

**ASPECTS OF THE TONE PATTERNS OF THE NOUN PHRASE IN THE
KIKAMBA LANGUAGE: AN OPTIMALITY APPROACH**

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DECLARATION

This project is my original work and it has not been presented in any other University or institution for academic credit. I am entirely responsible for any errors or omissions in this report. In areas where information, tableau or any other data has been sought from different studies, there is rightful accreditation by the references as per the rules on anti-plagiarism.

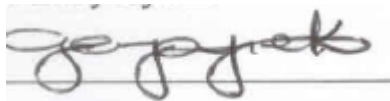
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DEDICATION

This work is dedicated to my mum who has been my greatest inspiration, my husband Steve Okech, my two children Remy and Renee and my three siblings Cate, Jorum and Evans.

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ABBREVIATIONS ACRONYMS AND SYMBOLS

ALIGN-FT-L	Align foot left
ALIGN- FT- R	Align foot right
CV	Consonant vowel
CON:	Constraints
EH	Extremely high tone
EL	Extremely low tone
EVAL	Evaluator
GEN	Generator
H	High tone
IDENT	A constraint that ensures that given segments are identical
L	Low tone
LMP	Lexical Morphology and Phonology
MDK	Machakos dialect of Kikamba
MS	Monospan
NP	Noun Phrase
OCP	Obligatory Contour Principle
OT	Optimality Theory
´	High tone
`	Low tone
ˊ	Super High tone
ˋ	Super Low tone
*	Violation
!	Fatal violation
⊂ : ⊂	Optimal candidate

OPERATIONAL DEFINITION OF TERMS

Constraint : A structural requirement that can be satisfied or violated by an input

Dialect: A given form of language which is unique to a particular place or particular social group

Faithfulness constraint: OT constraints that expect that the outputs are similar to the input.

Markedness constraint: OT constraints that dictate that the output have satisfied some well formedness conditions.

MAX-IO: constraint in which each segment of the input has a correspondent in the output.

Optimal form: The best candidate on a set of constraints and the one that wins against other competing candidates.

Tone: The pitch of a word in a given language that distinguishes a difference in meaning grammar

Tone bearing units: A constituent on the segmental tier which is capable of being associated to a constituent on the mora

Tone association lines: The horizontal lines that indicate the actual level of the tone register to other contour tones

ABSTRACT

This study was aimed at studying the aspects of the tone patterns of the Kikamba noun phrases using the Optimality Theory. The study attempted to establish the tone processes and patterns in the Kikamba Noun phrases especially the Machakos dialect. Kikamba MDK, just like any other language has dialectical variations and therefore our study focused on Machakos variety. This study also aimed at establishing the functions of the tone processes are in the Kikamba language especially the MDK noun phrase. It further attempted to establish some of the Optimality Theory constraints that govern the tone processes in the MDK noun phrase. The study also tried to analyze the tone processes and present them in tableau using the constraints of Optimality Theory. The motivation of the study stems from the presumption that Optimality Theory is a universal theory that can account for the analysis of tone in any language. The study targeted residents of Mumbuni location, Machakos County. Systemic convenient sampling method was used to select 10 residents from the target population, from which 5 male respondents, 5 female respondents was selected randomly. Tape recorded interview schedules were used to collect data from the selected respondents. Qualitative data analysis technique was used to analyze the data. The study outcome was presented by using textual description, figures and tables. The study revealed that there were different tone processes that occur in the MDK NPs. The different functions of tone in the MDK nouns were also discussed and the various tone processes were evaluated and ranked using OT approach.

CHAPTER ONE

INTRODUCTION

1.0 Chapter Overview

This chapter deals with the background of the study, the statement of the problem, research objectives and research questions. The chapter also presents the justification, scope and limitations of the study.

1.1 Background of the study

Kikamba is a Bantu language classified as E55 by Maho (2009). The speakers of the Kikamba language are known as the Akamba. The population of the Akamba speakers from the 2019 census on the Kenya population and housing, show that the count is rated at 3,893,157 persons.

Kikamba like any other language exhibits dialectical variations. It has three dialects which are the Kitui variety, Makueni variety and the Machakos variety. The present work makes reference to the noun phrase of Machakos dialect of Kikamba (MDK). Mutiga, (2002) found out that Kikamba is a tonal language that bears different tone patterns which are realized differently. There are different theories that tackle the parameters of tone and among them is the auto segmental theory.

Previous studies have shown that Kikamba has different tone patterns that are realized both as underlying and surface tones. For instance, Ford (1975) attempted to describe the tone systems of Kikamba variety in general. Kioko (1994) did a study on the syntax of the Kikamba words. Mutiga (2002) dealt with the types and patterns of Mwingi dialect of Kikamba noun tones. Tone processes were, however, not tackled in the previous studies.

She finds out that the MDK has four tone levels on the noun phrase .i.e. high super low, low and super high tones .She gives the following illustrations on different tone levels.

Mbu ‘scream’
|
H

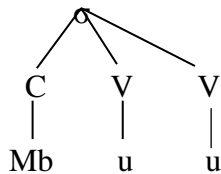
Ngj ‘housefly’
|
L

The tone levels in the language are four namely: high (H), low (L), super high (SH) and the high low (**HL**)

Kikamba noun phrases have a defined morphological structure that consists of a prefix and a root. According to Ladefoged(1989) every language has a combination of sounds within a syllable or even the word. A study carried out by Kimongo (2020) describes the syllable structure of Kikamba nouns. She observed that Kikamba nouns have four syllable structures namely; CV, CCV, CCVV and V.

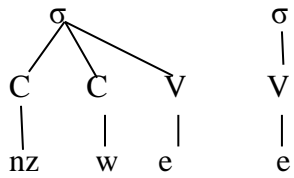
For instance; a CV syllable structure

/Mbu:/ ‘a scream’



CCV syllable structure

/Nzwee/ ‘hair’



The Autosegmental Phonology by Goldsmith (1976) discusses the nonlinear structures in Generative Phonology. It claims that the underlying tones are presented on different tiers on both the consonants and vowels leading to tiered representations in the surface structures. Here the elements presented in each tier are also known as autosegmentals. Similar to the Optimality Theory that the study employs, the Autosegmental Theory has principles that are also known as well formedness conditions which are meant to govern the multi-tiered structure of the representation.

The Kikamba grammar has a way of forming words from the morphemes through prefixing and suffixing. Kikamba noun classes are classified seventeen classes out of the numerous proto-Bantu classes that were mentioned by Welmers (1973) and Meinhof (1932). According to Mutiga (2002) nouns belonging to similar classes' often share identical prefix system. For instance according to Mutiga (2002: 49-50). He classified nouns in different classes as follows:

Class one and two nouns

The first class is indicated by the use of [mo] prefix

e.g. /mo+ndo/ - [mondo]-person

/mo+aka/ _ [mwaka] -a year

/mo+ka _ [muka] - a wife

Class two is denoted by the prefix [a]

For instance;

/a+ka/- [aka] -wives

/a+ndo/ - [a+ndo] -people

Class three is also denoted by the prefix [mo]

e.g.

/mo+twe/ _ [motwe] _head

/mo+ka/ _ [moka] _his wife

There are other thirteen classes that we have not illustrated here as Kikamba has seventeen nominal prefixes according to Welmers (1973) and Meinhof (1932).

e.g.

Nominal class	Prefix	example
1	/mo-/	/mo-uki/ - one who is mad
2	/a-/	/a-ki/ - builders
3	/mu-/	/mu-twe/ -head
4	/me-/	/me-sa/ -table
5	/e-/	/i-ia/ -milk

Mutiga (2002) points out that these vowel sounds are usually differentiated by length since each has a long or short distinction that is phonemic. These particular vowels comprise of two mid low, one low vowel, two High and two mid high vowels. She mentioned that each vowel has long form vs a short form.

For instance,

Short vowel	long vowels
i	/ i:/
e	/ e:/
a	/a:/
u	/ u:/

The present study was based on the Optimality Theory (OT) by Allan prince & Paul Smolensky (1993, 2004). OT is a theory of language and grammar in which well formedness constraints on output determine grammaticality. The theory develops in the context of specific empirical issues about the manner in which phonological systems are organized. The basic formal element of the theory is the constraint. The theory proposes two types of constraints. The first one is the markedness constraints that evaluates the output representations only and therefore penalizes them from presence of particular configurations. For instance, the NOCODA prohibits the output of the syllable ending for it to occur on a consonant.

The second is the faithfulness constraint that evaluates how the input and the output form are related expecting a similar repetition of the input amongst some particular structural aspects. For instance, the constraint MAX denies all deletion. Our study henceforth limited itself to the two constraints in an attempt to describe the tone patterns and processes in the MDK Noun Phrase.

1.2 Statement of the problem

A complete grammatical description of Kikamba would include the complete tonology of the language. Several studies have been carried out on the features of tonal grammar of different syntactic categories in Kikamba; however, the complete picture is far from complete. There is a lacuna in that the tonal processes of Machakos Kikamba have not

been described to the best knowledge of the present researcher and the literature reviewed. The present work is couched within Optimality Theory (OT) which unlike the previous generative accounts for processes in terms of constraints and not derivations from underlying forms. The tone system of the noun in Machakos dialect has not been described according to the literature reviewed.

The study uses the Optimality Theory therefore to analyze the tone patterns of the MDK Noun phrase, something that has not yet been attempted.

1.3 Research objectives

The specific objectives were to;

- i. describe the tone process in Kikamba noun phrase.
- ii. analyze the functions of tone processes in Machakos dialect of Kikamba noun phrase.
- iii. evaluate the Optimality Theory constraints that govern the tone processes in the Machakos dialect noun phrases.

1.4 Research questions

The research questions were:

- i. What are the tone processes in Machakos dialect of Kikamba Noun Phrase?
- ii. What are the functions of the tone processes in the Machakos dialect of Kikamba Noun Phrase?
- iii. What are the Optimality Theory constraints that govern the tonal patterns in the Machakos dialect of Kikamba Noun Phrase?

1.5 Justification of the study

This study is important in terms of its effectiveness in view of the practability and theoretical implications. The outcome in the study has increased the knowledge to the analysis of tone in the Kikamba Noun phrase in particular and to other grammatical categories in the language and by extension to other Bantu languages that bear the tone. The description of the tone patterns in MDK Noun Phrases will add new light in the understanding of differences between the tones patterns of NP found in other dialects. The optimality theory though not a recent model, has helped in better description of the tone patterns in the MDK Noun Phrases.

Our study therefore contributes to the field of phonology by adding linguistic knowledge in general about tone description in Noun phrases and in other grammatical categories hence enhancing the understanding of tonal patterns. The information collected from this study can be used in comparative linguistic studies in since the MDK noun phrases can be compared with those of other languages that are tones bearing. The scarcity of research on African languages means that a lot of indigenous knowledge has been ignored and it lost gradually since the guardians of the knowledge pass on time to time. It was assumed that this study has augment cultural conservancy of African languages as well as inspiring further studies.

1.5 Scope and limitations of the study

This study limited itself to the Machakos dialect of Kikamba noun phrases. It has mainly dealt with the analysis of the tone processes in the Kikamba noun phrases. It aimed at

establishing the function of the tone processes in MDK noun phrase and establishing the constraints that govern tone processes of the MDK noun phrases optimality theory.

