THE PHONOLOGICAL ADAPTATION PROCESSES OF RABAI LOANWORDS FROM ENGLISH AND KISWAHLI

BY

MBWIKA, JUDITH MWIKALI

C50/89071/2016

A PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF ARTS IN LINGUISTICS, DEPARTMENT OF LINGUISTICS AND LANGUAGES

UNIVERSITY OF NAIROBI

OCTOBER 2018

DECLARATION

This project is my original work and has not been submitted for the purpose of the award of a degree in any other university.

SIGNATURE: …… DATE: ……

MBWIKA, JUDITH MWIKALI

This work has been submitted for examination with my approval as the officially assigned supervisor for the candidate:

SIGNATURE: …… DATE: ……

PROF. JANE AKINYI NGALA ODUOR

SIGNATURE: …… DATE: ……

PROF. KITHAKA WA MBERIA

DEDICATION

My work is dedicated to:

My loving parents;

Joseph Mbwika and Mary Mutete;

My love

Henry Kisina Wambua;

My dearly loved son,

Richie David Tune.

ACKNOWLEDGEMENTS

I am truly grateful to Jehovah, my God, for his unstinting help.

I am deeply indebted to the University of Nairobi for the grant-in-aid it offered me. Indeed, it was a wonderful privilege through which I pursued a Master of Arts degree in the university and carried out this investigation.

I owe my supervisors, Prof. Jane Oduor and Prof. Kithaka wa Mberia, a great debt of gratitude. It is because of their infallible guidance that this study was completed successfully. Their support is priceless. May God's reward for their fine work be bountiful.

Various lecturers in the department of linguistics and languages deserve commendation in the varied ways they helped me: Prof. Helga Schröder; as she inspired courage that made me work on a language less studied; Prof Lucia Omondi; for helping me cultivate lowliness of mind in all her lectures; Dr. Buregeya Alfred, for his advice on matters statistics as well as on concepts that have to do with society and language; Dr. Marete, as he advised my class that degrees are made in the library and not in buildings that are of most interest architecturally, an idea that made us motivated to make the most of the library and Mr. Herman Manyora, for his advice on the cultivation of simplicity of style that will help my audience easily understand any public presentation that I make.

I am also grateful to some administrative assistants within the faculty, namely, Mr. Wasawo of the Linguistics Department and Ms. Peris of the Kiswahili Department. Ms. Peris would offer me a glass of water and ask in Kiswahili, "Hujamaliza?" Mr. Wasawo would always ask my classmate and I, "Are you guys still here?" Their concern and kind words made me work harder to finish this investigation on time in spite of the challenges involved.

My friend and classmate Diana Nyabuto is sincerely appreciated for her encouragement and support. I am heartily glad that she colored part of my history as a true friend.

Henry Kisina Wambua, my love, deserves special regard. Whenever things seemed tough, I drew strength from his words spoken with genuine feeling. He selflessly supported me, especially at this very busy time of my life as a mother and a student. He somehow made young Richie understand that his mother was busy.

Joseph Mbwika and Mary Mutete, my parents, are a people deserving of my heartfelt appreciation. Their calls, ardent prayers for me and moral guidance kept me going.

TABLE OF CONTENTS

DECLARATION.....ii

DEDICATION..... iii

ACKNOWLEDGEMENTS iv

LIST OF TABLES.....x

LIST OF FIGURES.....xii

LIST OF SYMBOLS xiii

LIST OF ABBREVIATIONS xiii

ABSTRACT.....xiv

CHAPTER ONE: INTRODUCTION.....1

1.1 Rabai Language Background.....1

1.2 Statement of the Research Problem 5

1.3 Research Questions.....6

1.4 Objectives of the Study.....6

1.5 Justification of the Study 6

1.6 Scope and Limitations of the Study.....7

1.7 Definition of Concepts.....8

1.8 Literature Review.....9

1.8.1 Literature on Comparative Phonological Studies 9

1.8.2 Literature on Loan Word Phonology 11

1.8.2.1 Related Literature that has Applied Optimality Theory 13

1.9 Theoretical Framework.....15

1.10 Methodology.....24

1.10.1 Data Collection 24

1.10.2 Data Analysis.....25

1.11 Conclusion 26

CHAPTER TWO: THE PHONEMIC INVENTORIES OF RABAI, ENGLISH AND KISWAHILI LANGUAGES 27

2.1 Introduction 27

2.2 The Rabai Phonemic Inventory 27

2.2.1 Rabai Consonants 27

2.2.2 Rabai Vowels 31

2.3 The English Sound Inventory 32

2.3.1 English Consonants 32

2.3.2 The Vowel Phonemes of English 35

2.4 The Kiswahili Phonemic Inventory 36

2.5 Conclusion 40

CHAPTER THREE: THE PHONOLOGICAL PROCESSES INVOLVED IN THE ADAPTATION OF RABAI LOANWORDS FROM ENGLISH AND KISWAHILI. 42

3.1 Introduction 42

3.2 Adaptation Processes of Rabai Loanwords from English 42

3.2.1 Rabai Vowel Adaptation Processes 42

3.2.1.1 Vowel Epenthesis 42

3.2.1.2 Vowel Syncopation 45

3.2.1.3 Monophthongization 46

3.2.1.4 Diphthongization 47

3.2.1.5 Vowel Shortening 48

3.2.1.6 English Input's Vowel Lowering 50

3.2.2 Consonant Adaptation Processes of English Inputs into Rabai Outputs 51

3.2.2.1 Consonant Substitution 51

3.2.2.2 Consonant Deletion 52

3.2.2.3 Consonant Insertion 54

3.3 Adaptation Processes of Rabai Loanwords from Kiswahili 56

3.3.1 Rabai Vowel Adaptation Processes 56
3.3.1.1 Vowel Epenthesis.....56
3.3.1.2 Vowel Elision.....58
3.3.1.3 Kiswahili Input's Vowel Raising.....60
3.3.1.4 Kiswahili Input's Vowel Lowering 61
3.3.2 Consonant Adaptation Processes of Rabai Loanwords from Kiswahili 61
3.3.2.1 Consonant Substitution 61
3.3.2.2 Consonant Elision 63
3.3.2.3 Metathesis 65
3.3.2.4 Glide Epenthesis 66
3.5 Conclusion 67
CHAPTER FOUR: THE ADAPTATION OF THE SYLLABLE STRUCTURE OF RABAI LOANWORDS FROM ENGLISH AND KISWAHILI.....69
4.1 Introduction.....69
4.2 The Syllable Structure of the English Language 69
4.3 The Syllable Structures exhibited in Kiswahili Language.....72
4.4 The Rabai Syllable Structure 74
4.5 The Adaptation of English and Kiswahili Syllable Structures into Rabai.....75
4.5.1 The Re-syllabification of Inputs 76
4.5.2 Weight Reduction in Syllables.....80
4.5.3 Cluster Tolerance.....81
4.6 Conclusion 82
CHAPTER FIVE: A SUMMARY OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS.....83
5.1 Summary of Findings.....83
5.1.1 Rabai Phonemic Inventory.....83
5.1.2 The Phonological Adaptation Processes of Rabai Loanwords from English and Kiswahili 84

5.1.3 The Syllable Adaptation Processes of Rabai Loanwords from English and Kiswahili 85

5.1.4 Commentary on Optimality Theory 86

5.2 Conclusion 87

5.3 Recommendations for further Study 87

REFERENCES 88

APPENDICES 93

Appendix I: Sample Questionnaire 93

Appendix II : Rabai Loanwords From English 101

Appendix III: Rabai Loanwords From Kiswahili 103

Appendix IV: Rabai Native Terms 105

LIST OF TABLES

Table 1: The Relationship among Possible Outputs, Constraints and Violations 19

Table 2: English Input and Rabai Output of the Word ‘office’ 19

Table 3: English Input and Rabai Output of the Word ‘school’: 20

Table 4: Kiswahili Input and Rabai Output of the Word ‘hospital’: 21

Table 5: The Syllabification of ‘mayo’/mɑjɔ/ ‘mother’ in Terms of Faithfulness Constraints 22

