n-gá-be	"sitatunga"
	n-gúfu	n-gúfuu + n-gúfu	"kind of short"
b.	é-m-buli	é-m-bulí + m-buli	"sheep"
	é-m-buto	é-m-butó + m-buto	"grain"
	é-n-gokò	é-n-goko + é-n-gokò	"chicken"
	é-n-zoka	é-n-zoká + n-zoka	"snake"

In Kisukuma, however, the noun class marker N- of Class 9 and Class10 optionally copies in the reduplicant even if it phonologically fuses with the nominal stem. This was shown in (37-38). Two important generalizations regarding the appearance of prefixes in the reduplicant and particulary noun class markers in Kisukuma nominals are:

(49) Generalization pertaining to Prefixes in the Reduplicant.

a. Prefixes optionally copy in the reduplicant even if there is phonological fusion between them and the nominal root.

b. Nouns in Class 7 and 8 that prefix the noun class morpheme before onsetless nominal stems *obligatorily* copy the noun class marker in the reduplicant. This is the result of total fusion between the noun class markers and the nominal stem to an extent that speakers treat the surface form as one morpheme.

3.7. Other Patterns

Before I close this descriptive section, I introduce one group of nouns that generally does not conform to the patterns observed so far. These nouns are given below:

		UR		SR	Base + Red
(50)	a.	/ø-gasógone/	=>	gasógone	gasógone + <u>sogone</u> *gasogone + <u>gasogone</u> "gonorrhea"
	b.	/ø-galééndelele/	=>	galééndelele	galééndelele + <u>leendelele</u> *galééndelele + <u>galeendelele</u> "camel"
	c.	/ø-gibéémbesele/	=>	gibéémbesele	gibéémbesele + <u>beembesele</u> *gibeembesele + <u>gibeembesele</u> "dwarf/short person"
	d.	ø-gaβutʊ́la	=>	gaβutʊ́la	gaβutʊ́la + <u>βutʊla</u> *gaβutʊla + <u>gaβutʊla</u> "shorts"
	e.	/ø-gasweende/	=>	gasweende	gasweende + <u>sweende</u> *gasweende + <u>gasweende</u> "syphilis"

Examination of the examples in (50) reveals a systematic truncatation of the root in the reduplicant. To be specific, the first syllable of the stem is excluded in the reduplicant. This is unexpected because it contradicts the underlying assumption that Kisukuma speakers know the morphological make up of the words in their language and thus are able to figure out morpheme boundaries. It is due to this knowledge that noun class morphemes do not surface in the reduplicant except when the stem is monosyllabic. Likewise roots do not get truncated in the reduplicant because they are treated as one morpheme. This leads to roots being treated as indivisible.

The tonal pattern in (50a-c) may lead us to think that it is the stem tone that determines what base segments shows up in the reduplicant. In these cases, the initial syllable of the reduplicant corresponds to the H-toned syllable of the unreduplicated stem. Examples (50d-e), however, show that this is not true. The initial syllable of the reduplicant in (50d), for example, does not correspond to the H-toned syllable of the unreduplicated stem. Moreover, stem (50e) is toneless and yet it shares the same pattern with the H-toned stems. I conclude that the H tone of unreduplicated stem cannot be used to account for the truncation process in these forms.

In order to understand the unusual property of truncating the first syllable of the nominal root in these nouns, the following background information may be helpful. First, all the nouns identified with this property begin with [ga-], and [gi-] which also alternates with [gɪ-]. The former is a general singular diminutive marker[13] in Kisukuma while the latter is a noun class marker for Class 7. Both morphemes do not copy in the reduplicant (cf. 51). This is expected because prefixes in Kisukuma usually do not copy in the reduplicant except when the root is monosyllabic or when they phonologically fuse with the stem (cf. 37).

[13] The same morpheme also indicates beauty and attractiveness

		Normal Noun	Diminutive Prefix	Base + RED
(51)	a.	i-gogo 5-log "log"	ga-gogo dim-log "a small log" *ga-i-gogo	ga-gogo + <u>gogo</u> dim-log + log "some sort of a small log"
	b.	n-goko 1-chicken "chicken"	ga-goko dim-chicken "small chicken" *ga-n-goko	ga-goko + <u>goko</u> dim-chicken + chicken "some sort of a small chicken"
	c.	βʊ-lɪlɪ 14-bed "bed"	ga-βʊ-lɪlɪ dim-14-bed "small bed" *ga-lɪlɪ	ga-βʊ-lɪlɪ + <u>lɪlɪ</u> dim-14-bed + bed "some sort of a small bed"
	d.	gʊ-gʊlʊ 15-leg "leg"	ga-gʊ-gʊlʊ dim-15-leg "small leg" *ga-gʊlʊ	ga-gʊ-gʊlʊ + <u>gʊlʊ</u> dim-15-leg + leg "some sort of a small leg"
	e.	lʊ-lɪmi 11-tongue "tongue"	ga-lʊ-lɪmi dim-11-tongue "small tongue" *ga-lɪmi	ga-lʊ-lɪmi + <u>lɪmi</u> dim-11-tongue + tongue "some sort of a small tongue"
	f.	gɪ-saaβo 7-calabash "calabash"	ga-gɪ-saaβo dim-7-calabash "a small calabash" *ga-saaβo	ga-gɪ-saaβo + <u>saaβo</u> dim-7-calabash + calabash "some sort of a small calabash"
	g.	gɪ-muumu 7-dumb "dumb"	ga-gɪ-muumu dim-7-dumb "small dumb" *ga-muumu	ga-gɪ-muumu + <u>muumu</u> dim-7-dumb + dumb "some sort of small dumb"

Examples in (51) illustrate the singular diminutive marker [ga-]. When prefixed to the stem in some nouns the singular diminutive marker [ga-] replaces the noun class marking morpheme as in (51a-b). In some nouns, however, it co-occurs with the noun class markers (cf. 51c-g). What is significant for our purposes here is its disappearance in the reduplicant. Regardless of whether it replaces the noun class prefix or co-occurs with it, the diminutive marker, like other prefixes, does not copy in the reduplicant. As shown in (51 f-g), the noun class marker for Class 7 also displays the same pattern.

In (50), the initial [ga-] and [gɪ-] is part of the nominal root and has nothing to do with the diminutive or Class 7 noun markers. This is to say there are no nominal roots like [-sogone], [-leendelele], [-beembesele], [-βutʊla] and [-sweende]. The truncation of the initial syllables in these nouns in thus problematic.

Further examination of these nouns reveals that all of them have [ø-] as a noun class-marking morpheme. One possible explanation for why the first syllable of the nominal root get truncated in the reduplicant can be sought in this lack of overt noun class marking morpheme. Since there is no overt noun class marking morpheme and due to the fact that the initial syllables of the root corresponds to existing prefixal morphemes [ga-] and [gi-] which does not copy in the reduplicant, it is possible that the initial syllables [ga-] and [gi-] in these nouns are reanalyzed as prefixes and thus excluded in the reduplicant.

In order for the root initial syllable to be reanalyzed as a prefix in nouns in (50), two crucial conditions must be met. The first condition is that there must be no overt noun class marking prefixes. Nouns starting with [ga-] and [gi-] but having overt noun class markers like those in (52) does not exclude the root initial [ga-] and [gi-] in the reduplicant. The starred (*) examples are thus impossible.

(52)	a.	n-galaβa	"flying saucer"	n-galaβa + galaβa *n-galaβa + laβa
	b.	ma-gambala	"scales"	ma-gambala + gambala *ma-gambala + mbala
	c.	βʊ-gikʊlʊ	"old age (women)"	βʊ-gikʊlʊ + gikʊlʊ *βʊ-gikʊlʊ + kʊlʊ
	d.	n-gagaβazu	"strong person"	n-gagaβazu + gagaβazu *n-gagaβazu + gaβazu
	e.	n-gitɪli	"fenced-in meadow"	n-gitɪli + gitɪli *n-gitɪli + tɪli
	f.	lʊ-galata	"shell of water mollusk"	lʊ-galata + galata *lʊ-galata + galata
	g.	i-galagalo	"sitting room"	i-galagalo + galagalo *i-galagalo + lagalo

The second condition is that the reanalysis of the first syllable of the root as a prefix (leading to its exclusion in the reduplicant) is possible only if the initial syllable corresponds to an existing (noun class) prefix in the language. In (50), for example, the root initial syllable [ga-] and [gi-] are reanalyzed as prefixes because they correspond to existing diminutive and noun Class 7 morphemes respectively. If the initial syllable does not correspond to an existing prefix, reanalysis is abandoned and the entire root is copied in the reduplicant. This is shown in (53). Notice that in all examples in (53), the root initial syllable does not correspond to any prefixes in Kisukuma.

(53)	a.	ø-gwalugwa	"family compound"	gwalugwa + gwalugwa *gwalugwa + lugwa

b.	ø-sabuni	"soap"	sabuni + <u>sabuni</u> *sabuni + <u>buni</u>
c.	ø-sengeka	"type of reed"	sengeka + <u>sengeka</u> *sengeka + <u>ngeka</u>
d.	ø-nonelezu	"sweet"	nonelezu + <u>nonelezu</u> *nonelezu + <u>nelezu</u>

There is another class of nouns (given in 54) that generally does not fit into any of the paradigms established so far.

		SR	Base + Red	Gloss
(54)	a.	gɪpilingityamaashi	gɪpilingityamaashi + <u>maashi</u>	"dung bettle"
	b.	ndaanhwambeβa	ndaanhwambeβa + <u>βeβa</u>	"name of a tree"
	c.	majanagʊshooka	majanagʊshooka + <u>shooka</u>	"name of a person"
	d.	gɪβulaganuungu	gɪβulaganuungu + <u>nuungu</u>	"name of an insect"
	e.	nchaβʊziku	nchaβʊziku + <u>ziku</u>	"name of a tree"
	f.	gɪlaambalume	gɪlaambalume + <u>lume</u>	"early bird"
	g.	gɪmilanzooka	gɪmilanzooka + <u>zooka</u>	"flamingo"
	h.	taangaβazugi	taangaβazugi + <u>zugi</u>	"evening star"
	i.	gɪŋwamaguta	gɪŋwamaguta + <u>guta</u>	"type of a lizard"
	j.	nzokaiheenge	nzokaiheenge + <u>heenge</u>	"cross-eyed snake"[14]
	k.	nsʊʊmbantaale	nsʊʊmbantaale + <u>taale</u>	"a local title"
	l.	gɪsɪmbamɪtɪ	(i) gɪsɪmbamɪtɪ + <u>mɪ-tɪ</u> (ii) gɪsɪmbamɪtɪ + <u>tɪ-tɪ</u>	"traditional healer's fee"
	m.	gɪsholomelanda	gɪsholomelanda + <u>nda nda</u>	"snake"
	n.	n-gwanasanagʊʊla	n-gwanasanagʊʊla + sanagʊʊla	"Sanaguula's son"

It is evident that regardless of length and segmental composition, the nominal root is truncated in (54) and the reduplicant comes out disyllabic. Unlike the nouns in (50) in

[14] This is usually a nickname used by dancers belonging to either one of the major traditional dancing families (i.e. Bagika and Bagalu) or to other smaller traditional dance groups across Sukumaland.

which the first syllables of the stem was reanalyzed as a diminutive or Noun Class 7 marker and thus excluded in the reduplicant, in this case the reduplicant is always the rightmost two syllables of the root. Notice, however, the strange behavior in (54 l-m) where the reduplicant can be formed by copying the last syllable of the unreduplicated nominal stem twice.

Although these examples may superficially look puzzling, in reality they are not. The fact is that all examples in (54) contain compound words that have bonded together to form one word. As in multiple-word numbers (cf. 44), it is only the rightmost member in the compound that gets copied in the reduplicant, subject to the same conditions as if it were in isolation.

Although the forms in (54) are compounds, they are not lexicalized and their morphology is still transparent. Their morphemic boundaries can thus be deduced. As clearly shown in (55), it is only the right member of the compound that surfaces in the reduplicant. If the second member of the compound is monosyllabic like in (55 l-m), two options are employed to make the reduplicant at least disyllabic. First, the noun class prefix can copy in the reduplicant as in (55 l-i). Second, if the noun class marker is not copied at all as in (55 l-ii) or if the copying of the noun class morpheme does not contribute in making the reduplicant disyllabic like in (55m), the nominal root is copied twice.

		Base + RED	
(55)	a.	gɪ-pilingit-y-a 7-roll-caus-FV “dung bettle”	ma-**ashi** + <u>ma-**ashi**</u> 6-dung

b. n-daanh-w-a **m-beβa** + **<u>βeβa</u>**
9-climb-passive-FV 9-mice
"a tree that attracts mice"

c. ma-j-a na- gʊ-**shook**-a + **shook-a**
?-go-FV and to-return-FV
"a person who goes and returns home, a survivor"

d. gɪ-βulag-a **nuungu** + **nuungu**
7-kill-FV pot
"an insect that is believed to cause pots to break"

e. n-ch-a βʊ-**ziku** + **<u>ziku</u>**
9-die-FV 11-night
"a tree whose leaves wither during sunset/night"

f. gɪ-laamb-a lʊ-**me** + <u>lʊ-**me**</u>
7-lick-FV 5-dew
"the first person to go out in the morning and soak in the dew"

g. gɪ-mil-a n-**zoka** + **<u>zoka</u>**
"7-swallow-FV 9-snake
"something (usually a bird) that swallows snakes"

h. taang-a βa-**zug**-i + **zug**-i
go first-FV 2-cook-nominalizing i
"something (usually a star) that comes out first before dinner is ready"

i. gɪ-ŋw-a ma-**guta** + **<u>guta</u>**
7-drink-FV 6-oil
"type of a lizard with a shiny skin"

j. n-zoka i-**heenge** + **<u>heenge</u>**
9-snake 5-cross-eye
"cross-eyed snake"

k. n-sʊʊmba n-**taale** + **<u>taale</u>**
1-young man 1-big
"a big young man" i.e. one with a title

l. i. gɪ-sɪmb-a mi-**tɪ** + <u>mi-**tɪ**</u>

ii. gɪ-sɪmb-a **mi-tɪ + tɪ-tɪ**
7-dig-FV 6-tree (medicine)
"preliminary fee paid to a traditional healer"

m. gɪ-sholom-el-a **n-da + n-da n-da**
7-creep-instr-FV 9-stomach
"something that creeps using its stomach, a snake"

n. n-gwana **sanaguula + sanaguula**
9-son proper name
"Sanaguula's son"

It must be insisted here that the noun class prefix of the second compound member does not copy in the reduplicant except when the root is monosyllabic like in (55 l-i). As I have shown before, this is the common pattern in monosyllabic root reduplication in Kisukuma: noun class markers are usually copied in the reduplicant in order to satisfy the disyllabic minimality requirement. Generally, therefore, the size of the reduplicant in these forms is determined by the length of the right member in the compound. The reduplicant can be of any length provided that it is not monosyllabic (cf. 55n).

To summarize, in both verbs and nominals, roots surface faithfully in Kisukuma reduplication. Likewise, morphemes can not be partially copied in the reduplicant. As I have shown above, two exceptions exist in which the roots can be truncated. The first is when the first syllable of the root is reanalyzed as a prefix leading to its exclusion in the reduplicant (cf. 50). In order for the reanalysis to happen, the nominal stem must have [∅] as a noun class prefix; and its first syllable that is reanalyzed as a noun class prefix (leading to its exclusion in the reduplicant) must resemble existing prefixes in the language. The second exception is when long numbers and compound words like those in (55) are reduplicated. In these cases, only the root of the rightmost member of the compound surfaces in the reduplicant. In monosyllabic roots, however, prefixes can be copied in order to satisfy the disyllabic minimality requirement on the size of the reduplicant.

3.8. The Reduplicant

Before I present the analysis of the observed facts in §3.9, it is important that I briefly elaborate below what constitutes the reduplicant and the base in Kisukuma. This is important because some assumptions in the analysis will crucially depend on a clear distinction between the two in reduplicated forms. This is problematic in Kisukuma because whole roots are copied and truncation is not allowed. The normal diagnosis that reduplicants tend to have unmarked structures compared to the base, (translates as fewer number of syllables in Bantu) is not helpful in distinguishing the reduplicant from the base in languages like Kisukuma and Swahili. It is thus not clear what stem in the reduplicated forms is the base and what is the reduplicant.

In his pioneering work, Marantz (1982) observes that reduplication has a prosodic rather than a morphological domain of application. Moreover, he generalizes that copying of the reduplicant affix starts at the edge to which the affix attaches and proceeding into the word. This implies that prefixal reduplication always tend to be left-anchored, while suffixal reduplication tends to be right-anchored.

(56) **Marantz's Generalization (Marantz 1982):**

> Copying proceeds inward from the edge of affixation. Prefixing reduplication copies base-initial material; suffixing reduplication copies base-final material.

Marantz's generalization has been taken up in subsequent work in Optimality Theory.

(57) "The **'base'** is the output string of segments to which the reduplicant is attached, more specifically: for reduplicative prefixes, it is the following string of segments; for reduplicative suffixes, the preceding string of segments" (Kager (1999), paraphrasing McCarthy and Prince (1994b).

Since Bantu reduplication generally does not involve infixation, the reduplicant in these languages is always characterized as a prefix or a suffix. In all studies of Bantu reduplication that I know, the status of the reduplicant is determined by the grammatical category of the reduplicated word, e.g. verbs vs. nominals (nouns, adjectives and numbers). When verbs are reduplicated, the reduplicant in Bantu is generally a prefix but if the reduplicated word is a nominal, the reduplicant is a suffix cf. Kinande (Mutaka and Hyman 1990), Kirundi (Brassil 2000), Chiyao (Mtenje 2002), Chichewa (Myers and Carleton 1996) and Nbebele (Hyman et al. 1998). The relevant question here becomes one of establishing whether reduplication in Kisukuma is like that of other Bantu languages in which the prefix vs. suffix status of the reduplicant is determined by the grammatical category of the reduplicated word, i.e. verbs vs. nominals. The answer to this question seems to be a positive one.

As predicted by the Marantz and Kager generalizations, the expected unmarked mappings can be schematically represented as in (58a) and the marked mappings are schematically illustrated in (58b). This is an example of a (hypothetical) Bantu language in which the (underlined) reduplicant must be disyllabic and identical to the base.

(58) a. Unmarked Mapping

i.	Prefixal:	som-el-a	=>	<u>som-e</u> + som-el-a
ii.	Suffixal:	som-el-a	=>	som-el-a + <u>mela</u>

b. Marked Mapping

i. Prefixal: som-el-a => mel-a + som-el-a

ii. Suffixal: som-el-a => som-el-a + som-e

Commenting on Marantz generalization above, Niepokuj (1991) points out that the unmarked reduplicative patterns in (58a) are more preferred because the reduplicant forms a contiguous string with the base, i.e. [som-e] + [som-e]l-a and so[m-el-a] + [mela]. The overall result is a more transparent reduplicative process than in unmarked mappings like those in (58b) where the reduplicant is not adjacent to the same sequence in the base. For example in (58b-i), a syllable -so- intervenes between the reduplicant and the base, i.e [mel-a] + so[m-el-a]. Examples in (59a) illustrate how Kisukuma verb stem reduplication would look like if the reduplicant were suffixal. From what I have shown in (13) and (14), the reduplicative pattern in (59a) is not attested in Kisukuma verb reduplication. The correct reduplicated forms in (59b) clearly indicate that the reduplicant in Kisukuma verb reduplication, like in other Bantu languages, is prefixal. To the best of my knowledge, I do not know any Bantu language in which the pattern in (59a) is fully attested in verb stem reduplication. The generalization that follows is that verb stem reduplication in these languages is indeed prefixal.

(59) a. Unattested (suffixal) Reduplication in Kisukuma

Stem	Base + RED	Gloss
som-el-a	***som**-el-a + **som-a**	"read for"
lɪm-ɪl-a	***lɪm**-ɪl-a + **lɪm-a**	"cultivate for"
lugul-ɪl-a	***lugul**-ɪl-a + **lugul-a**	"open for"

b. Attested (prefixal) Reduplication in Kisukuma

Stem	RED + Base	Gloss

som-el-a	**som-a** + **som**-el-a	"read for"
lɪm-ɪl-a	**lɪm-a** **lɪm**-ɪl-a	"cultivate for"
lugul-ɪl-a	**lugul-a** + **lugul**-ɪl-a	"open for"

Even in languages in which the reduplicant is both minimally and maximally disyllabic like Kikuyu (Peng 1992), Siswati (Downing 1996), Ndebele (Hyman et al. 1998) and Kirundi (Brassil 2000), the suffixal pattern exemplified in (60) is not attested (cf.15 in §3.3). This further supports the generalization that Bantu verb stem reduplication is generally prefixal.

(60) Unattested (suffixal) Verb Reduplication in Kirundi (60a) and Ndebele (60b)

a.	ku-**fuungur**-a	*ku-**fuungur**-a + **ngur**-a (cf. ku-**fuungu** + **fuungur**-a)	"smile"
	ku-**gaban**-a	*ku-**gaban**-a + **ban**-a (cf. ku-**gaba** + **gaban**-a)	"share"
b.	**nambith**-a	***nambith**-a + **mbith**-a (cf. **nambi** + **nambith**-a)	"taste"
	thembuz-a	***thembuz**-a + **mbuz**-a (cf. **thembu** + **thembuz**-a)	"go from wife to wife"

Regarding nominal reduplication (nouns, adjectives and numbers), many Bantu languages provide evidence to show that reduplication is suffixal. For example, in Chichewa (Carleton and Myers 1996; Hyman and Mtenje 1999), only the final two syllables of a noun copy in the reduplicant (cf. 61a) This shows that the reduplicant in these nouns is a suffix. If reduplication were prefixal in Chichewa nominal reduplication, the shape of the reduplicant would be like in (61b).

(61) a. Chichewa (Suffixal) Noun Reduplication.

Stem	**Base + RED**	**Gloss**
m-nyamatá	m-nyamatá + matá	"real boy"
chi-khulupiriro	chi-khulupiriro + riro	"real faith"
chi-gawénga	chi-gawénga + wengá	"real terrorist"

b. Unattested (Prefixal) Chichewa Noun Reduplication.

Stem	**RED + Base**	**Gloss**
m-nyamatá	*m-nyama + nyamatá	"real boy"
chi-khulupiriro	*chi-khulu + khulupiriro	"real faith"
chi-gawénga	*chi-gawé + gawengá	"real terrorist"

As far as Kisukuma nominal reduplication is concerned, Chichewa-like evidence is provided by long numbers and compound nouns like those in (44) and (54) respectively. As it was established in (44) and (54), the truncated part is usually suffixal. As shown in (62), if reduplication were prefixal in nominals, only the first content morpheme of the nominal compound would surface in the reduplicant. Notice, however, that this pattern of reduplication is unattested in Kisukuma because as pointed by Niepokuj (1991), the reduplicant does not form a contiguous string with the base. This is the marked type of reduplication (cf. 58b).

(62) a. *si-**huumbɪ** keenda + **si-huumbɪ**
C.8-thousand nine C.8-thousand
"nine thousands by nine thousands"

b. ***i-kumi*** na i-tandatu + **kumi**
C.10-ten and C.10-six ten
"sixteen by sixteen"

c. ***n-daanh-w-a** m-beβa + **daanh-w-a**
C.9-climb-passive-FV C.9-mice climb-passive-a
"some sort of a tree that attracts mice"

d. *gɪ-**βulag-a** nuungu + **<u>βulag-a</u>**
C.7-kill-FV pot kill-a
"some sort of an insect that is believed to cause pots to break"

Additional evidence that the reduplicant in Kisukuma nominal reduplication is a suffix is provided by recent nominal loans. When polysyllabic recent loans (usually nouns) are reduplicated in Kisukuma, the root is always truncated and it is the rightmost part of the reduplicant that surfaces in the reduplicant. This is shown in (63). The unattested examples (*) show the expected reduplicants if reduplication in these forms were prefixal. Since reduplication in these forms is suffixal, there is no reason to assume that it is prefixal in native words and nativized loans' reduplication. The analysis and discussion of these nouns is the subject of the next chapter.