Our study therefore applied the optimality theory by Alan Prince & Paul Smolensky (1993/2004). The theory has three components which include the Generator which gets in an input and then generates several outputs, the constraint that gives criteria in the form of ranked violable constraints then it is given a chance to choose between the candidates and the evaluator that selects the optimal candidate based on the constraints which are the candidates. The study restricted itself to the constraint component that has the markedness and faithfulness constraints in attempt to meet its objectives. The study employed a descriptive linguistic approach in the analysis. In addition, the study employed the interviews and wordlists as instruments for data collection.

This study limited itself to the phonological aspects of tone and did not look into other linguistic aspects such as syntax, pragmatics and semantics as linguistic aspects.

Kikamba language has three major dialects. i.e. the Kitui dialect, the Machakos dialect and the Kilungu –Makueni dialect as quoted by Mutiga (2002). The study henceforth used written and spoken data. The optimality theory that the present researcher used is not a recent theory therefore it may have some shortcomings in its application.

1.6 Chapter summary

This chapter has discussed the background of the study, discussed the statement of the problem, outlined the research objectives and the research questions, presented the justification of the study and finally enlisted the scope and limitations of the study. In the next chapter the study looks into the literature review and the theoretical framework.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.0 Introduction

This section reviewed the relevant literature on the tone processes of the Kikamba noun phrase specifically the Machakos dialect. It also gives a review of the theoretical framework of the study.

2.1 Literature review

The literature review is done in the following thematic areas:

2.1.1 Tone in Nilotic languages

Several Nilotic languages spoken in East Africa display formal marking of tone based on the different realizations. This is according to Tucker & Mpaayei (1995) who studied the Maasai and Kalenjin dialects. In a study carried out by Ladd (2008) in the southern Sudan in the Luanyjang language which is type of Dinka a Nilotic language indicate that the language has basically four tones which are Low (L), High (H), falling (HL) and rising (LH). The study still describes the manner in which underlying tones are moderated in speech by several phonological processes. Dinka languages in general have different suprasegmental features like tone, vowel length and voice quality according to Remijsen & Ladd. (2008). They realized the Luanyjang has three degrees of vowel length. This particular study provided the researcher with important insights on the manner in which underlying tones are realized.

Rasmussen .A. (2002) carried out a study on the tone in Il-keenyoikie of maa verbs. The study noted that the verb roots were toneless and that it was the nominal case that

determined tone in Maa language. The study shows that all nominal items bear tone and the minimal difference in the language is brought out by tone. The researcher looked into the function of tone in the il-keenyoikie dialect of Maa. This study gave insightful information on the function of tone which is a key issue in the current study.

Rasmussen&Payne.(2001) in their study analyzed down step of tone in the Maa language. They show that polar tones which are regarded as a common phenomenon in the tone systems, down step of tone occurs as a H tone when adjacent to a L tone and as a L tone when it appears adjacent to a H tone, this particular study gave useful information to the current study in the analysis of down step of tone in the MDK NPs.

Lodge. (1994) researched on the phonological system in the Kalenjin specifically on vowel harmony. The researcher observes that certain features like tone alternate in one and the same TBUS depending on those next to it.This study used the Autosegmental framework in the analysis of tone whereas our study used the optimality approach. We borrowed a lot of insightful information on the analysis of tone.

2.1.2 Tone in Bantu Languages

Various scholars have contributed to the study of tone in different word categories though there is still a lot left to be studied. Some Bantu studies have conducted researches on the tone allocation on verbs. For example Mutaka (1994) did a study on the morphological elements of the verbal patterns of the Kinande, a language spoken in Zaire. He uses the lexical phonology and morphology (LMP) to carry out his study. His research confirms that Bantu verbs are tonal. He also observes that Kinande has tonal melodies in which the high toned suffixes are added to the stem in some particular verb tenses. This study helped

in our research in that it provided information that was significant to our study. We used the Optimality Theory to study the tone in the noun phrases while they used the LMP Marlo.R. (2014) carried out a research on the Kuria tone melodies. The study revealed four basic tone melodies which are characterized as H tone that occurs towards the left edge of the paradigm. The study discussed the rules of assignment of High melodic tones in the moras of the verbs. Further the study explains how high tone spreading occurs in the Kuria verb. The study was based on the verbs while the current study focuses on the nominal classes. Our study therefore borrows insights on high tone spreading.

Oluoch.O (2003) did a research in the Lunyala which is a Bantu language in western Kenya focused on the phonological aspects and rules that govern its lexicon. He studied the different processes on syllable and syllabification. He discussed the noun stems, the noun classes and the assignment of tone on nominal classes. The study shows that Lunyala is a tonal language. This study is helpful in the current study in that it gives important insights on syllabification and tone allocation in nominal classes.

In a research carried out by Hyman (1980) on initial vowel and prefix tone in Kom (GB language), he found out that CV- prefixes are sometimes preceded by an additional schwa. Whether the tone of a noun prefix will be H/L is determined by a number of issues. Like other GB languages, Kom has both low and high tones. It also has M (mid) tone on the surface. HM and ML tones are also attested while LM and MH rising tones are marginal.

Kamba Muzenga (1988) observed that most cases of the BB languages have prefixes. Some languages in the Sotho like the Sesotho, Setswana and Sepeli allow a subject of the noun to be realized as absent at the crossroad of the phonological, discourse and syntactic qualities.

Cammega .J. (2004) in her study on igukuria phonology focuses on Nyabaasi variety . She studied tone in kuria infinitives using the melody based approach. She also analyses tone allocation in the kuria verbs. The study was helpful as it provided the basis of tone allocation to this study,

According to Hyman (1980) Aghem is a language where null prefixes are mandatory when all nouns are followed by an agreement. He says that a singular class with a cover prefix may form a gender with a plural one without a prefix.

Walker.R. (2012) reviews the analysis of vowel harmony using the Optimality Theory. Vowel harmony is a situation where the vowels in lexical items agree in terms of rounding, vowel height or blackness. She uses Optimality Theory to rank the named features. The study gave insights on ranking of constraint in the OT approach.

2.1.3 Ordering of tone rules in Bantu

Meeussen (1967) carried out a study on the ordering of tonal rules in Bwakire language. They noted that tone deletion, tone simplification, tone copy and tone lowering are part of the tone ordering rules.

In some situations, the tone does not survive and it is deleted if the vowel gets deleted hence tone deletion.

e.g.	Nominal prefix	Root	Output
	/ mo/	/ olana/	molana -woman
	/ mo/	/unana/	moan -man

In the above, the prefix in the said vowel deletes its own tone and therefore the noun is brought in to the root of the first vowel where the tone is high.

Tone copy

Here the morphemes copy the tone hence replacing the last vowel of the root.

For example;

/ligwa+na/ - [ligwana] -to die with

Tone simplification

The tone sometimes survives and then re-unites with the prefix if the vowel of the root is deleted. It therefore takes a simplified shape.

For example

NC Root	vowel deletion	tone simplification	output
/Ba+olana/	/Ba+lana/	/Balana/	[Balana] -women

In Bantu languages according to the study, in the tonal process where the second in the two consecutive tones that are high are orderly lowered or even deleted. Two successive High tones will therefore lead to the lowering of the second.

Underlying tone and surface realization in Bantu

Downing (2002) reasons that variation in the realization of tone in the Bantu languages is by stating various stems that are relevant for stem association. Most Bantu languages suppose that a tone that is high is either similar in all the stems in reduplication or a high tone that is realized in only one stem during reduplication. Most Bantu languages have an underlying two height system. Many have only H and L in their outputs Hyman & Valinande (1985). In Kikamba, there is not only contrast between H- and a super-high but L tones. Low level and an extra low level are sometimes falling tone (Ford 1976, Odden) & Robert –Kohno (1999)

e.g. Njāa- burnt sugarcane (low level)

Nzāa - hunger (falling)

Tone shifting in Bantu noun phrases

Tone shift refers to a situation whereby particular sounds are upgraded or degraded stepwise along some phonetic scale in a given context. McCarthy (1993) realized that this particular shift consists of a unified phenomenon of vowel reduction. In a study carried out by Malambe (2006) in the siSwati language using the Optimality Theory, makes several generalizations on tone shift. In her study, she quotes (Kisseberth & Odden 2003:62) that the mobility of (H) tone is one important phenomenon in of Bantu tonology. High tone shift and spread are said to be examples of that mobility. Malambe further quotes Myers (1997) who observed that if two high tones are placed side by side, there are usually some adjustments that are done and this does not occur in the case of low (L) tones. Myers further argues that the positioning of High (H) tones is restrained unlike the low (L) tones that can occur in any given place. Malambe then makes her generalizations about tone shift. For instance, a phrase finally shift may occur if one (H) is deleted and the next one moves to the antepenult.

L L H H

ni ya yi sebent-a > ni- ya-[yi-sebe: nt-a] means to work

The same case happens at final position of the phrase; the medial position has one tone that is deleted and the one that is left moves towards the penultimate syllable.

L H H

Ni yi sebant- a > ni-[yi –sebent-a Kanye Kanye] ‘work’

In a situation where we have H L H tone series, both high tones remain and there is a shift of the first tone to the next syllable.

i.e. H L H
 a ya seḽènt-a >a – ya-[sebe: nt-a ‘to work

In a study carried out in Zulu language of the Nguni Bantu languages (Downing,2001) shows that there is tone shift in the stated language. The high tone on the rightmost side has to shift from the input position to a position that is near the right end of the word which is basically the antepenult position. Therefore these tones that are high should move by one syllable towards the side on the right and they should not shift to the last syllable.

Stem –high tones -3 syllable stems

Si-ya-sebe’nzisa-we are working

U-ye-bala-she counts - these are pre-stems high tones

Tone association in noun phrases

Tone association according to Clements (1990) has it that tones are usually associated with TBUs in direct occurrence to the right from the left till every tone is fully utilized in a given construction. In this all the tones that remain are afterwards linked to the final TBUS. Finally the TBUs are thereafter linked to the tone on the end. Most Bantu languages have several surface tones like high, low, super high, super low etc.

Mwita (2008) carried out a study the nominal tonology in Kuria and discussed the underlying and surface tones in Kuria language. He realized that the underlying tone distinctions in Kuria are one High vs. ∅ and that low tones are not specified. Also from the study, this language has several surface tones. i.e. High (H) and Low (L) according to Whitley (1995) and Mwita (2008).High tone is denoted by an acute accent (´) and the low tones are not marked.

For example

Okó [rómá] to bite class 15
 | |
 L L H H

Okó [βéké [kérá]] to call - class 15
 | | | |
 L L H H H H

The representation of surface tone patterns in Kuria is guided by the presence of either monosyllabic, bisyllabic, trisyllabic or other syllabic stems.

Kikuyu is a very complex tonal language according Clement & ford (1981; 1984). They observed that it has the high (L) and the low (H) floating tones. These low tones are both at the lexical and phrase level. Clement & Ford (1984) show that the lexical floating tones are realized in the final position of the noun phrases. They also establish that there are three basic phenomena that show the presence of underlying tones which are the down step, blocking of the non-finality rule and the unbound HTS. Non- finality is an OT constraint which deters High tones on the edge of the given domain. Our study will therefore borrow a lot from this study since we are using the OT that was used in this study.

Mutahi (1977) establishes that Kiambu is a tonal language. He says that tone helps in classifying dialects in a given language. He observes that Kiambu has both High (H) and Low (L) tones. He further argues that a word that starts in a low tone in one dialect may begin with a high tone in a different dialect.

Kikamba literature began during the ages of early missionaries. They provided important aspects in the initial grammars that they needed to use in their studies. Farnsworth (1952, 1957) gave an introduction on the Kikamba grammar and an explanation of the main aspects of the grammar in Kikamba. The study dealt with the morphology of the noun classes, word order and verbal classes. The above works are very significant in the study of MDK noun phrase because they gave useful information to our study since our study borrowed information from the nominal categories.