Table 6: Rabai Consonants as Used in some Rabai Words 29

Table 7: Rabai Consonants 31

Table 8: Rabai Vowels.....31

Table 9: Rabai Vowels as Used in some Rabai Words.....32

Table 10: The English Consonant Chart.....33

Table 11: English Consonants as Used in some English Words 33

Table 12: The Monophthongs of English 35

Table 13: English Monophthongs in some English Words 36

Table 14: The Consonants of Kiswahili.....37

Table 15: Kiswahili Consonants as Used in some Kiswahili Words.....38

Table 16: Kiswahili Vowels.....40

Table 17: Kiswahili Vowels in some Kiswahili Words.....40

Table 18: English Input and its Rabai Equivalent for the Word ‘globe’ 44

Table 19: English Input and Rabai Output for the Word ‘skirt.’ 45

3.2.1.2 Vowel Syncopation.....45

Table 20: English Input and Rabai Output for the Word ‘handbag’.....46

Table 21: English Input and Rabai Output for the Word ‘decoder’ 47

Table 22: English Input and Rabai Output for the Word ‘tyre’ 48

Table 23: English Input and Rabai Output for the Word ‘tube’ 49

Table 24: English Input and Rabai Output for the Word ‘T.V’.....49

Table 25: English Input and the Rabai Output for the Word ‘budget’ 50
Table 26: English Input and Rabai Output for the Word ‘blanket’ 52
Table 27: English Input and Rabai Output for the Word ‘missionary’.....53
Table 28: English Input and Rabai Output for the Word ‘mortuary’ 55
Table 29: English Input and Rabai Output of the Word ‘office’ 55
Table 30: Kiswahili Input and Rabai Output for the Word “maktaba” ‘library’ 57
Table 31: Kiswahili Input and Rabai Output for the Word “eksibiti” ‘exhibit’ 59
Table 32: Kiswahili Input and Rabai Output for the Word “cherehani” ‘sewing machine’.....60
Table 33: Kiswahili Input and Rabai Output for the Word “akselereta” ‘accelerator’ 60
Table 34: Kiswahili Input and Rabai Output for the Word ‘operation’.....61
Table 35: Kiswahili Input and Rabai Output for the Word ‘Christmas’.....62
Table 36: Kiswahili Input and Rabai Output for the Word “historia” ‘history’ 64
Table 37: Kiswahili Input and Rabai Output for the Word ‘Moslem’.....65
Table 38: Kiswahili Input and Rabai Output for the Word ‘trailer’ 66
Table 39: Kiswahili Input and Rabai Output for the Word ‘iodine’.....67
Table 40: The Re-syllabification of the Kiswahili Input for the Word ‘screw’ in Rabai 78

LIST OF FIGURES

Figure 1: The Components of Optimality Theory. 18

Figure 2: The Syllabification of the Word ‘mother.’ 21

Figure 3: The Syllabification of /ə/ ‘a’ 70

Figure 4: The Syllabification of /ɪə/ ‘ear’ 71

Figure 5: The Syllabification of /eʤ/ ‘edge’ 71

Figure 6: The Syllabification of /spɪtl/ ‘spittle’ 72

Figure 7: The Syllabification of /strɪkt/ ‘strict’ 72

Figure 8: The Syllabification of ‘ago’ /ɑgɔ/ ‘thigh’ 73

Figure 9: The Syllabification of ‘nywele’ /ɲwɛlɛ/ ‘hair’ 73

Figure 10: The Syllabification of ‘aljebra’ /ɑljɛbrɑ/ ‘algebra’ 74

Figure 11: The Syllabification of ‘asbesto’‘asbestos’ /ɑsbɛstɔ/ 74

Figure 12: The Syllabification of ‘izu’ /izu/ ‘banana’ 75

LIST OF SYMBOLS

/ /	Phonemic transcription
→	It means, is produced as, is realized as or becomes
.	Syllable boundary
*	Violation
>>	Constraint dominance
!	Serious or fatal violation
☞	Optimal candidate

LIST OF ABBREVIATIONS

OT-	Optimality Theory
GEN-	Generator
CON-	Constraint
EVAL-	Evaluator
SPE-	Sound Pattern of English
NAmE-	North American English
IO-	Input and Output
MAX-	Maximize
DEP-	Dependency
IDENT-	Identical specifications
O-	Onset
R-	Rhyme or Core
N-	Nucleus
M-	Coda or Margin
C-	Consonant
V-	Vowel
F-	Feature

ABSTRACT

The research aimed at analyzing the phonological adaptation processes of Rabai loanwords from English and Kiswahili within the limits of Optimality theory. It was set out to address the following objectives: (i) To establish the phonemes of the Rabai language (ii) To investigate the phonological adaptation processes in Rabai loanwords borrowed from English and Kiswahili. (iii) To analyze the adaptation of English and Kiswahili syllable structures into the Rabai syllable structure. The investigation focuses only on Rabai language as used in the Rabai Constituency of the Kilifi County of Kenya. The data used in this analysis was gathered from Kombeni and Mkapuni villages of the Rabai Kisurutini Ward of the Rabai Constituency of the Kilifi County of Kenya using questionnaires. Being a preliminary phonological adaptation investigation on Rabai borrowings, it employs the Optimality theory, a theory that has not been used to study any Mijikenda language. The findings point out that the Rabai language has thirty-four cononants and five vowels. In addition, the consonant adaptation processes involved in this study are syncopation, prothesis, metathesis, substitution, epenthesis and apheresis. The adaptation processes that involve vowels are paragoge, anaptyxis, syncopation, apheresis, diphthongization, shortening, monophthongization as well as raising and lowering which result from substitution. Further analysis shows that there are two main adjustments on the syllable structures of English and Kiswahili inputs which are caused by the aforementioned adaptation processes. These adjustments are syllable weight loss and re-syllabification, adjustments which accompany coda elimination and cluster breakage. However, some foreign clusters are retained in Rabai outputs, something which is a weakness of the strongest tenet of the Optimality Theory; the elimination of outputs which violate makedness constraints.

CHAPTER ONE
INTRODUCTION

1.1 Rabai Language Background

This study investigates the phonological adaptation processes of Rabai loanwords borrowed from English and Kiswahili. The current chapter is a coverage of the background to the language under study, the statement of the problem, the research questions and objectives to be dealt with, the justification of the study, the scope and limitations of the study, definition of some concepts within the study, review on related literature, theoretical framework and the methodology employed in gathering relevant data.

As far as Rabai's genealogy is concerned, it is a Bantu language, among the nine languages of the Mijikenda language cluster (Heine and Möhlig 1980). Guthrie's zonal classification of 1971 places the language in zone E group 70 called the Nyika-Taita group (Guthrie 1971:46). It is one of the Northern Mijikenda languages with the rest being Chonyi, Giryama, Jibana, Kambe, Duruma, Ribe, Rabai and Kauma (Nurse 1982:179). The Southern Mijikenda language is Digo. Guthrie (1971) coded it as E. 72e after Duruma, E. 72d, Chonyi E. 72c, Kauma, E. 72b and Giryama, E. 72a and before Digo, E. 73.

The speakers of the Rabai language refer to themselves as Arabai. The Arabai are mainly farmers, and coconut palm is their main cash crop. According to the Kenya National Population Census report of 2009, the Rabai speakers were approximately 98680. The report suggests that the Kenyan population growth rate is 1.3 percent per annum. Going by the population estimates done by the Kenya Bureau of Statistics in 2012, the Rabai population by the year 2020 will be 116,100. Arithmetically, that brings us to an estimate of 114,000 Rabai speakers currently. The current study concentrates on Rabai whose speakers are found predominantly in the Rabai Constituency of the Kilifi County of the former Coastal Province of Kenya.

Aerially, Rabai is a North Eastern coastal language of Kenya. This is according to Greenberg (1963), who places the Mijikenda language speakers together with the Pokomo, Comorian, Kiswahili and Elwana speakers in the Sabaki sub-family as he traces the migration and spread of Bantu speakers from their original homeland to their

current areas of residence. The Sabaki sub-family forms the North Eastern Coastal Bantu speakers of Kenya together with the Taita, Ruvu, and Pare families. In addition, according to the areal classification by Heine and Möhlig (1980), Rabai falls under the Coastal group of Bantu languages of Kenya.

The term 'Rabai language' is employed in this investigation as opposed to the term 'Rabai dialect'. Various sociolinguists explain the relationships that help to distinguish these concepts, among them Trudgill (2000) and Wardhaugh (2006). The assertion in Trudgill (2000:4) is that cultural and political factors among them dependence and independence supercede linguistic factors such as mutual intelligibility (which is usually the main relationship used to show that certain speech forms are dialects of a language) in distinguishing among the aforementioned sociolinguistic concepts. In the case of the Mijikenda language cluster, there is no Mijikenda variety that is heteronomous to another superposed variety of Mijikenda. There are no standard variety(s) of Mijikenda and non-standard one(s). None of the nine varieties has been codified for use as the ideal one by all the Mijikenda people. All the languages under this cluster enjoy autonomy with respect to each other. These languages serve at similar capacities without competition, are all powerful and with native speakers who identify with them. Therefore, the speakers of each of these languages are ethnically distinct from each other and are bound to their fellow speakers by virtue of historicity.[1] Wardhaugh (2006:33) explains that a speech communities are detached from others with their language being the main difference.

From the assumptions provided above, one can only talk about proto-Mijikenda as a proto-language when establishing the genesis of the nine languages under it. In such a historical perspective, the languages within that cluster will be called dialects of Mijikenda. An example of such usage is an investigation by Mutahi (1977). In it, proto-Thagicu languages are referred to as the dialects of southern Mount Kenya although being languages that are independent from each other.

Trudgill (2000: 3) illustrates how the boundaries that demarcate dialects are gradual such that there is a continuum. Within the continuum, the dialects at the middle are mutually intelligible while those at either extreme are hardly mutually intelligible. This

[1] Wardhaugh (2006: 38) explains historicity to be the sense of belonging that a group of speakers of a given language hold with respect to the language that they use.

is something that does not hold in the case of Mijikenda. The northern Mijikenda languages are mutually intelligible because of their degree of shared cognates, but show no gradual linguistic differences when compared. Politically, the boundaries that exist demarcate the nine ethnic tribes of the Mijikenda with each tribe using its own language. These reasons account for the use of the term, 'Rabai language'.