(63) Reduplication of recent nominal loans

a.	βasikéeli	βasikéeli + kéeli *βasikéeli + βasi	"bicycle" (9)
b.	naijélia	naijélia + jélia *naijélia+ nai	"Nigeria" (9)
c.	améelika	améelika + méelika *améelika + amée	"America" (9)
d.	βa-simáati	βa-simáati + máati βa-simáati + simáa	"kind of smart" (2)

Based on this evidence, I will consistently assume that, like in other Bantu languages, the reduplicant in Kisukuma is a prefix in verbs and a suffix in nominals. Moreover, the base will constitute all the remaining segments after the reduplicant has been identified. This includes all verb extension morphemes that are always suffixed to the verb root. Notice, however that, prefixes are out of scope of reduplication and unless their copying is necessitated by high ranked constraints (like foot binarity), they usually do not copy. The base will thus exclude all prefixal morphemes. To be clear, the reduplicant will be underlined.

With this rich introduction to the basic facts, I am now at the position to present the analysis that accounts for the observed reduplicative patterns in both verbal and nominal reduplication.

3.9. Kisukuma Reduplicant: The Analysis

The data presented so far demands that an analysis of Kisukuma reduplication handle the following generalizations:

(64) i. That the reduplicant in Kisukuma verb stem reduplication is a prefix which is attached to the left of the stem in verbs but as a suffix in nominals.

ii. Generally reduplication in Kisukuma is total as opposed to partial. The entire base is thus copied in the reduplicant. No morpheme truncation is allowed. You either copy the entire morpheme or you do not copy it at all.

iii. In verb stem reduplication, the reduplicant always ends in [-a] except in the subjunctives, perfectives and past negatives where it can *optionally* end in [-e].

iv. In both verbs and nominals the reduplicant cannot be smaller than one syllable. Maximally, however, it can be of any length although there is a preference for disyllabic reduplicants.

v. In long numbers and noun compounds, only the second member of the compound surface in the reduplicant. In general, reduplication in Kisukuma allows only one content morpheme to be copied in the reduplicant. In verbs, it is the one to the left edge while in nominals the content morpheme to the right edge gets copied in the reduplicant. This follows systematically from the fact that reduplication is prefixal in verbs and suffixal in nominals.

The generalization in (64i) can be accounted for by alignment constraints. As proposed by McCarthy and Prince (1994), alignment constraints require constituents to share edges. Specifically, alignment constraints have the form in (65).

(65) Generalized Alignment (McCarthy and Prince 1994)

Align (Cat 1, Edge 1, Cat 2, Edge 2): where Cat 1, Cat 2 are grammatical or prosodic categories and Edge 1 and Edge 2 are either the left or right edge.

Since the reduplicant is attached to the stem as a prefix in Kisukuma verb reduplication, the task at hand is to show that it subcategorizes for a verb stem which we now know occurs to the right. The relevant constraint is given in (66).

(66) ALIGN (RED L, STEM, R): The left edge of the reduplicant aligns to the right edge of some stem.

As I have shown in §3.2, it is usually the case that the entire stem is copied and prefixed to itself. In this sense, the reduplicant in Kisukuma must be defined as maximally equivalent to a stem. By stem here, I am referring to Downing and Hyman's Inflectional Stem (IS). That is, the root and all extension morphemes including the default morphological ending vowel [-a]. In this sense only the prefixal materials does not belong to the stem. For example, in [gʊ-som-el-a] " to read for" the stem is the root [som-], the suffixal benefactive [-el-] and the morphologically default verb ending [-a].

In verb stem reduplication, the reduplicant must end in a low vowel [-a] even if this vowel is not present in the base (cf. 12). To handle all the complexities involving the fixed [-a] in the reduplicant as demonstrated in §3.3, I follow Downing (1997) and Hyman et al (1999) by assuming that the FV-a is a morphological default verb ending. Since the reduplicant in Kisukuma is, to a large extent, determined by morphological factors, it is always the case that reduplicants, which are stems themselves, must end in the morphologically default [-a]. This is why I am treating the final vowel [-a] as part of the stem and it is guaranteed to appear in the reduplicant because morphologically it is a default segment. Kisukuma reduplicants, therefore, generally resemble typical Bantu canonical verb stems (Downing 1997). Sometimes, however, the occurrence of [-a] in the reduplicant is overridden by other morphological factors like the need to have feature agreement between the base and the reduplicant. This is the case, for example, when [+subjunctive], [+perfective] and [+past negative] verb stems are reduplicated.

Building on Downing's (1997) notion of canonical stems, I will be referring to *any* stem that ends in the morphologically default [-a] in Kisukuma as a canonical stem regardless of its length. This is the most natural and most frequent stem ending in Kisukuma and other Bantu languages (Mabuza 1962).

To account for the fact that reduplicants in Kisukuma are generally (canonical) stems, the following constraint is proposed.

(67) RED(μ) = CANONICAL STEM(μ): For any μ morpheme, the reduplicant is identical to the canonical stem of μ (ABBR. RED(μ)=CSTEM(μ)).

It is crucial to note that the constraint in (67) does not say anything about the copying of the affixes in the reduplicant. As far as (ABBR. RED(μ)=CSTEM(μ)) constraint above is concerned, [gʊ-**som**-el-a] + [**som**-el-a] and [gʊ-**som**-a] + [**som**-el-a] are both optimal reduplicants because both are canonical stems. On the other hand, a candidate like [gʊ-som-**e**] + [som-el-a] is non-optimal because by ending in [-e], it violates the constraint in (67), a constraint requiring that reduplicants correspond to canonical stems which must end in the morphologically default low vowel [-a]. The candidate [gʊ-**som-e**] + [**som**-el-a] is also bad because it only copies part of the benefactive morpheme [-el-].

Since [gʊ-**som-el-a**] + [**som**-el-a] and [gʊ-**som-a**] + [**som**-el-a] are both optimal candidates in Kisukuma, it is apparent that the copying of affixes in the reduplicant is optional. The suffixal morphemes can be left out in the reduplicant provided that the copied content morpheme of the base corresponds to a canonical stem hence the optimality of [gʊ-**som-a**] +[som-el-a]. To account for the optionality of affixes in the reduplicant, the following markedness constraint is proposed.

(68) *AFFIX RED: Copying of affixes in the reduplicant is not allowed.

This constraint prohibits the copying of affixes in the reduplicant. Candidates like gʊ-**som-el-a** + **som**-el-a] will thus incur two violations of *AFFIX RED because it copies two affixal segments contributed by the benefactive morpheme [-el-]. Notice that copying of the benefactive morpheme here is unnecessary since [som-a + som-el-a] is also optimal.

As it has already been demonstrated above, reduplication in Kisukuma is generally total as opposed to partial as it is the case in Kirundi (Brassil 2000), Siswati (Downing 1999), Ndebele (Hyman et al. 1999) and Kikuyu (Peng 1992). Relating to verb stems, the reduplicant in Kisukuma copies the entire stem, i.e. the root, affixes and the final vowel [a]. In Downing (1997) and Hyman et al's (1999) proposals, reduplication in Kisukuma takes place at the (Inflectional) Stem (cf.§ 3.3.2) and (§ 3.3.4) respectively. The deletion of affixal materials in the reduplicant is a function of constraints like *AFFIX RED.

Since reduplication is total, this entails that a faithfulness constraint, requiring that every segment of the base have a correspondent in the reduplicant, is generally ranked high in Kisukuma grammar. This constraint is given below.

(69) MAX-BR: Every element of the Base (B) has a correspondent in the reduplicant (R).

Now notice that the faithfulness constraint MAX-BR conflicts with *AFFIX RED. While the former requires that all segments of the base be copied in the reduplicant (total reduplication), the latter demands the opposite by requiring that some segments of the base, namely affixes, be deleted. As I have shown above, both total (e.g. <u>**som**-el-a</u> + **som**-el-a) and partial reduplication (e.g. <u>**som**-a</u> + **som**-el-a) are possible in Kisukuma provided that the reduplicant corresponds to a canonical stem. This is an instance of free variation, which is generally still problematic in OT. In derivational theories, free variation was accounted by optional rule application. In OT, free variation is accounted for by free ranking of the competing constraints. Since its introduction in OT, as a theoretical option by Prince and Smolensky (1993), subsequent researchers like Kiparsky 1993, Kager 1994, Reynolds 1994 and Antilla 1995 have argued for the formal adoption of free ranking as an OT counterpart of optional rule application. Generally, "when two constraints C_1 and C_2 are freely ranked, the evaluation procedure branches at that point. In one branch, C_1 is ranked above C_2, while in the other branch the ranking is reversed" (Kager 1999: 406). Following Kager (1999), the formalization of this idea is given below.

(70) Interpretation of free ranking of constraints C_1, C_2

Evaluation of the candidate set is split into two subhierarchies, each of which selects an optimal output. One subhierarchy has $C_1 >> C_2$, and the other $C_2 >> C_1$ (Kagger 1999:406).

Since reduplication in Kisukuma can be total (e.g. **som-el-a** + **som**-el-a) or partial by deleting some affixal material as in **som-a** + **som**-el-a), it is clear that the two competing constraints, i.e. MAX-BR and *AFFIX RED are freely ranked in Kisukuma. This is illustrated in the following tableau.

71. gʊ-RED + som-el-a	RED = CSTEM	MAX-BR	*AFFIX RED
a. ☞gʊ-som-el-a + som-el-a			**(el)
b. gʊ-som-a + som-el-a		*!*(el)	

72. gʊ-RED + som-el-a	RED = CSTEM	*AFFIX RED	MAX-BR
a. ☞gʊ-som-a + som-el-a			**(el)
b. gʊ-som-el-a + som-el-a		*!*(el)	

Consider now cases like those in (73). Here the reduplicant can optionally parse the subjunctive-marking inflectional final ending [-e] or it can surface with the morphologically default vowel [-a]. As I have mentioned above, the reduplicant in Kisukuma is under constant pressure to resemble a (canonical) stem, which in essence is a prosodic word. As formulated, the constraint in (67) predicts that only canonical stems will surface in the reduplicant. In these forms, however, the reduplicant stem can either be canonical, e.g. [a-**som-a**] + [**som**-e] or can be an exact copy of the base stem by copying the subjunctive marking final vowel [-e]. The non-canonical stem, e.g. [a-**som-e**] + [**som**-e] is thus problematic.

(73) a. a-som-e a-**som-e**+ som-e "he ought to read, let him read"
a-**som-a** + som-e

b. a-βilim-e   a-**βilim**-e + βilim-e   "he ought to roll, let him roll"
a-**βilim**-a + βilim-e

There are at least two accounts that can be advanced to account for the free variation nature of both the canonical [a-som-a] + [som-e] and the non-canonical reduplicant stem [a-som-e] + [som-e]. The first account focuses on the feature mismatch or lack of feature correspondence between the reduplicant and the base when the reduplicant ends with the morphologically default vowel [-a]. Notice that the reduplicant final vowel [-a] corresponds with the subjunctive marking final vowel [-e] in the base. The two are thus not featurally identical.

It has been observed that unless constrained by higher ranked constraints, there is a widespread tendency for base elements to match in features with the elements of the reduplicant. In McCarthy and Prince (1995) Correspondence model, for example, the feature exactness between the base and the reduplicant is accounted for using IDENT family of constraints. In a case like ours, we can use an IDENT constraint like the one given in (74).

(74) IDENT F-BR: All segments in the base and the reduplicant must agree in features.

Notice that both candidates, i.e. the candidate with feature exactness between the base and the reduplicant [a-som-e] + [som-e] and the one with feature mismatch [a-som-a] + [som-e], are optimal in Kisukuma. In the former case, however, the feature exactness between the base and the reduplicant comes at the expense of violating RED$_{(\mu)}$ = CSTEM, the constraint requiring that all reduplicants be canonical stems. In this case the reduplicant stem ends with a subjunctive marking morpheme [-e] and thus the stem is not canonical. Although the reduplicant stem is canonical in the latter case [a-<u>som-a</u>] + [som-<u>e</u>], this canonicity comes at the expense of violating IDENT F-BR because the final segment of the base [-e] corresponds with [-a] in the reduplicant and the two are not featurally identical. It is apparent then that we are dealing with free variation here. Like in (71) and (72) above, the two constraints $\text{RED}_{(\mu_i)}$ = CSTEM and IDENT F-BR are freely ranked. The free ranking of these constraints is illustrated in the following tableaux (75a) and (75b).

75a. /a-RED + som-e/	IDENT F-BR	$\text{RED}_{(\mu_i)}$ = CSTEM
a. ☞a-<u>som-e</u> + som-e		*
b. a-<u>som-a</u> + som-e	*!	

75b. /a-RED + som-e/	$\text{RED}_{(\mu_i)}$ = CSTEM	IDENT F-BR
a. ☞a-<u>som-a</u> + som-e		*
b. a-<u>som-e</u> + som-e	*!	

The second account is based on Steriade's (1997) proposal that the reduplicant in Bantu corresponds to some listed stem in the base. According to this view, non-canonical reduplicants are predicted in the grammar. For example, if the base is [a-<u>som-e</u>], the reduplicant is predicted to correspond to this stem hence [a-<u>som-e</u> + som-e]. To capture this observation, the following constraint is proposed.

(76) $\text{RED}_{(\mu_i)}$ = LISTED $\text{STEM}_{(\mu_i)}$: For any μ morpheme, the reduplicant is identical to the Listed Stem of μ (Abbr. $\text{RED}_{(\mu_i)}$=$\text{LSTEM}_{(\mu_i)}$).

The constraint in (76) makes the constraint that require reduplicants to be canonical stems ($\text{RED}_{(\mu_i)}$ = $\text{CSTEM}_{(\mu_i)}$) irrelevant because what matters now is whether the reduplicant resembles a listed stem (of itself) regardless of whether it is canonical or not. Notice, however, that in non-canonical reduplicants, the reduplicant copies the subjunctive affix. This violates *AFFIX RED but satisfies IDENT F-BR. Canonical reduplicants on the other hand satisfy *AFFIX RED by not copying the subjunctive marker in the reduplicant, but they violate IDENT F-BR because the last vowel of the reduplicant is not similar to the last vowel of the base. Both stems, however, satisty $RED_{(\mu)}$=$LSTEM_{(\mu)}$ because they are both "legal" stems in Kisukuma. Since the canonical stem a-<u>som-a</u> + som-e alternates with the exact copy a-<u>som-e</u> + som-e, it must be the case that IDENT F-BR and *AFFIX RED are also free ranked. The free ranking of these constraints is illustrated in the following tableaux.

77. /a-RED + som-e/	$RED_{(\mu)}$=$LSTEM_{(\mu)}$	IDENT F-BR	*AFFIX RED
a. ☞a-<u>som-e</u> + som-e			*
b. a-<u>som-a</u> + som-e		*!	

78. /a-RED + som-e/	$RED_{(\mu)}$=$LSTEM_{(\mu)}$	*AFFIX RED	IDENT F-BR
a. ☞a-<u>som-a</u> + som-e			*
b. a-<u>som-e</u> + som-e		*!	

In tableau (79) below is an illustration of a derivation of a long subjunctive reduplicated stem [a-pulugun-e] "(s)he should struggle" which reduplicates canonically as [a-<u>pulugun-a</u>] + [pulugun-e] or as an exact copy [a-<u>pulugun-e</u>] + [pulugun-e]. The same free ranking, like the one established for disyllabic stems, can also account for these stems. Candidates (c-d) in both tableaux are not optimal because they fatally violate $RED_{(\mu)}$=$LSTEM_{(\mu)}$: they truncate the verbal root thereby creating unlisted and unrecognizable stems.

79. /a-RED + pulugun-e/	RED(μ)=LSTEM(μ)	IDENT F-BR	*AFFIX RED
a. ☞a-<u>pulugun-e</u> + pulugun-e			*
b. a-<u>pulugun-a</u> + pulugun-e		*!	
c. a-<u>pulu</u> + pulugun-e	*!		
d. a-<u>pul-a</u> + pulugun-e	*!	*	

80. /a-RED + pulugun-e/	RED(μ)=LSTEM(μ)	*AFFIX RED	IDENT F-BR
a. ☞a-<u>pulugun-a</u> + pulugun-e			*
b. a-<u>pulugun-e</u> + pulugun-e		*!	
c. a-<u>pulu</u> + pulugun-e	*!		
d. a-<u>pul-a</u> + pulugun-e	*!		*

There is still one important observation before we proceed. It is important to note that (verb) stem reduplication in Kisukuma is basically a morphological process: reduplicants are stems that resemble prosodic words and their truncation is possible only to the extent that it does not produce forms that do not correspond to already existing listed forms. Another piece of evidence that verb reduplication in Kisukuma is primarily a morphological process is provided by reduplicants that end with [-e], which is the only other possible final vowel in reduplicants apart from the canonical [-a]. The realization of [-e] in the reduplicant is strictly limited in Kisukuma: it occurs in the reduplicant when the base is [+subjunctive], [+perfective] or [+past negative] as illustrated in (81a), (81b) and (81c) respectively (-ile- is a perfective marker while -da-marks (past) negative). In all cases, the morphological default vowel [-a] can also copy in the reduplicant.

(81) The Realization of [-e] in subjunctive, perfective and past negative stems

	SR	Red + Base	Gloss
a.	a-som-e	a-<u>som-e</u> + som-e	"he should read, he ought to read"
		a-<u>som-a</u> + som-e	

	a-βiling-e	a-<u>βiling-e</u> + βiling-e a-<u>βiling-a</u> + βiling-e	"he should collect, he ought to collect"
	a-laal-e	a-<u>laal-e</u> + laal-e a-<u>laal-a</u> + laal-e	"he should sleep, he ought to sleep"
b.	a-li-il-e	a-<u>li-il-e</u> + li-il-e a-<u>li-il-a</u> + li-il-e	"he is full (has eaten a lot)"
	a-ji-il-e	a-<u>ji-il-e</u> + ji-il-e a-<u>ji-il-a</u> + ji-il-e	"he is gone"
	a-chi-il-e	a-<u>chi-il-e</u> + chi-il-e a-<u>chi-il-a</u> + chi-il-e	"he is dead"
c.	a-da-li-il-e	a-da-<u>li-il-e</u> + li-il-e a-da-<u>li-il-a</u> + li-il-e	"he did not eat"
	a-da-ji-il-e	a-da-<u>ji-il-e</u> + ji-il-e a-da-<u>ji-il-a</u> + ji-il-e	"he did not go"
	a-da-chi-il-e	a-da-<u>chi-il-e</u> + chi-il-e a-da-<u>chi-il-a</u> + chi-il-e	"he did not die"

The crucial observation in (81) is that [-e] can occur in the reduplicant only when there is a feature agreement between it and the base. That is to say, the base must be either [+subjunctive], [+perfective] or [+past negative]. Redundantly stated, [-e] can not occur in the reduplicant when the base does not have these features i.e. [+subjunctive], [+perfective] or [+past negative]. The consequence of this observation is that, the [-e]-final reduplicants in (81) are possible only when their occurrence in the reduplicant is licenced by the features [+subjunctive], [+perfective] or [+past negative] of the base. Without the presence of these features in the base, the [-e]-final reduplicants can no longer be optimal. Reduplicated forms like [a-som-e] + [som-a] are thus non-optimal because the reduplicant som-e does not agree in features with the base from which it is derived. In this case, the base ends in [-a] which is morphologically featureless. The reduplicant can not have the feature [+subjunctive] if the base is featureless because generally reduplicants tend to have unmarked structures. On the other hand, the morphologically empty morph [-a] can occur in the reduplicant even when the base is [+subjunctive], [+perfective] or [+past negative] because, unlike [-e], [-a] is featureless. It is thus an unmarked segment, a morphologically default segment, that can occur in the stem reduplicant without disrupting the feature agreement pattern between the base and the reduplicant. This is Hyman et al's (1999) insight in Ndebele although their analysis is purely morphosyntactic and does not involve any base-reduplicant correpondences. It should therefore be noted that [-e] itself is marked and unless its [+subjunctive], [+perfective] or [+past negative] features are realized in the base, it can not surface in the reduplicant.

To recapitulate, from what we have seen so far, several generalizations can be made regarding the size of the reduplicant in Kisukuma verb stem reduplication.

(82) Generalizations Pertaining to the Shape of the Reduplicant in Verb Reduplication.

a. The reduplicant is a stem that is prefixed to the base and can end with a morphologically default vowel [-a] or with subjunctive, +past negative and perfective marking [-e] provided that it corresponds with a listed stem. Truncation of root materials is thus not allowed because it usually results in non-listed stems (RED$_{(\mu)}$ =LSTEM$_{(\mu)}$, *AFFIX RED >> IDENT F-BR or RED$_{(\mu)}$ =LSTEM$_{(\mu)}$, IDENT F-BR >> *AFFIX RED)

b. The reduplicant stem "looks like" a (minimal) prosodic word. That is, minimally the reduplicant can not be smaller than a foot. Monosyllabic roots thus must be augmented by either copying the prefixal materials (if any) or by double copying the root itself (FOOT MINIMALITY >> *AFFIX RED, INTEGRITY).

c. The occurrence of [-e] as a final vowel in the reduplicant requires that the base have the following morphosyntactic features: [+subjunctive], [+perfective] and [+past negative]

e. The low vowel [-a] can occur in the reduplicant regardless of the features of the base because [-a] does not take morphological features like [+subjunctive], [+perfective] and [+past negative]. Morphologically, it is a default (unmarked) segment.

3.9.1. The Reduplicant in Long (unsuffixed) Stems

When long unsuffixed stems are reduplicated in Kisukuma, the stem is never truncated and total reduplication is preferred (cf. 83).

(83)	a.	gʊ-**gaagan**-a	gʊ-**<u>gaagan</u>**<u>-a</u> + **gaagan**-a	"to be hyperactive"
			*gʊ-**<u>gaag</u>**<u>-a</u> + **gaagan**-a	
	b.	gʊ-**leembeel**-a	gʊ-**<u>leembeel</u>**<u>-a</u> + **leembeel**-a	"to be calm"
			*gʊ-**<u>leembee</u>** + **leembeel**-a	
			*gʊ-**<u>leemb</u>**<u>-a</u> + **leembeel**-a	
	c.	gʊ-**palagan**-a	gʊ-**<u>palagan</u>**<u>-a</u> + **palagan**-a	"to struggle "
			*gʊ-**<u>pal</u>**<u>-a</u> + **palagan**-a	
	d.	gʊ-**pʊʊndʊl**-a	gʊ-**pʊʊndʊl**-a + **pʊʊndʊl**-a	"to bore a hole"
			*gʊ-**<u>pʊʊndʊ</u>** + **pʊʊndʊl**-a	
			*gʊ-**<u>pʊʊnd</u>**<u>-a</u> + **pʊʊndʊl**-a	
	e.	gʊ-**pʊʊlʊlʊk**-a	gʊ-**<u>pʊʊlʊlʊk</u>**<u>-a</u> + **pʊʊlʊlʊk**-a	"to bore a hole"
			*gʊ-**<u>pʊʊlʊ</u>** + **pʊʊlʊlʊk**-a	
			*gʊ-**<u>pʊʊl</u>**<u>-a</u> + **pʊʊlʊlʊk**-a	

In these forms, the disyllabic reduplicants with exact copy or those ending in the default [-a] are not possible because to achieve the disyllabic reduplicants would necessitate the truncation of the root morpheme. However, this is not allowed due to the highly ranked RED$_{(\mu)}$ =LSTEM$_{(\mu)}$, a constraint requiring that the reduplicant correspond to some listed stem of the base. Although the non-optimal candidates ending in [-a] in (83) look like canonical stems, their canonicity results from the truncation of the root morpheme. While this is allowed in languages like Kirundi (Brassil 2000) and Siswati (Downing 1997), it is not tolerated in Kisukuma because of the high ranked RED$_{(\mu)}$=LSTEM$_{(\mu)}$. It is apparent then that RED$_{(\mu)}$ =LSTEM$_{(\mu)}$ is ranked higher in Kisukuma than the constraint that forces foot binarity in Kirundi, Siswati, Ndebele and Kikuyu reduplication. It seems that the constraint that is ranked higher than RED$_{(\mu)}$ =LSTEM$_{(\mu)}$ in the former languages is FOOT BINARITY. The consequence of this constraint is that the reduplicant is both minimally and maximally disyllabic. In Kisukuma, Chiyao and Olusamia, however, this constraint requires that the reduplicant be at least two syllables. Maximally, it can be of any length. As a result, roots are never truncated regardless of their length or segmental composition. This satisfies RED$_{(\mu)}$ =LSTEM$_{(\mu)}$. I conclude that the responsible constraint in Kisukuma is FOOT MINIMALITY instead of FOOT BINARITY.