Further, Maundu (1980) and Kitavi (1992) investigated the phonological, morphological and lexical differences that happen between the different dialects of Kikamba. The above studies provided insight into the study on Machakos dialect noun phrases. Our study will borrow information from the variations (phonological, morphological and lexical) that were established in the above study and use it to identify the tone patterns in the MDK noun phrase.

Kioko (1994) carried out a study on Kikamba tone and in her paper; she describes the tone patterns of Kikamba words in general. She therefore did a general study of Kikamba words without limiting themselves to any Kikamba dialect. This study has left a gap that needs to be studied, concerning the Machakos dialect of Kikamba noun phrases. This is what our study will be dedicated in; filling the gap of what has not yet been tackled.

Mutiga (2002) discussed the tonal aspect in Kikamba which is phonological. She identifies and describes the lexical and grammatical functions using the auto segmental theory. Our study is different from hers in that, we used the optimality theory to study the tone processes in the noun phrases of the Machakos dialect of Kikamba. Our study

therefore borrowed several important insights on tone from their study. She reveals that the dialect has different levels of tone association. She finds out that the MDK has four tone levels on the noun phrase .i.e. high ,superlow,low and super high tones .She gives the following illustrations on different tone levels.

Mbú – screams

|
H

Mù ndù – person

| |
L SL

Mú twě – head

| |
H SH

OT deals with constraints on tonal associations. In MDK, the super low tone is shown only on the last position of a word whereby all the word or sentence final place. (Mutiga 2002)

According to Kioko (2005) also finds out that the last position in a low tone is required as extra low which is the super low while the higher tone in the Kikamba is referred to as the super high.

Theoretical Framework

2.2 Optimality Theory (OT)

Optimality theory is a theory of language and grammar which entails the well formedness constraints on output in which they are determined grammatically. The theory is a constraint based approach. The theory was proposed by Allan prince and Paul Smolensky.

It was originally developed from generative phonology. The mentioned constraints can be used simultaneously as a representation of structure. Optimality theory is a linguistic model that has in it forms of language that arise from the optimal satisfaction of conflicting constraints. It is therefore a general model that shows how grammars are structured. O.T has three basic components viz: the candidate generator (GEN), the constraints (CON) and the evaluator (EVAL)

a) The Generator (GEN) The generator takes in an input and then generates the list of the possible outputs which are the candidates. The GEN is allowed to produce any given number of output of candidates no matter how they deviate from the input.

1(a) – (d) below shows the part of GEN relevant for tones in the present study.

a. $\emptyset \rightarrow T$	b. $T \rightarrow \emptyset$	c. T \vdots X	d. T \neq X
------------------------------	------------------------------	---------------------------	-------------------------

The processes in (1a) and (1b) add and delete tones respectively, but the ones in (1c) and (1d) add and delete associations of tone. These operations are optional and unordered, so they generate every conceivable matching of the tone tier and the tone-bearing tier for a given input.

b) Constraints

The phonemes do not change according to the different phonetic and phonological environments. The unmarked position is to leave the constituents unaltered. In OT, this unmarked default position is expressed by the Faithfulness Constraints, which deal with the correspondence of the input (I) and the output (O) of GEN (McCarthy and Prince 1995). Correspondence is defined in (2).

(2) Correspondence is a relation between an element of one representation and an element **a'** of another representation.

Correspondence between the input and the output is constrained by Faithfulness Constraints, such as those in (3), which require corresponding elements to resemble each other.

(**MAX-T**: Every input tone and output tone are the same **DEP-IO (X)**: Every element of tone in the output has a correspondent tone in the input. **UNIFORMITY-IO (X)**: If **a** and **b** are distinct elements of type X in the input, then their output correspondents **a'** and **b'** are also distinct elements of type X. **IDENT-T** - Every input tone and output tone are the same. **NOFUSION** - Separate underlying tones must stay separate. ***DISASSOCIATE** – No removal of association lines.

The markedness constraint, on the other hand, was also brought in by Prince & Smolensky (1993). It includes;

***Float**: A tone must be associated with a TBU

Specify T: A TBU must be associated with a tone

***Contour**: A TBU may be associated with at most one tone

***LongT**: A tone may be associated with at most one TBU

Align-Tone (L, R) Align the specified edge (L/R) of a tone span with the head or edge (L/R) of a prosodic or morphological unit.

This study analyzes the tone processes in the noun phrases of the MDK using the constraint principle more specifically the faithfulness and markedness constraints. The constraints were used to describe the tone patterns of the MDK since the main role is evaluating the output representations only.

The evaluator selects the optimal candidate depending on the constraints .It selects the most harmonic. EVAL like all other components is considered to be universal.it chooses the subsets of the candidates that best satisfy the second constraint that has been ranked and therefore selects the best that satisfy the second ranked constraint. . EVAL refers to candidate x which is optimal and therefore if any constraint prefers a different constraint y to x then there is a higher ranked constraint that x prefers to y.EVAL then selects the most harmonic representation from the list. Any forms harmony is viewed by the extent to which the wellformedness constraints are met in that specific form. The three tenets can be summarized as:

INPUT → GEN → SUBSET OF CANDIDATES → EVAL → OPTIMAL

OUTPUT

The following constraints, adopted from Cassimjee & Kisseberth (1998)'s

Tone domain (ALIGNTD) Align R (TD, Word) which means that the right edge of the tone domain is aligned with the right edge of the word.

In non-finality, the word-final syllable is not parsed into a tone domain.

The avoid prominence ensures that the stressed (penult) syllable into a tone domain ae not parsed. In the minimality constraint, the prosodic constituents (like tone domains) must be minimally bisyllabic. The following is a default OT tableau that observes maximum faithfulness

Tableau 1

Aa	*FLOAT	MAX-IO (T)	IDENT (H)	DEP- IO(T)	SPEC(H)
a. $\overline{\text{CVCVCVCV}}$ H					***
b. CVCVCVCV H	*!				****
c. CVCVCVCV		*!			****
d. CVCVCVCV H			*!		***
e. CVCVCVCV H H				*!	**

The winning candidate (a) violates SPEC (H) which is relevant for this ranking and has the least effect. Candidate (b) violates the high ranking markedness constraint *FLOAT resulting to a high floating tone. Tone deletion has occurred to candidate (c), violating MAX-IO (T). Candidate (d) has been displaced to the right of the TBU by a High tone and this violates constraint IDENT (H). Finally, candidate (e) has another H that has been inserted violating DEP-IO (T).the present writer notes that *FLOAT and MAX –IO (T)

have unique roles. The optimal output in any given input is the one which has incurred the least serious violations in relation to its competitors

2.2.1 Principles of optimality theory

Optimality theory has the following basic principle according to prince and Smolensky. (2004).

Universality - this means that the optimality theory gives a set of constraints that are common and universal in all languages.

Violability -it dictates that all constraints can be violated although the violation is limited.

Inclusiveness - in this the hierarchy of the constraints evaluates the set of candidates according to their well formedness.

In ranking, the components of con are often ranked on particular languages.

2.2.2 Justification for the use of Optimality Theory

The researcher chose to use OT in this study based on the assumptions of the theory that the constraints are universal and can easily apply in MDK Nps. With the theory bearing constraints that are easily violated, it gives the researcher a chance to choose the optimal candidate in a set of candidates. It is also true that the constraints in OT do not occur in isolation rather they are use in human language and therefore used in different phonological aspects.

2.3 Chapter summary

This chapter has basically reviewed the literature that is linked to this study. It has also identified the gaps that the study has filled. The chapter has discussed the tone in the Nilotic languages and afterwards narrowed to the tone in Bantu noun phrases. It has discussed the literature on the various tone processes in several Bantu languages. Lastly it has outlined the Optimality Theory that has been used in the study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter mentions the methods of research that were applied in order to carry out the study, the research design, the target population, method of collecting information and technique that were used for data analysis. Lastly, the ethical issues are also discussed.

3.1 Research design

This study employed a descriptive survey research design in order to investigate the tone patterns of the noun phrase in the Machakos dialect of Kikamba. This design is meant to explain the features of a given phenomenon, for instance finding out the differences within variables (Mugenda & Mugenda, 1999). In addition, it is better research design that helped in explaining the outcome of tone processes in MDK Nps that concern the current study.

3.2 Study population

This is the total categories of persons from which the researcher wants to conduct his/her study from. For a phonological study, the researcher should identify respondents who are neither too old nor young. This is because the identified sample gave adequate information as required. This study targeted native Kikamba speakers who are very fluent in the language selected noun phrases were used to aid in the collecting the required data.

3.3 Sample size and sampling techniques

This research employed the non-probability sampling which is a situation where you cannot determine the accuracy of an element being selected. It allows the choosing of elements according to some assumptions in relation to the target population. (Litosseliti, 2010). This study sampled 10 residents of Mumbuni location of which 5 are female and 5 are male. This is because the identified sample gave adequate information as required again, the selected ages (25-50) are naturally fluent with the language and have control over their articulators hence giving the desired outcome. On the linguistic population, the researcher narrowed down to twenty MDK noun phrases that would give significant results.

These results used a systematic convenient sampling technique. This method is often applied in researches carried out in linguistic paradigms like theoretical syntax, semantics and phonology which assume that there are lesser interpersonal differences across the population. Systematic sampling technique was used because it is cost effective and quick method of sampling where by the interview questions were asked to those residents who were visited.

3.4 Research instruments

These are the instruments that were used in data collection. This research used interviews and word lists to obtain information from the sampled population. This was achieved by asking the informants some formulated questions from the schedule prepared in order to ascertain some of the tonal processes in the MDK noun phrases. The researcher conducted one on one interview with the respondents at different times. The researcher instructed the

respondents in articulating the selected words. This was then recorded in audio tapes. The word lists that were used guided the researcher in the phonetic and phonological analysis of tone in MDK Nps. The selected Nps were articulated by various respondents so as to enhance reliability.

3.4 Validity and reliability

Validity focuses on establishing the degree to which the instruments of research gather the information that is aimed at. Reliability focuses on discovering the consistency of the feedback gathered by the instruments used.

Questions for the questionnaires were structured and pre- testing was done prior to the actual research was done to ensure that they are valid and reliable. This ensured that the exact facts were determined. In addition to making the instruments more clear and focused, Pilot testing (test- retest) incurs carrying out a pre-test on the tools of collecting data and the methods of identifying and reducing problems

3.5 Data collection procedures

This study made use of both the spoken and written data. In this regard the researcher selected several Kikamba noun phrases and made a word list. The Nps were articulated by the various respondents, as recording was done. Data for this research was collected by interviewing the respondents from the target population. The information was tape-recorded and later be transcribed in notebooks. The data was collected and recorded. The researcher formulated specific noun phrases that helped in guiding the interviews from the selected group of informants. Again, for the purpose of research and in order to attain

the expected objectives, we used secondary information sources to obtain adequate, valid and reliable information. (Denzin & Lincoln, 2000)

3.6 Data presentation and analysis procedures

This research used qualitative data analysis. For analysis of data to be successful the researcher needs to break the data down into small elements in order to identify the features you are looking for. The information from the interviews were analysed by observing general tonal processes in the noun phrases identified. This was in accordance with the view expressed by (Mugenda & Mugenda, 1999) that qualitative data analysis aims at making general statements on how categories of data are related. The process will involve determining the basic tone pattern of the noun stem. Qualitative data was analyzed using interpretive approach which includes sorting and coding of the raw data. Sorting and coding is achieved by transcribing the recorded data, labelling each category, coming up with a metadata and then identifying the different patterns as desired (Bower,2008). Thereafter, the researcher analysed the tone processes by choosing the Optimality theory constraints, than ranked all and finally placed them in tableaux in order to determine the best candidate in each case.