There are various investigations that have been carried out on languages that are related and adjacent to the Rabai language. These include studies on the verbal morphology of Kigiryama (Sirya et.al (1993)) and Chidigo grammar (Nillole (2013). However, the main accounts about the Rabai language are works done by historians, missionaries and anthropologists, which have no linguistic basis.[2] Walsh (1992), Spear (1974, 1977 and 1994) and Morton (1977) described the origin of the Mijikenda peoples and their migration patterns to their current areas of residence.[3] Additionally, studies by Allen, (1983) and McIntosh (2009) discuss these people's cultural practices and social organization. The available linguistic comprehensive studies on Kenyan coastal languages have not discussed Rabai as a distinct language but mention it among the languages within the Mijikenda cluster as they carry out comparative work (See Nurse (1982), Hinnebusch (1973) as well as Nurse and Hinnebusch (1993)).

The Rabai speakers have had a long history of contact with English and Kiswahili speakers from the precolonial times. They have interacted with some of the earliest European missionaries (Morton 1977), the neighboring Kiswahili speakers, European colonial masters and European tourists. It is in their land where Rebmann and Krapf, the earliest missionaries in East Africa, built a missionary base in 1846 (Morton 1977: 291). European colonial masters even used their council of elders to govern this part of the Kenyan British Protectorate before the World War I (Morton 1977: 291). The interaction of Rabai speakers with English and Kiswahili speakers has lasted decades leading to the present period. This long term contact has led to the introduction of borrowed words into the Rabai lexicon. The newly introduced lexical items into the

[2] Morton (1977: 628) uncovers Mijikenda traditions recorded by the earliest missionaries in the Northeast coast. These records are available in London's Church Missionary Society Archives. These records unveil various myths of origin that the Mijikenda people hold.
[3] Walsh (1992) and Spear (1974, 1977 and 1994) discuss the Shungwaya myth of origin, while Morton (1977) counters this myth. Much of this work is sociological and hardly airs on the languages of the people involved.

lexicon of another language are called '**loan words**' (Campbell 1999: 58) or '**borrowings**' (Fromkin, Rodman and Hyams 2011: 505).

The introduction of terms into a language through borrowing is due to the introduction of new concepts and items from foreign speech communities, in this case, English and Kiswahili speech communities. Fromkin, Rodman and Hyams (2011: 505) claim that lexical borrowing results from the regular interaction of multilingual or bilingual. For borrowing of linguistic items to occur in a given language, therefore, there must be a considerable period of contact among speakers of different languages. Borrowing of lexical items is an external change in language (Wardaugh 2006: 192).[4] This is because it does not alter the internal structure of the recipient language. Many loanwords may be marked forms in the recipient language.

Campbell (1999: 59) gives **prestige** as well as **need,** to be the reasons behind the adoption of borrowed terms into languages. Some loanwords from some languages are viewed as prestigious or luxurious due to the high esteem that the donor language is regarded by speakers of the recipient language. Some donor languages are highly regarded due to their dominance with reference to the recipient languages. An example of such borrowing is in Old English. Following the Norman conquest of 1066 AD and subsequent dominance by the French people, English borrowed many administrative terms from French (Fromkin, Rodman and Hyams 2011: 505). This was because French was the language of exchange in all state affairs. Thus, at that time, French dominated English and the situation prompted the borrowing of terms. In addition, the native English terms for various types of meat were replaced with luxury loans from French. This also happened for the various terms that explain food preparation methods such as **roast** and **fry**.

By need, I mean that the introduction of new concepts or things into another language from other languages in contact with it necessitates its speakers to adopt the terms as used in the donor languages with minimum or no translation. These borrowed words are then adjusted to fit the recipient language's structure. One such adjustment is phonological adaptation. This leads to the research problem stated in the next section.

[4] Internal language changes alter the internal structure of languages. They may affect the syntax, morphology or phonology of languages (Wardhaugh 2006:192).

1.2 Statement of the Research Problem

A pilot study on the Rabai language by the researcher shows that it has borrowed greatly from English and Kiswahili. Campbell (1999: 60) explains that phonological remodelling is one of the initial stages of language contact. Thus, as discussed earlier in the background, loanwords have to undergo systematic alterations to adapt to the recipient language's phonological system. Antilla (1972: 156) explains the same phenomenon in languages and says that when a loanword undergoes such retailoring to fit its recipient language's system, its original form is undiscernible. There is no systematic academic study to date, to the best of my knowledge that has been carried out on the phonological modifications that Rabai loanwords from English and Kiswahili undergo. It is on these grounds that this study investigates the phonological adaptation processes involved in making Rabai loanwords borrowed from English and Kiswahili conform to the Rabai phonological patterns within the confines of Optimality Theory to fill this gap. In other words, for the Rabai language, there is need to carry out a systematic investigation to find out the phonological adaptation processes. The phonological adaptation processes that are suspected to exist are those that involve consonants, vowels and the syllable structure. There is need to carry out a systematic investigation to find out if the vowel adaptation processes go beyond the most common one which is insertion. There is also need to undertake a systematic investigation to find out if the consonant adaptation processes involve other processes apart from consonant deletion. Any phonological analysis must always begin with the identification of the phonemes of the language involved. Since the sound system of the language has not been established, as a starting point, the investigation will establish the phonemic inventory of the language. In loanword adaptations, the syllable structure of the words is usually modified so as to resemble that of the borrowing language. There is need to investigate the syllable structure adaptation of the English and Kiswahili loanwords borrowed into Rabai. It is possible that some syllable structures remain the same as those of English and Kiswahili, while others are modified. This failure to change some phonological aspects is something which is acknowledged by various scholars[5] and will be put into consideration in this study.

[5] Fromkin, Rodman and Hyams (2011: 505) note that the phonology of borrowed morphemes is not always changed to match the recipient language's phonology.

1.3 Research Questions

This study is geared towards answering the questions below:

i. What are the phonemes of the Rabai language?
ii. What are the phonological adaptation processes that occur in Rabai loanwords borrowed from English and Kiswahili?
iii. Has the syllable structure of Rabai been altered by the phonological adaptation processes that its loanwords from English and Kiswahili undergo?

1.4 Objectives of the Study

In view of the statement of the problem and the abovementioned research questions, the following are the objectives that this study sets out:

i. To establish the phonemes of the Rabai language
ii. To investigate the phonological adaptation processes in Rabai loanwords borrowed from English and Kiswahili.
iii. To analyze the adaptation of English and Kiswahili syllable structures into the Rabai syllable structure.

1.5 Justification of the Study

There are various reasons that justify a phonological study of Rabai. The investigation plays a key role in documenting Bantu languages which have not been documented since it is the first linguistic study of the Rabai language. It will provide valuable information to linguists and writers of publications of Rabai language. It will also accelerate linguistic inquiry into Rabai language and other Mijikenda languages that have not been studied systematically.

The linguists who will find this study useful include phonologists who would like to undertake phonological studies on Mijikenda languages. For example, a systematic study of the phonological processes of the Rabai language will require the researcher to know the phonemic inventory of the language. Others are morphologists who may be interested in studying the morphophonological processes in Rabai. Moreover, translators will find the study useful especially when documenting and translating literature in the Rabai language. These translators include Bible translators who may need to document the Rabai Bible.

Additionally, the Kenya Institute of Curriculum Development (KICD) will benefit from the findings of this research as they develop the curriculum for Rabai beginners. This is because there has been concerted effort by various stakeholders on curriculum development to have elementary level learners in the rural areas of Kenya learn and use their native language. Thus, Rabai children will eventually benefit when literature on their own language is availed by curriculum developers.

The study will employ the assumptions of Optimality Theory to describe the phonological adaptations of Rabai loanwords from English and Kiswahili. This is opposed to many other loan words' phonological adaptation studies that have used Natural Generative Phonology. Additionally, it will try to shed some light on borrowing as one of the factors that cause phonological changes in languages.

1.6 Scope and Limitations of the Study

This study will investigate the phonological adaptation processes of Rabai loanwords borrowed from English and Kiswahili. These are the processes that have to do with vowels, consonants and syllable structure. Moreover, the phonemes of the Rabai language will be established. Languages can borrow varied linguistic items when they come into close contact. These items include phonemes[6], morphemes, phonological rules, semantic concepts and grammatical patterns. However, this investigation deals with borrowed morphemes and their accompanying phonological adjustments.

Since borrowing is an arm of historical linguistics, this study is purely diachronic. Although the researcher is aware that there are morphological adaptation processes that Rabai loan words undergo to fit the language's morphological structure, the study will not delve into them. Additionally, there may be words borrowed from Portuguese and Arabic into Rabai given the interaction of Rabai speakers with Portuguese and Arabic traders and explorers from the precolonial period to the present (See Morton 1977:). However, due to the time available to accomplish the study, the study will focus on Rabai loan words from only English and Kiswahili.

[6] The phonemes /ʒ/ and /v/ were introduced into the English language from French through borrowing. This is another example of external language change that adds to the number of phonemes of the recipient language.

1.7 Definition of Concepts

Adaptation: This is process by which borrowed linguistic material is remodeled to suit the patterns of the recipient language.

Adoption: It is a process in which a borrowed linguistic material enters into the recipient language without alterations on the patterns of the source language.

Autonomy: This is the independence that a given language has. A language is autonomous if it does not look up to some other superimposed variety

Heteronomy: This refers to dependence of a language variety on another standardized variety.[7]

Source language: This is the language that has donated linguistic material to another language.