3.9.2. Suffixed Stems

In tableau (71) and (72), an instance of free variation involving a suffixed stem was illustrated by using the base stem [som-el-a]. In this section; I provide the big picture of suffixed stems reduplication. The crucial point I want to make here is that the Root-a reduplicants in suffixed stems are governed by semantic or more appropriately by morphosyntactic factors. The evidence for this view is provided by such suffixal morphemes such as the inversive marker [-ul-] and inversive persistive [-ol-] morphemes. In these morphemes the Root-a reduplicants are not available. Moreover, when the base stem has more than one derivational suffix, root-a (canonical) reduplicants become questionable.

Consider now the forms in (84). In (84a), the roots are suffixed with an applicative morpheme. The same morpheme also functions as a benefactive and instrumental morpheme in Kisukuma. In (84b) is a stative morpheme [-ɪk- ~ -ek-] while in (84c) is a passive morpheme [-iw-] and in (84d) is a causative marker.

(84) Suffixed Stems

a. Applicative morpheme [-ɪl- ~ -el-]: Root-a RED possible.

SR	**Red + Base**	**Gloss**
gʊ-**gʊl**-ɪl-a	gʊ-**gʊl**-ɪl-a + **gʊl**-ɪl-a	"to buy for/with"
	gʊ-**gʊl-a** + **gʊl**-ɪl-a	
	*gʊ-**gʊl**-ɪ + **gʊl**-ɪl-a	
gʊ-**peemb**-el-a	gʊ-**peemb**-el-a + **peemb**-el-a	"to burn for/with"
	gʊ-**peemb**-a + **peemb**-el-a	
	*gʊ-**peemb**-e + **peemb**-el-a	
gʊ-**sul**-ɪl-a	gʊ-**sul**-ɪl-a + **sul**-ɪl-a	"to wash for/with"
	gʊ-**sul**-a + **sul**-ɪl-a	
	*gʊ-**sul**-ɪ + **sul**-ɪl-a	

b. Stative, Neuter Morpheme [-ɪk-] ~ [-ek-]: Root-a RED possible.

SR	**Red + Base**	**Gloss**
gʊ-**βʊnz**-ɪk-a	gʊ-**βʊnz**-ɪk-a + **βʊnz**-ɪk-a	"to break"
	gʊ-**βʊnz**-a + **βʊnz**-ɪk-a	
	*gʊ-**βʊnz**-ɪ + **βʊnz**-ɪk-a	
gʊ-**lʊʊnd**-ɪk-a	gʊ-**lʊʊnd**-ɪk-a + **lʊʊnd**-ɪk-a	"to accumulate"
	gʊ-**lʊʊnd**-a + **lʊʊnd**-ɪk-a	
	*gʊ-**lʊʊnd**-ɪ + **lʊʊnd**-ɪk-a	

gʊ-**βel**-ek-a	gʊ-**βel**-ek-a + **βel**-ek-a	"to break"
	gʊ-**βel**-a + **βel**-ek-a	
	*gʊ-**βel**-e + **βel**-ek-a	

c. Passive morpheme [-iw-]: Root-a RED possible.

SR	Red + Base	Gloss
gʊ-**many**-iw-a	gʊ-**many**-iw-a + **many**-iw-a	"to be summoned"
	gʊ-**many**-a + **many**-iw-a	
	*gʊ-**many**-i + **many**-iw-a	
gʊ-**luum**-iw-a	gʊ-**luum**-iw-a + **luum**-iw-a	"to be forced to leave in a haste"
	gʊ-**luum**-a + **luum**-iw-a	
	*gʊ-**luum**-i + **luum**-iw-a	
gʊ-**lam**-iw-a	gʊ-**lam**-iw-a + **lam**-iw-a	"to be worshiped"
	gʊ-**lam**-a + **lam**-iw-a	
	*gʊ-**lam**-i + **lam**-iw-a	

d. Causative morpheme [-y-]: Root-a RED possible.

SR	Red + Base	Gloss
gʊ-**sab**-y-a	**sab**-y-a + **sab**-y-a	"cause to be rich"
	sab-a + **sab**-y-a	
gʊ-**dadab**-y-a	gʊ-**dadab**-y-a + **dadab**-y-a	"cause to run"
	gʊ-**dadab**-a + **dadab**-y-a	

As shown in examples above, when suffixed stems are reduplicated, two shapes of the reduplicant are possible. First the reduplicant stem can copy the entire base stem, i.e. the root, the suffixes and the final vowel. Thus [gʊ-gʊl-ɪl-a] "to buy for" reduplicates as [gʊ-gʊl-ɪl-a] + [gʊl-ɪl-a] "to buy for (here and there)". Second, the reduplicant can ignore or skip the suffix morpheme and copy only the root and the final vowel. Thus [gʊ-gʊl-ɪl-a] can also reduplicate as [gʊ-gʊl-a] + [gʊl-ɪl-a].

According to the analysis and argumentation laid down in §3.9, both shapes of the reduplicant in (84) can be straightforwardly accounted for. The total reduplication cases are not problematic because the reduplicant is a pefect copy of the base stem. The problematic cases are the ones in which the suffixal morphemes are skipped over. These cases, however, can also be accounted for by the same constraints. The argument runs as follows. Suffixal morphemes can be skipped over in the reduplicant provided that the resulting stem corresponds to some listed stem in the base. Only the root and the final vowel –a (or-e for morphologically marked endings) are obligatory in forming a typical Bantu stem. These materials can not be tampered with in the reduplicant because this will always produce a stem that does not correspond to some listed stem in Kisukuma. Suffixal morphemes, however, can be skipped over because the resulting reduplicant stem corresponds to a listed stem.

It has been observed that, unless prohibited by high ranked markedness constraints, many languages prefer total to partial reduplication. This is the basic premise behind Steriade's (1988) model of reduplication; the first model of reduplication to put forward the view that reduplicative templates are derived by total reduplication followed by truncation of excess prosodic and melodic materials (see also Mutaka and Hyman 1990). Truncation is usually motivated by the need to map the reduplicant in specific reduplicative templates or by other highly ranked phonotactic constraints of the language. Relating this observation to our case, it is obvious that the suffixal morphemes, though part of the base, optionally surfaces in the reduplicant because this does not affect the status of reduplicants as stems. The analysis of suffixed stems provided in (71-72, 74, 77-80) can also be straightforwardly extended to these forms. Since the analysis is essentially the same, I will not repeat it here.

There is another factor that affects the availability of Root-a (canonical) reduplicants. It seems that the Root-a reduplicants are possible only when the base has no more than one suffixal morpheme. That is to say, even in stems with derivational suffixes where Root-a reduplicants are optimal, e.g. in the applicative/instrumental/benefactive morpheme [-el-], an addition of another suffixal morpheme on the base gradiently makes the availability of Root-a reduplicants questionable. Thus, although [gʊ-som-el-a-nij-a] "read for/with simultaneously" can reduplicate as [gʊ-som-a] + [som-el-a-nij-a], some native speakers (including myself) find the reduplicant in forms like these questionable. Total copy of the base in these forms is, however, unquestionable. Consider the example in (85).

(85)	gʊ-**lek**-a	gʊ-**lek**-a + **lek**-a	"to leave"
	gʊ-**lek**-an-a	gʊ-**lek**-a + **lek**-an-a	[+reciprocal]
	gʊ-**lek**-an-ɪl-a	gʊ-**lek**-an-ɪl-a + **lek**-an-ɪl-a ?gʊ-**lek**-a + **lek**-an-ɪl-a	[+applicative]
	gʊ-**lek**-an-ɪl-a-nij-a	gʊ-**lek**-an-ɪl-a-nij-a + **lek**-an-ɪl-a-nij-a ?gʊ-**lek**-a + **lek**-an-ɪl-a-nij-a	[+simultaneous]
	gʊ-**lek**-an-ɪl-a-nij-iw-a	gʊ-**lek**-an-ɪl-a-nij-iw-a + **lek**-an-ɪl-a-nij-iw-a ?gʊ-**lek**-a + **lek**-an-ɪl-a-nij-iw-a	[+passive]

As shown in (85), Root-a reduplicants are questionable when the base contains more than one suffixal morpheme. The are two possible explanation I can think of at the moment to account for this pattern. The first has to do with semantics. It seems that when the base stem has more than one suffixal morpheme, Root-a reduplicants become questionable because *too much* semantic information will be lost. As I mentioned earlier, the Kisukuma reduplicant is always under pressure to agree with the base in morphosyntactic features, the mismatch of which leads to semantic/meaning discrepancies between the base and the reduplicant as in (85). The (Semantic) feature disagreement between the base and the reduplicant is tolerated only if the base has one suffixal morpheme. Here the suffixal morpheme can be skipped over in the reduplicant. Despite the fact that the final vowel [–a] in Root-a (canonical) reduplicants is featureless (and thus does not interupt the morphosyntactic feature agreement between the base and the reduplicant), skipping more than one feature-bearing suffixes seems to be semantically too expensive because the deleted features cannot be recovered. The semantic agreement between the base and the reduplicant thus must be maintained. The examples in (86) illustrate the fact that the gradient exclusion of the derivational suffixes in the reduplicant leads to fatal violations and Root-a reduplicants eventually become non optimal.

(86)
a. gʊ-**<u>lek</u>**<u>-a</u> + **lek**-a — "to leave behind, to stop"
b. gʊ-**<u>lek</u>** <u>- a</u> + **lek**-an-a — "+ stative/reciprocal"
c. ?gʊ-**<u>lek</u>**<u>-a</u> + **lek**-an-ɪl-a — "+applicative"
d. ?gʊ-**<u>lek</u>**<u>-a</u> + **lek**-an-ɪl-a-nij-a — "+simultaneous"
e. ?gʊ-**<u>lek</u>**<u>-a</u> + **lek**-an-ɪl-a-nij-iw-a — "+passive"

Before I close this section, there is one observation that is worthy mentioning. Sometimes the availability of Root-a reduplicants is overriden by semantic factors. There are a few instances in which the reduplicant stem is a typical Kisukuma stem but its realization is rendered non-optimal purely by semantic factors. One such case involves stems having inversive and persistive inversive suffixal morphemes as shown in (87).

(87) **Inversive Morpheme [-ʊl-] and Persistive Inversive Morpheme [-ol-]**: Root-a RED not possible.

	Simple stem	Suffixed stem	Red + Base
a.	gʊ-fuung-a	gʊ-fuung-**ʊl**-a	gʊ-<u>fuung-**ʊl**-a</u> + fuung-**ʊl**-a
	to-close-a	to-close-inv-a	*gʊ-<u>fuung-a</u> + fuung-**ʊl**-a
	"to close"	"to open"	"to open (here and there)"
b.	gʊ-kom-a	gʊ-kom-**o.ol**-a	gʊ-<u>kom-**o.ol**-a</u> + kom-**o.ol**-a
	to-plug-a	to-plug-o.inv-a	*gʊ-<u>kom-a</u> + kom-**o.ol**-a
	"to plug"	"to unplug"	"to unplug (here and there)"
c.	gʊ-tab-a	gʊ-tab-**ʊ.ʊl**-a	gʊ-<u>tab-**ʊ.ʊl**-a</u> + tab-**ʊ.ʊl**-a
	to-weave	to-weave-ʊ.inv-a	*gʊ-<u>tab-a</u> + tab-**ʊ.ʊl**-a
	"to weave"	"to unweave"	"to unweave (here and there)"
d.	gʊ-kag-a	gʊ-kag-**ʊ.ʊl**-a	gʊ-<u>kag-**ʊ.ʊl**-a</u> + kag-**ʊ.ʊl**-a
	to-protect	to-protect-ʊ.inv-a	*gʊ-<u>kag-a</u> + kag-**ʊ.ʊl**-a
	"to protect"	"to unprotect"	"to unprotect (here and there)"

As shown in (87), the reduplicants in which the suffixal inversive morpheme is skipped are non-optimal because they have a morphosyntactic feature disagreement between the base and the reduplicant. They thus tend to convey an opposite meaning to that of the base. Since the base conveys an opposite meaning, the reduplicant also is forced to agree in meaning with it. That is, *[gʊ-<u>fuung-a</u> + fuung-ʊl-a] is bad because the reduplicant complex will mean " to close and open frequently". To convey the meaning of "to open here and there" only [fuung-ʊl-a] "open" is reduplicated. To some extent, this is a reflection of morphological feature agreement introduced above while discussing the factors that determine the realization of [+subjunctive], [+perfective] and [+past neg] marking final [-e] in the reduplicant. In this case, there must be a morphosyntactic feature [+inversive] agreement between the base and the reduplicant.

This pattern of reduplication is not confined to Kisukuma. As shown in (88), standard Kiswahili also displays the same pattern with its unproductive inversive marker.

(88) **Inversive marker in standard Kiswahili: Root-a RED not available.**

ku-fung-a "to close"	ku-fung-u-a "to open"	ku-fung-u-a + fung-u-a "to open (here and there)"	*(ku-fung-a + fung-u-a)
ku-fum-a "to weave"	ku-fum-u-a "to undo"	ku-fum-u-a + fum-u-a "to undo what is woven (here and there)"	*(ku-fum-a + fum-u-a)
ku-zib-a "to close, shut"	ku-zib-u-a "unclose"	ku-zib-u-a + zib-u-a "to unclose (here and there)"	*(ku-zib-a + zib-u-a)
ku-chom-a "stab, pierce"	ku-chom-o-a "to pull out"	ku-chom-o-a + chom-o-a "to pull out (here and there)"	*(ku-chom-a + chom-o-a)

Since only the total copy of the base is possible in these forms, the ranking between *AFFIX RED and MAX-BR is stable. As shown in (89), the two constraints are not free ranked: MAX-BR always outranks *AFFIX RED.

89. gʊ-RED + fuung-ʊl-a	RED(μ) =LSTEM(μ)	MAX-BR	*AFFIX RED
a. ☞gʊ-<u>fuung-ʊl-a</u> + fuung-ʊl-a			**(ʊl)
b. gʊ-<u>fuung-a</u> + fuung-ʊl-a		*!*(ʊl)	
c. gʊ-<u>fuung-ʊ</u> + fuung-ʊl-a	*!	**(la)	*

3.9.3. Deverbal Nouns

Before closing this section, consider now the shape of the reduplicant resulting from deverbal nouns that are formed by prefixing a noun class marker to the verb root and suffixing a nominalizing morpheme as shown below.

3.9.3.1. Nominalizing suffix [-i].

The nominalizing suffix [-i] is used mainly for nouns in Class 1 and Class 2 -the human being classes. Deverbal nouns formed in this manner express specialization or professions of the noun (e.g. gʊ-zug-a is "to cook" while n-zug-i is "a cook/chef")[15]. What is interesting is that the morphologically default vowel [-a] can still occur in the reduplicated forms.

(90) Nominalizing suffix [-i] Class 1 and 2: [-a] can appear in Reduplicated forms

	Verb	Noun	Reduplicated forms
a.	gʊ-log-a	βa-log-i	βa-log-i + log-i
	to-bewitch-a	2-bewitch-i	βa-log-a + log-i
	"to bewitch"	"witches"	"some sort of witches"
b.	gʊ-zeeng-a	n-zeeng-i	n-zeeng-i + zeeng-i
	to-build-a	1-build-i	n-zeeng-a + zeeng-i
	"to construct"	"a constructor"	"some sort of a constructor"
c.	gʊ-lɪm-a	βa-lɪm-i	βa-lɪm-i + lɪm-i
	"to-farm-a	2-farm-i	βa-lɪm-a + lɪm-ɪ
	"to farm"	"farmers"	"some sort of farmers"

The nominalizing suffix [-i] can also be used to form nouns that fall in class (14). This is a class that is basically composed of abstract nouns. As shown in (91), the morphologically

[15] Other Bantu languages (e.g. Standard Kiswahili) are more detailed in this respect. Thus: [ku-pik-a] is "to cook" while [m-pik-a-ji] is "a cook" and [m-pish-i] is "a chef". Likewise, [ku-som-a] "to read", [m-som-a-ji "a reader" and [m-som-i] "an educated person"

default [-a] can occur in reduplicated forms. In these forms, root-a reduplicants are possible because the final [-a] is morphologically empty. The nominalizing feature between the base and the reduplicant is thus not disrupted.

(91) Nominalizing suffix [-i-] Class 14: [-a] can appear in Reduplicated forms

	Verb	Noun	Reduplicated forms
a.	gʊ-log-a to-bewitch-a "to bewitch"	βʊ-log-i 14-bewitch-i "witchcraft"	βʊ-log-i + log-i βʊ-log-a + log-i "some sort of witchcraft"
b.	gʊ-zeeng-a to-build-a "to construct"	βʊ-zeeng-i 14-build-i "construction"	βʊ-zeeng-i + zeeng-i βʊ-zeeng-a + zeeng-i "some sort of a construction"
c.	gʊ-lɪm-a "to-farm-a "to farm"	βʊ-lɪm-ɪ 14-farm-i "farming"	βʊ-lɪm-ɪ + lɪm-ɪ βʊ-lɪm-a + lɪm-ɪ "some sort of farming"

3.9.3.2. Nominalizing suffix [-o]

Nouns formed through nominalizing suffix [-o] usually represent objects and instruments useful to human beings. The [-o] deverbatives have also been explained as an act or instance of the verbal meaning, e.g. Kiswahili [tend-a] "do", [tend-o] "deed". The morphologically default final morpheme [-a] *can* surface in reduplicated forms depending on the meaning of the item being reduplicated.

(92) Nominalizing suffix [-o-]: [-a] can appear in Reduplicated forms

	Verb	Noun	Reduplicated forms
a.	gʊ-teg-a to-trap "to trap"	mi-teg-o C.6-trap-o "traps"	mi-teg-o + teg-o mi-teg-a + teg-o "some sort of traps"

b.	gʊ-zeeng-a to-build-a "to construct"	mi-zeeng-o C.6-build-o "cities"	mi-zeeng-o + zeeng-o mi-zeeng-a + zeeng-o "some sort of cities"
c.	gʊ-zug-ɪl-a "to cook-appl-a "to cook for"	i-zug-ɪl-o C.5-cook-appl-a "a cooking place"	i-zug-ɪl-o + zug-ɪl-o i-zug-a + zug-ɪl-o "some sort of a cooking place"

3.9.3.3. Nominalizing suffix [-u]

These nouns fall in Class 14 and they indicate general abstract nouns or state. The morphologically default [-a] can occur in reduplicated forms.

(93) **Nominalizing suffix [-u]:[-a] can appear in the reduplicant**

	Verb	Noun	Reduplicated forms
a.	gʊ-saat-a "to-suffer-a "to suffer"	βʊ-saat-u C.14-suffer-u "suffering"	βʊ-saat-u + saat-u βʊ-saat-a + saat-u "some sort of suffering"
b.	gʊ-seβ-a to-be hot-a "to be hot"	βʊ-seβ-u C.14-be hot-u "hotness"	βʊ-seβ-u + seβ-u βʊ-seβ-a + seβ-u "some sort of hotness"
c.	gʊ-gaand-a to-become thin-a "to loose weight"	βʊ-gaand-u C.14-become thin-u "thinness"	βʊ-gaand-u + gaand-u βʊ-gaand-a + gaand-u "some sort of thinness"

3.9.3.4. Nominalizing suffix [-e] and [-ʊ]

There are few cases in which Root-a reduplicants are not possible in deverbal nouns. Such cases involve deverbal nouns formed by nominalizing suffix [-e] and [-ʊ] shown below. The nouns formed through suffixation of the nominalizing morpheme [-e] also denote artifacts and objects used by human beings and state of actions. As shown in (94) and (95), when nouns formed through suffixation of the nominalizing [-e] and [-ʊ] are reduplicated, the morphologically default [-a] can not occur in the reduplicant.

(94) Nominalizing suffix [-e-]: [-a] can *not* appear in Reduplicated forms

	Verb	Noun	Reduplicated forms
a.	gʊ-yog-a	βʊ-yog-e	βʊ-yog-e + yog-e
	to-brawl-a	14-brawl-e	*βʊ-yog-a + yog-e
	"to argue loudly"	"a tumult"	"some sort of a tumult"
b.	gʊ-lol-a	i-lol-e	i-lol-e + lol-e
	"to look-a	5-look-e	*i-lol-a + lol-e
	"to look"	"mirror"	"some sort of a mirror"

(95) Nominalizing suffix [-ʊ-]: [-a] can *not* appear in Reduplicated forms

	Verb	Noun	Reduplicated forms
a.	gʊ-lʊl-a	βʊ-lʊl-ʊ	βʊ-lʊl-ʊ + lʊl-ʊ
	to-become bitter-a	14-become bitter-ʊ	*βʊ-lʊl-a + lʊl-ʊ
	"to become bitter"	"bitterness"	"some sort of bitterness"
b.	gʊ-kʊl-a	i-kʊl-ʊ	i-kʊl-ʊ + kʊl-ʊ
	to-grow-a	5-grow-ʊ	*i-kʊl-a + kʊl-ʊ
	"to grow"	"chief's compound"[16]	"some sort of chiefs compound"

There are two issues that need to be addressed regarding deverbal nouns. The first question is to account for the anomaly between reduplicants that copy the canonical [-a] and those that do not. That is, why is the morphologically default final vowel [-a] possible in all deverbal nouns except those in (94) and (95). The second question is how to account for the alternation between Root-a reduplicants like [βa-log-a] + [log-i] and those with an exact copy between the base and the reduplicant, e.g. [βa-log-i] + [log-i].

Regarding the first question, it seems that, to the large extent, the realization of the morphologically default [-a] in reduplicated forms in deverbal nouns is governed by semantic factors: it is only realized in the reduplicant when there is a compositional semantic relationship between the root and its corresponding derivative. That is, [βa-<u>log-a</u>] + [log-i] "some sort of witches" is possible only because the (verb) stem [gʊ-log-a] "to bewitch" and the noun [βa-log-i] "witches" are semantically closely related. Due to this close semantic relationship, the reduplicant can parse the final vowel of the verb stem [gʊ-log-**a**] resulting in [βa-<u>log-**a**</u> + log-i] or it can parse the final vowel of the noun [βa-log-**i**] hence [βa-<u>log-**i**</u> + log-i]. When the semantic relationship between the base and the reduplicant is not transparent, the reduplicant can not parse the final vowel of the verb. This is expected because it is nouns that are reduplicated in these forms and not verbs. In (94b), for example, there is no compositional semantic relationship between the verb [gʊ-lol-a] "look" and the derivative noun [i-lol-e] "mirror". Since this is noun reduplication, the reduplicant thus copies the suffixal morpheme of the noun [i-lol-e] and not the canonical [-a] of the verb. I thus conclude that Root-a reduplication is possible only in cases where a compositional semantic relation is maintained between the root and the derivative.

Regarding the second question, the alternation between canonical reduplicants and the exact copy in these forms can be analyzed in a similar way like the alternation between

[16] A place where important people (those who have grown in power and authority) live e.g. kingdom headquarters, state house e.t.c.

[a-som-a] + [a-som-e] and [a-som-e] + [a-som-e] was analyzed in tableaux (71) and (72) respectively. It should be noted that the Root-a (canonical) reduplicants violate IDENT F-BR because the final vowel of the nominal base, e.g. [βa-log-**i**] is not featurally identical to the final vowel [-**a**] of the reduplicant, e.g. [βa-<u>log-a</u>] + [log-i]. From (68) we also know that the copying of affixes in the reduplicant is not allowed. This is due to the effect of *AFFIX RED constraint. The exact copy [βa-<u>log-i</u>] + [log-i]satisfies IDENT F-BR because a feature exactness between the base and the reduplicant is maintained. This satisfaction of IDENT F-BR, however, comes at the expense of violating *AFFIX RED because the nominalizing suffix [-i] is copied in the reduplicant. On the other hand, in the canonical reduplicants, *AFFIX RED is satisfied because no suffixal affix is copied in the reduplicant. Since both candidates are optimal, this is another case of free ranking between the two competing constraints, i.e. IDENT F-BR and *AFFIX RED. Both variants satisfy $RED_{(\mu_i)} = LSTEM_{(\mu_i)}$ because both candidates are listed stems. This is illustrated below.