3.7 Data management and ethical issues

Prior to data collection, the researcher ensured that she sought permission to collect information from the mentioned locality. in this case, the researcher ensured that the proposal for this study was submitted to the graduate school and later given permission to carry out the research by NACOSTI.

The researcher ensured to give appropriate and correct identification of her and what he plans to do in the field. The researcher explained clearly the questions she was planning to ask and created a rapport with the informants. This was after getting consent freely from the informants. A consent form was filled by the various respondents. Lastly the researcher made sure not to interfere with the private life of the informants by ensuring that any information given remained confidential.

3.8 Chapter summary

This chapter has outlined the research design, the target population, the sample size and sampling techniques that were used in the study, and the research instruments used. The chapter also outlined the validity and reliability of the research instruments, data collection procedures and the presentation and analysis procedures. Finally, the data management and ethical issues were elaborately discussed. The next chapter outlines the data presentation and data analysis.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.0 Introduction

This chapter provides the description of the tone processes in Kikamba noun phrases and also analyses the function of tone processes in the Machakos dialect of Kikamba noun phrase. Finally, the evaluation of the constraints that govern the tone processes in the MDK noun phrases using the Optimality Theory is discussed. Therefore, the data presentation and the analysis are merged.

4.1 Kikamba tone system

When doing an analysis of a tone language, establishing the number of basic tone in the language is always the first step. Kikamba has a basic two level tones namely High tone which will be marked using the IPA symbol [a´] and the low tone which will be represented using the IPA symbol [`a]

Table.4.1 (a) Explanation of the two basic tones in MDK NPs

In the table 4.1(a) below, the nouns ngú kú for `chicken` and ngù kù for `a gulp` is used to explain these basic tones of Kikamba. The nouns below (4.1, a) illustrate the two basic tones in MDK NPs which are the low (L) and the high (H) from which all the other tones are derived from.

Table.4.1 (b) Presentation of the tones derived in MDK Nps.

Word	gloss	Class
ngú kú	‘Chicken’	Nine
ngù kù	‘gulp down something’	Nine

This table gives a presentation of the various tone levels in MDK Nps. There are five derived tones in Kikamba. The derived tones are: high (H), extremely high (EH) tone, low (L) tone, extremely low (EL) tone and lastly a high low (HL) tone. This is shown below.

Word	Gloss	Tone	Class
1. mú- twé H EH	‘head’	rising	Three
2. n-gú EH	‘firewood’	rising	Nine
3. mú-ndù L EL	‘a person’	Falling	One
4. ng òò EH EL	Heart	falling	Nine
5. nduũ LH	Friendship	rising	Fourteen
5. ndò :tò EL EH	Dream	rising	Nine
6. tâ HL	Lamp	Falling	Ten

4.1.1 Kikamba Noun phrases

Just like most Bantu languages, Kikamba nouns can be grouped in different classes like other Bantu languages. Mutiga (2007) shows that in the Mwingi dialect of Kikamba there are seventeen Noun classes out of the twenty-three proto-Bantu noun classes that were mentioned by Welmers (1973) and Meinhoff (1932). Singular and plural noun roots in

Proto Bantu languages have different phonological shapes, be them segmental, tonal or both.

According to Robert Konho (2000) Kikamba noun class system characteristic of other Bantu noun classes. The allocation of the nouns to the various lexical classes which are marked by class prefixes to which the noun stems are attached .There is nominal agreement between the modifiers prefix to the stem to which it is attached to modifiers in Kikamba, adjectives, demonstratives and quantifiers which are characterized by a very productive agreement system because nouns and adjectives can also be derived from verbs with the inclusion of prefixes, suffixes and specific tone patterns.

4.1.2 Structure of MDK Kikamba Noun phrases

The noun system in Machakos dialect of Kikamba contains seventeen classes (Mutiga, 2002) .The classes are so grouped because of the way they have been structured or depending on their meaning (Kioko, 2019) the nouns have a prefix followed by a root. Each noun class behaves differently when it comes to the tone patterns that are distributed upon them. The distribution of the patterns is influenced by the positioning of the prefix and the root. In this, all the nouns that belong to the same classes usually have similar prefix and agreement in terms of number and person.

4.1.3 Machakos Kikamba Dialect (MDK) Nominal classes

Kioko (2019) also classifies the MDK nouns in seventeen classes. Here, we group the noun classes into their different numbers (singular and plural). Class one and two contains prefixes that denote human beings - ‘ mo’ - , the singular prefix and ‘a’ the plural.

Class one denotes singular ‘mo’ while class two denotes plural of nouns found in class one.

Table 4.1 (c) Representation of class one and two

Class/morpheme	Kikamba noun	Tone	English gloss
1 /mo-/	Mùì mǐ L EL	falling	farmer
2 /a-/	Aì mǐ L EL	falling	farmers
1 / mo-/	Mú sú mbǐ H H EH	rising	King
2 /a-/	á sú mbǐ H H EH	rising	Kings

Class three and four are denoted by prefix /mo/ which is mostly used to name trees, parts of the body and other phenomena.

Table.4.1 (d) Representation of class three and four

Class/morpheme	Kikamba noun	tone	English gloss
3./mo-/	Mú twé H EH	rising	Head
4./me-/	Mí twè H L	falling	Heads
3./mo-/	Mù sú ngwá L H EH	rising	Orange tree
4./me/	Mì sù ngwà L L EL	falling	Orange trees

Class five and six of the Kikamba nouns is denoted by /e/ and it gives names of several nouns such as fruits, parts of the body and objects

In class six, we use prefix /ma/ which represents the plural forms of nouns in class five.

Table 4.1(e) Representation of class five and six

Class/morpheme	Kikamba noun /e/	Tone	English gloss
5. /e-/	È vù L H	Rising	Stomach
6. /ma-/	Mà vù L L	Falling	Stomachs
5./e-/	È vù í L H H	Rising	Dove
6./ma-/	Mà vù ì L L EL	Falling	Doves

Class seven is marked by prefix /ke/. The nouns in this class are used to name physical features, some parts of the body, objects, birds and such things. Class eight is marked by prefix /i/. The nouns here are the plurals of nouns found in class seven as illustrated below the nouns in these classes have a rising tone.

Table 4.1 (f) Class seven and eight

Class/morpheme /ke/	Kikamba noun /i/	tone	English gloss
7. /ke-/	Kí kó mbě H H EH	rising	Cup
8. /i-/	Í kó mbè H H L	Falling	Cups
7. /ke-/	Kí sí kó H H EH	rising	Spoon
8. /i-/	I'sì'kò H L L	falling	Spoons

The next classes 9 and 10 are denoted by the same prefix /n/ or at times zero prefix for some of the nouns that are borrowed. These nouns share same agreement both in singular and plural. These classes have nouns that name birds, animals and names that are borrowed.

Table 4.1(g) Nouns that share same agreement both in singular and plural

Class9/10	Kikamba noun	tone	English gloss
10	Lú là H L	falling	Ruler
9	ndo ǒ LH	Rising	Bucket
10	mé sà H EL	falling	Table

Class eleven is denoted by morpheme /u/ which is used to name objects. Nouns from this class take their plurals from class ten prefixes.

Table 4.1 (h) Nouns that take their plurals from class ten prefixes

Class/ morpheme	Kikamba noun	Tone	English gloss
11-/u-/	Ú tí sí H H EL	Rising	lightening
11 - /u-/	Ú tà H L	falling	Bow
11 -/u-/	Ú vù vù H L EL	Falling	Bat

Class twelve nouns are marked by morpheme /ka/. The nouns in this class indicate diminutives. The morpheme /ka/ represents the singular form of nouns that are found in class thirteen that is marked by morpheme /to/.

Table 4.1(i) Indicators of diminutives that represents the singular form of nouns that are found in class thirteen

Class/morpheme	Kikamba noun	Tone	English gloss
12 /ka-/	Kà vù lí L H H	Rising	Small goat
13 /to-/	Tù vù lí L H H	Rising	Small goats
12 /ka-/	Kà ví sí L H H	Rising	Small boy
13 /to-/	Tù ví sí L H H	Rising	Small boys

Class fourteen nouns are denoted by morpheme /o/. These nouns are mostly abstract and non-countable.

Table 4.1(j) Abstract and Non-Countable Nouns

Class/morpheme	Kikamba noun	tone	English gloss
14 /o-/	Ū là ú L L H	rising	generosity
14 /o-/	Ū thù kú L L H	rising	Evil
14 /o-/	Ū sè ó L L H	rising	goodness

The above abstract nouns are both in their singular and plural forms. Class nouns fifteen are denoted by the morpheme /ko/. Some nouns here are derived from verbs and they represent actions. Such nouns do not have their plurals. Nouns in class sixteen are denoted by the morpheme /va/ and it is used to indicate places giving different meanings. Finally class seventeen nouns are marked by prefix /ku/ to refer to places in a general manner.

Table 4.1 (k)

Class/morpheme	Kikamba noun	tone	English gloss
16 /va-/	Vá lǎ H EH	Rising	That place
16 /va-/	Và ä L EL	falling	Here
17 /ku-/	Kù yà L EL	falling	There

In the above illustrations, we have shown the nominal prefixes of the various Kikamba noun classes.

4.1 Table on Kikamba noun classes summary

Table 4.1 (k) nominal prefixes of the various Kikamba noun classes.

Class/morpheme Singular	Kikamba noun	Class Plural	Kikamba noun	English gloss
1./mo-/	Mù i mĩ	2./a-/	Aì mĩ	Farmer(s)
3./mo-/	Mú twě	4./me-/	Mí twě	Head(s)
5./e-/	È và và ì	6./ma-/	Mà và và ì	Pawpaw(s)
7./ke-/	Kí thĩ má	8./i-/	Ì thĩ má	Water well(s)
9./p-/	Ngú kú		Ngú kú	chicken
10./n-/	Nzá ú		Nzá ú	bull
11./u-/	Ù vù vù		Mbù vù	Bat(s)
12./ka-/	Ká vù lí	13./to-/	Tú vù lí	Small goat(s)
14./o-/	Ù là ú		Ù là ú	Generosity
15./ku-/	Kú tú		Má tú	Ear(s)
16./va-/	Và ndù		Và ndù	Place(s)
17./ ku-/	Kù ndù			Some place

4.2.1 Analysis of tone in MDK noun phrase stems

Kikamba has quite a huge representation of nouns with different number of stems. In the analysis of Kikamba Noun tones, the present researcher adopted the three aspects outlined in Hyman (2014) as:

- a) determining the surface tone by considering words in isolation,
- b) discovering tone alternation by considering phrasal paradigmatic contexts,
- c) producing data and analysis of the various tonal variations.

The first step was to establish the surface tone of the noun phrases in MDK. This has been done as follows;

4.2.2 Monosyllabic nouns

In this category, just one tone applies. They have a simple syllable distribution as illustrated below.

1) a) Ngö - leopard class 9/10

EL

CV

b) ndä- stomach. class 10

| EL

CV

c) Ngì fly -class 9/10

EL

CV

Table 4.2 (a) Monosyllabic stems

Word	Gloss	tone	Class
ngö cv EL	Leopard	falling	9/10
ndä cv EL	Stomach	falling	9/10
ngì c v EL	Fly	falling	9/10

The nouns in the above illustrations belong to different classes as indicated in each case.