Loanword: This is a word that has been borrowed from one language into another language.

Synchronic study: It is an inquiry that deals with linguistic changes that happen at one particular time

Diachronic study: It is an inquiry that deals with linguistic changes over a period of time.

Comparative study: This is an investigation that draws upon data from various languages for the purpose of making conclusions based on their similarities and differences.

Constraint: This is a restriction that limits a certain phonological process.

Correspondence: This refers to the relation that exists between segments of an input and those in the output. It is governed by Faithfulness constraints that dictate that the sound segments of the input must bear similarity to those in the output.

[7]Some language varieties are autonomous, while others are heteronomous. For example, Standard British English and Standard Kiswahili language varieties are autonomous; Kiamu dialect of Kiswahili is heteronomous, it looks up to the Standard dialect of Kiswahili.

Native speaker: This refers to an individual who uses a given language as his first language. Thus, he can make judgements on the grammatical standing of strings in the language.

Feeding: This is a situation in phonology in which the occurrence of one particular process leads to a subsequent process.

Bleeding: This is a situation in phonology whereby the occurrence of a given process prevents the occurrence of another process.

1.8 Literature Review

This investigation refers to various phonological studies. These include investigations that have been done on Bantu languages especially on the Sabaki languages.[8]Other studies considered are studies on loanword phonological adaptation that source data from various languages and use varied theoretical frameworks. The final section of review presents studies that have been done using the Optimality Theory.

1.8.1 Literature on Comparative Phonological Studies

Hinnebusch (1973) carried out comparative research on the prefixes of some Kenyan coastal languages, namely, the Digo, Giryama, Pokomo, Swahili and Duruma. He reconstructed several sound changes that the prefixes in these languages underwent. The current study is also diachronic and focuses on one coastal language, Rabai, with emphasis on phonological adaptation of Rabai loanwords from English and Kiswahili. Three of the languages that Hinnebusch dealt with are Mijikenda, thus closely related genetically to Rabai. The current study benefits from that study by getting some basic phonological facts on Mijikenda languages.

Mutahi (1977) made an attempt to classify the dialects of southern Mt. Kenya based on historical sound changes.[9] He makes use of both synchronic and diachronic approaches to counter his problem. The current study analyzes phonological adaptation processes in Rabai language. His comparative study however illuminates on the phonological

[8] The studies on Sabaki languages involve those on Mijikenda languages, Pokomo dialects, Kiswahili dialects, Elwana and Comorian.

[9] In Mutahi (1977), the languages under study are referred to as the dialects of southern Mount Kenya. These languages are those in the Thagicu language family namely, Kimbeere, Gikuyu, Kikamba, Daiso, Kiembu, Kimeru and Kitharaka. In this case they are referred to as dialects on a historical perspective.

processes involved in analyzing the phonological structure of a Bantu language thus being very relevant to the current study.

Bakari (1982) did an investigation on the morphophonology of seven indigenous dialects of Kiswahili using the Natural Generative Phonological theory. His study lays emphasis on the exploration of distinct varieties of a language because each is different from its sister languages in its own ways. He was opposed to generalizations of a whole language based on a few of its constituent varieties. In the study, Bakari further investigates the consonantal systems of the different Kenyan Kiswahili dialects and goes on to describe the phonological processes they undergo and formulate their rules. The processes discussed in Bakari's study include palatalization, vowel deletion, vowel insertion and assimilation. Some of these processes are relevant to the study of Rabai loanword phonological adaptation.

Nurse (1982) investigated the genealogy of Daiso and Segeju languages. In the study, he pointed out some phonological relations among Chonyi, Giryama, Standard Swahili, Digo, Duruma and Segeju that were the outcome of shared sound shifts from proto-Bantu. With the exception of Segeju and Standard Swahili, the other languages in Nurse's study are in the Mijikenda language cluster. Therefore, Nurse's diachronic study provides some phonological guidance to the current study especially on some of the phonemes that are likely to be found in the Rabai language.

Nurse (1983) did a comparative study on Pokomo, Malankote, Comoro, Mijikenda and Standard Swahili languages. The investigation established some hypothetical steps from some proto-Bantu consonants leading to some current phonemes within these languages. Although this study did not account for all the proto-Bantu sounds that all the current consonants evolved from, it will help in generating some consonants that the Rabai language has given that Rabai is a language within he Mijikenda cluster, a cluster which was discussed in Nurse (1983).

Nurse and Hinnebusch (1993) carried out a comparative study of the phonological relations among languages within the Sabaki family. It gives the phonemic systems of some of these languages and their relations. Furthermore, the study discusses how Kiswahili has greatly influenced Chidigo, the southern Mijikenda language, but the influence is not as much in the Northern Mijikenda languages. The available work on

Rabai phonology in it is sketchy. However, it provides basic information that will guide in establishing the phonemes of the Rabai language.

1.8.2 Literature on Loan Word Phonology

Wa Mberia (1993) investigated the phonology of borrowed vocabulary as he studied the segmental morphophonology of Kitharaka language. The study included The loanwords examined were borrowed from English and Kiswahili. Although the study employed the Natural Generative Phonological theory, which is a different theoretical orientation to that of the current study, it will significantly aid in the analysis of loanword adaptation processes of the loanwords of the Rabai language drawn frm English and Kiswahili.

Mbonankira (2004) studied the adaptation of Kinyarwanda borrowings from Kiswahili and English. The study used an eclectic theoretical framework. One significant finding of the study is that the anaptyxis of vowels is useful in repairing illicit consonant clusters in Kiswahili and English inputs. Although the current study deals with Rabai loanwords, the study is significant since the loanwords are drawn from English and Kiswahili. In addition, the Rabai language is Bantu just as Kinyarwanda, and therefore the study aids in the exploration of sound adjustments in Rabai borrowings.

Kivuko (2005) took a natural generative perspective to investigate the vowel system of the Kitui Central Dialect of Kikamba. He also discussed the adaptation that the dialect's loan words undergo to fit its vowel system. His study is important in the analysis of vowels though in a different language, Rabai. In addition, it will help in the discussion on adaptation of loanwords to fit the native Rabai vowel system.

Iribemwangi (2008) carried out a synchronic study of the morphophonology of Standard Kiswahili. His study partly explored the sound adjustments that borrowed words undergo as well as how these adjustments relate with Standard Kiswahili morphophonology. The study uses Natural Generative Phonology and Auto-segmental phonological theories which are different theories from the one used in the current study. However, the work is of significant to this investigation especially in analyzing phonologically based adjustments that Rabai loan words undergo since Rabai is a Bantu language just as Kiswahili is.

Ngugi (2008) studied the morphological and phonological adaptation of English loan words into the Kikabete dialect of Gikuyu language using the claims of Natural Generative Phonology. He found out that several phonemic strategies were responsible for the adaptation of English loan words into the Gikuyu language. This study is significant in that it will assist in the analysis of the phonological adaptation processes that loan words from English and Kiswahili undergo in order to be part of the Rabai lexical structure, given that Rabai is a Bantu language just as Gikuyu is.

Chege (2009) explored the morphophonological modifications of Maasai borrowings drawn from English and Kiswahili. The study used the theory of Constraints and Repairs. However, the current study deals with phonological modifications and focuses on Rabai, a Bantu language, as opposed to Maasai, a Nilotic language. Additionally, it uses Optimality Theory in the analysis of the modifications. Nevertheless, the study is useful in establishing adjustments at the level of sound.

Karuru-Iribe (2012) used the source-similarity model to discuss the morphological and phonological adjustments of Gĩ-gichũgũ[10] loanwords. The loanwords that she analyzed were the ones borrowed from English and Kiswahili. Although the language that this study deals with is different, her work is significant in the analysis of Rabai loanwords since some of the processes discussed in the study may surface in the current one. Moreover, it is partially significant theoretically, given that the model she used is formalized in Optimality Theory.

Boen (2014) investigated the morphological and phonological adaption of loan words of Nandi language that are borrowed from English and Kiswahili. The study used the Natural Generative Phonology and Generative CV-Phonology as its descriptive tools. Natural Generative Phonology was used to explain the phonological and morphological adaptation processes in borrowing while the Generative CV-Phonology was used to analyze the syllable structure adaptation strategies. This study is significant analytically because English and Kiswahili are the languages that serve as source languages for the loanwords to be analyzed in the current study.

Mwaliwa (2014) employed the Generative CV-Phonology theory in investigating syllable structures that Standard Kiswahili loan words drawn from Modern Standard

[10] Gĩ-gichũgũ is one of the various dialects that the Gikuyu language has.

Arabic exhibit. The findings reveal foreign syllable structures such as closed syllable structures that were copied and adopted into Kiswahili from Modern Standard Arabic. The study also analyzed the phonemic inventory of Kiswahili sounds, the phonological processes which occur as a result of borrowing and the syllable structure. At the segmental level, the study discusses changes in consonants and vowels. This study uses a different theoretical framework from the one that the current study adopts, but it is very significant given that Kiswahili is related genealogically to Rabai. Furthermore, there may be cases where Kiswahili forms such as closed syllables have been adopted into Rabai, something which Mwaliwa's study may help to explain since it highlights on the same phenomena being introduced into Kiswahili from Modern Standard Arabic.