96. βa-<u>RED</u> + βa-log-i	$RED_{(\mu_i)} = LSTEM_{(\mu_i)}$	*AFFIX RED	IDENT F-BR
a. ☞βa-<u>log-a</u> + βa-log-i			*
b. βa-<u>log-i</u> + βa-log-i		*!	

97. βa-<u>RED</u> + βa-log-i	$RED_{(\mu_i)} = LSTEM_{(\mu_i)}$	IDENT F-BR	*AFFIX RED
a. ☞βa-<u>log-i</u> + log-i			*
b. βa-<u>log-a</u> + log-i		*!	

3.9.4. Nouns, Adjectives and Short Numbers

Nouns, adjectives and short numbers can be accounted for by the same constraints and ranking as has been done with verbs. Like in verbs, prefixal materials (usually noun class markers) in nouns, adjectives and numbers are irrelevant in reduplication. Generally, prefixal materials do not surface in the reduplicant except when the nominal stem is monosyllabic. Moreover, regardless of the length of the nominal stem and segmental composition, no truncation of the nominal stem is allowed. Stems thus surface faithfully in the reduplicant. Notice also that nominals do not need to end in [-a]. All vowels can appear word finally and the final vowel is not a morpheme. Instead, it is part of the stem which, regardless of its length, is treated as one morpheme (a stem) and thus does not get truncated in the reduplicant. This is shown in (98) below where (98a) represents nouns, (98b) adjectives and (98c) numbers.

		SR	**BASE + RED**	**Gloss**
(98)	a.	i-telegani	i-telegani + <u>telegani</u>	"type of bird" (5)
		i-kongomilo	i-kongomilo + <u>kongomilo</u>	"esophagus" (5)
	b.	nkenaguuzi	nkenaguuzi + <u>kenaguuzi</u>	"kind of destroyer" (1)
		βa-tagadiifu	βa-tagadiifu + <u>tagadiifu</u>	"kind of holy" (2)
	a.	a-taandatʊ	a-taandatʊ + <u>taandatʊ</u>	"six by six (6)"
	b.	mpuŋgatɪ	mpuŋgatɪ + <u>puŋgatɪ</u>	"seven by seven"

The only modification that is required to account for nouns, adjectives and short numbers is the fact that, unlike in verbs, the reduplicant stem is a suffix in nominals. To accommodate this fact, the alignment constraint given in (66) must now be revised accordingly to properly align the edges of the base and that of the reduplicant. This constraint, given in (99) stipulates that the edges of the reduplicant and that of the base are aligned.

(99) ALIGN (RED R, STEM, L): Align the Right edge of the reduplicant with the left edge of the stem.

The tableau in (100) illustrates how the same constraints and ranking proposed earlier to account for verbs can also account for nominal stems.

100. /i-kongomilo + RED/	RED(μ) = LSTEM(μ)	FOOT MINIMALITY
a. ☞i-kongomilo + <u>kongomilo</u>		*
b. i-kongomilo + <u>milo</u>	*!	

3.11. The Reduplicant in Compound Nouns and Long Numbers.

In §3.5.4 and §3.7. I presented the data and descriptive discussion pertaining to long numbers and noun compounds like those in (101a) and (101b) respectively.

(101) Long numbers and compounds

	Base		**Base + RED**			
a.	si-huumbɪ	keenda	si-huumbi	keenda	+	<u>keenda</u>
	C.8-thousand	nine	C.8-thousand	nine		nine
	"nine thousands"		"nine thousands by nine thousands"			
	i-kumi na	i-tandatu	i-kumi na	i-tandatu	+	<u>tandatu</u>
	CL[17]-ten and	CL-six	CL-ten and	CL-six		six
	"sixteen"		"sixteen by sixteen"			
	Base		**Base + RED**			
b.	n-ch-a	βu-ziku	n-ch-a	βu-ziku	+	<u>ziku</u>
	C.9-die-FV	C.11-night	C.9-die-FV	C.11-night	+	night
	"a tree whose leaves wither during sunset/night"					
	Base		**Base + RED**			
	n-zoka	i-heenge	n-zoka	i-heenge	+	<u>heenge</u>
	9-snake	5-crossed eye	9-snake	5-crossed eye	+	crossed eye
	"crossed eyed snake"					

[17] CL is used here instead of a specific noun class number, (e.g. C.11) because more than one noun classes are possible with the respective prefix(es).

results, however, seem to suggest the opposite: these place names are not listed and thus there is no lexical entry (or lexical entry fails). Low-ranking phonological constraints like IDENT H-BR and ALIGN (RED,L, H,L) thus determine the shape of the reduplicant.

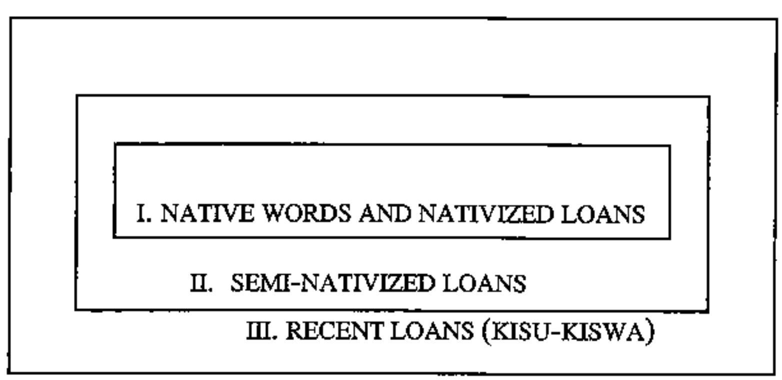
Let me know comment on the core-periphery structure (Ito and Mester 1995). Kisukuma phonology can be divided into three major strata, each of which is characterized by how far the mobile H has been displaced to the right from its sponsor. In the core phonology (native words and nativized loans), the High Domain (HD) is trisyllabic, the noun class system is apparent and nouns have clear noun class prefixes. Constraints like *AFFIX RED can thus be evaluated. Reduplication is determined by morphological factors e.g. lexical conservatism constraint ($RED_{(\mu_i)}=LSTEM_{(\mu_i)}$). Truncation of unreduplicated stems is thus not allowed. When tolerated, the truncated stem must resemble a morphological stem, e.g. [<u>som-a</u>] + [som-el-a].

Moving away from the core phonology, there is an intermediate stratum. This is an intermediate stage with bimoraic HD. That is, the HD has expanded by only one mora to the right. Some of these loans also have overt noun class marking. Reduplication is determined by a mixture of both morphological and phonological factors. In loans that have developed overt noun class marking like ma-shi(nd<u>a</u>nó) "competition" in (47b), reduplication is determined by morphological factors because morphological constraints like ($RED_{(\mu_i)}=LSTEM_{(\mu_i)}$) and *AFFIX RED can be evaluated. Thus ma-shi(nd<u>a</u>nó) reduplicates as ma-shi(nd<u>a</u>nó) + shindano. In loans that have no overt noun class marking, reduplication is determined by phonological factors. Thus (47e) reduplicates as shili(k̲alé) + kale. In the peripheral phonology (recent loans), the HD is monomoraic (fixed H tone), there is no overt noun class marking and reduplication is determined by the H-toned syllable of the unreduplicated loan. Morphology is opaque and morphological constraints like lexical conservatism (RED(μ_i)=LSTEM(μ_i)) and *AFFIX RED cannot be evaluated and are irrelevant. Reduplication, therefore, is determined by phonology.

		Kiswahili	Gloss	Kisukuma
(47)	a.	si'gala	"cigarette"	si(g̲alá)
	b.	ma-shi'ndano	"competition"	ma-shi(nda̲nó)
	c.	suru'ali	"pants"	sulu(βa̲lé)
	d.	wa'limu	"teachers"	βa-(li̲mú)
	e.	as'kari	"soldier"	shili(ka̲lé)
	f.	'hela	"money"	(he̲lá)
	g.	'simu	"telephone"	(si̲mú)
	h.	'tano	"five"	i-(t̲a̲a̲nó)

The core-periphery structure in Kisukuma is schematized in (48) and the characteristics of each stratum are summarized in (49).

(48) Core-Periphery model in Kisukuma (Ito and Mester 1995)



(49) Morphological and phonological characteristics of the core-periphery structure in Kisukuma.

I. Native words and nativized loans

- Overt morphology, e.g. overt noun class markers.
- The mobile H domain is usually trisyllabic.
- No OCP violations.
- The reduplicant is determined by morphological factors. Morphological constraints are thus higher ranked than phonological constraints.
- Minimally, the reduplicant must be at least disyllabic. Monosyllabic reduplicants are thus impossible.
- INTEGRITY is violated.

II. Semi-nativized loans (intermediate stratum).

- Sometimes overt morphology, e.g. overt noun class markers.
- The mobile H domain is disyllabic.
- Sometimes OCP is violated.
- Sometimes morphological constraints are violated.
- Minimally, the reduplicant must be disyllabic. Monosyllabic reduplicants are thus impossible.

III. Recent loans –The Kisu-Kiswa stratum.

Words in these stratum are closer to Kiswahili from which most of them are borrowed hence the name Kisu-Kiswa, i.e. Kisukuma-Kiswahili.

- Opaque morphology, e.g. no overt noun class markers.
- OCP is violated.
- No wide domain because only fixed H tone is realized.
- Morphological factors are irrelevant in computing the size of RED.
- Reduplication is determined by phonological factors.
- No INTEGRITY violations.
- Minimally, the reduplicant must be at least disyllabic. Monosyllabic reduplicants are impossible.

As can be seen in (49), some crucial properties are transferred from the core phonology to the outermost stratum-the Kisu-Kiswa stratum. For example, regardless of the phonological strata involved, the reduplicant can not be less than a foot. This shows that FOOT MINIMALITY is inviolable. Other constraints, e.g. INTEGRITY (violable in the core phonology but inviolable in Kisu-Kiswa stratum) and OCP (inviolable in the core phonology but violable in Kisu-Kiswa stratum) are not transferred from the core (phonology) to the outermost stratum.

4.8 Chapter summary

My major goal in this chapter was to investigate the factors that determine the size of the reduplicant in recent loans in Kisukuma. I have argued that the morphological composition of recent loans is not generally transparent to Kisukuma speakers. They thus rely on prominent position of the base and other phonological constraints to form reduplicants. I have specifically argued that the size of the reduplicant in recent loans is determined by the domain of the (rightmost) H of the base. However, if a speaker knows the semantics or the morphological make up of the borrowed noun this process is suspended.

This having been said, there are still many issues that need further investigation. For example, what motivates the fixed H tone to trigger a mobile H on the following syllable? Is the trisyllabic mobile HD in Kisukuma a result of two spreading rules (i.e. *MONOHD that is evaluated twice) as the diachronic evidence seems to suggest? To answer some of these questions, elaborate diachronic studies on Kisukuma loan phonology need to be undertaken. We need to know when a certain group of loanwords were borrowed in Kisukuma and if the borrowing was via Swahili or not. Until this is done, some of the tonal properties displayed by loans and how to account for them in reduplication will continue to be problematic. All in all, this study provides a good starting point for further detailed studies on the nature of Kisukuma high domain in native words, nativized loans and unassimilated (recent) loans. When this is done, it will be possible to predict the size of the reduplicant in Kisukuma recent and future loans particularly those from English regardless of whether they are borrowed in Kisukuma directly or via Swahili.

CHAPTER FIVE

TONE TRANSFER

5. 0. Introduction

Since the pioneering work of Wilbur (1973), different models of reduplication have been proposed (cf. Marantz 1982, Clements 1985, Levin 1985, McCarthy and Prince 1986, 1988, Steriade 1988, Mutaka and Hyman 1990, McCarthy and Prince 1995). These models predict different results regarding the question of tonal transfer. Below I provide a brief summary of some of these models. I particularly demonstrate that, to a large extent, none of these models can fully account for a wide range of tonal transfer patterns in Kisukuma. I also summarize the main proposals that have been advanced by Bantuists to explain why some high tones are copied and others are not in Bantu languages (Myers and Carleton 1996, Mutaka and Hyman 1990, Hyman and Mtenje 1998 and Downing 2002). I crucially argue that none of these proposals can effectively explain or predict which H tone is copied and which is not in Kisukuma. I will conclude this chapter by arguing that the process of tonal transfer in Kisukuma is the result of constraints interaction in Optimal Domains Theory (Kisseberth and Cassimjee 1998) without necessarily referring to the proposed generalizations. As far as the mobile H is concerned, what matters in Kisukuma is the position of the rightmost sponsor in the base and sometimes, the number of syllables for the rightward expansion of the High Domain (HD) which, everything being equal, must be trisyllabic.

Several models of reduplication that predict prosodic transfer have been proposed in the literature. Some of these models include Clements (1985), McCarthy (1988), Steriade (1988) and McCarthy and Prince (1995). Although these models predict that tone should faithfully transfer along with the segmental content of the base, the fact is that tone is rarely transferred in Bantu reduplication particularly in verb stem reduplication. In all studies that I have seen, systematic tonal transfer in the verb stem is only attested in one Bantu language: Chichewa (Myers and Carleton 1996, Hyman and Mtenje 1998). In nominals, however, tonal transfer is common across Bantu (Mutaka and Hyman 1990, Odden 1996 and Brassil 2001).

5.1. Models of Reduplication

5.1.1. Clements' Model (1985)

According to Clements'model (1985), the nature of the reduplicative affix determines what is copied in reduplication. If the affix consists of skeletal units, anything that is associated with the corresponding skeletal units of the base is also copied in reduplication. For example, if the reduplicative template consists of syllable nodes, anything that is associated with the corresponding syllables of the base will be copied. This model predicts that tone will be copied in reduplication if and only if (iff) the reduplicative affix consists of the Tone Bearing Units (or higher units that contain those units) of the language. As mentioned above, transfer is rare in Bantu verb stem reduplication even though the reduplicant in these languages meet the structural requirement of the model.

5.1.2. McCarthy and Prince's Model (1988)

According to the McCarthy and Prince model (1988), only underlying information gets transferred in reduplication. In this model, phonemic quantity is transferred but not predictable aspects of syllable structure. As far as tone is concerned, the crucial prediction here is that underlying tone will always be transferred in reduplication. If this prediction were true, underlying H tones (Fixed H) would be systematically transferred in reduplication.

This model is relevant in Bantu verbal stem reduplication where the realization of H tone is generally predictable. In H-toned verb stems, the sponsor is usually root-initial. The H tone can iteratively spread or shift to the penultimate or final syllable of the phrase. Since the H tone domain in verbs is predictable, the McCarthy and Prince (1988) model correctly predicts that verbal H tones should not copy in reduplication. This is what we get in Bantu. Tone transfer in verb stems is rare and is only attested in Chichewa (Myers and Carleton 1996). Chichewa is thus problematic for this model.

5.1.3. Mutaka and Hyman's Model (1990)

The McCarthy and Prince model (1988) is closely related to Mutaka and Hyman's model (1990). In Mutaka and Hyman's model, the copying of tone in reduplication is assumed to apply to the skeletal tier of the base and all tiers that link to it e.g. melodic or tonal tier. This model, like the McCarthy and Prince model (1988), predicts that tone will be copied in reduplication only if its location is unpredictable, i.e. if it requires underlying association. The difference between Mutaka and Hyman's (1990) model and McCarthy and Prince model's (1988) prediction is that, unlike the latter, the underlying floating tones will not be copied in the former. Again, Chichewa provides a counter argument to both the McCarthy and Prince (1988) model and the Mutaka and Hyman

(1990) model because verb tone, though predictable and unlinked in both Kinande and Chichewa, it is transferred in the latter but not in the former. Likewise, nominal tone in Chichewa in unpredictable and arguably underlyingly linked but no transfer.

5.1.4. Steriade's Model (1988)

Steriade (1988) also proposes a model that allows for tonal transfer. According to Steriade's model, the first step of reduplication is always total reduplication. That is, the base is copied in its entirety including prosody. Partial reduplication is only attested when the result of total reduplication is submitted to a process of truncation to fit respective prosodic templates. All information from the base is retained unless it is lost in the truncation process. The general prediction according to this model is that tone is always copied in reduplication regardless of whether the tone is underlying or floating (derived). As widely attested in Bantu verb reduplication (and demonstrated by Siswati and Kisukuma data in (1) an (2) respectively), this model faces problems because tone is generally not transferred in Bantu verb stem reduplication except in Chichewa.

(1) Non-Transfer in Siswati verbal reduplication (Downing 1994:90)

	<u>Unreduplicated</u>	<u>Gloss</u>	<u>(X repeatedly)</u>
i.	kaléla	<u>kale</u> + kaléla	"weigh for"
ii.	khulúma	<u>khulu</u> + khulúma	"talk"
iii.	u-ya-boniîs-a	u-ya-<u>boni</u> + boniîs-a	"you show"
iv.	u-ya-futfúmal-a	u-ya-<u>futfu</u> + futfúmal-a	"you are getting warm"
v.	tfútsa	<u>tfusá</u> + tfutsa	"move house"
vi.	phá	<u>phayí</u> + pha	"give"

(2) Non-Transfer in Kisukuma verbal reduplication (Polysyllabic words)

	Unreduplicated	Gloss	(X repeatedly)
i.	(nyenyeelá)	"whine"	(nyenyeelá) + nyenyeela
ii.	(dadaaβʊ́)ka	"stagger"	(dadaaβʊ́)ka + dadaaβʊka
iii.	(piliingí)ta	"roll"	(piliingí)ta + piliingita
iv.	(hoomboké)la	"fall into a ditch"	(hoomboké)la + hoombokela
v.	(daandagá)na	"stagger"	(daandagá)na + daandagana
vi.	(kaangaβá)la	"stiffen"	(kaangaβá)la + kaangaβala

(3) a. Non-Transfer in Kisukuma verbal reduplication (Disyllabic words)

	Unreduplicated	Gloss	(X repeatedly)
i.	lèèmbà	"deceive, lie"	(leemba + léé)mba
ii.	kààngà	"terrify"	(kaanga + káá)nga
iii.	βòònjà	"taste"	(βoonja + βóó)nja
iv.	kàànzà	"wash"	(kaanza + káá)nza
v.	kààndà	"feel with fingers"	(kaanda + káá)nda
vi.	lʊ̀ʊ̀njà	"engage"	(lʊʊnja + lʊ́ʊ́)nja
vii.	lààmbà	"lick"	(laamba + láámba)

(3) b. Non-Transfer in Kisukuma verbal reduplication (Disyllabic words)

	Unreduplicated	Gloss	(X repeatedly)
i.	(byaalá)	"give birth"	(byaalá) + byaala
ii.	(zuulá)	"undress"	(zuulá) + zuula
iii.	(βeelá)	"be attractive"	(βeelá) + βeela
iv.	(giishá)	"greet"	(giishá) + giisha

5.2. Non Transfer of Tone: Phonological Account

There are several accounts of tonal transfer that propose a purely phonological solution to explain why tone is not transferred in reduplication. Akinlabi (1997) and Alderete et al. (1999), for example, propose that the lack of correspondence between the reduplicant and the base must systematically follow from the Emergence of the

Unmarked (TETU): marked segmentism in the base corresponds to unmarked segmentism in the reduplicant. As far as tone is concerned, the lack of identity between the reduplicant and the base can be explained by the fact that the reduplicant has an unmarked tone; which in Bantu languages is the low tone.

The TETU analysis can successfully account for non-transfer of tone in some Bantu languages but not in others. An example of a Bantu language whose tonal transfer pattern in verbal reduplication can be accounted by TETU analysis is provided by Chiyao in (4) where only one half of the reduplicant + base can realize the tone.

(4) Non-Transfer in the Machinge dialect of Chiyao (Carleton 1995: 64)

	Unreduplicated	**Gloss**	**(X repeatedly)**
a.	ku-télék-a	"to cook"	ku-télék-a + telek-a
b.	ku-wómbók-a	"to save"	ku-wómbók-a + wombok-a
c.	ku-súlúmund-a	"to sift (flour)"	ku-súlúmund-a + sulumund-a

The challenge to this account, however, is provided by Bantu languages like Siswati and Kisukuma in 1 and 2 above. In Kisukuma, for example, the reduplicant can have the marked tone (H tone) because the reduplicative complex is a single domain for tone association. Moreover, the mobile H can be realized in either stem in reduplicated complex depending on the size of the reduplicated stem, and more importantly, the location of the (rightmost) sponsor in the base. Since one of the stem realizing the marked

(H) tone in the reduplicative complex must be a reduplicant, it is not clear how TETU analysis can account for this property.[24]

5. 3. Factors determining the Transfer of tone in Bantu Reduplication

5.3.1. Stem length

It has been repeatedly argued that the realization of tone in the Reduplicant + Base in Bantu languages is determined by the length of the base stem, e.g. Myers and Carleton (1996) and Hyman and Mtenje (1999) on Chichewa, Odden (1984) and Hewitt (1992) on Shona; and Dowming (1994) on Shona. In monosyllabic and disyllabic stems, the entire reduplicated complex forms a single tone domain. In trisyllabic and longer stems, however, each stem in the Reduplicant + Base forms a distinct tone domain. According to Hewitt (1992), Myers and Carleton (1996) and Hyman and Mtenje (1999), the reduplicated complex forms a single tone domain only if the base is monosyllabic or disyllabic because these stems are morphologically subminimal. Longer bases, however, automatically satisfy minimality, resulting in each half of the reduplicant-base complex being treated as a separate domain for tone realization purposes.

What is surprising about this proposal is that in many Bantu languages, both the base and the reduplicant must be minimally at least disyllabic. It is not clear why the disyllabic stems do not satisfy the minimality requirement for tone transfer purposes. Moreover, as shown in (5), many Bantu languages employ different mechanisms in order to satisfy the minimality requirement. In Kisukuma, for example, prefixes are copied in order to make

[24] Notice, however, that If TETU is a constraint, as usual in OT, it will be ranked higher in some languages

the reduplicant at least disyllabic and monosyllabic roots can be copied twice. In Siswati and Ndebele, a morphologically empty particle [-yi-] is epenthesized in order to make the reduplicant at least disyllabic (cf. §3.2). In Kikerewe, the final vowel of the reduplicant is lengthened. The question is, even after all these mechanisms to satisfy the minimality requirement on the size of the reduplicant, why are these stems still subminimal for tone purposes?

(5) a. Monosyllabic verbal reduplication in Siswati (Downing 1999: 63)

Stem	**Reduplicated Form**	**Gloss**
-phá	**-phayî + pha**	"give"
-wa	-wayi + wa	"fall"

b. Monosyllabic verbal reduplication in Ndebele imperative (Hyman, Inkelas and Sibanda 1998:11)

Stem	**Reduplicated Form**	**Gloss**
dl-a-yi	**dl**-a-yi + dl-a	"eat!"
m-a-yi	**m**-a-yi + m-a	"stand!"
lw-a-yi	**lw**-a-yi + lw-a	"fight!"

c. Prefixation has no effect on [yi] augmentation (Hyman, Inkelas and Sibanda 1998:11)

Stem	**Reduplicated Form**	**Gloss**
uku-**dl**-a	uku-**dl**-a-yi + dl-a	"to eat"
uku-**m**-a	uku-**m**-a-yi + m-a	"to stand"
uku-**lw**-a	uku-**lw**-a-yi + lw-a	"to fight"

d. Monosyllabic verbal reduplication in Kikelewe (Odden 1996:130)

Stem	**Gloss**	**Reduplicated Form**	**Gloss**
ku-**gwa**	"to fall"	ku-**gwaa** + gwa	"to fall about"
ku-sya	"to grind"	ku-syaa + sya	"to grind here and there"
a-ka-za	"he went"	a-ka-**zaa** + za	"he went about"

than in others and this will account for variations in tonal realizations in reduplicated structures.