As shown above the nouns bear a EL tone that is attached to the vowel although they belong to different nominal classes. The nouns have a CV syllable structure. The tone pattern in this category is the assigning of a low tone on the mora.

4.2.2 Bisyllabic noun stems

These are nouns that bear two syllables. The tone patterns are specific to each case. The nouns have a varied syllable distribution and structure as shown below.

a) Eg. Mù tĩ class 4 ‘a tree’

L EL
CVCV

b) mà tũ –class 6 ‘clouds’

L EL
CVCV

Table 4.2 (b) Bisyllabic stems

Kikamba noun	Gloss	tone	Class
Mù tĩ CV CV L EL	A tree	falling	4
Mà tũ CV CV L EL	clouds	Falling	6

From the illustrations above, the few nouns that have been selected here have a similar tone assignment in which the Low (L) is allocated to the first syllable and a low tone spreading takes place to the next syllable whereby it changes to a EL tone. in such a case the intra-syllabic tone spread rule applies.

4.2.3 Trisyllabic stems

These are words bearing three syllables and they are common in occurrence among the Kikamba speakers. They bear various syllable structures and distribution the commonest been a CVCVCV

3) a) Kì vî lă -class - a ‘chair’

L L EL

- CVCVCV
 b) sù kù lù – class school
 L L EL
 CVCVCV

Table 4.2 (c) Trisyllabic stems

Kikamba noun	Gloss	Tone	Class
Kì vî là L L EL	Chair	falling	7
Sù kù lù L L EL	School	falling	10

From the illustrations given above, the nouns in (a) and (b) above have low tone that spreads to the left into a super low tone. The primary low tone allocation rule takes place in the first vowel which afterwards spreads to the stem of the next syllable and the intra-syllabic tone allocation applies. The low tone is then deleted at the mora next to the last stem. Finally the last syllable takes a SL tone. Therefore tone deletion takes place during the low tone allocation.

4.2.4 Quadrisyllabic stems in MDK NPs

There are several words with four stems in MDK NPs. Such words have a varied syllable distribution. It is noted that the nouns belong to different tonal classes.

For instance

- 4) a) eg mwí sú kú úe –class 1 grandchild

H H H EH
 CCVCVCVV

or

- b) kí sú lú lú class 7
 H H H EH
 CVCVCVCV

Table 4.2(d) Quadrisyllabic stems

Kikamba noun	Gloss	tone	class
Mwí sú kú ũe CV CV CVVV H H H EH	Grand child	Rising	1
Kí sú lú lú CV CV CV CV H H H H EH	Bicycle	Rising	7

From the examples given above in 4 (a), the primary high (H) tone has been attached to the mora of the syllable in the first position and then it spreads to the next syllable two syllables through the H tone doubling process. In this particular case, the first three syllables have high tones but the last syllable has a super low tone. The down stepping tone rule pattern has taken place hence the high tone has down stepped to low. In (b) the intra-syllabic rule applies and the high (H) tone is moves across to the third syllable after which the high tone shifts to a super high SH.

4.2.5 Penta- syllabic and more syllables

These are rare in occurrence among the Kikamba speakers. They fall into different nominal classes and varied distribution of syllables.

- 4) a) Nthyú ngú lú lú _ - type of a bird class

CCVCVCVCVCV

- b) Ità vù tà vù tì lyä – type of a bird class 4

LLLLL EL

VCVCVCVCVCV

Table 4.2 (e) Penta syllabic stems

Kikamba noun	Gloss	Tone	class
Nthyú ngú lú lú CCVCVCVCV H H H H EH	Type of a bird	Rising	10
ɪ'ta`vu`ta`vu`ti`lyã VCVCVCVCVCV L L L L EL	Type of a bird	falling	4

From the above 4.2 (e) the low (H) tone spreads across the syllables and changes to super low (EH) at the last syllable. Basic (H) tone is placed on the first vowel segment and it double spreads to the fourth vowel before it goes down to a EH tone in the last syllable. The same applies for the Low (L) tone in (b) above.

4.3 Tone processes in MDK Nps

The third objective of this study was to describe and illustrate the various tone processes in MDK NPs. There are several tone processes in any tonal language. According to the data collected, the following tone processes take place in the Machakos dialect of Kikamba. The MDK has basically two main (basic) underlying tones which are the high (H) and low (Mutiga, 2007) The two main tones can later convert to either HL, SL or SH, L through various processes such as, tone spreading, down drifting or down stepping, tone deletion, tone association, tone copy several other processes.

4.3.1 Tone spreading

This is a tonal rule where a tone in an initial TBU is spread from the first to the second or third TBU in a stem. (Mwita, 2008.) A high tone can be spread across other TBU in a word.

In the above illustration, primary H tone allocation has been done on the first syllable then it is spread leftwards to the next mora through to the third syllable. This is an H tone spreading.

Similarly, a low tone spreading can take place as illustrated below. In each case, a tone that is low is attached to the first vowel that is then spread leftwards towards the next TBU to the last.

Eg. Nzò kò lò

L L H

Ngú kú

H H

4.3.2 Tone deletion

This is a situation where a tone is deleted during tone modification. In MDK noun phrases, there are several situations that result to deletion of tone. For instance in this dialect, deletion of a low (L) tone is occurs when it encounters a high (H) tone.

L —————> O/HH —————> H

In such cases, the L tone is neutralized by the HH tone if it occurs at the sentence final position. This comes as a result of tone intensification. The intensification rule dictates the change of the L tone subtype at the last position of a sentence.

E.g. Mukwa [mù kù á] -rope

L L H

Mù lí nú kù ìtè mùkù á (Muli is carrying a rope)

L H H L L L L L H

Figure 4.3 (a) tone change at the sentence final position

Kikamba noun*	English gloss
Mùlí nú kù ì tè mù kù á CVCV CV CVVCV CV CVV	Mary is carrying a rope

From the above illustration, the low tone is changed to high tone at the sentence final position.

b) Another case of tone deletion occurs where the low, low ,high (LLH) tone is deleted and it therefore changes to low,high,low (LHL) at the sentence final position. Thus, the low tone is deleted.

e.g. nzò kò ló cockrel
L L H
Mù lí nì wá ò nǎ nzò kó lò (Muli has seen the cockrel)
L H L H L L L H L

Low tone deletion occurs in case where the NP which ends in a super low (EL) tone is modified by an adjective

Mù lí nì wá ù à kì vǐ là kì sè ò (Muli has bought a good chair)

4.3.3 Contour tones

As mentioned earlier, in MDK NPs the TBU is usually the syllable. In cases where just one of the two vowels in along vowels following each other are marked for tone. In that case, that particular syllable has a contour (Mwita, 2008) in MDK NPs a long vowel gives a HL contour.

Eg mú ú ndà -a garden

H H L

Kwó ó kò – hand

H H L

In a case where all the vowels have the same tone, then they take a similar pitch in their articulation.

Eg nthò ò kò peas

L L L

4.3.4 Tone shift

Tone shift is a situation where by some sounds are upgraded or degraded stepwise along some phonetic scales in a given context. There are several factors that bring about tone shift.

a) The low (L) tones shift to the penultimate position in cases where there are short syllables.

E.g. Ì vù kù (a book)

L L H

Mùlì nì wá thó à ì vù kù (Muli has bought a book)

L H L H H L L L L

In the above illustrations, we see that the low tones shift to the right if they occur in the penultimate positions.

b) High tones move (shift) only if they are in the penultimate position and if a low tone follows low tone.

For example

Sá vù nì (soap)

H H L

Mùlí nì wà ò sà sá vù nì (Muli has taken the soap)

L H L L L EL H H L

c) High tones shift to the pre-penultimate position if they are followed by a low tone.

For example

Kù à mù vù kó ù yú (carry this bag)

L SL L H H L H

d) Tone shift also occurs in instances where a high tone is placed on the ultimate position of a noun. This applies if this particular NP comes after a given modifier within the modifier phrase. For example;

- i. usi wa mu li (muli 's river)
(Modifier) possessive

Ù sí wâ mù lí

L H HL L H

- ii. Ndeto sya mwaitu (words of mother)

Ndètó syâ mwá í tu

L H HL H H H

- iii. Nguku iya (demonstrative) (that chicken)

Ngú kú í yà

H H H L

4.3.5 Tone copy

In this process, the tone copy rule initiates the copying of tone to the vowel that is deleted.

For instance, when a high vowel is deleted before any other vowel then the tone is copied

the next vowel as a contour tone. It is a mechanism that is used to link tonal melodies to constituents. Tone copying occurs either leftwards or rightwards. For tone copying to take place, tone bearing units should be linked together. For instance, if we have H tone initially, then this implies that the second H tone will copy itself to the next as illustrated below.

Nthá ká mé - (blood)

H H H

Nzú kú kú -great grandchild

H H H

Nzú kú lú -grandchild

H H H

Copying to the leftwards happens regardless of the number of the TBUs that are there between the floating low L tone and the copied tone. On the other hand, rightward copying cannot take place if there is a floating L tone on the right side (Hyman 2007).

4.3.6 Tone association

We realized that tones in nouns can vary depending on the environment a given noun is in and on how these tones associate with other elements. There are several situations that lead to tone association. For instance; a final low (L) tone is usually realized as a super low (SL) tone at the sentence medial position after association has taken place. Thus, a L tone changes to SL tone after association.

For example,

súà mbèmbà - kùsùà mbè mbà (to peel maize)

HL L L L LSL L EL

Sémbà nyùmbá - kù sè mbà nyù mbá (run to the house)

HL L H L L SL L EL

étè sùlùlù - kù è tè sù lù lù (to bring a chisel)

HL HL L EL L L EL H L EL

In the above illustrations, we note that all the above word final tones have changed to super-low (SL) tones from a low (L) tone. This occurs because of the inclusion of a verb element hence changing their initial position to a clause final from a word final position. Another instance is realized in a case of a clause final high (H) tone in a syntactic environment where we have a super high tone which leads to a High (H) and Low (L) tone to be realized at the clause medial and final positions.

For example,

Ngú kú – kù à à ngú kú (to slaughter a chicken)

HH L L EL HL EH

mbú -kù ù wà mbú - (to scream)

H L L EL EH

4.4 Functions of tone in MDK NPS

The third objective of this study was to illustrate the various functions of tone in the MDK NPs. Tone plays several roles in any given tonal language. Similarly, tone in MDK noun phrases is not left behind and therefore it plays major roles in the language. First, tone in the MDK helps bring a difference in meaning for the lexical items in the language. It is therefore used to differentiate the word classes. This occurs mostly in cases where we have

minimal pairs in the dialect and therefore the word class is dictated by the use of tone. In such cases where the consonants and vowels are identical, then tone is used to bring in the different word classes of these particular lexical items. Note that all the tone levels will apply.

For example

íia - weeds

íia - milk

íia - lake

í í à

í í à

í í à

H L SL

H H EH

L L EL

In the above constructions, the words provided are minimal pairs bearing the same spelling hence it is only tone that brings out the differences. In the above cases, the medial syllable is what brings in the difference when it comes to tone; a SH tone occurs in the first while a H tone comes the second and the last has L tone.

Mbua [mbu`à] - grave

L SH

Mbua [mbu' á] - rain

H L

Muti - [mu' tí] - a tree

H L

Muti [mu' tí] - a seller

H SH

Ivuku [i`vu`kù] - a big rabbit

L L SL

Ivuku [i`vu`kú] -a book

L H SH

The second function of tone in the Machakos dialect of Kikamba is to indicate differences in word classes. This occurs mostly when differentiating verbs from nouns. In MDK Nps we have items that have similar spelling but lie under different word classes. For example;

Sú`á [sú`á] - sun (noun)

H EH

Sù`à [sù`à] -to peel verb

L EL

In the above pairs, the contrast is brought in by the SH and SL tones in the noun and verb respectively.