1.8.2.1 Related Literature that has Applied Optimality Theory

Various other studies have been done using Optimality Theory. These are of significance theoretically. One such investigation is by Yip (1993) who investigated positional weight constraints in Cantonese loanwords. The constraints used were applied on loanwords from English in order to match the phonological of Cantonese. The argument was that loanwords do not have their phonology, rather they are subjected to the phonology of a recipient language by use of ranked constraints which make them adapt fully into this language. The study is significant theoretically since it was done using OT, which is also employed in the current analysis of Rabai loanwords.

Catherine and Vago (1998) used the theory to do a morphophonological study on Hungarian backness vowel harmony. This was done against the constraints of faithfulness, alignment, the specifications of features as well as inventory. Their work sorted out some problems that rule based frameworks are unable to handle, such as the under-specification found in some inputs. Although the study was majorly morphophonological, it will help in the formulation of the constraints that will be used in the current study.

Lombardi (1999) used the theory to test positional faithfulness and voicing assimilation in several languages among them Polish, German and Yiddish. The findings reveal that the voicing assimilation that occurred in consonant clusters was due to the constraint that dictates agreement in voicing. The study will aid in the handling of various phonological adaptation processes within the confines of OT especially in formulating

workable constraints. Additionally, it will aid in explaining the patterns of consonant clusters in Rabai language (if any).

Orgun (2001) studied English schwa-epenthesis, and r-insertion using OT. The investigation used universal margin and peak sonority as the constraints that governed these phonological processes. For the schwa epenthesis to occur, /r/ is required in the context. The study is significant given that the current one will deal with various phonological adaptation processes in Rabai loanwords. It will shed light on how the processes of epenthesis and insertion occur, and the ordering of the constraints involved.

Hall (2006) studied the issue of derived environment blocking effects using OT. The study gives ideas on the ranking of various constraints in certain phonological processes using data drawn from various languages among them Finnish and German. Although the current study is on the Rabai language, Hall's study is significant theoretically.

Mwita (2009) studied the adaptation of Kiswahili loanwords borrowed from Arabic. The investigation adopted Optimality Theory to show faithfulness of open syllabicity of Kiswahili against the markedness constraints of the sonority hierarchy in borrowings. His study is significant to the current study from a theoretical point as well as in the analysis of Rabai borrowings.

Mutua (2013) used OT to investigate the strategies used by the Kikamba phonological system to handle phonologically different words from English. The study sought to establish how the adherence to the markedness constraints provided by the grammar of Kikamba language produces acceptable words. Rabai language is a Bantu language as Kikamba is. Therefore, the study is very useful in the analysis of Rabai loanwords owing to the genesis of the two languages and the fact that the theory at work in the current study is the same and it has used the same theory for analysis and thus this work is very significant in the analysis of Rabai loanword adaptation processes.

Shidiavai (2015) explored the phonological adjustments of Kiswahili and English loanwords into Lwidakho within the constraints of OT. The study found out that foreign phonemes are adapted into Lwidakho through substitution, and that Kiswahili and English syllable structures are changed into open syllables in Lwidakho and also vowel epenthesis was the main repair strategy for unacceptable consonant clusters and final

syllable margins in Lwidakho. The study is significant theoretically and some of its findings are significant in the study of Rabai borrowings.

Shume (2017) used OT to analyze the phonology of Pokomo loanwords borrowed from Orma and English. She found out that epenthesis was the main vowel process responsible for nativisation of loanwords from English while vowel voicing led to the nativisation of loan words from Orma. In addition, substitution was witnessed as a consonant process involved in the adaptation of loan words into Upper Kipokomo language. Her study is significant in analyzing the adaptation of loanwords into Rabai, which is a Bantu language just as Pokomo is. In addition, the current study benefits from her methodology.

1.9 Theoretical Framework

Optimality theory is a formal theory which sprang in 1991 through the work of Smolensky and Prince. This is a phonological theory founded on constraints. "[It] is a theory of constraints and constraint interaction" (Myers 1997:851, Archangeli, 1999:533). It makes use of well-formedness requisites that are typologically well-founded. This being a generative theory, it is based on the principles of formal linguistics. However, it uses constraints, as opposed to other generative theories which use rules, to explain phonological derivations (Golston, 1996:715-716).

This theory proposes three main principles. First is the principle of **violability** which dictates that constraints have the capability to be broken. Faithfulness constraints are violable. However, breaking highly ranked constraints is penalized. The candidates that break highly ranked constraints, markedness constraints, are eliminated.

The second principle is the principle of **ranking**. This stipulates that languages rank universal constraints differently from each other. Markedness constraints are ranked higher than are faithfulness constraints. When these constraints act upon each other, they choose the optimal surface structure of an input from a set of possible inputs. This is what determines the aforementioned minimal violation in the second principle.

The last principle of the theory is **inclusiveness**. This principle explains the fact that the hierarchy of constraints assesses a suite of possible inputs which are permitted following the structural well-formedness grounds. All inputs within the set of possible

candidates are therefore assessed. None is eliminated without being evaluated against all constraints set to evaluate them.

The Standard Optimality theory consists of various components. First is the **Inputs'** component which consists of strings of segments that bear no foot and are not syllabified in a language. Within this theory, languages pose no restrictions with regard to the input to be fed into them and such is the case of loan words in languages. The loanwords of any given language can be from varied languages which may be different typologically and that were in contact with the language at a particular time in history. Thus, all these 'inputs' are acceptable in the language and can nevertheless be handled by the language's grammar. The inputs will be required to undergo various modifications such as phonological adaptations or processes to fit into the language's system; in this case, its phonology. The adaptations that these inputs undergo will very much depend on the language. In this study, the inputs will be English and Kiswahili words.

This takes us to the second component which is referred to as **GEN** which stands for GENERATOR. It is this component that produces various outcomes of the inputs. Thus various alternatives of the input are generated which will later get filtered using OT related wellformedness limitations in the EVAL (EVALUATOR) component.

The next component is the **Outputs'** component. It refers to the outcome of the generation process. It consists of strings of segments that are footed and syllabified in accordance to the language's phonological system. In this study, an output will be one of the possible outcomes produced by the Rabai grammar.

The fourth component is the **CON** or **constraints**' component. In this one, there are the conditions that are used to determine the appropriateness of a given output. This is done using two main constraint groups namely, those dictating **faithfulness** and those determining **markedness** as explained in Aissen (1999). These constraints are the ones that lead to processes of adaptation of inputs to fit a language's system, in this case the phonological system. The markedness constraints have to do with the structure of the underlying representation. For example, in the Rabai language, there is a markedness constraint of **NOCODA** representation in all syllables, this being a language that has open syllables. This is a constraint that will hold for borrowed words. Another

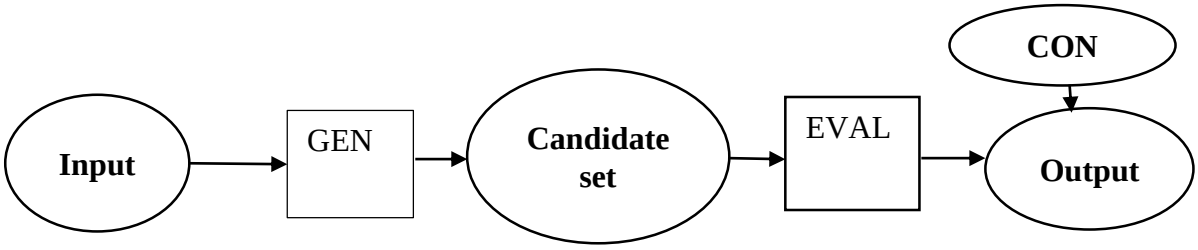
constraint is that which dictates that **nasals should share the feature [+voi] with the consonants that follow them** in Rabai nasal obstruent clusters. In this case, the nasals assimilate the obstruents by virtue of their redundant feature of voice. Thus, we have **/ŋg /** as in /**fuŋg ɑhɛ**/ 'seven' and **/nd/** as in /**mundɑni/** 'farm'. These, among other markedness constraints, will be generated in this linguistic enquiry. Therefore, if the underlying form of the input is not well-formed according to the language's lexical structure, it is changed.

The faithfulness constraints dictate that surface forms (outputs) should partially match underlying forms (inputs), and thus not all inputs are marked forms. Myers (1997) as well as Kager (1999) give DEP-1O and MAX-IO among faithfulness constraints. DEP-IO means that output phonemes should match input phonemes thus blocking phoneme insertions. MAX-IO calls for input phonemes to correspond to output ones. Therefore, none of the phonemes that surfaced in the input should be deleted in the corresponding output. Thus, faithfulness constraints call for uniformity among input sound segments and output phonemes. This means that the two types of constraints will conflict at times in order to come up with the most optimal outputs in Rabai, given that some inputs may have totally different phonemes arranged differently in the donor language but surfacing differently in the recipient one-Rabai.

The constraints' component is connected to another one known as **EVAL (Evaluator),** which serves to present to the surface the structures which are least-marked. Thus, it selects the optimal surface representation, that is, "… the only well-formed parse assigned by the grammar to the input..." (Bruce & Smolensky 1998: 232). The theory presupposes that constraints are universal in all languages. This means that this component is therefore universal.