5.3.2. Affix vs. Stem

Myers and Carleton (1996) provide an account of why some tones fail to copy in Bantu languages. They argue that tone is transferred only if the reduplicant is a compound stem. If the reduplicant is an affix, tone is not transferred. The problem with this proposal is that reduplicants in Bantu languages phonologically resemble stems particularly in cases where total reduplication is attested as in Kisukuma and Chiyao. All Bantu languages are known to have a disyllabic minimality requirement on the size of the reduplicant and this is a stem property. Moreover, as argued by Downing (1999, 2000), the fixed final vowel [-a] in Bantu verb stem reduplication is best explained by proposing that the reduplicant is a verb stem. The same argument can be raised in support of Steriade's Lexical Conservatism (1997) analysis where the reduplicant must correspond to some listed stem. Moreover, as argued by Urbanczyk (1996), cross-linguistically, affix-like reduplicants are monosyllabic, while longer reduplicants are root or stem-like. In fact, all affixes in Bantu languages are monosyllabic. It is thus very questionable to propose that the reduplicant is an affix rather than a stem to explain the lack of tone transfer particularly in languages like Kisukuma and Chiyao where reduplication is total. As shown in (6a) and (6b), it is simply not clear why the reduplicant is a stem in Chichewa (6a) where tonal transfer is attested and and an affix in Chiyao (6b) where there is no tonal transfer.

(6) a. Transfer in Chichewa Verbal reduplication (Myers and Carleton 1996: 48): RED = stem

	Unreduplicated	**Gloss**	**Reduplicated (X repeatedly)**
i.	tambalal-á	"stretch out your legs "	tambalal-á + tambalal-á
ii.	phik-its-á	"really cook"	phik-its-á + phik-its-á
iii.	ndî-ma-sangaláts-a	"I please"	ndî-ma-sangaláts-a + sangaláts-a

b. Non-Transfer in the Machinge dialect of Chiyao (Carleton 1995: 64): RED = affix.

	Unreduplicated	**Gloss**	**Reduplicated (X repeatedly)**
i.	ku-télék-a	"to cook"	ku-télék-a + telek-a
ii.	ku-wómbók-a	"to save"	ku-wómbók-a + wombok-a
iii.	ku-súlúmund-a	"to sift (flour)"	ku-súlúmund-a + sulumund-a

5.4. Variation in Tone Copy (Downing 2002)

Contrary to previous accounts on tone transfer in Bantu reduplication, most of which assume that a H tone is either identical in the reduplicant and the base or H tones are realized on only one half of the Reduplicant + Base, Downing (2002) proposes three variants of tone transfer.

5.4.1. Variant 1

The first variant follows from the predictions made in current theories of reduplication (cf. Steriade 1988, McCarthy and Prince 1995, Inkelas and Zoll 2000) which characterize reduplication as the total copy of both prosody and segments. In this variant, tone is identical in the reduplicant and the base. As shown by Kisukuma nominals (nouns, adjectives and numbers)[25] and Kirundi nouns in 7 and 8, many Bantu nominal reduplication falls into this variant, i.e. there is tonal transfer. As far as verbal

[25] Notice, however, that only nominal stems with fixed H tone fall into this variant. There is no tonal transfer in Kisukuma nominal stems with mobile H regardless of the grammatical category of the stem being reduplicated.

reduplication is concerned, only one Bantu language, Chichewa, is known to fall into this variant (cf. Myers and Carleton 1996, Hyman and Mtenje 1998). Chichewa verb reduplication is shown in (9).

(7) Tone transfer in Kisukuma Nominal Reduplication (Fixed H).

	Unreduplicated	Gloss	Reduplicated (Some sort of X)
a.	(n-yá̱)nda	"young man (9)"	(nyá̱)nda + (yá)nda
b.	ma-gʊ(ní̱)la	"sacks (6)"	ma-gʊ(ní̱)la + (gʊ́)nɪla
c.	i-go(ngó̱)li	"millipede (5)"	i-go(ngó̱)li + (gó)ngoli
d.	a-(táá̱)ndatʊ	"six (6)"	a-(táá̱)ndatʊ + (tá)ndatʊ
e.	mpu(ŋgá̱)tɪ	"seven"	mpu(ŋgá̱)tɪ + (pú)ŋgatɪ
f.	n-(sá̱)la	"intelligent" (1)	n-(sá̱)la + (sá)la
g.	βa-di(dí̱)ga	"stubborn"(2)	βa-di(dí)ga + (dí)diga

(8) Tone transfer in Kirundi Nominal Reduplication (Brassil 2000: 6)

	Unreduplicated	Gloss	Reduplicated (Some sort of X)
a.	ma-gúfi	"short (6)"	ma-gúfi + má-gufi
b.	ma-kúru	"important (6)"	ma-kúru + má-kuru
c.	i-n-kóni	"stick (9)"	i-n-kóni + kóni "of a stick kind (9)"
d.	u-mu-tíma	"heart (1)"	i-n-tíma + tíma "of the center (9)
e.	a-ma-béere	"breast (6)"	a-ma-béere + béere "breast milk (6)"

(9) Tone Transfer in Chichewa Verbal reduplication (Myers and Carleton 1996: 48)

	Unreduplicated	Gloss	Reduplicated (X repeatedly)
a.	tambalal-á	"stretch out your legs "	tambalal-á + tambalal-á
b.	phik-its-á	"really"	phik-its-á + phik-its-á
c.	ndí-ma-sangaláts-a	"I please"	ndí-ma-sangaláts-a + sangaláts-a

5.4.2. Variant 2

In Variant 2, the H tone of the entire reduplicative complex is identical to the tone of the unreduplicated base stem. The crucial assumption in this variant is that the entire reduplicative complex is viewed as a compound structure for tone realization. This variant is exemplified by Kikerewe data in (10)

(10) Non-Transfer in Kikerewe Verb Reduplication (Odden 1996: 129, 133)

	Unreduplicated	Gloss	X carelessly, here and there
a.	ku-lima	"to cultivate"	ku-lima + lima
b.	ku-bîbá	"to plant"	ku-bîbá + biba
c.	ku-kálááŋga	"to fry"	ku-kálááŋga + kalaaŋga
d.	m-baz-îlé	"I kicked (yesterday)"	m-bazile + bazîlé
e.	m-bib-îlé	"I planted (yesterday)"	m-bib-ile + bib-îlé

As shown in Kikerewe data, if the stem H tone surfaces on the final two syllables of the unreduplicated stem, a H tone also surfaces on the final two syllables of the reduplicative complex (cf. 10d-e). If a H tone is realized on the first two syllables of the unreduplicative stem, the H tone surfaces on the first two syllables of the reduplicative complex (cf. 10b-c). Notice also that the toneless verb stem remainS toneless when reduplicated. Other examples of Bantu languages that fall into Variant 2 include Haya (Hyman and Byarushengo; 1984), Kimatuumbi (Odden 1996a) and Kinyamwezi (Maganga and Schadeberg 1992).

5.4.3. Variant 3

In languages that fall into Variant 3, the H tone of the unreduplicated stem falls only on one half of the reduplicated form. A good example of a Variant 3 language is Kihehe (Odden and Odden 1996). As shown in (11), when a H tone is realized on the stem-initial mora in an unreduplicated verb stem complex, the H tone is also realized on the initial mora of the second stem in the reduplicated complex. Notice that the first stem in the reduplicated complex is ignored for tone realization. As argued by Odden and Odden (1985) and Downing (2002), the second stem is the base stem because both H tones and long vowels occur in this stem.

(11) Non-Transfer in KiHehe Verbal Reduplication (Odden and Odden 1985, 1996)

	Unreduplicated	**Gloss**	**X a bit**
a.	si-tu-dóongoleesa	we won't roll	si-tu-dongolesa + dóongoleesa
b.	si-tu-fúlugala	we won't be tired	si-tu-fulugala + fúlugala
c.	si-tu-déeña	we won't cut	si-tu-deña + déeña
d.	si-tu-fúuwa	we won't believe	si-tu-fuwa + fúuwa

Chiyao, a Bantu language spoken in Malawi and Southern Tanzania also falls into Variant III. In Chiyao, H tones are only realized on the first stem in the reduplicated complex. In this case, the second half is ignored for tone realization. This is shown in (12)

(12) Non-Transfer in Machinge Dialect of Chiyao (Carleton 1995: 64)

	Unreduplicated	**Gloss**	**"do X repeatedly"**
a.	ku-télék-a	"to cook"	ku-télék-a + telek-a
b.	ku-wómbók-a	"to save"	ku-wómbók-a + wombok-a
c.	ku-súlúmund-a	"to sift (flour)"	ku-súlúmund-a + sulumund-a

Shona, a Bantu language princincipally spoken in Zimbabwe also falls into Variant III with a similar pattern like Chiyao in (13). The second half of the reduplicated complex is ignored for tone realization.

(13) Non-Transfer in Shona Verbal Reduplication (Odden 1984)

	Unreduplicated stem	**Gloss**	**"do X repeatedly"**
a.	-tóresá	"make take"	-tóresá + toresa
b.	-tóréserá	"make take for"	-tóréserá + toresera

Other examples of Bantu languages that fall into Variant III include Ndebele (Hyman, Inkelas and Sibanda 1999), Siswati (Downing 1994) and Xhosa (Cassimjee 1994).

To summarize, the variation in tone realization in Bantu languages can be accounted for by defining the different stems as relevant domains for stem tone association for a particular language. This is shown in (14) below:

(14) Structure for reduplicated Stems in Bantu (Downing 2002)

[Compound Verb Stem]$_{\text{Stem 1}}$

[RED Stem]$_{\text{Stem 2}}$ [BASE Stem]$_{\text{Stem 3}}$

As shown in 14, if both Stem$_2$ and Stem$_3$ bear tones, there is tone transfer. This gives Variant 1 languages. If tone is realized on the reduplicative complex (Stem$_1$) as a whole this gives rise to Variant 2 languages and tone transfer is not attested here. Tone can also be realized on one stem in the reduplicated structure (either Stem$_2$ or Stem$_3$). This gives rise to Variant 3 languages. If tone is realized in *both* stems (Stem$_2$ and Stem$_3$), this gives rise to Variant I languages.

5.5. What variant is Kisukuma?

Kisukuma's "membership" in these variants depends on the nature of the H tone and the grammatical category involved. Generally, when a verb stem is reduplicated no H tone is realized on the corresponding reduplicant. Whether the H tone surfaces on the first or second half of the reduplicated complex is determined by the length of the unreduplicated stem (base). This is shown in (15) and (16) respectively.

(15) Monosyllabic and Disyllabic Verb Stem reduplication

	Unreduplicated stem	**Gloss**	**"do X repeatedly"**
a.	lòβà	"fish"	(loβa + ló)βa
b.	nyàmà	"bring back the animals"	(nyama + nyá)ma
c.	lòòmbà	"ask, beg"	(loomba + lóó)mba
d.	lèèmbà	"deceive, to lie"	(leemba + léé)mba
e.	kààngà	"terrorize"	(kaanga + káá)nga
f.	βòònjà	"taste"	(βoonja + βóó)nja
g.	kààǹzà	"wash"	(kaanza + káá)nza
h.	kààndà	"feel with fingers"	(kaanda + káá)n
i.	lʊ̀ʊ̀njà	"engage"	(lʊʊnja + lʊ́ʊ́)nja
j.	lààmbà	"lick"	(laamba + láámba)

When the unreduplicated stem is less than three syllables as in (15), the H tone sponsored by the initial mora of the first stem is realized on the first mora of the second stem in the reduplicated complex. Notice that the unreduplicated stem has an Extra Low tone (marked by the grave accent (̀)) because there are not enough syllables on which the Kisukuma trimoraic High Domain (HD) can be realized.

When the unreduplicated stem is three syllables or longer, however, the H tone is realized on the third syllable of the first half of the reduplicated complex (cf. 16). In this respect, Kisukuma falls into Variant 2 because the tone pattern of the corresponding unreduplicated form is distributed over the entire Reduplicant + Base complex as a single unit, depending on the length of the base.

(16) Polysyllabic Verb Stem Reduplication

	Unreduplicated stem	Gloss	"do X repeatedly"
a.	(dadaaβʊ́)ka	"stagger"	(dadaaβʊ́)ka + dadaaβʊka
b.	(piliingí)ta	"roll"	(piliingî)ta + piliingita
c.	(hoomboké)la	"fall into a ditch"	(hoomboké)la + hoombokela
d.	(daandagá)na	"stagger"	(daandagá)na + daandagana
e.	(kaangaβá)la	"stiffen"	(kaangaβá)la + kaangaβala

As far as verb stem reduplication is concerned, the nature of H tone (Fixed vs. Mobile) involved is not relevant because only mobile H is relevant in verb stem reduplication. There is no evidence to show that fixed H is involved in verb stem reduplication. The assumption here is that, like in other Bantu languages, only the verb stem initial syllable contrasts for H tone. It follows that, everything being equal, any H tone that is realized on the second or third syllable from the initial (sponsor) syllable is assumed to have shifted from the initial sponsor. The problem in Kisukuma is that sometimes moras, and not syllables, affect the rightward expansion of the High Doman. This is shown in (17) and (18).

	Unreduplicated stem	Gloss	"do X repeatedly"
(17) a.	(zuulá)	"undress"	(zuulá) + zuula *(zuula + zúú)la
b.	(tʊʊlá)	"put, store"	(tʊʊlá) + tʊʊla *(tʊʊla + tʊ́ʊ́)la
c.	(zuuká)	"have no cloth"	(zuuká) + zuuka *(zuuka + zúú)ka
d.	(laalá)	"sleep"	(laalá) + laala *(laala + láá)la

e.	(yeelá)	"wander"	(yeelá) + yeela *(yeela + yéé)la
f.	(toolá)	"take a wife"	(toolá) + toola *(toola + tóó)la

In (17), it is only the first mora of the initial stem that sponsors the H tone (cf. Richardson 1959). The ungrammatical (*) examples would be more optimal if the mobile were to undergo the normal rightward shifting two syllables to the right of the sponsor. In (18) below, however, it is the entire initial syllable and not the initial mora that sponsors the H tone. Here the mobile H shifts two syllables to the right.

(18)	**Unreduplicated stem**	**Gloss**	**"do X repeatedly"**
c.	lòòmbà	"ask, beg"	(loomba + lóó)mba *(loombá) + loomba
d.	lèèmbà	"deceive, lie"	(leemba + léé)mba *(leembá) + leemba
e.	kààngà	"terrify"	(kaanga + káá)nga *(kaangá) + kaanga
f.	βòònjà	"taste"	(βoonja + βóó)nja *(βoonjá) + βoonja
g.	kàànzà	"wash"	(kaanza + káá)nza *(kaanzá) + kaanza
h.	kààndà	"feel with fingers"	(kaanda + káá)nda *(kaandá) + kaanda
i.	lʊ̀ʊ̀njà	"engage"	(lʊʊnja + lʊ́ʊ́)nja *(lʊʊnjá) + lʊʊnja

The relevant question to ask here is: are both H tones in (17) and (18) mobile or is it the case that the H tone in (17) is fixed, i.e. is not sponsored by the verb-initial mora as it was assumed in Matondo (2001)? Although experimental evidence seems to suggest that the H tone in (17) is fixed and that in (18) is mobile, this issue is not resolved because all the data used in the experiment was from one speaker only (the author). Further experiments utilizing representative data from different native speakers are thus needed in order to confirm if these findings can be generalized. For the moment I will assume that both H tones in (17) and (18) are mobile. Since I have not come across any verb stems that have a H tone on an initial mora, (to indicate a fixed High tone) throughout this work I will assume that the fixed H is not realized in verb stems and thus is irrelevant in Kisukuma verb stem reduplication. I thus conclude that, as far as verb stem reduplication is concerned, Kisukuma falls into Variant 2.

In Kisukuma nominal reduplication, Kisukuma seems to fall into Variant 2 and Variant I depending on the type of H tone involved (however see 26 and 27). If fixed H is involved, Kisukuma falls into Variant I because H tone is realized in both the base stem and the reduplicant. Notice, however, that regardless of the position of the mora that bears the H tone (called a head) in the base stem, the H tone in the reduplicant is always aligned with the left edge of the second stem in the reduplicative complex. This is shown in (19).

(19) Tonal Transfer in Kisukuma nominals

	Unreduplicated stem	**Gloss**	**"Some sort of X"**
a.	(n-yáá)nda	"young man (1)"	(ny<u>áá</u>)nda + (yáá)nda
b.	(n-kî)ma	"woman (1)"	(n-kî)ma +(kî)ma

c.	lʊ-ga(lá̲)ta	"shell of water mollusk"	lʊ-ga(lá̲)ta + (gá)lata
d.	(n-góó)sha	"man (1)"	(n-góó)sha + (góó)sha
e.	βa-si(láá)mu	"moslems(2)"	βa-si(láá)mu + (sí)laamu
f.	ma-gʊ(ní̲)la	"sacks (6)"	ma-gʊ(ní̲)la + (gʊ́)nɪla
g.	i-go(ngó̲)li	"millipede (5)"	i-go(ngó̲)li + (gó)ngoli
h.	(n-séé)nzi	"stupid (1)"	(n-séé)nzi + (séé)nzi

	Unreduplicated stem	**Gloss**	**"X by X"**
a.	a-(táá)ndatʊ	"six by six (6)"	a-(táá)ndatʊ + (tá)ndatʊ
b.	m-pu(ŋgá)tɪ	"seven by seven"	m-pu(ŋgá)tɪ + (pú)ŋgatɪ
c.	βa-(náá)ne	"eight by eight (2)	βa-(náá)ne + (náá)ne

Notice, however, that if the fixed H is realized on the final syllable of the unreduplicated stem, the second half of the reduplicated complex surfaces toneless. This pattern is shown in nouns and number reduplication in (20) and (21) respectively.

(20) Head is base's final syllable: No Transfer.

	Unreduplicated stem	**Gloss**	**"Some sort of X"**
a.	maa(gí)	"slaughterer"	maa(gí) + maagi *maa(gí) + (máá)gi
b.	ta(lá)	"lamp"	ta(lá) + tala *ta(lá) + (tá)la
c.	ma-βee(lé)	"milk"	ma-βee(lé) + βeele *ma-βee(lé) + (βéé)le
d.	namu(gí)	"head of a family"	namu(gí) + namugɪ *namu(gí) + (ná)mugɪ
f.	hɪmbɪ(zí)	"viper"	hɪmbɪ(zí) + hɪmbɪzi *hɪmbɪ(zí) + (hí)mbɪzi
g.	kaanga(lá)	"type of local beer"	kaanga(lá) + kaangala *kaanga(lá) + (káá)ngala

(21)	**Unreduplicated**	**Gloss**	**"X by X"**
	a-taa(nó)	"five (6)"	a-taa(nó) + taano

Like in (20) and (21) above where a fixed H tone is involved, when a mobile H is realized on the final mora of the first stem in the reduplicated complex, the second stem also comes out toneless regardless of the grammatical category. This is shown in 21 where nouns and verbs display the same pattern of tonal transfer.

(21)	**Unreduplicated stem**	**Gloss**	**"X by X"**
a.	n-da(βagɪjá)	"Maasai (1)"	n-da(βagɪjá)+ daβagɪja
b.	i-(gokooló)	"scoop net (5)"	i-(gokooló) + gokoolo
c.	(daanganá)	"confuse"	(daanganá) + daangana
d.	kumiingá	"gather, collect"	(kumiingá) + kuuminga
e.	(nyenyeelá)	"whine"	(nyenyeelá) + nyenyeela

When a mobile H is involved in nominal reduplication, Kisukuma falls into Variant 2 or Variant 1 languages. If the stem is two syllables or shorter, the mobile H is realized on the first mora of the second stem in the reduplicated complex. This is shown in (22).

(22)	**Unreduplicated stem**	**Gloss**	**"Some sort of X"**
a.	chʊ̀ʊ̀gà	"hoof (7)"	(chʊʊga + chʊ́ʊ́)ga
b.	shʊ̀ʊ̀gà	"hooves (8)"	(shʊʊga + shʊ́ʊ́)ga
c.	chòònzà	"fox (7)"	(choonza + chóó)nza
d.	ndɪ̀mù	"animal (9/10)"	(ndimu + lɪ̂)mu
e.	βa-gààndù	"thin (2)"	βa-(gaandu + gáá)ndu
f.	ndɪ̀pù	"tall 9)"	(ndipu + lɪ̂)pu
g.	mpààngà	"healthy (9)"	(mpaanga + páá)nga
h.	nchɪ̀lʊ̀	"naughty (9)"	(nchilʊ + chɪ̂)lʊ
i.	ma-sààngù	"cooked corn (6)"	ma-(saangu + sáá)ngu
j.	βʊ-βɪ̀sɪ̀	"raw (13)"	βʊ-(βɪsɪ + βɪ́)sɪ
k.	βa-kòòndu	"slim (2)"	βa-(koondu + kóó)nd
l.	n-zɪ̀ɪ̀ngi	"womanizer (1)"	n-(ziingi+ zɪ́ɪ́)ngi
m.	n-tɪ̀ɪ̀mbu	"confident (9)"	"n-(tiimbu + tɪ́ɪ́)mbu

Unreduplicated stem	Gloss	"X by X"
g. kèèndà	"nine"	(keenda + kéé)nda

In this case Kisukuma seems to fall into Variant 2: the entire reduplicative complex is one tone domain. This is to say, the H tone that is sponsored by the initial mora of the first stem is realized on the initial mora of the second stem.

With longer stems, the H tone of the reduplicated stem can also be realized on the initial mora of the second stem in the reduplicative complex. In this case Kisukuma falls into Variant 2 because there is transfer of H tone.

(23) i-(gaganú)lwa "name of a village" i-(gaganú)lwa + (gá)ganulwa

It is crucial, however, to note that the length of the base does not matter when the mobile H is involved. As shown in (24), what matters the most is the position of the rightmost sponsoring mora in the unreduplicated stem. In (24), the mobile H is sponsored by the penultimate syllable of the first stem. The mobile H then shifts two syllables to the right and is realized on the initial mora of the reduplicant. What is apparent in this case is that even though the base is longer than two syllables, it is the position of the sponsor in the unreduplicated stem that matters the most in determining the realization of the Mobile H in the Reduplicant + Base complex.

(24)

Unreduplicated stem	Gloss	"Some sort of X"
a. n-ghuŋgulùmè	"rooster (9)"	n-ghuŋgu(lume + kú)ŋgulume
b. n-hʊmbɪ̀lɪ̀	"monkey (9)"	n-hʊ(mbɪlɪ + tʊ́)mbɪlɪ
c. βa-sikààǹù	"kind of perfect (2)"	βa-si(kaanu + sí)kaanu
d. n-daŋgànù	"kind of crazy (1)"	n-da(ŋganu + dá)ŋganu
e. ga-βɪnzɪ̀kù	"kind of fragile 11)"	ga-βɪ(nzɪku + βɪ́)nzɪku

f. ma-kulunghùmà	"gullies (6)"	ma-kulu(nghuma + kú)lunghuma	

There is still one crucial observation to be made. In some cases, the final mora in the unreduplicated stem is the sponsor. What is interesting is that even in these cases, the HD never expands beyond the first mora of the second stem (cf. 25). In these cases, the HD is bimoraic and it covers both stems in the reduplicative complex.

Unreduplicated stem	**Gloss**	**"Some sort of X"**	
(25) n-dʊgʊ̀	"relative (1)"	n-dʊ(gʊ + dʊ́)gʊ.	*n-dʊ(gʊ + dʊgʊ́)
		(cf. ndʊ(gʊ sagá)la	"useless relative"
n-damà	"calf (9)"	n-da(ma + dá)ma	*n-da(ma + da má)
		(cf. n-da(ma sagála)	"useless calf"

Further evidence to support the observation that the mobile H sponsored by the final mora of the unreduplicated stem does not cross the initial mora of the second member in the reduplicated complex is provided by monosyllabic stems (cf. 26). Initially it looks as if the mobile H have undergone the normal two syllables tonal displacement to the right. That is, reduplication has taken place before glide formation. In fact this observation was made in Matondo (2001).

(26)	**UR**		**Unreduplicated**	**Gloss**	**"Some sort of X"**
a.	/lí-a/	=>	ly-à	"eat"	(ly-a + ly-á) ly-a
b.	/ŋú-a/	=>	ŋw-à	"drink"	(ŋw-a + ŋw-á) ŋw-a
c.	(kú-a/	=>	kw-à	"pay dowry"	(kw-a + kw-á) kw-a
d.	(pí-a/	=>	py-à	"be ready (food)"	(py-a + py-á) py-a
e.	(chí-a/	=>	ch-à	"die"	(ch-a + ch-á) ch-a
f.	(sú-a/	=>	sw-à	"spit"	(sw-a + sw-á) sw-a

The evidence to show this observation is not necessarily true is provided by monosyllabic verbs that are not vowel initial and thus are not affected by glide formation. As shown in (27), the Mobile H does not cross the initial mora of the second stem in the reduplicative complex.