In addition, tone in Kikamba language at large helps in ascertaining dialectal variations since the language has several dialects. A speaker from the Mwingi dialect of Kikamba may say a particular word in a certain way and a Machakos dialect speaker say the same word in a different way because of the different way of tone used.

For example,

Machakos dialect

Mwingi dialect

Và lù`á

và lù`à , letter

L L H

L L L

Má vù`kú

má vù`kù 'book'

H H EH

H H L

4.5 Constraints in Optimality Theory that govern the tonal patterns in MDK NPS

Optimality Theory (Prince and Smolesky, 1993) is a generative framework which discusses language grammars by providing constraints that are arranged hierarchically. In

Optimality theory (OT), GEN (generator) is the process of mapping input representations on to the output through a set of optional structure-building operations. The general assumption is that the GENERATOR can influence the tone auto segments and their interaction with the tone bearers'. GENERATOR can add or delete tones, and also extends or reduces the number of Tone Bearing Units bearing that auto segment. There is a set of faithfulness constraints and markedness constraints that account for the tonal grammar of Kikamba as shown below:

Faithfulness Constraints

IDENT-T - Every input tone and output tone are the same.

MAX-T - Every input tone has an output correspondent (No deletion of tone.)

NOFUSION - Separate underlying tones must stay separate.

*DISASSOCIATE – No removal of association lines.

Markedness Constraints

OCP – Adjacent identical tones are prohibited.

SPECIFY-T – A TBU must be associated with a tone.

NOLONGT – A tone may be associated with at most one tone.

*FLOAT – A tone must be associated with a TBU.

NOCONTOUR – A TBU may be associated with at most one tone.

The elements are either a segment, or autosegments such as tone, stress, etc floating. MAX-IO does not allow any tone to be deleted. In addition DEP-IO does not allow copying of tone. The constraint IDENT ensures that features elements are not changed.

McCarthy & Prince (1995) proposed the following;

DEP-ET (M &P 1995)) (= *FLOAT): Every tone should have a similar tone bearer

MAX-ET (M &P1995)) (=SPECIFY (T): Each tone bearer should have an equivalent tone.

The default OT tableau that observes maximum faithfulness;

Tableau 1

Candidates	*FLOAT	MAX-IO (T)	IDENT (H)	DEP- IO(T)	SPEC(H)
a. \square CVCVCVCV H					***
b. CVCVCVCV H	*!				****
c. CVCVCVCV H		*!			****
d. CVCVCVCV H			*!		***
e. CVCVCVCV H H				*!	**

The winning candidate (a) violates SPEC (H) which is relevant for this ranking and has the least effect. Candidate (b) violates the high ranking markedness constraint *FLOAT resulting to a high floating tone. Tone deletion has occurred to candidate (c), violating MAX-IO (T). Candidate (d) has been displaced to the right of the TBU by a High tone

and this violates constraint IDENT (H). Finally, candidate (e) has another H that has been inserted violating DEP-IO (T).the present writer notes that *FLOAT and MAX –IO (T) have unique roles. The optimal output in any given input is the one which has incurred the least serious violations in relation to its competitors.

This work analyses the tonal processes in Kikamba noun phrase viz:tone down step, tone spreading, High tone displacement, tone shift, contour tone and tone copying.

4.5.1 High Tone Down step

High tone down step according to pulleybank, (1986) occurs when a high tone is realized as being slightly lower than the preceding high tone, but not so low as to be equivalent to a low tone. A second definition of a down step tone is a high tone that has been down stepped and comes after a floating low tone. The two key constraints that determine down step are:

MAX-IO (T) and *FLOAT (T) as illustrated below in the Kikamba noun ‘mbiti’ – hyena

Tableau (2)

Candidates	MAX-IO (T)	*FLOAT (L)	IDENT (L)
a) CV CV HL H		*	
b) CV CV H H	*!		

In the above tableau, (2) the candidate (a) has a H tone that is followed by a floating low tone and a high tone that emerges as the winning or the optimal candidate. In this case, the floating L tone is not linked and it therefore qualifies for a deletion. The root above prompts the down stepping of the high tone. This candidate violates *FLOAT since the

tone lacks a correspondent TBU. Candidate (b) is disqualified as it gives a different output and violates the high ranked constraint MAX-IO (T)

In cases where the noun phrase lacks the mid tone, it usually takes the floating low tone in order to compensate for it (Clements and Ford, 1979). This is termed as a non-automatic down step. Down step focuses on consecutive High tones in a construction and mainly targets the final H tone. If this happens, the pitch is lowered by the down stepped H tone due to the intervention of the floating low tone. This is shown in the tableau below;

Mú ká!té -bread

Tableau (3)

candidate	OCP	NOLONGT	*FLOAT (L)	SPECIFY (T)	IDENT(T)
a) mú ká!té H HL H				*	
b) mú ká te H H	*!	*	*	*	*

In tableau (3), candidate (a) is the winning candidate. It emerges as the winner over candidate (b) because (b) violates the high ranking constraints OCP and NoLONGT which are crucial for the ranking of displacement. From the above, the final High tone in candidate (a) is down stepped after violating the constraint *FLOAT (L) which prohibits a floating Low tone.

OCP effects on down step of high tones in Kikamba noun phrases

a) High tone down step lexically

As mentioned earlier down step of tone is one of the patterns that affect tone distribution in Kikamba nouns

Eg kalá!i Mù vù ko
 L HL H L H ' ' '

/Muvuko/ /muvuko/ - bag
 /Kalai/ /kà lá!i/ - basin

The above cases, lexical down step are prompted by a floating L tone which leads to a high (H) tone. OCP motivates the occurrence of the Floating (L) tone between the consecutive high tones hence Kalai. OCP in this case is undominated and therefore other constraints like NO LONGT, SPECIFY-T, will be lowly ranked eg

Tableau (4)

		OCP	NO LONGT	SPECIFY-T	IDENT-T
A	Mùvúkó \ V L H		*!		
b ^{opt}	Mùvú!ko \ \ \ L HL H			*	*
C	Mùvúko \ L H H	*!			

The optimal candidate in tableau (4) is (b) which is the most harmonic as it satisfies two higher ranked constraints OCP and NO LONG-T. Candidate (c) is the loser as it violates OCP constraint that disallows adjacency of identical tones. The OCP has resulted to the down step of the H-tone.

Grammatical down stepped high tone

In MDK NPS, grammatical down step can take place if we have two consecutive H tone on bisyllabic constructions. This happens in a situation where the bisyllabic word appears at the rightmost position of a construction.

Ngúkú ‘chicken’
H H

Nguku mwela – ‘a female chicken’
/ngú kú mwèlá/

Tableau (5)

	Candidate	OCP	NO LONGT	FLOAT	SPECIFY-T	IDENT-T
A	<p>Ngúkú mwélá H</p>		*!			*
B	<p>Ngúkú mwélá H H H H</p>	*!				
c ^{win}	<p>Ngúkú mwélá H L H</p>			*		*

The winning candidate (c) in the tableau above does not violate OCP which is a highly ranked constraint. The candidate (b) violates the high ranking constraint OCP. The OCP constraint has prompted the occurrence of the floating L-tone as it prohibits consecutive H's in the construction.

In the table above the ranking is thus

OCP>>NO LONGT>>*FLOAT>>SPECIFY>>IDENT-T

The winning candidate (c) is the optimal one as it satisfies the rule on the occurrence of adjacent identical tones. It is expected that candidate (a) could have been the optimal candidate as it observes the dictates of OCP but it is not relegated as the winner to the spreading. This makes it to fatally violet NO LONGT candidate (b) is the least harmonic as it violets the highly ranked OCP constraint.

High tone displacement (final)

This is a tone process in Kikamba tonology in which a tone that is high (final) is displaced by a low tone as a result of OCP effects. This happens as a result of SPECIFY-T impact a Tone Bearing unit should be associated with a tone.

Kúá mútú 'carry the flour'
 H H HL

Tableau (6)

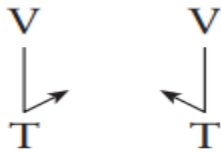
	Candidate	OCP	IDENT-T	SPECIFY-T	MAX-T	NO LONGT
A	Kúá mútú H HH	*!	*		*	
b ^{win}	Kúá mútù / \ H L		*		*	*
C	Kua mutu / \ \ H H H H	*!				

From the above tableau (6), the optimal candidate is (b) with reference to high tone displacement. This is as a result of satisfying OCP which is highly ranked.

Candidate (c) violates the high ranked OCP constraint and this makes it a loser although it satisfies all other constraints. This brings a serious competition of the markedness and faithfulness constraints between candidate (b) and (c).

4.5.2 Tone spreading

Tone spreading is a phonological process which moves the tone association lines to a given direction. For example, a tone that is high which is associated with an initial vowel later is associated with the vowel(s) that follow (as shown below). This process is demonstrated using an arrow in the auto segmental rule. This arrow points rightwards if the spreading is to the right and points to the left of the unbounded spreading is to the left. (Crystal,2008)



A high tone can be spread across other TBU in a word. The primary H tone allocation on the first syllable then it is spread leftwards to the next mora through to the third syllable. This is an H tone spreading as illustrated.

Tableau (7)

	Candidate	OCP	SPECIFY -T	IDENT -T	NO FUSION	*DISASSOC	NO LONG T
A	Mútwé H H	*!					
B	Mútwe H		*!	*		*	
c	Mutwe H			*	*		*

As seen from above, candidate (c) wins over the others. Since it highly satisfies the OCP constraint that is highly ranked. Candidate (a) fatally violates of dissatisfying the OCP constraints as it allows adjacent tones to be identical. The ranking therefore OCP>> Specify-T >>IDENT>>No fusion >> Dissassoc. Candidate (c) allows H-tone spread.

High tone spread (HTS) is a process whereby a tone that is high appears both on the surface of the underlying syllable associated to it and also on the surfaces on the syllables that follow. Bounded high tone spread to a tone that is high just one step to the next syllable.

Unbounded High Tone Spread stretches a tone to several syllables in a given prosodic domain (Cassimjee & Kisseberth 1998)

High tone spread of H tone in MDK occurs to the immediate right adjacent syllable. A tone that is high in a noun phrase stem spreads up to the next to the last syllable of the word in polysyllabic nouns. Eg Kiimbalutya

CV CV CV CV

Tableau (8)

	CANDIDATE	OCP	MAX-T	SPECIFY-T
A	Mavuku H H H	*!		
b ^{top}	Mavuku / / H		*	*

From the above table, candidate (b) wins over the other candidates since it fulfills the requirements of the higher ranked OCP constraint which prohibits occurrence of similar tones. Nevertheless, this candidate violates MAX-T as it allows tone spreading. Candidate (a) although it has less violations of the other constraints, it fatally violates OCP constraint which does not allow adjacency of identical tones. (Kager, 1999, YIP 2002)

Mono span (MS) is a constraint that can help in preventing the spreading of a H tone input. Monospans dictates that a HTs cannot be more than one TBU. This can be illustrated as shown;

CVCVCVCV

Kisululu –bicycle

|
H

Tableau (9)

Candidates	MS	SPEC (T)
a) tu Ki su lu lu CVCVCVCV H		***
b) Ki su lu lu CVCVCVCV / / / H	*	**

In the above table, candidate (a) is the winner as it satisfies the highly ranked constraint. MONOSPAN which prevents spreading of H tone to more than one TBU's. Candidate (b) loses out because it allows H tone spreading to multiple TBU's in the output form.