There are **violations** which serve to indicate broken constraints. The optimal or best output is chosen using a hierarchy of the constraints presented in a language. If a possible output breaks the highest ranked constraint that serves a distinctive role among possible outputs in a set presented in a language, then it is discarded. An alternative is chosen based on the fact that it breaks the lowest ranked constraint in a set, as opposed to another that breaks a highly ranked one. This follows that constraints are ranked by virtue of importance in distinguishing entities, say sound segments. Additionally, all

possible outcomes violate constraints of varied capacities. All these components are presented in the following figure:



Adapted from Archangeli (1999: 534)

Figure 1: The Components of Optimality Theory

The input and the constraint component represent the language's grammar while the Generating and the Evaluating component represent universal grammar. The set of possible candidates and the output represent the results of the interaction between universal grammatical operations and the grammar of the language.

The following table represents a tableau of constraints as dictated by OT theory. It shows the relationship among the possible outputs, constraints and violations. The possible outputs of a given input violate certain constraints which are set by the grammar of a language. The optimal choice is made with regard to the hierarchy of the constraints set.

The table illustrates that a given phonological phenomenon could have two possible outputs which violate certain constraints up to given magnitudes. The first and second outputs get blocked because of braking constraints which are highly ranked. The third one breaks a faithfulness constraint, one of a lower rank, hence is the optimal choice. The violation of a constraints is marked by an asterisk * while extreme violation is marked by the asterisk and an exclamation mark combined (*!). The satisfaction of a constraint is indicated by a blank cell. The symbol '☞' points to the optimal candidate.

The shaded zones indicate that the constraints involved serve no relevance with respect to the outputs alongside these zones.

Table 1: The Relationship among Possible Outputs, Constraints and Violations

INPUT	CONSTRAINT A	CONSTRAINT B	CONSTRAINT C
CANDIDATE$_1$ (possible output)			**VIOLATION *!**
CANDIDATE$_2$ (possible output)		**VIOLATION *!**	
☞CANDIDATE$_3$ (possible output)	**VIOLATION ***		

The following tables give actual illustrations. The first table represents an English input which undergoes the evaluation process, after which the best optimal output suitable in the Rabai language is chosen against a set of constraints.

Table 2: English Input and Rabai Output of the Word 'office'

English input: /ɒfɪs/

Output in Rabai: /hɔfisi/

Input: office /ɒfɪs/	NOCODA	DEP-V	ONSET	DEP-C
a. /ɒ.fɪs/	***!**		*	
b. /ɔ.fi.si/		*	!*	
☞ c. /hɔ.fi.si/		*	`	*

In this case, the constraints at work in the selection of the optimal output form are the faithfulness constraints NOCODA and ONSET against the markedness constraints DEP-V and DEP-C. DEP-V limits epenthesis of vowels. DEP-C means that output consonants must have input correspondents thus consonant insertion is not allowed. Since candidate c. incurs minimal violation of lower ranked constraints, which only block any segment insertion, it is the preferred optimal output form. It should be noted that the output has violated the faithfulness constraint as the epenthetic segment /h/ has no correspondent input phoneme. However, the optimal choiceis appropriate owing to

the open syllables that it has. It can be observed that whereas the input has two syllables, the output has three of them.

The table below illustrates further on how some of these constraints work differently on another English input. The constraints at a work are the faithfulness constraints **NOCODA** and **COMPLEX*** and markedness constraint **DEP-V** and **IDENT IO-(F)**. COMPLEX* is a constraint which means that certain consonant clusters are illicit.

Table 3: English Input and Rabai Output of the Word 'school':

English input: /sku:l/

Rabai output: /sikuli/

Input: /sku:l/	**NOCODA**	**DEP-V**	**COMPLEX***	**IDENT IO-(F)**
a. /sku:l/	***!**		***!**	
b. /siku:l/	***!**	*		
☞ **c. /sikuli/**		*		*

The first candidate violates two highly ranked constraints. First, it presents a syllable with a coda, yet Rabai language has open syllables. Additionally, it presents a consonant cluster in the syllable's onset, **sk-,** which is an illicit cluster in Rabai. Therefore, it gets penalized by COMPLEX*. Output b. is unacceptable for optimality as it is penalized by NOCODA, though it also breaks another constraint, DEP-V (which opposes vowel insertion) because it inserts the vowel /u/, to eliminate the unacceptable consonant cluster/sk/. The final candidate is the optimal one, since it violates constraints which are lowly ranked. The first constraint which it violates is DEP-V, because it inserts two vowels, /i/ to break the illicit cluster /sk, and /i/, to eliminate the coda because Rabai syllables are open. The other constraint that it violates is IDENT IO-(F), one that demands preservation of phonemic features. This gets violated because the syllable peak, **/u:/**, in the input is a long segment, yet this feature is not preserved in this segment's output correspondent, **/i**/.

The table below represents a Kiswahili input and its resultant possible outputs.

Table 4: Kiswahili Input and Rabai Output of the Word 'hospital':

Kiswahili input: /hɔspitali/ 'hospital'

Rabai output: /sipitɑli/

Input: /hɔspitali/	**DEP-V**	***COMPLEX**	**MAX-C**	**MAX-V**
☞a. /sipitɑli/	*		*	*
b. /spitɑli/		*!	*	*
c. /hɔspitɑli/		*!		

The optimal output is **a.** because it violates minimally ranked constraints which block deletion (MAX-C and MAX-V)[11] and insertion (DEP-V). MAX-C is violated when the consonant /h/ is deleted at word initial position. MAX-V is violated when the vowel in the first syllable of the input is deleted. These constraints are ranked at a lower level because they deter the processes required for segments to fit into the borrowing language. The other two possible outputs violate a highly ranked constraint, one which dictates that there should be no complex *COMPLEX) consonant clusters in a given syllable (in this case the unacceptable cluster is /**sp**/). The following is an example of the syllable representation of the Rabai word **/mɑjɔ/ 'mother'**, which illustrates the open syllable structure that inputs are expected to match:

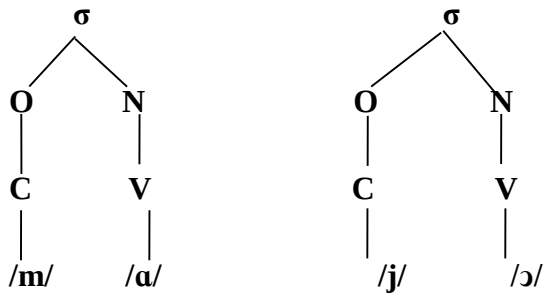


Figure 2: The Syllabification of the Word 'mother.'

[11] MAX-C calls for input consonants to match output ones. The vowels in inputs shoud also match those in the outputs as dictated by MAX-C. Thus, segments should not be deleted. Instead, their possible correspondents should be sought for in the recipient language.

The following table presents the syllabification of the word within OT. In the tableau below, the faithfulness constraints of the Rabai syllable structure are used to evaluate the suitability of each possible output. The optimal candidate has no codas in the syllables, but has syllable peaks and syllable onsets which are acceptable in Rabai.

The table presents the syllabification of the Rabai word for 'mother' in terms of faithfulness constraints. The faithfulness constraints at work are those that deal with the syllable structure. The first one is the NOCODA constraint, which dictates that the syllables of the Rabai language have a non-branching rhyme. The second constraint, ONSET, requires the syllables that make the word in this case to have onsets. The last constraint, NUC, makes the core to be obligatory in any syllable. The table shows how one arrives at the optimal candidate, **c.** Candidate **a.** is unsuitable because it presents a syllabic nasal before a vowel, which is unacceptable in Rabai. Candidate **b.** presents a syllable with a coda, whereas Rabai syllables are open.

Table 5: The Syllabification of 'mayo'/mɑjɔ/ 'mother' in Terms of Faithfulness Constraints

Input: /mɑjɔ/	**NOCODA**	**ONSET**	**NUC**
a. m.ɑjɔ			*!
b. mɑj.ɔ	*!	*	
☞c. mɑ.jɔ			

On matters alignment of segments in syllables, the constraint to be considered is the '**onset sonority constraint hierarchy' (**Maria 2004: 209**)** which is based on the sonority scale of segments. This is because syllables in the language are likely to be open and as such the coda sonority scale is irrelevant here. However, the coda sonority scale will be considered in cases where English and Kiswahili syllable structures get adopted into the Rabai language especially after a morpheme with syllables that have branching codas are borrowed. Such adoption (if any) will add on syllable weights of current Rabai syllables which are majorly weak due to lack of branching rhymes.[12] This

[12] Katamba (1989:176) explains that heavy syllables have branching rhymes (that is to say, have codas), or the peaks are of long vowels or diphthongs.

study will discuss such syllable adaptations or lack thereof in cases of adoption and check whether Rabai syllables obey sonority constraint hierarchies. Goldsmith (1990: 110-111) describes sonority of segments as a range reflecting the ranks of spontaneous voicing held by phonemes which ranges from approximants to voiceless obstruents. The sonority of Rabai segments will set in in the discussion on the patterns that they form. Sonority constraint hierarchies to be considered have to do with the sonority principle. The principle holds that phonemes in the initial margin of a syllable are ordered from the least sonorous to the most sonorous in the core, while they are ordered in terms of decreasing sonority from the core to the final syllable margin (see Goldsmith, 1990: 110).