(27) Monosyllabic adjectives.

	Unreduplicated stem	Gloss	"Kind of X"	
a.	βʊ-(βí̲)	"bad (14)"	βʊ-(βi̲ + βí̲) βi	
			βʊ-(βi̲ + βʊ̲́)-βi	
			cf. βʊ-(βi̲ βu-táá)le	"cruelty"
c.	βa-(dó̲)	"small (2)"	βa-(do̲ + dó) do	
			βa-(do̲ + βá)-do	
			cf. βa-(do̲ geeté)	"very small"
c.	(shí̲)	"fish (9)"	(shɪ̲ + shí) shɪ	
			cf. (shɪ sagá)la	"useless fish"

The evidence provided in (25-27), suggests that as far as mobile H is concerned, Kisukuma falls into Variant 3 and not Variant 2 as argued above. In Variant 3 languages, tone is realized either in the reduplicant [$Stem_2$] or the base [$Stem_3$]. Notice that the basic assumption in Variant 2 languages is that the entire reduplicative complex is a compound structure. The consequence for the compound structure is that "no matter what the tense, polarity or construction type, there can be a maximum of only one surface H " occurring in the RED + Base complex (Hyman and Byarushengo 1984: 60). Since tone must be aligned with the leftmost mora in $Stem_2$, it is clear that the reduplicative structure is not a compound structure for tone realization. I thus conclude that, when mobile H is involved, regardless of the base length and grammatical category, Kisukuma falls in Variant 3 and not Variant 2. With fixed H, Kisukuma displays Variant 1 pattern in nominals.

From this discussion, the treatment of tonal transfer in Kisukuma reduplication can be summarized as follows.

	NOUNS		ADJECTIVES		NUMBERS		VERBS	
Type of H Tone	Fixed	Mobile	Fixed	Mobile	Fixed	Mobile	Fixed	Mobile
Tone Transfer	Always	never	always	never	always	never	N/A	never
Variant	1	3	1	3	1	3	N/A	3

5.6. Tonal Transfer

As shown in §5.5, the copying of H tone in Kisukuma, to some extent depends on the type of H tone involved and the grammatical category being reduplicated. It is generally more common for fixed H tones to be copied than mobile H. It is also more common for tone to be transferred in nominals than in verbs. I start the discussion of tone transfer with fixed H tone.

The fixed H tone in Kisukuma never moves and in nominals it is transferred in the reduplicant. Recall the Optimal Domains Theory generalization identified in Chapter 1 that many Bantu languages tend to avoid narrow domains. The typical scenario in many Bantu languages is for the High Domain (HD) to be at least bimoraic. Moreover, the HD expands rightwards and in few cases leftwards. This is caused by the preference of High Domains to align with right edge (or left edge) of a word or phrase. Kisukuma is somehow unique in a sense that, apart from having a narrow domain, its wide domain is neither bounded nor unbounded. The HD is not disyllabic but *trisyllabic*. It is thus not bounded in ODT sense (not monosyllabic or disyllabic) and it is not unbounded because its HD does not expand further to the right after the trisyllabic domain has been attained. Once the HD has expanded two syllables to the right (creating a trisyllabic HD), further expansion ceases even if there are still syllables to the right on which the HD could continue to expand.

To account for these facts, the following constraints in Kisukuma are proposed.

(28) Constraints

a. ALIGN R (HD, PW): Align the right edge of a HD with the right edge of a Prosodic Word.

b. TRISYLLABIC HD: A High Domain must contain three syllables.

c. ALIGN L (HD, RED, STEM): Align the left edge of the HD with the left edge of the reduplicant stem.

d. DOMAIN CORRESPONDENCE B-R (DOM COR-BR): A HD in RED must have a correspondent in the base.

e. BAR: Align the left edge of an F-domain with the right edge of the F-sponsor to which it corresponds.

ALIGN R (HD, PW) makes sure that the HD expands rightwards and not leftwards. ALIGN L (HD, RED, STEM) takes care of the fact that the H tone is aligned with the left edge of the second stem in the reduplicative complex. DOM COR is violated by ALIGN L because regardless of the position of the high domain in the unreduplicated stem, it surfaces aligned with the leftmost syllable of the reduplicant. The crucial ranking is illustrated in the tableau below. Since the fixed H never moves, BAR must outrank

29. i-gʊ(ní)la + RED	ALIGN H L	DOM COR	BAR	TRIMORAIC HD	ALIGN R
a. ☞ i-gʊ(ní)la + (gʊ́)nɪla				*	**
b. i-gʊ(ní)la + gʊ(ní)la	*!			*	*
c. i-gʊ(ní)la + gʊ(nɪlá)	*!		*	*	
d. i-gʊ(ní)la + (gʊnɪlá)	*!		*		
d. i-gʊ(ní)la + gʊnɪla	*!	*		*	***

When the H tone of the base stem is on the final mora, there is no transfer (cf. 31). This is due to OCP effects because this would create a HH sequence. The relevant constraint is formalized below:

(30) *ADJACENT HEADS: Two heads can not be adjacent *(HH)

(31)		**Unreduplicated stem**	**Gloss**	**"Some sort of X"**
	i.	maa(gí)	"slaughterer (1)"	maa(gí) + maagi *maa(gí) + (máá)gi
	ii.	ta(lá)	"lamp (9)"	ta(lá) + tala *ta(lá) + (tá)la
	iii.	ma-βee(lé)	"milk (6)"	ma-βee(lé) + βeele *ma-βee(lé) + (βéé)le

Since the fixed H tone is not transferred in these cases, it must be the case that *ADJACENT HEADS is ranked above both ALIGN L as well as DOM COR. This is shown in the following tableau.

32. ma-βeelé + RED	*ADJACENT HEADS	ALIGN L	DOM COR
a. ☞ma-βee(lé) + βeele		*	*!
b. ☛ma-βee(lé) + βee(lé)		*	
c. ma-βee(lé) + (βéé)le	*!		*

The constraints in (32) are not able to select the correct winner (32i). As it stands out, candidate (32ii) is the winner because it has the least violations of the highly ranked constraints. To exclude the wrong winner (candidate 32ii), I propose a familiar constraint that plays an important role in many Bantu languages. This constraint is given in (33). Notice that I am assuming that Kisukuma reduplication produces a compound stem.

(33) NON-FINALITY [B] + [R]: The right edge of a stem-final syllable does not coincide with the right edge of a H domain in the reduplicative complex.

34. ma-βeelé + RED	NON-FINALITY	*ADJ. HEADS	ALIGN L	DOM COR
a. ☞ma-βee(lé) + βeele			*	*
b. ma-βee(lé) + (βéé)le		*!		*
c. ma-βee(lé) + βee(lé)	*!		*	

The solution based on NON-FINALITY as a determining constraint in selecting the optimal candidate in (34) is doomed to fail when polysyllabic stems with word final fixed H tone as those given in (35) are involved. NON-FINALITY as stated in (33) and illustrated in (34) cannot choose between the optimal candidate namu(gí)+ namugɪ (36a) and the wrong winner namu(gí) + na(mú)gɪ (36c) because the latter candidate does not violate NON-FINALITY.

(35) namu(gí)	"head of a family (1)"	namugí) + namugɪ *namu(gí) + (ná)mugɪ
hɪmbɪ(zí)	"viper (9)"	hɪmbɪ(zí) + hɪmbɪzi *hɪmbɪ(zí) + (hí)mbɪzi
kaanga(lá)	"type of local beer (9)"	kaanga(lá) + kaangala *kaanga(lá) + (káá)ngala

36. kanga(lá) + RED	NON-FINALITY	*ADJ. HEADS	ALIGN L	DOM COR
a. ☞kanga(lá) + kangala			*	*!
b. kanga(lá) + kanga(lá)	*!		*	*
c. ☚kanga(lá) + ka(ngá)la			*	

The existence of polysyllabic roots with a final fixed H as those in (35) is controversial in Kisukuma. Since there are enough syllables to the left of the final H tone, it is logical to assume that the final H tone is mobile and that it has been sponsored by preceding morphemes. I will assume in this work that word final fixed H tone does not exist in Kisukuma polysyllabic roots. As shown in (37), there is evidence to show that the H tone in (35) is in fact mobile and is sponsored by the initial syllable. When a disyllabic mobile H-sponsoring word is prefixed to items in (35), the mobile H of the preceding stem surfaces on the noun class morpheme which is extrametrical in Kisukuma. This shows that the initial syllables in (35) are sponsoring syllables themselves. In Chapter 2, it was demonstrated that mobile H tones do not move to sponsoring syllables due to the high ranked *OVERLAP constraint, which is the Optimality Theory version of Goldsmith's well formedness condition that association lines do not cross. The form in (37ii) is thus impossible because it has overlapping domains.

(37) gʊ-βò̱n-à "to see"
i. gʊ-(βo̱n-a βá)-(na̱mugɪ́) "to see husbands"
ii. *gʊ-(βo̱n-a βa-(ná̱)mugɪ́)
iii. cf. gʊ-(βo̱n-a βa-dá)(βagɪɪjá)

In (35), for example, the mobile H sponsored by preceding verb [βò̱n-à] "see" cannot move to the verb initial syllable of the following word because the initial syllable is a sponsor. The H tone thus surfaces on the noun class marker [βa-] which is skipped over if the following syllable is not a sponsor (cf. 37iii). The analysis of the mobile H tone in reduplicated stems is provided in §5.6 below.

Even if the word final H tone in (35) is fixed, it can be uncontroversially accounted for by positing an OCP_{GRID} constraint proposed in (43) Chapter 4. The tableau in (38) demonstrates the ranking that derives the optimal candidate.

38. ma-βeelé + RED	*ADJACENT HEADS	OCP_{GRID}	ALIGN L	DOM COR
a. ☞ma-βee(lé) + βeele			*	*
b. ma-βee(lé) + βee(lé)		*!	*	
c. ma-βee(lé) + (βéé)le	*!	*		*

5.7. Mobile H

In the mobile H stems, TRISYLLABIC HD outranks both BAR and ALIGN R. As a result, the mobile H must shift two syllables to the right of its sponsor unless other high ranked constraints like the OCP intervene. This shifting is not affected by the length of the base stem or the grammatical category being reduplicated.

(39)	**Unreduplicated stem**	**Gloss**	**"Some sort of X"**
a.	n-ghuŋgulùmè	"rooster (9)"	n-ghuŋgu(lume + kú)ŋgulume
b.	n-humbɪ̀lɪ̀	"monkey (9)"	n-hu(mbɪlɪ + tú)mbɪlɪ
c.	βa-sikààǹù	"perfect (2)"	βa-si(kaanu + sî)kaanu

Since the rightward expansion of the HD never goes beyond three syllables, it must be the case that TRISYLLABIC HD is ranked above ALIGN R. This is illustrated in (40)

40. n-ghuŋgu(lume + kú)ŋgulume	TRIMORAIC HD	NON FINALITY	BAR	ALIGN R
a. ☞n-ghuŋgu(lume + kú)ŋgulume			**	***
b. n-ghuŋgu(lume + kuŋgulú)me	*!		****	*
c. n-ghuŋgu(lume + kuŋgulumé)	*!	*	*****	
d. n-ghuŋgu(lú)me + kuŋgulume	*!			*****

Candidate (40b) is the one that we would expect with non-finality effects if ALIGN R were to outrank TRIMORAIC HD like in Mijikenda languages shown in (41).

(41)	ninarima	(yu̲narí)ma	"I/he cultivate"
	ninagula	(yu̲nagú)la	"I/he buy"
	ninalamusa	(yu̲nalamú)sa	"I/he greet"
	ninavumikiza	(yu̲navumikí)za	"I/he agree"
	ninagula nyama	(yu̲nagula nyá)ma	"I/he buy meat"
	ninalamusa muganga	(yu̲nalamusa mugá)nga	"I/he greet doctor"

As you can see, however, unlike in Mijikenda, in Kisukuma the rightward expansion of the HD ceases immediately after TRIMORAIC HD is satisfied.

Since the HD never expands beyond the Left edge of the second stem in the reduplicative complex (cf. 42), it is clear that ALIGN L outranks TRIMORAIC HD as shown in (43).

(42)	a. n-dʊgʊ̲̀	"relative"	n-dʊ(gʊ̲ + dʊ́)gʊ *n-dʊ(gʊ̲ + dʊgʊ́)	"some sort of a relative"
	b. n-damà̲	"calf"	n-da(ma̲ + dá)ma *n-da(ma̲ + damá)	"some sort of a calf"

43. n-da(ma̲) + RED	ALIGN L	TRIMORAIC HD
a. n-da(ma̲ + dá)ma		*
b. n-da(ma̲ + damá)	*!	

It should also be noticed here that Kisukuma is a shifting and not a spreading language. If you recall the discussion in Chapter 1, it was demonstrated that in shifting languages like Mijikenda in (41) above, the H tone is realized on the head only (the rightmost mora in the HD). In spreading languages like Xitsonga (Cassimjee and Kisseberth 1998), however, the H tone spreads from the sponsor to the head as in 44. Unlike in shifting languages, every mora in the HD realizes the H tone.

(44) Spreading in Xitsonga (Cassimjee and Kisseberth 1998: 53)

a. ndzati:rha	(vá̱tî:)rha	"I/they work"
b. ndzatsutsu:ma	(vá̱tsútsú:)ma	"I/they run"
c. ndzatlomute:la	(vá̱tlómúté:)la	"I/they fish"
d. ndzixava nya:ma	(vá̱xává nyá:)ma	"I/they buy meat"
e. dzixava tingu:vu	(vá̱xává tíngú:)vu	"I/they buy clothes"
f. ndzixava xihlambetwa:na	(vá̱xává xîhlámbétwá:)na	"I/they buy pot"

As demonstrated in §1.8.3.5, the difference between the spreading and shifting languages is the result of the different ranking of the following constraints:

(45) Constraints for Tone realization in HD.

a. *(H, NON HEAD): Moras that are not domain-heads should not be pronounced on a H-tone.

b. EXPRESS (H): Every mora in the HD should realize the H tone.

If *(H, NON HEAD) dominates EXPRESS (H), only the head of the domain will realize the H tone. This represents a shifting language. If EXPRESS (H) dominates *(H, NON HEAD), then all moras in the domain will express the H tone. This represents a spreading language. Since Kisukuma is a shifting language, *(H, NON HEAD) must be ranked higher than EXPRESS (H). This is illustrated in the following tableau.

46. n-ghuŋgu(lu̱me + kú)ŋgulume	*(H, NON HEAD)	EXPRESS H
a. ☞n-ghuŋgu(lu̱me + kú)ŋgulume		**
b. n-ghuŋgu(lú̱mé + kú)ŋgulume	*!*	

5.8. Tone Transfer in Compound Stems

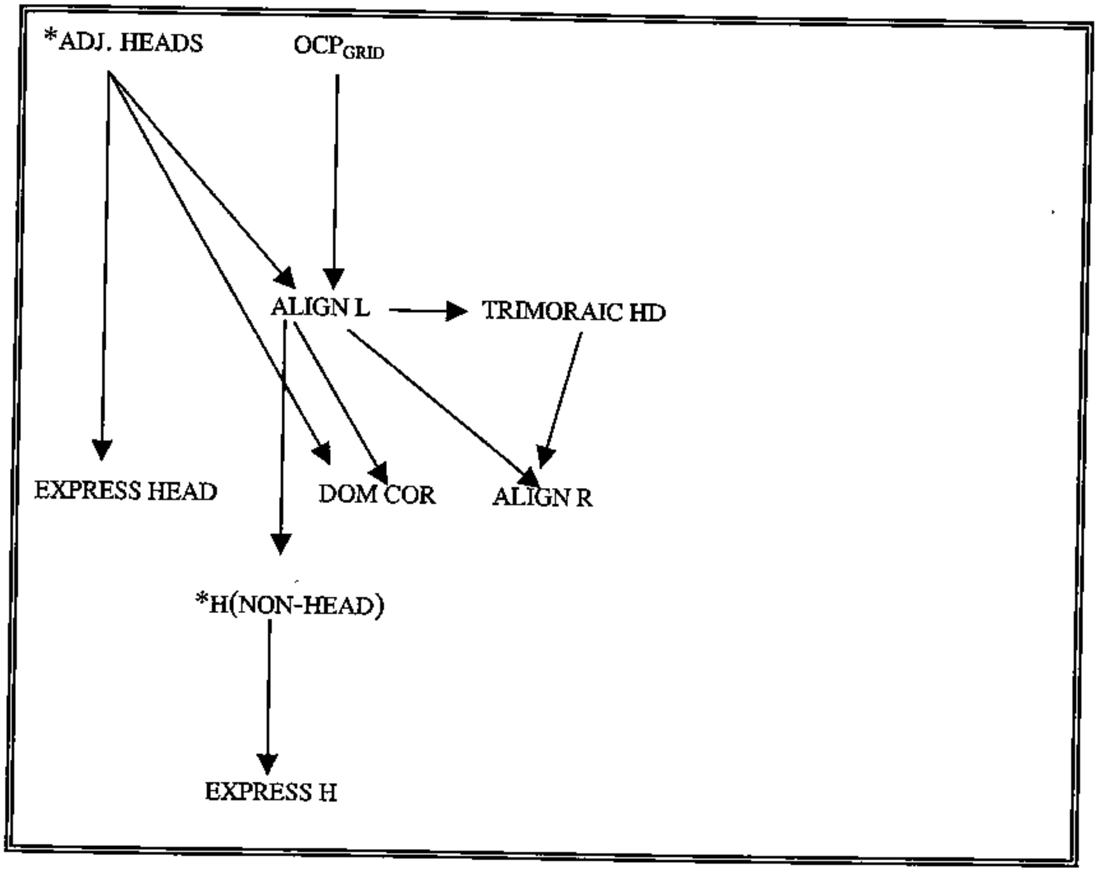
In compound stems, only the H tone of the second member of the compound is relevant in reduplicant because it is the second member that gets copied in reduplication. Consider the data in (47).

(47) Non-Transfer in Compound Stems

	SR		**Reduplicated form**		
a.	n-(ch-a̱	βú)-zi̱kù	n-(ch-a̱	βú)-(zi̱ku	+ zî)ku
	9-die-FV	11-night	9-die-FV	11-night + night	
	"a tree whose leaves wither during sunset/night"				
b.	gɪ-(pi̱lingí)t-y-a	ma-a̱shi	gɪ-(pi̱lingí)t-y-a	ma-(a̱shi + mááshi)	
	7-roll-caus-FV	6-dung	7-roll-caus-FV	6-dung + 6-dung	
	"an insect that makes small balls from animal dung and rolls them"				
c.	(ta̱ang-a	βá)-zùg̱-ì	(ta̱ang-a	βá)-(zug̱-i + zú)g-i	
	go first-FV	2-cook-I	go first-FV	2-cook-i + cook-i	
	"something (usually a star) that comes out first before dinner is ready"				
d.	gɪ-(ŋw-a̱	má)-gùtà̱	gɪ-(ŋw-a̱	má)-(gu̱ta + gú̱)ta	
	7-drink-FV	6-oil	7-drink-FV	6 - oil + oil	
	"type of a lizard with a shiny skin"				
e.	gɪ-sɪmb-a	mɪ-(tɪ)	gɪ-sɪmb-a	mɪ-(tɪ̱ + mí)-tɪ	
	7-dig-FV	6-medicine	7-dig-FV	6-medicine + 6-medicine	
	"preliminary fee paid to a traditional healer"				

As shown in (47), the H tone of the second member of the compound displays the same pattern of non-transfer like other stems. The mobile H tone moves two syllable to the right as required by the high ranked TRIMORAIC HD constraint. When TRIMORAIC HD is satisfied, the rightward expansion of the HD ceases. Notice also that, like in non compound stems, the H tone never crosses the first mora of the second stem in reduplicated forms. This is clearly shown in (47f) where the mobile H of the monosyllabic noun mɪ-(tɪ̱) "tree/medicine" moves only one syllable to the right (violating TRIMORAIC HD) but satisfying ALIGN L. This is the ranking we established in (43) above. Generally, these stems are not problematic and the same ranking arguments established above straightforwardly accounts for non-transfer in these stems. The relevant constraints in Kisukuma tone transfer are summarized in 48.

(48) **The summary of the constraint ranking**



5.9. Problematic Cases

There are few nominal cases that are problematic in a sense that they do not fit into any tonal pattern discussed so far. Given the property of Kisukuma tone and its property in reduplication as demonstrated above, there is no plausible reason why there should be no tonal transfer in cases like those in (49). All nouns in (49) have a fixed H tone and we should expect the H tone to be transferred. Moreover, notice that the expected pattern does not violate any of the highly ranked constraints like *ADJACENT HEADS. It is thus not clear why there is no tonal transfer in these nouns. Further research is needed in order to understand what prohibits the copying of the H tone in these nouns.

(44) Unusual Non-Transfer of Fixed H tone.

a.	/ø-ga(só)gone/ => ga(só)gone	ga(só)gone + sogone *ga(só)gone + (só)gone "gonorrhea"
c.	/ø-ga(léé)ndelele/ => ga(léé)ndelele	ga(léé)ndelele + leendelele *ga(léé)ndelele + (léé)ndelele "camel"
d.	/ø-gi(béé)mbesele/=> gi(béé)mbesele	gi(béé)mbesele + beembesele *gi(béé)mbesele + (béé)mbesele "dwarf (for men)"

5.10. Chapter Summary

This chapter was concerned with issues of tonal transfer in Kisukuma reduplication. It has been shown that, as in other Bantu languages, tone is not transferred in Kisukuma verb stem reduplication regardless of whether it is mobile or fixed. In nominal reduplication, however, fixed H tone is normally transferred. Regardless of the grammatical category being reduplicated, mobile H in not transferred in Kisukuma reduplication. Both stems in reduplication are treated as one compound stem. As in unreduplicated stems the HD is normally trisyllabic. Disyllabic HDs are realized when the sponsoring mora in the unreduplicated stem is word final because the mobile H always surface on the first syllable of the second stem in the reduplicative complex. Generally therefore, if the unreduplicated stem is monosyllabic or disyllabic, the mobile H will surface on the initial syllable of the second stem in verb stem reduplication. If the unredulicated stem is polysyllabic, there are enough syllables on which the trisyllabic mobile H domain can be realized. The mobile H tone thus surfaces on the second stem in the reduplicative complex. The non-transfer of H tone is thus determined by TRISYLLABIC HD and ALIGN (RED, L , H, L).

CHAPTER SIX

6.0 SUMMARY AND CONCLUSION

My main goal in this work was to investigate the interaction of tone and reduplication in Kinyantuzu – a sub-dialect of the Eastern dialect of Kisukuma spoken in Eastern Bariadi, Shinyanga region in the United Republic of Tanzania. To achieve this goal, I adopted Lexical Conservatism (Steriade 1997) and the McCarthy and Prince Correspondence Model (1995) to account for the shape of the reduplicant in Kisukuma. Optimal Domains Theory (Cassimjee and Kisseberth 1999) was adopted in order to account for the tonal patterns in unreduplicated stems and reduplicated ones.

After introducing the Optimal Domains Theory (ODT) in Chapter 1, Kisukuma tone was discussed in Chapter 2. It was demonstrated in this chapter that as formulated ODT cannot account for the Kisukuma High Domain (HD). ODT recognizes two types of Wide Domains – those motivated by *MONO HD and ALIGN XR. The former constraint creates disyllabic HD while the latter constraint propagates the H Tone from the sponsor to the right (or left) edge of a word, prosodic phrase or an intonational phrase. Kisukuma's mobile HD, which is usually trisyllabic is thus problematic because it is neither motivated by *MONO HD nor ALIGN XR. A new constraint namely TRISYLLABIC HD was proposed; and it is ranked higher than both BAR and ALIGN XR.