Add feature is an approach which disqualifies situations in which a segment lacks an element in the input, but the element is in the output. The constraint is the opposite of IDENT (f). It states,

The illustration is as follows:



Tableau (10)

Candidates	FIDAT	IDENT (H)	MAX-10(T)	DEP-10	*A-F	SPEC (T)
(a) CVCVCVCV / \ H						**
(b) CVCVCVCV / / / H					*!	*

From the tableau above, candidate (b) is the most disharmonic since violets ADD FEATURE constraint alongside SPECIFY (T). The winning candidate is (a) as it only dissatisfies SPECIFY (T) constraints. The hierarchy of the constraints is thus:

*FLOAT>>IDENT (H)>>MAX-10(T)>>DEP-10(T)>>

*A-F>>SPECIFY (T)

Add feature penalizes the case of H tone spreading that occurs only in the output.

Unbound spreading of tone in MDK Nouns is evident where a H tone spreads from one TBU to the next on the right. The unbound spreading of H tone is seen to begin from the first TBU to the next in the word/paradigm.

Here, the constraints ALIGN is highly required which needs a high tone spreading output alignment to be on the right end of the noun phrase. ALIGN (H, R, PW, R) according to the end on the rightside of a high tone spreading should match with the rightmost end a noun. In the case of tone spreading; a No Gapping constraint is introduced to prevent gaps during the tone spreading. (cf Kisseberth 1993, Akinlabi 1994)

CV CV CV

Nzú kú kú- great grandchild

H

Tableau (11)

Candidates	*GAP	IDENT (H)	AL (H,R)	*H	SPEC (H)
a) CVCVCV H				***	*
CVCVCV H	*!			*	**
b) CVCVCV H		*!		*	***
c) CVCVCV H			*!*	**	***
d) CVCVCV H			*!*	**	**

In the above tableau (11) *GAP is the highly ranked constraints that aids in the tone spread. The winner candidate (a) satisfies the three highly ranked constraints viz: *GAP >> IDENT (H) >> and AL (H, R). Candidate (b) violates the *GAP constraint that allows a gap between two TBU's with *H. Candidate (d), (e) and (f) are ruled out as they dissatisfy ALIGN (H, R) as the rightmost end of the outputs HTS does not match with the rightmost end of the word,

Bounded spreading can be accounted by having a High tone that contains exactly two TBU's i.e. high tone spans should be binary.

From this we derive the constraints DOM BIN (HTS) according to (McCarthy and Prince 1993). This constraint requires that a tone that is (H) high should have two tone bearing units. In Kikamba noun phrases, DOM BIN (HTS) will take place if the output on the leftmost end of the HTS aligns with the leftmost end of the input leading to bounded spreading

This is illustrated below

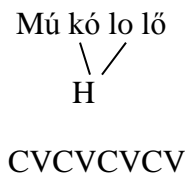

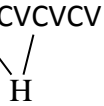




Tableau (12)

Candidate	AL (H,L)	DOM BIN	*H
(a) 			**
b) 	*!		**
a) 		*!	*
b) 		*!	***

In the tableau (11) above candidate (b) makes the worst violations disharmonic as it dissatisfies constraints ALIGN (H, L) which are highly ranked. Since the leftmost end of the output does not match the leftmost end of a stem. It does not satisfy the *H constraint candidate (c) and (d) also dissatisfy a more domineering constraint DOM BIN for they

lack the two TBU's. Lastly candidate (a) is the wins the competition candidate as it slightly dissatisfies constraint *H which is lowly ranked.

Bounded spreading of floating H tones in MDK nouns can be accounted for using the rightmost end of the input. The alignment parameter dictates that the end on the left side of the right most TBU in the output which is HTS should match with the rightmost end of the input with the rightmost. The OT constraints ALIGN (H, L, R; H, R, R) *H account for HTS

CV CV CV CV

Tableau (13)

Candidates	ALIGN(H,L,L)	ALIGN(H,L,R)	*H
(a) CV CVCVCVCV H			**
(b) CVCVCVCV H	*!		*
(c) CVCVCVCV H		*!	**
(d) CVCVCVCV H		*!	*
(e) CVCVCVCV H		*!	**

In the tableau above, Candidate (a) is the optimal candidate since it does not violate constraint ALIGN (H, L, L) and ALIGN(H,L,R) which are highly ranked. candidate (b) commits the worst violation as the high tone doesn't align with the leftmost end of the input hence making it the most disharmonic in candidates (c), (d) and (e) they also violate

the second ranked constraint (ALIGN (H, L, R; H, R, R) since the rightmost end on the input doesn't match the leftmost end of the last TBU in a HTS output.

4.5.3 Tone association

OT has three principles which are violability, ranking and inclusiveness. Here, the constraints can be referred to as structural entity that can be fulfilled or violated by an output. OT presupposes that languages have a given number of constraints which give the basic phonological and grammatical order in a given language. The present study adopts Myer (1994:1997)

Instead of OT formulating features on the surface structures by applying several outlines phonologically, it takes a grammatical assumption that a candidate can only be optimal if it satisfies constraints that are considered to be of a higher rank. This candidate has structures that are formed from a particular output as processed by GEN which is responsible for the generation of inputs.

The first step is to mark the underlining tone-bearer that is related to the tone. The second step is assigning heads by revising GEN. "Associate Free Tone" (1a) is applicable to unassociated tones, and it outputs a head association. "Associate" (1b) is applicable to any tones, and outputs a non-headed association. "Keep Association" maintains outputs and head association.

Source (Myers1994:1997)

Associate joins tones to syllables (a)

- (a) Associate free tone (b) keep (ASSOC) (c) keep (T) (d)
- (h) h h h h - -> H
 O - -> O O - -> O

Keep (ASSOC) works in underlying association for output association. Keep (T) keeps underlying association for output tones.

All the above operations are structural building i.e. Association adds association lines to the representations for keep (ASSOC) and keep (T) they help in addition to parsing as a property.

The above operations will be used to generate any pattern between tones and syllables these associations are determined by faithfulness constraints such as.

- (a) PARSE (T) A tone should be parsed
- (b) PARSE (T) Any association should be parsed
- (c) *FLOAT: Any tone should be associated to a parsed association with a TBU.
- (d) *STRUCT (A): association should not occur

PARSE (T) provides a * for every case of a lower-h which makes sure that every tone that is underlying is realized. PARSE (A) assigns * for every dotted line and it demands that a tone should remain underlying as assigned *FLOAT provides a * for every floating tone while *STRUCT (A) provides a * for every association regardless of if it is parsed or not. It therefore rejects any association, A * on ALIGN is also noted for each tone bearer (TBU) which separates a parsed tone from the leftmost end of the input.

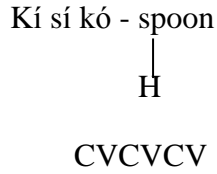
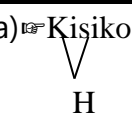
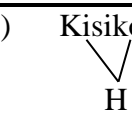



Tableau (14)

Candidate	PARSET (T)	PARSE (A)	ALIGN
a) Kisiko  H			*
b) Kisiko  H	*!		
c) Kisiko  H		*!	

In the tableau (14) above, the candidates have just one underlying tone and a one that is not underlying since there is a floating tone. As noted above, PARSET (A) and PARSE (A) are highly ranked as compared to ALIGN since the underlying tones do not gravitate to the left edge. The earlier mentioned operation for GEN for tone can help in deriving constraints that motivate spread and association.

- (a) LEFT – HD: the TBU on the left of any tone span should be a head.
- (b) T-BIN: there can be just one non-head in a tone span
- (c) FILL (O): each syllable must be linked to a tone

Thus the hierarchy

LEFT-HD >> T-BIN >> FILL (O) >> *STRUCT

eg kǐ sù lù lù- bicycle input / h /
 | | | |
 H H H L /kisululu/

Tableau (15)

Candidate	LEFT-HD	T-BIN	FILL (O)	*STRUCT
a) kǐ' sù' lù' lù H			***!	*
b) ǐ kǐ sù lù lù H			***	**
c) Kǐ sù lù' lù H	*!		***	**
d) Kǐ sù lù lù H		*!	**	***

In the above tableau (15), the winning candidate is (b) which is the most optimal in the spread of the high tone that underlies in the single syllable to the right side in although it violates constraints FILL (O) and *STRUCT which are low ranked. Candidate (c) loses since it fatally violates the most highly ranked constraint LEFT-HD which requires that the head should be the leftmost bearer of a tone.

4.5.4 Tone deletion

Tone deletion is a process where a tone is deleted during tone modification. In the data from the MDK noun phrases, there are several situations that result to deletion of tone. The present study looks at different constraints that prompt deletion of given tone in the

noun phrases in MDK. There are two tone deletion processes in MDK namely boundary tone deletion and deletion of consecutive lexical H tones.

In MDK NPs deletion of a high tone does not take place in a situation where a boundary tone deletion occurs in a TBU. This occurs in situations where the HL or LH is in a sequence. This displays the stability of the tone. If the named TBUs survive the deletion they become stable and lead to contour formation.

Boundary tone deletion occurs in cases where a H tone is deleted where two or more consecutive H tones are lost and turn into a single H tone. The loss is as a result of the OCP effect since it disallows the occurrence of adjacent identical tones.

Tableau (16)

	CANDIDATE	OCP	MAX-T	SPECIFY-T	NO LONGT
	a) Kisululu H HH H	*!			
	b) is Kisululu H		*		*

Candidate (b) is the optimal candidate as it satisfies constraint OCP that disallows adjacent tones by deleting the H tones it violates Max-T since it allows deletion.

Deletion of consecutive lexical H tones

In MDK nouns, some bisyllabic and trisyllabic noun stems have their TBU's take similar tone distribution since they duplicate the H tone to the consecutive syllable.

Eg ú kú – a piece of wood

Mú twé– head

Ná thí – coconut

Tableau (17)

	CANDIDATE	IDENT-T	NO FUSION	SPECIFY-T	OCP	*DISASSOC
a)					*	
b)		*!		*		*
c)		*!	*			

In the table above, candidate (a) is the optimal candidate since it satisfies the highly ranked constraint IDENT-T since it is exactly as the input though it violates the OCP constraint that disallows adjacency of identical tones. Candidate (b) and (c) fatally violate the highly ranked constraint IDENT-T which do not allow spreading candidate (a) satisfies No Fusion constraint that requires underlying tone should remain separate in the output. Assuming that OCP is relevant in Kikamba noun phrases it therefore helps us conclude that the constraint aids in avoidance of repetition of the same tone levels through tone spread. In such a case OCP dominates over IDENT-T

This can be illustrated using;

Tableau (18)

	Candidat	OC	SPECIFY	IDENT	NO FUSION	DISASSOCIATION	NOLONG T
A	Mbaka L L	*!					
B	Mbaka L		*!	*		*	
C	Mbaka L			*	*		*

As seen above the winning candidate is (c) since it does not violate the constraints OCP and SPECIFY-T which does not allow adjacency of similar tones and that a TBU must be linked to a tone. Candidate (a) also loses since one of the TBUs is not associated with a tone as required by SPECIFY-T.

4.5.5 Contour tones

According to (Akinlabi ¹, Liberman 2000, Ezen wafor, 2014) contour tones are motivated by the two level high (H) and L (low) which have been combined phonetically in a tone system. This tonal process occurs as an effect of the operation of some rules on the segment that lead to deletion or disyllabification of either of the two tones in a segment. If the segmental rule takes place, then a falling or rising tone occurs.