It follows that the segments that are capable of functioning as syllable peaks have greater sonority than the segments that occur at syllable margins. Therefore, if a syllable onset contains several segments, the least sonorous ones must precede the most sonorous ones in that order. The syllables in the Rabai word 'food' **/ʧɑ.ku.rjɑ/** obey the sonority principle. In the last one, **rjɑ.**, **/r/** is an approximant and therefore stronger but less sonorous than the palatal glide, while the palatal glide is stronger but less sonorous than the back unrounded vowel, **/ɑ**/ that forms the peak.

Several approaches have been described to handle the problem of opacity in the original OT theory. These include the work of Wolf (2011) who suggested chains as a means of representing derivations that are represented by rules in other generative theories. These chains are controlled by precedence constraints that follow their order of occurrence in phonological processes. He tackled mutual counter feeding and mutual counter, though his findings on their occurrence in language could not adequately convince linguists.

The OT-CC theory follows rule ordering approach argued for in the 1970s by linguists such as Lakoff (1970) and Kisseberth (1973) although in its case it presents phonological derivations using constraints rather than rules. The idea is that some processes precede others in phonological derivations. This study will follow this order in accounting for derivations in the Rabai language bearing in mind the ranking of constraints that dictate these operations. This is because one sound may feed another process and subsequently, the other process may counter-feed another process to act on the sound that began the chain of processes.

1.10 Methodology

1.10.1 Data Collection

This study depended solely on fieldwork. The speakers used as informants come from Rabai Kisurutini Ward of the Rabai Constituency of the Kilifi County. Snowballing was used in order to get 20 native speakers of Rabai who have acquired elementary education, the reason being that the speakers who have acquired elementary education have learnt how to read and write. These language skills of reading and writing were key in documenting Rabai data in its actual orthography. Data on Rabai loan words was obtained from both men and women aged between 15 and 70 years. This is because, at the age of fifteen, one will have developed his or her full linguistic capacity to use his or her native language. Beyond 70 years of age, one may have the dysfluencies that surface due to old age. (See Burke et.al. (2000))

In order to elicit data on loanwords, the whole idea of borrowing of lexical items into a language which has to do with the introduction or foreign concepts and items was explained to the informants by the researcher. After this, the informants were requested to provide any Rabai terms, that they think were as a result of borrowing, together with their English and/or their Kiswahili equivalents. Each informant was then requested to read the loan word list he or she had provided aloud as the reasearcher recorded using a laptop. Each word was read aloud three times for clarity. Each informant's speech recording was done for 10 to 15 minutes. The speech of each informant was confirmed by the rest of the informants for accuracy. This helped me get key primary data. I also used questionnaires with two types of wordlists to get more data. One section of the questionnaire had a list of 60 English and 60 Kiswahili loanwords. The list of 60 Kiswahili words had some words that were borrowed indirectly from English through Kiswahili, but in this study, they were considered to be borrowed directly into Rabai from Kiswahili, since Kiswahili came into contact with English much earlier than Rabai. The other section questionnaire had 100 terms on general concepts and items that I requested my informants to provide their native Rabai equivalents. The list of 120 loan words contained 120 common nouns that arose due to the interaction of Rabai speakers with the Kiswahili and English speakers such as through missionary work, colonization of Kenya and foreign inventions which are aspects that were absent in the native Rabai setup. The other 120 words were English words that denote general items and concepts that were not borrowed from other speech communities which the

informants were required to translate into Rabai. These words helped me get the phonemes of the Rabai language. After they provided the Rabai equivalents, I requested them to read each word three times in Rabai for clarity as I recorded each informant's pronunciation. In order to gain credible data, I verified the responses received with other five informants who were sampled randomly and who were not used to give the data. Thus, all my informants were 30 in total.

Where possible, I adopted participant observation approach as I engaged in casual conversation with the informants, conversations which I recorded when the situation allowed. At times I listened to the informants as they conversed and recorded their conversations. This helped me add to the validity of my data, especially when establishing the phonemes of the Rabai language. Thus, I got the actual Rabai speech in casual use in order to complement the data that was gathered by systemic means.

1.10.2 Data Analysis

The native Rabai terms and the loan words collected were transcribed orthographically and phonetically, a process in which the researcher was involved. The 120 Rabai native terms generated and transcribed were used to establish the Rabai phonemic inventory. Furthermore, the remaining data which had captured Rabai loanwords from English and Kiswahili was sorted. The sorting was done according to the language and the phonological processes found out. The process or processes that each item exhibited were written beside the item. Thus, this sorting produced two main sections of the data. The first section had processes that English inputs underwent in order to fit into the Rabai language, each process accompanied by the data that illustrates it. The second section had processes that Kiswahili inputs underwent in order to fit into the Rabai language and the data that illustrates each process given under the process. Further analysis divided the processes identified according to the variations in syllable structure that they produced. This division generated two main phonological adjustment strategies under which illustrative data was given.

The Rabai phonemic inventory is discussed in the second chapter of this investigation. The consonant and vowel processes involved in the adaptation of Rabai loanwords from English and Kiswahili into Rabai are discussed in the third chapter of this study. Each phonological process is discussed together with the constraint(s) within the Optimality theory involved in producing Rabai outputs. The fourth section of this investigation

discusses the adaptation of syllable structures of English and Kiswahili inputs into the Rabai syllable structure. The syllable adjustments are discussed hand in hand with the constraints that they violate or obey.

1.11 Conclusion

This chapter has provided background information to the topic under study, the language under analysis that is the Rabai language and the speakers of the language. More discussion within the chapter set out the research problem and its accompanying research questions and objectives that are tested in this study. Additionally, the rationale of the investigation, the scope and limitations have been given. The Optimality Theory, under which the analysis in this investigation is carried out has been given emphasized. Furthermore, highlights from the relevant literature to the problem in the current study have been provided. The final section has dealt with methodology used in the collecting and analyzing data.

CHAPTER TWO

THE PHONEMIC INVENTORIES OF RABAI, ENGLISH AND KISWAHILI LANGUAGES

2.1 Introduction

This section describes the phonemes of Rabai, English and Kiswahili languages. The phonemes are discussed in terms of their patterns. Rabai and Kiswahili phonemic inventories are partially similar because they are closely related Bantu languages which stem from the proto-Sabaki language. The Rabai sound system is discussed for the first time in this chapter. The significance of the English and Kiswahili sound systems in this chapter is to provide a benchmark against which the Rabai loanwords will be analyzed. The final section of this chapter provides a summary of the three phonemic inventories.

2.2 The Rabai Phonemic Inventory

Rabai has 34 consonantal phonemes, 2 semivowels and 5 vowels. Six of the consonants are prenasalized obstruents.

2.2.1 Rabai Consonants

In this subsection, Rabai consonants are discussed in terms of their variation in the state of the glottis, place of articulation and manner of articulation. The different laryngeal settings considered are voiceless and voiced (modal voice). The contrasting places of articulation as regards Rabai consonants are glottal, velar, labiovelar, palatal, palato-alveolar, alveolar, dental, labiodental and bilabial. In terms of manner of articulation, there are stops, fricatives, affricates and approximants.

Rabai encompasses seven oral stops namely /p/, /b/, /t/, /d/, /ɟ/, /k/and /ɡ /. They are orthographically represented as ‘p’, ‘b’, ‘t’, ‘d’, ‘j’, ‘k’ and ‘g’, respectively. /p/ is a voiceless bilabial plosive, whose voiced counterpart is /b/. /t/ and /d/ are the voiceless and voiced alveolar plosives respectively. /ɟ/ is the voiced palatal plosive. /k/ is the voiceless velar plosives, whose voiced counterpart is /ɡ /. They all occupy syllable onsets and appear word initially and word finally.

The language has ten fricatives namely /ɸ/, /f/, /v/, /ð/, /s/, /z/, /ʃ/, /x/, /ɣ/ and /h/. These are realized orthographically as ‘ph’ or ‘v̲’, ‘f’, ‘v’, ‘dh’, ‘s’, ‘z’, ‘sh’, ‘kh’, ‘gh’ and ‘h’, respectively. /ɸ/ is the voiceless bilabial fricative. /f/and/v/ are the voiceless and

voiced labiodental fricatives, while /ð/ is the voiced dental fricative. /s/and /z/ are the voiceless and voiced alveolar fricatives respectively. /ʃ/ is the only palato-alveolar fricative in the language, which is voiceless. There are two velar fricatives in Rabai; the voiceless one being /x/whose voiced contrasting phoneme is /ɣ. Finally, there is the voiceless glottal one, /h/. They occur at syllable onsets and appear word medially and initially.

Rabai has three affricates. Two are alveolar; /ʦ/ and /ʣ/, and the other one is a voiceless alveo-palatal affricate, /ʧ/. /ʦ/ is voiceless while /ʣ/is its voiced counterpart. The graphemes of the three affricates are 'ts', 'dz', and 'ch', respectively. They occur word initially and medially.

Rabai has nine approximant consonants, five of which are nasals. The first four include a lateral, a trill and two glides[13] namely /l, r, w, j/ described as the voiced lateral approximant, the voiced alveolar trill, the voiced labio-velar glide and the voiced palatal glide. These are realized orthographically as 'l', 'r', 'w' and 'y', respectively. They occur word initially and medially and are therefore found in syllable onsets.