Chapter 3 was concerned with the factors that determine the size of RED in Kisukuma's native words and nativized loans. It was demonstrated that, as in other Bantu languages, reduplication in Kisukuma's native words and nativized loans is also determined by morphological factors and not phonology alone. In Kisukuma, the reduplicant must resemble a listed stem. As a result, truncation of stem materials is generally discouraged. Even when it is tolerated (only in verb-stem reduplication), the resulting form must resemble a listed stem. Truncation of derivational affixes is tolerated provided that it does not disturb the root materials. Thus [gu-som-el-a] can reduplicate as [gu-som-a] + [som-el-a] because the reduplicant [-som-a] is itself a cited (canonical) verb stem. It is a listed stem that is derived from the morphological paradigm of [-som-el-a]. Disyllabic [Root-a] reduplicants are impossible in polysyllabic roots. Therefore, [gʊ-βulugut-a] cannot reduplicate as [gʊ-βulu] + [βulugut-a] or [gʊ-βul-a] + [βulugut-a] because the resulting reduplicant is not a morphological word in Kisukuma and it does not fit into the morphological paradigms of the base stem from which it is derived. Moreover, the [Root-a] reduplicants are questionable when a disyllabic stem has more than one derivational affixes. It seems that the more derivational suffixes are there in the (disyllabic) root, the more unacceptable [Root-a] reduplicants become. Thus in both [gu-som-el-a-nij-a] "to read for simultaneously" and [gu-som-el-a-nij-iw-a] "to be read for simultaneously" [Root-a] reduplicants (som-a) are questionable because deriving the [Root-a] reduplicant in these forms require that more than one derivational morpheme be skipped over. This, however, is morphosyntactically costly. Generally therefore, the reduplicant in native words and nativized loans must be drawn from the lexical paradigm of the base stem in Kisukuma.

Some derivational morphemes must be copied in the reduplicant. This is the case, for example, with the inversive morpheme [-ʊl-]. Thus [gʊ-fuung-a] "to close" becomes [gʊ-fuung-ʊl-a] "to open". In the latter's reduplication, [Root-a] reduplicants are impossible because a meaning disagreement would occur between the base and the reduplicant. Notice, however, that the inversive marker has been lexicalized in Kisukuma and is not productive anymore. In essence, therefore, [gʊ-fuung-a] "to close" and [gʊ-fuung-ʊl-a] "to open" are different words. This explains the non-optimality of [gʊ-fuung-a] + [gʊ-fuung-ʊl-a] in reduplication. Phonologically, the reduplicant cannot be less than a foot. Monosyllabic reduplicants thus must be augmented either by prefix copying or double copying of the monosyllabic roots.

The observations made in Chapter 3, however, do not hold in reduplication of recent loans. As argued in Chapter 4, recent loans' morphology is opaque to Kisukuma speakers thereby rendering the morphological constraints like (REDμ_i=LSTEM(μ_i)) and *AFFIX RED irrelevant in computing the size of the reduplicant. Phonology takes precedence in determining the size of the reduplicant. For recent loans, therefore, the size the reduplicant is determined by the H-toned syllable of the unreduplicated stem. As in native words and nativized loans, the reduplicant cannot be less than two syllables and the reduplicant prefers to copy the root materials than double copy the monosyllabic portion of the root that is guaranteed to appear in the reduplicant. Thus [hóliwuudi] reduplicates as [hóliwuudi] + [wuudi] and not as [hóliwuudi] + [dídi]. Moreover, tonal constraints that are undominated in native words and nativized loan phonology (e.g. NO ADJACENT HEADS) are dominated in recent loans.

The strategy of segmenting the RED by relying on the H-toned syllable is surprising because, it seems more appropriate to copy everything if you are faced with opaque morphology. Total reduplication in these nouns is appealing because total reduplication is generally preferred in Kisukuma particularly in nominal stems. Even more surprising is the observation that young, educated Kinyantuzu speakers living in towns seem to use the same strategy in forming reduplicants in recent loans as the old illiterate speakers living in rural areas. The young, educated speakers living in urban areas are likely to have heard of the recent loans (place names) like the ones used in Chapter 4. One would then expect that these stems might be reflected in their lexicon and thus able to establish their listedness. The fact that they segment the recent loans (even the popular ones like America) by looking at the H-toned syllable of the base is surprising.

As far as tone transfer is concerned, Kisukuma's fixed H tone is usually transferred in the reduplicant. However, this transfer is determined by the grammatical category. In verbal reduplication, fixed H tones are not transferred, contradicting the theories that predict transfer of underlying H tones in reduplication. In nominals, however, fixed H is usually transferred in the reduplicant except when high ranked constraints like NO ADJACENT HEADS intervene. In recent loans, where only nominals are involved and morphology is generally irrelevant in computing the size of the reduplicant, tone *must* be transferred in the reduplicant regardless of whether the transfer incurs NO ADJACENT HEADS violations or not. Regardless of the location of the H tone in the unreduplicated noun, it surfaces aligned with the left edge of the reduplicant.

When mobile H is involved as in core phonology and the intermediate stratum, neither the grammatical categories involved nor the length of the unreduplicated stem matters. All that matters is the location of the sponsoring mora in the unreduplicated stem and the mobile H itself must move two syllables or moras rightwards from its sponsor. In verbs where the sponsoring mora is usually root initial, the heads of the mobile high domain can be predicted as follows: in monosyllabic and disyllabic unreduplicated stems, the mobile H tone surfaces on the initial mora of the next stem in the reduplicative complex, e.g. (βo̱n-a + βó)n-a "see here and there". In polysyllabic verbal stems, however, the mobile H tone surfaces on the first stem in the reduplicative complex, e.g. (βulugú)t-a + βulugut-a "panick here and there". In nominals sponsors are unpredictable and, in principle, any mora can sponsor a H tone. The length of the unreduplicated stem does not matter anymore and what matters instead is the location of the sponsor. For example, a disyllabic nominal stem βa-dugʊ̱̀ "relatives" (with a word final sponsor) reduplicates as βa-dʊ(gʊ̱ + dʊ́gʊ) "some sort of relatives" and the polysyllabic stem nghungulṵ̀mè (with a penultimate sponsor) shows the same reduplicative pattern, i.e. nghungu(lu̱me + kú)ngulume like the disyllabic stem. This location of the sponsor-determined tonal realization in the reduplicant is a new observation in Bantu and is not predicted in the models advanced to account for tone realization in Bantu reduplication. βa-dʊ(gʊ̱ + dʊ́gʊ) also shows that regardless of the position of the sponsor, the mobile H always surfaces on the initial mora of the reduplicant.

There are still a lot of issues that need further investigation. First, the account of tone presented here is far from complete and ODT faces problems when confronted by Kisukuma data. There is a need for further research in order to understand the nature of the problematic mobile high domain in Kisukuma and how it can be addressed in promising theories like ODT. While the analysis presented here seems to work, one can, however, claim that the constraint used (TRISYLLABIC HD) is controversial in a sense that it it is language specific and has not been applied anywhere in Bantu. It will thus be interesting to see how the interaction of the basic constraints in ODT like *MONOHD, BAR and ALIGN XR can account for Kisukuma mobile H domain without resorting to language specific constraints like TRISYLLABIC HD.

Moreover, there is a need to look at Kisukuma tone from a diachronic point of view. As pointed out in Chapter 4, this may be helpful in understanding the nature of the mobile H domain because evidence seems to point to a fact that the trisylabic H domain is actually a result of two monosyllabic high domains. Words in the intermediate stratum have disyllabic mobile high domain and this suggests an evolving stage. Many items which were borrowed during the colonial or pre-colonial period seem to have developed some overt morphological properties like noun class markers but most of them still have disyllabic or monosyllabic high domains. Future studies may attempt to characterize the different periods when different lexical items were borrowed and examine their morphological properties and particularly the mobile high domain. Moreover, detailed experimental studies may also help in our understanding of the mobile H tone and its controversial aspects like its relationship with the extra low tone.

APPENDIX I

A PRELIMINARY PHONETIC ANALYSIS OF KISUKUMA TONE

1. Introduction

Although Kisukuma tone has been investigated by many scholars, e.g. Richardson 1959, 1960; Batibo 1976, 1985, 1991; Goldsmith 1985; Sietsema 1989; Roberts 1992 and Kang 1997), to the best of my knowledge, no experiments have been undertaken to reveal its phonetic properties. As mentioned earlier, Kisukuma has been shown to have two types of Low tones and two types of High tones. Regarding the Low tone, it has been shown to have normal Low tone (L) and Extra Low tone (XL). The two types of H tone in the language are Mobile H (MH) and Fixed H (FH). Whether a syllable carries a H tone (Fixed or Mobile) or not is an idiosyncratic property of that syllable. What is known is that the Mobile H is frequent in native words while the Fixed H is frequent in recent loanwords. The former also occurs more frequently in verbs than in nominals.

Unlike the Fixed and Mobile H, the realization of the Extra Low tone is completely predictable. It is only realized when a Mobile H is originally associated to a penultimate or final syllable of a word in isolation or in a phrase. This is to say that a Mobile H hardly surfaces on a penultimate or final syllable of a word in isolation or in a phrase as its original position.

Since no experimental studies have been undertaken, the phonetic properties of Kisukuma tone are thus unknown. It is not clear, for example, how the normal L and Extra L tones on one hand and Mobile H and Fixed H on the other differ phonetically. This is an interesting problem because it is very hard to perceive the difference between

L and XL tone particularly in the near minimal pairs. It is also not clear how the Extra Low tone interacts with other Kisukuma tones particularly the Mobile and Fixed H. Likewise, it is not clear if there are any differences between the L tone before Fixed H and the L tone before Mobile H. Moreover, nobody knows the phonetic status of the tone bearing units (TBUs) that are left behind after the Mobile H has been displaced one, two or three syllables to the right.

As a general objective, this appendix thus seeks to provide a phonetic characterization of Kisukuma tone. We want to know the phonetic differences between the normal Low and Extra Low tone on one hand and Fixed and Mobile H on the other. Along the same line, the difference between L before Fixed H and L before Mobile H is also investigated. The study also seeks to reveal the phonetic status of the tone bearing units (TBUs) that are left behind after the Mobile H has been displaced one, two or three syllables to the right. This is intended to improve our understanding of the tonal displacement process in Kisukuma. It must, however, be borne in mind that this study is just preliminary. In the absence of any prior experimental studies of Kisukuma tone, the primary goal of this experiment is to give some general ideas as to what might be potentially interesting phonetic aspects of Kisukuma tone. I hope that this will provide a foundation for further, more detailed experimental studies. Given the preliminary nature of this study and particularly the fact that it is based on the speech of only one Kinyantuzu sub-dialect native speaker (the author), no attempts will be made to generalize the data.

Since Kisukuma tone has already been described (and analyzed), in this section, I present the explanation of the method and materials used for the experiment. In §3 and §4, the results of the experiment and the discussion pertaining to the phonetic properties of Kisukuma tones will be presented. This will be followed by a summary and concluding remarks in §5.

2. The Experiment

The subject in this study was a male Kisukuma (Kinyantuzu sub-dialect) native speaker in his early thirties from Bariadi district, Shinyanga region, in the United Republic of Tanzania. He has been in the United States for approximately six years. Apart from Kisukuma, he also speaks Kiswahili and English.

The subject was recorded reading a total of (217) Kisukuma tokens as shown in §6. All tokens were randomized and written down on paper. This was done in order to avoid putting contrastive focus on a certain word/syllable or making a certain word a "given". The whole list was recorded (6) times at a normal speech but the first and the sixth recording of the tokens were not analyzed. Recordings were done in the sound booth at the UCLA Phonetics Laboratory using a TASCAM 122 MK III cassette deck and a head mounted microphone. The recordings (868 in total) were digitized and pitch tracks were created and analyzed using PitchWorks software. The Fundamental Frequency (F0) was measured from the pitch tracks in the center of each target tone-bearing unit (TBU) because this is the most stable section of the vowel.

The corpus was designed to allow the examination of F0 between tokens with normal Low and Extra Low tones (c.f §6.1). Minimal pairs both in isolation and in phrasal contexts were used. With near minimal pairs, the corpus was designed to rule out segmental effects on the F0 as effectively as possible. The general prediction in these cases was that, if the Extra Low tone exists in Kinyantuzu, the mean F0 of tokens with Extra Low tone will be significantly lower than those with the normal Low tone. This would show that the Extra Low tone is different from the phonetic final lowering. The mean F0 of Mobile H vs. Fixed H and L before Mobile H vs. L before Fixed H were also compared.

As I mentioned in Chapter 2, when a word with morphemes that sponsor Mobile H is followed by another word, the Mobile H surfaces on the following word if the sponsoring morpheme is realized on the penultimate or final syllable of the preceding word. This part of the corpus was designed to allow the examination of F0 of the left TBUs that are left behind after the Mobile H has shifted two or three syllables to the right and that of the Mobile H itself. In all cases, t-tests for Paired Two Samples for Means were performed to determine if the differences in F0 between the two tonal categories were significant or not.

Finally, the F0 of Low before Fixed H and L before Mobile H was also compared and t-tests were performed to determine if the F0 difference between the two L tones is statistically significant. Notice, however, that I was unable to get perfect or near minimal pairs between Mobile and Fixed H. The two tones therefore had to be compared differently. Efforts were made to reduce any segmental and vowel effects on the F0 of the target syllables.

3. Results

The following table summarizes the mean F0 for all tones in Kisukuma.

Tone		Mean F0 (Hz)
1.	Fixed H	214
2.	Mobile H	200
3.	Low Tone before Fixed H	179
	Low Tone before Mobile H	198
5.	Normal Low	181
6.	Extra Low	164

Table 1

Mean F0 for all tones in Kisukuma

3.1. Phonetic Tonal Categories

At the phonological level, Kisukuma has been shown to have three tonal categories namely High H, Low (L) and Extra Low (XL) tone. But the H tone has two types – Fixed H and Mobile H. This indicates that there are four (4) types of tones in Kisukuma: Fixed H, Mobile H, Low (L) and Extra Low tone (XL). I examined how the two H tones differ and whether their effect on the preceding Low tone is the same. The results seem to suggest that at the phonetic level the two High tones are consistently different, and the Low tones preceding these two H tones are also consistently different. However, the Low tone before Mobile H is influenced by the following Mobile H to such an extent that the L tone and the following H are not significantly different. This suggests that, in Kisukuma, there are four different tonal categories at the phonetic level. These four tonal categories at the phonetic level are, from highest to lowest: (1) Fixed H (2) Mobile H and Low before Mobile H (3) Low tone and (4) Extra Low tone. Below I characterize each of the four phonetic levels in their respective pairs and briefly provide their phonetic approximations in terms of F0.

3.2. Low and XL tone

When comparing the F0 of all analyzed tokens that have Extra Low tone with those with normal L, the F0 of the former tonal category was found to be significantly lower than that of the latter. Two tail t-tests for Paired Two Sample for Means showed that the difference between the two categories is significant at ($p < 2.21E\text{-}12$). This shows that the Extra Low tone is distinguishable from Low tone in Kisukuma.

The figure below summarizes the observed significant difference in F0 between tokens with normal L and those with Extra L tone.

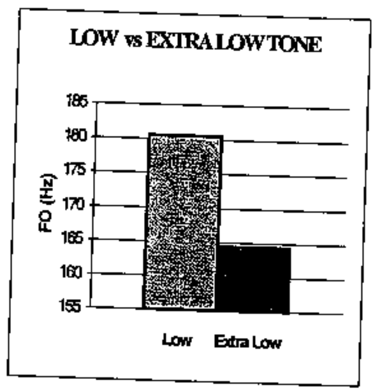


Figure 1
Plot of mean FO values between tokens with normal Low and those with XL Tone.

3.3. Fixed H and Mobile H

The mean Fundamental Frequency of the Fixed H was found to be significantly higher than that of the Mobile H. A two tail t-test for Paired Two Sample for Means showed that the difference between these two tonal categories is significant ($p < 4.1074E\text{-}05$). I thus concluded that although at the phonological level the H tone is characterized as only one category, at the phonetic level, the Kisukuma H has two distinct tonal levels. These findings are summarized in figure (2) below.

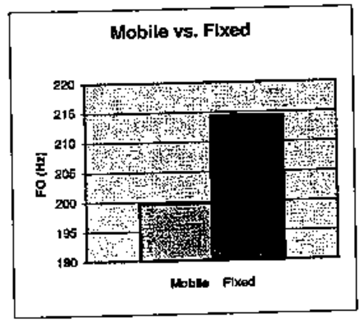


Figure 2
Mean FO values for Fixed H vs. Mobile H.

It has been suggested in autosegmental studies that the Fixed H is underlyingly prelinked while the Mobile H is floating. It is not clear at the moment if being linked underlyingly has anything to do with the higher F0 of the Fixed H. I have not come across any experimental studies on this issue from other Bantu languages and it is not clear if these findings can be generalized to other Bantu languages.

3.4. Low Tone before Mobile H and Low Tone before Fixed H

From what we know so far, one prediction is particularly very attractive here. Since the F0 of the Fixed H is significantly higher than that of the mobile H tone, one can logically predict that the F0 of the Low tone before fixed H tone will be higher than that of the L tone before mobile H tone. This prediction, however, is not supported by the results of the experiment. The results, however, show the opposite pattern: the F0 of the L tone before Mobile H tone is higher than that of the L before fixed H.

Since the L tone before mobile H is significantly higher than L before fixed H, and mobile H is significantly lower than fixed H, I wanted to know whether the L tone before Mobile H is different from the following mobile H. Surprisingly, it was found that the F0 of L before Mobile H and the mobile H itself was not significantly different. This shows that Kisukuma has a rule (given in 11) that changes a Low tone to Mobile H before a Mobile H.

(11) Low Tone Raising (LTR):

L => MH/ - MH: A Low tone becomes a Mobile H when followed by a Mobile H.
Condition: Phrasal level.

The existence of this rule in Kisukuma, however, is very questionable and surprising at the phonological level because generally Kisukuma does not allow a sequence of two H tones. In descriptive literature, this prohibition of HH sequence is accounted for by Meeussen's rule, a rule that delinks the leftmost H in a sequence of HH tones (Goldsmith 1984, Roberts 1992). Kinyantuzu also has evidence everywhere to show that Meeussen's rule is active. These findings are thus surprising. It may, however, be the case that Kisukuma allows a sequence of two vowels with the same high F0 at the phonetic level only. Since this study is based on only one speaker, further detailed experiments using more that one speaker are needed to confirm if these findings can be generalized.

3.5. When the H tone moves, what tone is left behind?

The standard treatment of left to right (or right to left) tonal displacement in Bantu literature is that the Mobile H undergoes spreading one, two or three syllables to the right or left. Another rule, say, Delinking, iteratively delinks all the leftward (or rightward) H in the now multiply-linked H leaving only the rightmost (or leftmost) H linked to their respective TBU. From this treatment, the phonetic status of the leftward (or rightward)

TBUs whose H has been iteratively delinked is not clear. With reference to Kisukuma, the relevant question here is this: are the TBUs that are left behind toneless, or do they have a normal L or XL tone? In this section, I examined the phonetic status of the TBUs that are left behind after the Mobile H has been displaced two or three syllables to the right. I was specifically concerned with the tonal category of the TBU which has been affected by the tonal displacement process.

To investigate this issue, each of the three TBUs that have been affected by shifting was compared with its corresponding TBU with a normal L in which no shifting is involved, e.g. F0 of the last 4 syllables [guloβa geete] "to become wet completely" was compared with that in [guloβa̲ geeté] "to fish seriously". The results are summarized in Figure 3. The mean F0 of normal L tones is shown in light bars and that of syllables affected by shifting is shown in dark bars.

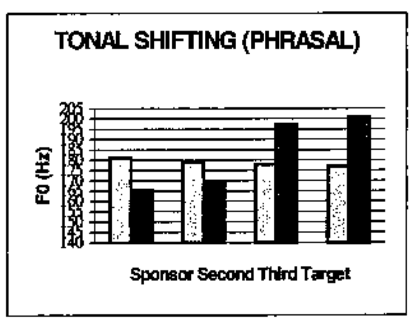


Figure 3
Plot of mean F0 values for TBU affected by shifting compared with normal L.

As can be seen from figure 3, the F0 of the sponsoring syllable (the syllable from which the Mobile H originates) and that of the following syllable are significantly lower than that of their corresponding normal L in which no tonal movement is involved. In the penultimate syllable, however, the mean F0 of the tokens with tone shifting sharply ascends from 169Hz to 197Hz. The F0 of the target vowel is even higher (201 Hz).

From these results, I can now phonetically categorize all the syllables that are involved in the tonal displacement process in Kisukuma as follows:

(I) The sponsoring syllable and its local neighbor (non-adjacent syllables from the target)

The mean F0 for the first two syllables in tokens with normal L tone was found to be around 181Hz and 179Hz respectively while that of corresponding tokens, in which the Mobile H is displaced, was 165Hz and 169Hz respectively. The two tail t-test between the two showed that the F0 difference between tokens with normal L and those with Mobile H displacement was significant at ($p < 5.62E-15$) and ($p < 2.51E-11$) respectively. It was thus concluded that, when the Mobile H is displaced three syllables to the right at phrasal level, the first two syllables (the sponsor and the immediate right neighbor) surface lower than normal L tone, probably corresponding to or being categorized as Extra Low phonologically. At phonological level, however, they are assumed to be normal L and they are left unmarked in the literature.

(II) The syllable immediately preceding the target and the target itself.

The mean F0 for the syllable immediately preceding the target syllable in tokens with tonal shifting was found to be 198Hz and that of the target syllable itself was 201Hz. The two tail t-test showed that the F0 difference between the syllable immediately preceding the target and the target itself was not significant. That is, the last two syllables in cases involving tonal displacement across word boundaries are both higher than normal H, thus possibly be labelled as Mobile H phonologically. At the phonological level, however, only the target syllable is identified with a (mobile) H tone.

In the tokens with normal L tone, the mean F0 of the penultimate syllable and the target (final) syllable was found to decrease slightly from 179Hz to 176Hz respectively indicating a normal declination. The tonal category of each of the TBU involved in the tonal displacement process at phrase level is summarized in table (2).

Syllable position	The sponsoring syllable	Local neighbor	Third syllable	Target syllable
Tonal Category	XL(165Hz)	XL(168Hz)	MH(198Hz)	MH(201Hz)

Table 2

Phonetic characterization of the tones involved in the shifting in Kisukuma (phrasal).

4. The Status of Mora

This section was designed to show if the H tone associated with disyllabic stems but distinct in its characteristics is the same H tone or not. The H tone in the first forms, i.e. Richardson's H 1 (R'H_1) drifts further to the right when a toneless suffix or word is added to the right while Richardson's H_2 (R'H_2) does not drift further to the right when toneless suffixes or words are added. The tokens involved are shown in (cf. §6, VIII) and the results are summarized in figure (4).

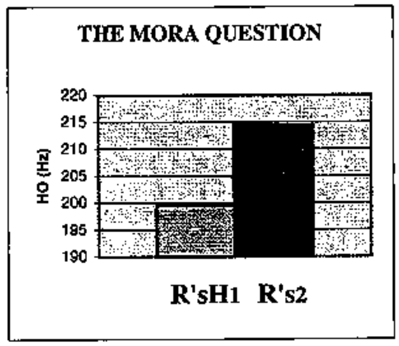


Figure 4
Plot of mean F0 values between tokens with Richardson's H (type 1) Vs. Richardson's H (type 2).

As shown in figure (4), the mean F0 for Richadson's H (type 1) listed in §6, VIIIA was found to be 199Hz and the H in Richardson's H (type 2) from tokens listed in §6, VIIIB was found to be 214Hz. As shown in Table 1, these mean F0s correspond to Mobile H and Fixed H respectively. The two tail t-test showed that the difference between the two was significant at ($p < 2.12E-5$). These results seem to suggest that the H in §6, VIIIA tokens is Mobile while the H in §6, VIIIB is Fixed.

5. Summary and Concluding Remarks

In this study I set out to investigate one of the most interesting and probably the most controversial aspects of Kisukuma tone – the Extra Low tone. The experimental results confirmed the presence of the Extra Low Tone in the language. The F0 of the tokens that were assumed to have XL tones was found to be significantly lower than that of tokens with L tone. From these observations, it was concluded that the Extra L tone is distinct from the normal L.

Based on the F0 differences, it was also found that Kisukuma tone could be phonetically grouped into three distinct pairs: Fixed H vs. Mobile H, Low before Fixed H vs. Low before Mobile H, and Low vs. Extra Low. Between these pairs, it was found that the L before Mobile H is not significantly different from the following Mobile H across word boundaries. From these observations, it was concluded that the L before Mobile H and the following Mobile H at phrasal level does not form two distinct tonal categories. Interestingly, it was also found that the F0 of the Fixed H is significantly higher than that of the Mobile H. This may suggest that this has to do with the fact that the former is underlyingly linked while the latter is not.