The realization of a falling tone in Kikamba language is phonetic. It therefore can be realized at the level of a word or at the post lexical level

Word based falling tone

Múndù - a person

CVCV

Tà â - lamp

CVV

Post lexical

Kúà ívù kù – falling

(Carry a big rabbit)

Ínzà mbúä– grave - falling

(Dig grave)

Contour tones are several H and L level tones that are realized on a single TBU phonetically in MDK nouns. The falling (^) tone is realized in the Kikamba language as a result of either tone deletion rule or disyllabification rule as mentioned earlier. Disyllabification rule is also known as glide formation according to (Casali, 1995, 2011) in these situations, the high tone that appears stranded segmentalises with the low tone that follows to bring forth a falling tone. The rising tone is also phonetic and occurs both at the level of a word and at the post lexical level. In its formation the low and high tones merge in order to come up with the contour.

e.g Ndu'ú – Rising – friendship

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of findings of the study

Here, the summary is given in line with the stated objectives.

Firstly, the study described the tone processes in the Kikamba noun phrase. The study discussed the overall Kikamba tones system in which we concluded that kikamba tones are mainly two High and Low tones and from which later convert to either HL or EL or EH through various tone processes. The study also looked into the structure of Kikamba noun phrases and the various nominal classifications of the nouns. In this the researcher considered the tone allocation and distribution for the noun phrases in each nominal classes. The analysis of the tone patterns in the stems of the noun phrases was done by determining the surface tone, alternation of tone and data production for the different tonal variations was done. We considered the different stems in MDK NPs such as monosyllabic, bisyllabic, trisyllabic, quansyllabic and Penta syllabic cases and the changing tone patterns in each category.

The researcher discussed the different tone processes in Machakos dialect of Kikamba noun phrases. The processes include; down step of tone, tone spreading, tone deletion, tone association tone shift among others. One of the processes identified was tone deletion and we looked at several situations that lead to deletion of tone. We saw that deletion of tone occurs where a LLH tone is deleted to a LHL tone if it occurs at the sentence final position. In this the researcher also saw that if the intensification rule takes place, then a

low tone is changed to a high one when it encounters HH tones at the sentence final position. Tone shifting was another process that is used to describe tone in Kikamba noun phrases. Tone shifting can occur due to different circumstances. We saw that low tones shift penultimate if we have short syllables in the construction. High tones also shift to the pre-penultimate position if they occur at the last position of a sentence. The study also looked at tone copying in which the copying rule copies a tone of the vowel to be deleted in the noun phrase.

Secondly, we looked into the functions of tone processes in Machakos dialect of Kikamba noun phrases. The first function identified is to differentiate lexical items in the language. This happens in case we have minimal sets in the nouns and we have to differentiate the meaning, the tone will be used to do so. The second function of the tone processes is to show differences in word classes in the dialect. This applies mostly with verbs and nouns. The researcher also discussed that tone helps in dialectal variation in the Kikamba language generally.

The last objective was to evaluate the constraints in Optimality Theory that govern the tone patterns in the MDK noun phrases. This study used the Optimality (Prince & Smolensky, 1993) which is a generative framework which discusses language grammars by providing constraints that are arranged hierarchically. OT as discussed in the theoretical framework is a theory that discusses language grammars using given constraints. The study adopted the theory by McCarthy & Prince (1995) which alludes that there are no changes in the input if there is an absent constraint. The markedness and faithfulness constraints in the theory were used to discuss tone in Kikamba noun phrases.

and the data was presented in tableaux and figures syllables. All these constraints were evaluated on their effect on the tone processes earlier listed in MDK noun phrases. The present researcher looked into high tone down step where a tone that is high is slightly lower (floating low) than the preceding high tone and the OCP effects on down step of high tone both grammatically and lexically. High tone displacement is a situation where a tone that is high (final) is displaced by a low tone as a result of OCP effects. This happens as a result of SPECIFY-T impact a TBU should be associated with a tone. A different tone process that the researcher looked into is Tone spreading which refers to a phonological process that directs tone association to a particular direction. In this we analyzed how bounded and unbounded spreading of high tone affects tone in MDK NPs. MONOSPAN is constraint that prevents spreading of H tone to more than one TBU's. Tone deletion is another tone process where a tone is deleted during tone modification. In the data from the MDK noun phrases, there are several situations that result to deletion of tone. The present study looked at different constraints that prompt deletion of given tone in the noun phrases in MDK. There are two tone deletion processes in MDK namely boundary tone deletion and deletion of consecutive lexical H tones. Lastly the study looked at contour tones which are tonal process that occurs as an effect of the operation of some rules on the segment that lead to deletion or disyllabification of either of the two tones in a segment.

5.2 Conclusion

From the research we reached a conclusion that there are several tonal processes that can be said to describe tone in MDK noun phrases. The processes discussed are phonologically described and therefore applicable with the noun phrases in this dialect. The tone

processes in MDK noun phrases prove to play key semantic roles in the language in that it shows distinction of meanings in words and differentiates between the word classes in the Kikamba nouns.

The researcher realized that vowels are the bearers of tone in the language and this is based on our description of tone using the optimality theory. The optimality theory constraints were used to evaluate tone in the MDK noun phrases.

5.3 Recommendations

This study examined the tone structure of MDK noun phrases in respect to the tone processes and functions using the optimality theory's constraints. The researcher realized that tone is a key factor when studying Kikamba language in general and therefore Kikamba speakers and learners need to pay attention to tone distribution, tone processes, and functions in relation to any theoretical framework.

Curriculum developers, academic writers and teachers can use this work in learning institutions. This will apply for the learners who use vernacular (in this case Kikamba) as a language of instruction and also as a subject in the lower grades. This study will help them in differentiating word classes of minimal pairs and also getting the right pronunciation. The study has brought out how tone helps in bringing out the lexical meaning of words. It has further indicated how tone helps in pronunciation of words with similar spelling. Henceforth the teachers will be enlightened on dealing with minimal pairs in Kikamba noun phrases.

The researcher encourages other studies to be carried out in order to explore different areas on Kikamba language which are yet to be studied. Learning institutions that offer studies

in local languages should therefore endeavor implementing such findings as this in their curriculum. If this is done, then the study of language will be highly enriched.

It is well known that language is a key aspect on how people interact socially culturally, educationally and economically. Therefore, I recommend linguists to create interest in researching this language.

5.4 Suggestions for further research.

Lastly, the researcher suggests the following areas for study; the researcher's suggestion is that a similar study on tone can be on other Bantu languages on different word classes. In addition to this, different theory from which we have used in our study (optimality theory) can be used to study tone in a different dialect of Kikamba. Moreover, a study on other phonological aspects apart from tone can be carried out in this language. Lastly, a study on how stress determines tone patterns of Machakos dialect of Kikamba noun phrases can be looked into.

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APPENDICES**Appendix I: The Research Budget**

SERIAL NO.	ITEMS	COST IN KSHS
1	Stationary	4,000
3	printing and photocopying	9,000
4	Binding	4,000
6	Buying resource books	3,000
7	Personal upkeep	3,000
8	Data Analysis and copy preparation	5,000
9	Miscellaneous	7,000
	TOTAL	35,000

Appendix II : Research Timeline

Activity	Time(Months)	Dates
Developing a pre-proposal	1	August - 2016
Developing a proposal	5	May - November 2018
Preparation for defense	1	June 2019
Start of data collection	2	August 2022
Data organization, analysis, interpretation and presentation	2	September 2022
Writing summary, findings and submission of final copies	2	June 2023

Appendix III: Interview Schedule Questions

Kikamba gloss	English Gloss
Muithasya ngombe va?	Where do you graze your cattle?
Kisululu kii ni kyakwa.	This is my bicycle?
Nyumba yaku iiana ata?	How big is your house?
Kuu kwenyu kwi iia?	Do we do you have a lake around this place?
Mutwe uu ni wa kyau?	Whose head is this?

1. The researcher presented the following NPs to the respondents. The participants ought to read and pronounce the following nouns to ascertain the different tones in the words. The words were used in sentences as instructed and the researcher recorded in a tape recorder.

-mutwe	-head
Ngu	- firewood
Mundu	- person
Ndoto	- dream
Nyumba	-house
Kithima	- a well
Kisululu	-bicycle
Mukate	- bread
Nzukuku	-great grand child
Kisiko	-spoon
Ngo	leopard
Nda	stomach

2. The participants to read aloud the following nouns in order to bring out different pronunciation and meaning of the words as a result of varied tone allocation. They then used the stated words in sentences. These were used to ascertain the different meanings of the words.

- a) mbua - grave
 - Rain
- b) ivuku. - book
 a big rabbit
- c) sua -sun
 -to peel
- d) nguku. - chicken
 -a gulp
 - safari ants

3 The respondent articulated the following words aloud in order to mark different tone representation. The words were used in sentence so as to bring out the correct tones.

- Ngo -leopard
- nda – stomach
- Muti -a tree
- Matu clouds
- Kisululu -bicycle
- Musumbi - king
- nthiungululu -type of bird
- Nthakame - blood

Appendix IV: Participants consent Letter

Study title: Aspects of the Tone Patterns of the Noun phrase in the Kikamba Language:An Optimality Approach


Researcher: Everlyn Mutua

I Confirm that the researcher has explained the elements of informed consent to me as the respondent. I admit the knowledge that the research is voluntary. The purposes of the research as well as any risk or benefits have been explained. The procedures as well as the time frame have been outlined. The respondent hereby, understands the whole process.

Participants name.....

Participants signature.....

Appendix V: Research Approval


KENYATTA UNIVERSITY
GRADUATE SCHOOL

RECEIVED
25 JUL 2022
P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 810901 Ext. 4150

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

Internal Memo

FROM: Dean, Graduate School
DATE: 28th June, 2022

TO: Everlyn Mbinya Mutua
REF: CSO/CE/25270/2014
C/o Literature, Linguistics & Foreign Languages Dept.

SUBJECT: APPROVAL OF RESEARCH PROPOSAL


We acknowledge receipt of your revised Research Proposal as per our recommendations raised by the Graduate School Board of 31st March, 2022 entitled "Aspects of the Tone Patterns in the Noun Phrases of Kikamba Language: An Optimality Approach."

You may now proceed with your Data Collection, Subject to Clearance with Director General, National Commission for Science, Technology and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School webpage downloads.

Also, please ensure that you publish article(s) from your project before submitting it to Graduate School for examination as per the Commission for University Education and Kenyatta University guidelines.

Thank you.


ELIJAH MUTUA
FOR: DEAN, GRADUATE SCHOOL

C.c. Chairman, Department of Literature, Linguistics & Foreign Languages.

Supervisors:

1. Dr. Gerry Ayieko
C/o Department of Literature, Linguistics & Foreign Languages
Kenyatta University

Appendix VI: Nacosti Permit

 <p>NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION</p>	 <p>NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION</p>
<p>Ref No: 287154</p>	<p>Date of Issue: 01/August/2022</p>
RESEARCH LICENSE	
	
<p>This is to Certify that Ms. Everlyn Mbiinya Motos of Kenyatta University, has been licensed to conduct research in Machakos on the topic: Aspects of the tone patterns in the noon phrases of Kikamba language: An Optimality Approach for the period ending: 01/August/2023.</p>	
<p>License No: NACOSTI/P/22/19441</p>	
<p>287154</p>	
<p>Applicant Identification Number</p>	
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