Another important observation of this preliminary study has to do with the status of the TBUs that are left behind after the Mobile H has been displaced two or three syllables to the right. In many studies the leftward TBUs are not marked at all suggesting that they are either toneless or have a L tone. This study seems to suggest that the first two syllables have XL tone when the Mobile H is displaced across word boundaries. The third syllable's F0 is influenced by the following Mobile H to such an extent that both the third syllable and the target syllable surface as Mobile H.

This being said, there are many issues in this study that are controversial and thus require further studies in the form of careful and detailed experimentation. One of these issues include the status of the L tone raising rule. From Chapter 2, we know that Kisukuma does not allow a sequence of two Hs. There is evidence everywhere in Kinyantuzu to show that Meeussen's rule is active cf. /βádáβáβónile/ => [βadaβaβonilé] "they did not see them". The LTR rule thus goes against this general observation. It remains to be seen if experiments using other Kinyantuzu speakers will arrive at the same conclusions.

Another problem is about the mora as a TBU in Kisukuma. If we accept that the H in tokens like those in §6, VIIIB is fixed, the general observation that any H tone in a Bantu verb stem is sponsored by verb-root initial syllable becomes questionable. This is evidence to show that H tones in a Bantu verb stem do not necessarily need to be sponsored by the initial syllable of the root. Although this sounds like an interesting finding, it needs to be verified by detailed experiments using data from other Kisukuma (Kinyantuzu) speakers. At the moment I do not feel comfortable to generalize these findings based on my own data only. It follows that, however interesting these results may look at the moment, it remains to be seen if they will be supported by future experimental studies using more representative data from other Kinyantuzu speakers.

Future experimental studies can focus, for example, on demonstrating the differences between Extra Low tone and the phonetic final lowering and the effects of declination and phrase length on the realization of Kisukuma tone. All these are interesting problems that need to be experimentally investigated if we want to have a clear picture of the phonetic characteristics of Kisukuma tone.

All in all, my primary goal in this preliminary study was to give some general ideas from an experimental point of view as to what might be potentially interesting aspects of Kisukuma tone thereby providing a starting point for further, more detailed experimental studies. This preliminary study is likely to provoke a serious debate about some of the findings reported here. The best way to verify these findings will be through careful experimentation. This will increase our understanding of the complex Kisukuma tonology and that of many other Bantu languages with tonal systems similar to that of Kisukuma.

6. TOKENS USED IN THE EXPERIMENTAL STUDY IN APPENDIX I[26]

I. Low tone vs. Extra Low tone
A. Perfect Minimal Pairs

	Low Tone		Extra Low Tone	
	Token	Glossary	Token	Glossary
1.	ŋʰo̱lo̱	"sheep"	ŋʰhò̱lò̱	"heart"
2.	nda̱	"stomach"	ndà̱	"lice"
3.	gʊlu̱la̱	"to cool"	gʊlù̱là̱	"to whistle"
4.	gʊlu̱ka̱	"to weave"	gʊlù̱kà̱	"to vomit"
5.	gʊlo̱βa̱	"to become wet"	gʊlò̱βà̱	"to fish"
6.	gʊsu̱la̱	"to quench thirsty"	gʊsù̱là̱	"to wash clothes"
7.	ŋgo̱ko̱	"tree forks"	ŋgò̱kò̱	"chicken (s)"
8.	nya̱ma̱	"meat"	nyà̱mà̱	"bring back the cows"
9.	gʊpa̱la̱	"to growl"	gʊpà̱là̱	"to clear, to weed"
10.	gʊʊ̱βa̱	"to peel (with teeth)	gʊ̀ʊ̱̀βà̱	" to take shelter from rain
11.	gʊka̱nda̱	"to fill hole"	gʊkà̱ndà̱	"feel with fingers"
12.	gʊβi̱i̱mba̱	"to thatch the roof"	gʊβì̱ì̱mbà̱	"to swell"
13.	so̱o̱nda̱	"point (with a finger)	sò̱ò̱ndà̱	"stars"
14.	gʊlʊ̱ʊ̱nja̱	"to heal (wound)	gʊlʊ̱̀ʊ̱̀njà̱	"to engage"
15.	gʊla̱a̱nga̱	"to teach"	gʊlà̱à̱ngà̱	"to stay aloft"
16.	gʊsi̱i̱nga̱	"to delay"	gʊsì̱ì̱ngà̱	"to put haphazardly"

B. Near Minimal Pairs

	Low Tone		Extra Low Tone	
	Item	Glossary	Item	Glossary
1.	gʊsi̱i̱ga̱	"to gossip"	gʊsì̱gà̱	"to leave behind"
2.	βʊsi̱si̱	"tamarind"	βʊsì̱ì̱sì̱	"small ants"
3.	nka̱a̱βi̱	"the exchanger"	nkà̱βì̱	"the strangler"

[26] The underlined vowels are *not* sponsors but they represent the analyzed vowels.

4.	saato	"tilapia"	sàtò	"python"
5.	gusika	"to arrive"	gusȉtà	"to squeeze"
6.	gulama	"to live longer"	gulàlà	"to fly"
7.	guduta	"to pull"	guβùtà	"to cut"
8.	gupaala	"to slap	gupàlà	"to peel (scales)"
9.	gugana	"to tell a story"	guβànà	"to squeeze"
10.	gupula	"to snatch"	gutùlà	"to lead the cows"
11.	gusina	"to pinch"	gusȉmà	"to deepen"
12.	gutala	"to go astray"	gupàlà	"to scratch"
13.	gupala	"to growl"	gupàmà	"to hit (using head)"
14.	gusina	"to pinch"	gusȉmà	"to become deep"
15.	gatanga	"small pumpkin"	gutàngà	"to arrive early"
16.	gulamba	"to become scarce"	gulààmbà	"to lick"

II. Low Tone vs. Fixed H

	Low Tone		Fixed H	
	Item	Glossary	Item	Glossary
1.	numa	"backyard, behind"	núma	"non vegetarian"
2.	gudadela	"to tighten"	gudadéla	"to walk slowly difficulty"
3.	kangala	"wooden piece of wood for local beds"	kangalá	"type of local beer"
4.	gaseenge	"partition in a house"	gaséende	"one cent"
5.	guβoomba	"to get soft after soaking"	gaβóomba	"small pump"
6.	hela	"arrange in a row"	helá	"money"
7.	ndaki	"a man who gets angry easily"	ndáagi	"a westernized person"
8.	mooga	"shave, cut hair"	móoga	"type of vegetable"
9.	gadolomi	"small fierce runner"	gadólolo	"small one"

III: Low Before Fixed H

	Low Tone		Fixed H	
	Item	Glossary	Item	Glossary
1.	gudadıla	"to tighten"	gudadíla	"to walk with difficulty"
2.	guβela	"to break"	guβeelá	"to be attractive"
3.	gaseenge	"partition in a house"	gaséende	"one cent"

4.	hela	"arrange in a row"	helá	"money"
5.	gadolomi	"fierce runner"	gadólolo	"small one"
6.	guβoomba	"to get soft after soaking"	gaβóomba	"small pump"
7.	kangala	"piece of wood for local beds"	kangalá	"type of local beer"

IV. Extra Low Tone vs. Fixed H

	Extra Low Tone		Fixed H	
	Item	Glossary	Item	Glossary
1.	ndĭimù	"wild animal"	ndimú	"lemon"
2.	βusĭisĭ	"small ants"	βusĭisi	"ticklishness"
3.	nghʊ̀ʊ̀mbʊ̀	"nostalgia"	nghuumbʊ́	"girl's name"
4.	ngwààndʊ̀	"boy's name"	ngwaandʊ́	"baobab tree"
5.	guβùùnzà	"to escape(animals)"	guβuunzá	"to change (money)"
6.	ngwèèzì	"the moon"	ngweezí	"honey harvester"
7.	iβelèlè	"corn/millet stalk"	iβelelé	"container for storing grains"
8.	guβùùndà	"to take a mouthful"	gaβúúnda	"small packet or parcel"
9.	guβààndà	"to hide yourself"	gɪβaandá	"ball of tobacco"
10.	mhèlà	"rhino"	mhéela	"traditional healer's fee"
11.	namhàlà	"an old man"	namháála	"to become old"
12.	kààngà	"to frighten"	kááŋga	"type of cloth"

V. Fixed H (Additional Data)

	Item	Glossary
1.	gɪβaandá	"a hut"
2.	masuungá	"raw milk"
3.	sɪŋwaandá	"cow tail used by traditional entertainers"
4.	nzagaambá	"a bull"
5.	kangaalá	"local beer"
6.	lugaangá	"evening fire"
7.	sigaangá	"big rocks"
8.	ŋwaambá	"girl's name"
9.	sigalá	"cigarette"
10.	ikooná	"kite-hawk"
11.	gataalá	"small lamp"

VI. Mobile H

At Phrase level (Perfect Minimal Pairs)

Low Tone		Mobile H	
Item	Glossary	Item	Glossary
1. ŋ^{h}olo gɛɛtɛ	"real sheep"	ŋ^{h}olo gɛɛtɛ́	"real heart"
2. nda nhaalɛ	"big stomach"	nda nhaalɛ́	"big lice "
3. saato sazi	"crazy tilapia"	sato sazî	"crazy python"
4. βʊsisi sagala	"useless tamarind"	βʊsiisi sagála	"useless ants"
5. gulʊka gɛɛtɛ	"serious weaving"	gulʊka geeté	"to vomit a lot"
6. gʊloβa zigizigi	"to be wet completely"	gʊloβa zigízigi	"to fish a lot"
7. gʊsula geete	"to be totally satisfied"	gosula geeté	"to wash seriously"
8.gʊlula wangʊwangʊ	"to cool quickly"	gʊlula wangʊ́ wangʊ	"to whistle quickly"
9. gʊsiiga βaanhʊ	"to gossip about people"	gʊsiga βaanhʊ́	"to outrun people"

VII. Low vs. Mobile H

Low Tone		Mobile H	
Item	Glossary	Item	Glossary
1. gʊʊβanɪja	"to peel with the teeth" (simul)[27]	gʊʊβanɪ́ja	"to take shelter from sun/rain"
2. gʊtwiima	"to set on fire"	gʊtwiiná	"to drip"
3. gʊsumɪla	"to search for food during famine"	gʊsumɪlá	"to sew for" (appl)
4. gʊtembela	"to carry something heavy" (appl.)[28]	gʊtendelá	"to guard" (appl.)
6. gʊshoona	"to eat corn from cob"	gʊshoomá	"to speak a language badly"
7. gʊsinɪla	"to pinch" (appl)	gʊsimɪlá	"to deepen" (appl)
8. gʊβilima	"to roll"	gʊβilingá	"to collect"
9. gʊmanɪja	"to pretend to know much"	gʊʊmanɪ́ja	"to dry up together"
10. gʊsulɪla	"to plant seeds"	gʊsulɪlá	"to wash for"
11. gʊloβela	"to be wet for"	gʊloβelá	"to disappear to foreign parts"
12. gʊguguma	"to growl (of the stomach)	gʊguguná	"to grumble"

[27] Simult = simultaneous
[28] Appl = applicative

VIII. The Question of Mora as a TBU

A. Richardson's H (Type 1) -Mobile or Fixed? (H drifts further to the right)

Batibo (1985)	Richardson (1959)	Glossary
1. gʊsùùngà	gʊsuungá	"to put at a high place"
2. gʊkʊ̀ʊ̀ngà	gʊkʊʊngá	"to put ready (bow)"
3. gʊtʊ̀ʊ̀ngà	gʊtʊʊngá	"to pierce together"
4. gʊkààanzà	gʊkaanzá	"to wash"
5. gʊkààngà	gʊkaangá	"to frighten"
6. gʊtààngà	gʊtaangá	"to precede"
7. gʊchààanjà	gʊchaanjá	"to vaccinate"
8. gʊβììmbà	gʊβiimbá	"to swell"
9. gʊlììngà	gʊliingá	"to fold"
10. gʊpèèmbà	gʊpeembá	"to burn"
11. gʊβààndà	gʊβaandá	"to take cover"

B. Richardon's H (Type 2)- Mobile or Fixed? (H does not drift further to the right)

1. gʊtaangá	"to surpass"
2. gupaandá	"to make love (for animals)"
3. gufaanyá	"to pretend"
3. guleengá	"to target yourself"
4. gʊtwiiná	"to take a wife"
5. gʊsheemá	"to milk"
6. gʊdiimá	"to hold, to catch"
7. gʊshoomá	"to speak a (foreign language) a lot"
8. gʊŋoolá	"to howl, to scream"
9. gʊdaamá	"to be strong"
10. gʊlaalá	"to sleep"
11. gʊseená	"to chop firewood"

APPENDIX II
REDUPLICATION (URUDUFISHAJI)

Weka alama ya X katika neno sahihi kama unavyoona wewe. Kama kuna majibu sahihi zaidi ya moja, tia alama ya X katika kila jibu sahihi. Asante

I. Utarudufishaje maneno yafuatayo?

	Neno	Maana	Neno Lililorudufishwa	N. I	M. H	N.V	L. M	E. M
a.	choga	"ukwato"	choga choga	X	X	X	X	X
			choga oga	X				
b.	chonza	"cheche"	chonza chonza	X	X	X	X	X
			chonza onza					
c.	chuma	"chuma"	chuma chuma	X	X	X	X	X
			chuma uma		X			
d.	shoga	"ukwato"	shoga shoga	X	X	X	X	X
			shoga oga					
e.	chumba	"chumba"	chumba chumba	X	X	X	X	X
			chumba umba					

II. Tunaweza kuyarudufisha maneno yafuatayo? Kama jibu ni ndiyo, tutayarudufishaje?

	Neno	Maana	Neno Lililorudufishwa	N. I	M. H	N.V	L. M	E. M
a.	ngholo	"kondoo"	ngholo ngholo	X	X	X	X	X
			ngholo kolo		X	X	X	
b.	nghingo	"shingo"	nghingo nghingo	X	X	X	X	X
			nghingo kingo			X	X	X
c.	ngubu	"kiboko"	ngubu ngubu	X		X	X	X
			ngubu gubu	X	X	X	X	X
d.	ndama	"ndama"	ndama ndama	X	X	X	X	X
			ndama dama	X	X	X	X	X

III. Maneno yafuatayo utayarudufisha vipi?

	Neno	Maana	Neno Lililorudufishwa	N. I	M. H	N.V	L. M	E. M
a.	lyoochi	"moshi"	lyoochi oochi	X		X		
			lyoochi lyoochi	X	X	X	X	X
b.	lyaala	"ukucha"	lyaala aala	X		X	X	X
			lyaala lyaala	X	X	X	X	X
c.	lyeembo	"wimbo"	lyeembo eembo	X	X	X	X	X
			lyeembo lyeembo	X	X	X	X	X

d. lwaala	"ugua"	lwaala lwaala	X	X	X	X	X
		lwaala aala	X		X	X	

IV. Rudufisha Maneno Yafuatayo

Neno	Maana	Neno Lililorudufishwa	N. I	M. H	N.V	L. M	E. M
a. ngi	"nzi"	ngi ngi ngi	X	X	X	X	X
		ngi gi gi	X				
b. nke	"mke"	nke nke nke	X	X	X	X	X
		nke ke ke	X		X		
c. mva	"mbwa"	mva mva mva	X	X	X	X	
		mva va va	X	X	X	X	X
d. nkwi	"mlipa nahari"	nkwi nkwi nkwi	X	X	X		X
		nkwi nkwi					
		nkwi kwi kwi	X	X	X	X	X

V. <u>Muhimu Sana:</u> Maneno haya ya kigeni kama yanasemwa na mzee wa Kisukuma kule kijijini ambaye hajasoma wala kusafiri, tutayarudisha vipi?

Neno	Maana	Neno lililorudufishwa	N. I	M. H	L.V	L. M	E. M
a. amelika	"America"	amelika melika	X	X	X	X	X
		amelika amelika	X			X	
b. lumania	"Rumania"	lumania mania	X	X	X	X	X
		lumania lumania	X	X			

				N. I	M. H	N.V	L. M	E. M
c.	kalifonia	"California"	kalifonia fonia	X	X	X	X	X
			kalifonia lifonia		X			
d.	fulolida	"Florida"	fulorida lida	X			X	X
			fulorida lorida		X	X		
			fulorida fulorida	X			X	X
e.	bujelemaani	"Ujerumani"	bujelemani maani					
			bujelemani jelemaani	X	X	X	X	
			bujelemani bujelemani					X
			bujelemani lemaani	X	X	X	X	X
f.	pensilovenia	"Pennsylvania"	pensilovenia venia	X	X	X	X	X
			pensilovenia lovenia					
			pensilovenia siloveni					
			pensilovenia pensiloveni	X	X			X
h.	kolumbia	"Columbia"	kolumbia lumbia	X	X	X	X	
			kolumbia mbia					
			kolumbia kolumbia					X
i.	tolonto	"Toronto"	toloonto loonto	X	X	X	X	
			toloonto oonto					
			tolonto tolonto					X
j.	saibelia	"Siberia"	saibelia belia	X		X	X	X
			saibelia lia		X			
			saibelia saibelia					X

				N. I	M. H	N.V	L. M	E. M
k.	wisikonsini	“Wisconsin”	wisikonsini konsini	X	X	X	X	X
			wisikonsini sikonsini					
			wisikonsini sini			X		
			wisikonsini wisikonsini					
l.	minesota	“Minnesota”	minesota sota	X	X	X	X	
			minesota nesota					
			minesota minesota				X	X
m.	kangaruu	“kangaroo”	kangaruu ngaruu					
			kangaruu ruu	X	X	X	X	
			kangaruu kangaruu					
n.	tenesii	“Tennesse”	tenesii sii		X	X	X	X
			tenesii nesii					
			tenesii tenesii					X
o.	skandinavia	“Scandinavia”	skandinavia navia	X	X	X	X	X
			skandinavia via					
			skandinavia ndinavia				X	
			skandinavia skandinavia					X

VI. <u>Muhimu Sana</u>: **Maneno haya ya kigeni kama yanasemwa na mzee wa Kisukuma kule kijijini ambaye hajasoma wala kusafiri, tutayarudisha vipi?**

	Neno	Maana	Neno Lililorudufishwa	N. I	M. H	N.V	L. M	E. M
a.	michigaani	"Michigan"	michigaani gaani		X	X	X	X
			michigaani chigaani	X	X			X
			michigaani michigaani	X				
b.	olegooni	"Oregoni"	olegooni gooni	X	X	X	X	X
			olegooni legooni	X				
			olegooni olegooni					X
			olegooni nini					
c.	holiwuudi	"Hollywood"	holiwuudi wuudi	X	X	X	X	X
			holiwuudi liwuudi					
			holiwuudi holiwuudi		X			
			holiwuudi didi					
d.	sililaanka	"Sri Lanka"	sililaanka laanka	X	X	X	X	
			sililaanka lilaanka					
			sililanka sililaanka			X	X	X
			sililaanka nkanka					
e.	pagisitaani	"Pakistani"	pagisitaani taani	X	X	X	X	X
			pagisitaani sitaani				X	X
			pagisitaani pagisitaani					

				N. I	M. H	N.V	L. M	E. M
h.	okilaandi	"Oakland"	okilaandi laandi	X	X	X	X	X
			okilaandi ndi ndi				X	X
			okilaandi okilaandi					
i.	losanjeleesi	"Los Angeles"	losanjeleesi leesi	X	X	X	X	X
			losanjeleesi jeleesi					
			losanjeleesi losanjeleesi					
			losanjeleesi si si					
j.	isilamabaadi	"Islamabad"	isilamabaadi baadi	X	X	X	X	X
			isilamabaadi lamabaadi					
			isilamabaadi isilamabaadi		X			
			isilamabaadi silamabaadi			X	X	X
k.	pitisibaaga	"Pittsburgh"	pitisibaaga baaga	X	X	X	X	X
			pitisibaaga sibaaga					
			pitisibaaga pitisibaaga					X
			pitisibaaga tisibaaga			X	X	
l.	afuganisitaani	"Afhanistan"	afuganisitaani sitaani					X
			afuganisitaani nisitaani				X	
			afuganisitaani taani	X	X	X	X	X
			afuganisitaani afuganisitaani					
o.	telegilaamu	"telegram"	telegilaamu gilaamu	X	X	X	X	
			telegilaamu laamu					
			telegilaamu telegilaamu					X

				N. I	M. H	N.V	L. M	E. M
p.	telesikoopu	"telescope"	telesikoopu sikoopu	X	X	X	X	
			telesikoopu koopu					
			telesikoopu telesikoopu					X
q.	miniapolisi	"Minneapolis"	miniapoliis poliisi	X	X	X	X	X
			miniapoliis liisi					
			miniapoliis miniapoliis					
r.	dalisalaama	"Dar-es-Salaam"	dalisalama salama	X	X	X	X	X
			dalisalaama laama					
			dalisalama dalisalama					

KEY:

N.T. Late 30s living in Dar-es-salaam. First University degree. Speaks Kisukuma, Kiswahili and English

M.H. Mid 30s living in Dar-es-salaam. Primary school certificate. Speaks Kisukuma and Kiswahili

N.V. Mid 20s living in Moshi. Primary school certificate. Speaks Kisukuma and Kiswahili

L.M. Late 30s now living in London. Pursuing a Masters in Law. Speaks Kisukuma, Kiswahili and English

E.M. Mid 70s living in Dar-es-salaam for a year. Illiterate. Speaks Kisukuma.

APPENDIX III
HIGH-TONED PREFIXES

1. All pronominal agreement markers for a-/βa- (human beings) class sponsor a mobile H tone except the third person singular [a-]. As expected, this mobile H moves two syllables to the right.

(a) First person singular /na̲-/

chagʊl-a	"choose"
gʊ-chagʊl-a	"to choose"
na̲-gʊ-chágʊl-a	"I will choose"
na̲-gʊ-gʊ́-chagʊl-a	"I will choose you"
na̲-gʊ-gʊ́-chagʊl-el-a	"I will choose for you"
na̲-gʊ-gʊ́-chagʊl-el-a-nij-a	"I will choose for you simultaneously"

(b) Second person singular /ʊ̲-/

chagʊl-a	"choose"
gʊ-chagʊl-a	"to choose"
ʊ̲-gʊ-chágʊl-a	"you will choose"
ʊ̲-gʊ-ní-chagʊl-a	"you will choose me"
ʊ̲-gʊ-ní-chagʊl-el-a	"you will choose for me"
ʊ̲-gʊ-ní-chagʊl-el-a-nij-a]	"you will choose for me simultaneously"

(c) Third person singular /a-/

chagʊl-a	"choose"
gʊ-chagʊl-a	"to choose"
a-gʊ-chagʊl-a	"(s)he will choose"
a-gʊ-gʊ-chagʊl-a	"(s)he will choose you"
a-gʊ-gʊ-chagʊl-el-a	"(s)he will choose for you"
a-gʊ-gʊ-chagʊl-el-a-nij-a	"(s)he will choose for you simultaneously"

(d) First person plural /dʊ-/

chagʊl-a	"choose"
gʊ-chagʊl-a	"to choose"
dʊ-gʊ-chágʊl-a	“we will choose"
dʊ-gʊ-gʊ́-chagʊl-a	“we will choose you"
dʊ-gʊ-gʊ́-chagʊl-el-a	“we will choose for you"
dʊ-gʊ-gʊ́-chagʊl-el-a-nij-a	"we will choose for you simultaneously"

(e) Second person plural /mu-/

chagʊl-a	"choose"
gʊ-chagʊl-a	"to choose"
mu-gʊ-chágʊl-a	“you (pl) will choose"
mu-gʊ-ní-chagʊl-a	"you (pl) will choose me"
mu-gʊ-ní-chagʊl-el-a	"you (pl) will choose for me"
mu-gʊ-ní-chagʊl-el-a-nij-a	"you (pl) will choose for me simultaneously"

(f) Third person plural /βa-/

chagʊl-a	"choose"
gʊ-chagʊl-a	"to choose"
βa-gʊ-chágʊl-a	“they will choose"
βa-gʊ-gʊ́-chagʊl-a	"they will choose you"
βa-gʊ-gʊ́-chagʊl-el-a	"they will choose for you"
βa-gʊ-gʊ́-chagʊl-el-a-nij-a	"they will choose for you simultaneously"

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