The nasals in the Rabai language are namely the velar /ŋ/, palatal /ɲ/, alveolar /n/ and the bilabial /m/. Their orthographic representations are 'ng'', 'ny', 'n' and 'm', respectively. They are all found either word-medially or word-initially. They are therefore found in syllable onsets, except /m/ which is syllabic in some words. However, /m/ is syllabic at some word initial contexts. Nasality is different from manner of articulation. These segments, as Ladefoged and Maddieson (1996:135) explain, are continuants acoustically, "...characterized by a steady state... [in a distribution similar to that of approximants] rather than to stops." Thus, they cannot be said to be nasal stops as as lung air flows continuously via the nasal cavity during their production (Ladefoged and Maddieson 1996:103). Nevertheless, they are grouped under consonantal phonemes in this study because they primarily occupy syllable onsets.

Rabai language has six prenasalized obstruents namely, the prenasalized bilabial stop /mb/, the prenasalized alveolar stop /nd/, the prenasalized alveolar fricative /nz/, the

[13] Katamba (1989: 7) groups these three types of sounds (semivowels, laterals and rhotics) under the bracket of approximant articulation.

prenasalized palatal stop /ɲɟ/, the prenasalized voiceless velar stop /ŋk/ and the prenasalized voiced velar stop /ŋg /. These are presented orthographically as ‘mb’, ‘nd’, ‘nz’, ‘nj’, ‘nk’ and ‘ng’, respectively. Thus, the total number of Rabai consonant sounds is thirty-four.

Table 6: Rabai Consonants as Used in some Rabai Words

No.	IPA Symbol	Example	Gloss
1	p	kapu /**kɑpu**/	lemon
2	b	baba /**bɑbɑ**/	father
3	m	mengu /**mɛŋg u**/	clouds
4	mb	embe /**ɛmbɛ**/	mango
4	t	tophe/ tove **/tɔɸɛ**/	mud
5	d	donje **/dɔɲɟɛ**/	chunk
6	n	nane **/nɑnɛ/**	eight
8	nd	tindi /**tindi**/	tomatoes
9	ɲ	nyama **/ɲɑmɑ/**	meat
10	k	kumba **/kumbɑ/**	a certain species of fish
11	g	gana **/mɑg ɑnɑ/**	hundreds
12	ŋ	ng’onzi **/ŋɔnzi/**	sheep
13	ŋk	banka /**bɑŋkɑ**/	fan
13	ŋg	chiphongololo **/ʧiɸɔŋg ɔlɔlɔ/**	screwdriver
14	ɸ	aphu **/ɑɸu/**	uncle
15	f	fungahe **/fuŋg ɑhɛ/**	seven
16	v	vitswa /**vitswɑ/**	madness
17	ð	dhome **/ðɔmɛ/**	council of elders
18	s	masikiro /**mɑsikirɔ**/	ears

19	z	uziho /**uzihɔ/**	weight
20		usinzizi **/usinzizi/**	sleep
21	ʃ	sherehe /**ʃɛrɛhɛ/**	a feast
22	x	khambira /**xɑmbirɑ**/	tell
19	ɣ	ghamu /**ɣɑmu/**	gum
20	h	handaho /**hɑndɑhɔ/**	six
21	ʦ	mtsai /**mtsɑi/**	witch
22	ʤ	dziza /**ʤizɑ/**	darkness
23	ʧ	chulwa /**ʧulwɑ/**	frog
24	ɟ	jogolo /**ɟɔg ɔlɔ/**	cock
	ɲɟ	chirenje /**ʧirɛɲɟɛ/**	a type of a gourd
25	l	lurimi **/lurimi/**	tongue
26	r	rua /**ruwɑ/**	flower
27	w	wawe /**wɑwɛ/**	grandmother
28	j	mbeyu /**mbɛju**/	seeds

The table below sums up the discussion on Rabai consonants.

Table 7: Rabai Consonants

	Bilabial	Labio-dental	Dental	Alveolar	Palato-alveolar	Palatal	Velar	Glottal
Plosive	p b			t d		ɟ	k ɡ	
Nasal	m			n		ɲ	ŋ	
Fricative	ɸ	f v	ð	s z	ʃ		x ɣ	h
Affricate				ʦ ʣ	ʧ			
Lateral				l				
Trill				r				
Glide	w					j		

The table above excludes prenasalized obstruents because they combine several articulations rather than specific ones. These include approximant-plosive combinations as namely, /mb/, /nd/, /ɲɟ/, /ŋk/ and /ŋg /, as well as an approximant-fricative combination /nz/.

2.2.2 Rabai Vowels

Rabai language has 5 vowels. These are /ɑ/, /ɛ/, /i/, /ɔ/ and /u/. They are represented orthographically as ‘a’, ‘e’, ‘i’, ‘o’ and ‘u’, respectively. These can pair with any consonant in the language, and can appear word initially, medially and finally. The table below summarizes Rabai vowels.

Table 8: Rabai Vowels

JAW POSITION IN THE MOUTH	**POSITIONS OF THE HIGHEST POINT OF THE TONGUE IN THE MOUTH**		
	FRONT	**CENTRE**	**BACK**
HIGH	**i**		**u**
MID	**ɛ**		**ɔ**
LOW			**ɑ**

These vowels are illustrated in the following table.

Table 9: Rabai Vowels as Used in some Rabai Words

Grapheme	**Phoneme**	**Example**	**Gloss**
a	**ɑ**	tsangarawe/**ʧaŋg ɑrɑwɛ/**	sand
		taa **/tɑ:/**	lamp
e	**ɛ**	nyere **/ɲɛrɛ/**	hair
		nee **/nɛ:/**	four
i	**i**	chisima **/ʧisimɑ/**	well
		dii /**di:**/	repeatedly
o	**ɔ**	jogolo **/ɟɔg ɔlɔ/**	cock
		njongoo **/ɲɟɔŋg ɔ:/**	tractor
u	**u**	magulu **/mɑg ulu/**	legs
		chitunguu **/ʧituŋg u:/**	onion

The sequences of vowels shown above cannot be said to be long vowels because they present similar but distinct phonemes. The transcription of such sequences lacks colons because vowel length is not distinctive in Rabai. The transcription therefore follows the pattern of the segments in syllables they fall into.

2.3 The English Sound Inventory

The phonemic system of the English language is composed of 22 consonantal phonemes, 2 semivowels, 12 monophthongs, 8 diphthongs and 5 triphthongs.

2.3.1 English Consonants

These include six plosives, nine fricatives, two affricates and seven approximant consonants. All English obstruents present a symmetrical pattern except the glottal fricative, /h/, which lacks a voiced counterpart. Therefore, of the other eight fricatives, two are dental, namely, /ð/ and /θ/, two labio-dental, namely, /v/ and /f/, two alveolar, namely, /z/ and /s/ and two alveo-palatal, namely, /ʒ/ and /ʃ/, each pair encompassing a voiced and a voiceless phoneme. As regards the plosives in the language, two are bilabial, namely, /b/ and /p/, two are alveolar, namely, /d/ and /t/ while the remaining

two are velar, namely, /ɡ / and /k/ with each pair having a voiced and a voiceless segment respectively. The affricates are all alveo-palatal: a voiced one, /ʤ/ and a voiceless one, /ʧ/. The seven approximants include three nasals namely, a velar, /ŋ/, an alveolar, /n/ and a bilabial /m/, an alveolar trill /r/, an alveolar lateral, /l/, a labiovelar semivowel /w/ and a palatal glide, /j/.

Table 10: The English Consonant Chart

	Bilabial	Labio-dental	Dental	Alveolar	Palato-alveolar	Palatal	Velar	Glottal
Plosive	p b			t d			k ɡ	
Nasal	m			n			ŋ	
Fricative		f v	θ ð	s z	ʃ ʒ			h
Affricate					ʧ ʤ			
Liquid				l				
Trill				r				
Glide	w					j		

Table 11: English Consonants as Used in some English Words

NO.	**Grapheme**	**Phoneme**	**Example**	**Gloss**
1.	p	/p/	**/pɔ:pə/**	pauper
2.	b	/b/	**/bɑ:bə/**	barber
3.	m	/m/	**/mæml/**	mammal
4.	t	/t/	**/tɜ:tl/**	turtle

5.	d	/d/	**/dwɪndl/**	dwindle
6.	n	/n/	**/naɪn/**	nine
7.	k	/k/	**/kʊk/**	cook
8.	g	/g /	**/ɡ ɪmɪk/**	gimmick
9.	ng/ n	/ŋ/	**/bæŋ/** **/bæŋ/**	bang bank
10.		/f/	**/fli:t/**	fleet
11.		/v/	**/vælv/**	valve
12.		/θ/	**/θɪŋk/**	think
13.		/ð/	**/ðeɪ/**	they
14.		/s/	**/si:naɪl/**	senile
15.		/z/	**/zi:l/**	zeal
16.		/ʃ/	**/ʃeri/**	sherry
17.		/ʒ/	**/meʒəd/**	measured
18.		/h/	**/hʌf/**	huff
19.		/ʧ/	**/ʧɜ:ʧi/**	churchy
20.		/ʤ/	**/ʤɪnʤə/**	ginger
21.		/l/	**/lɒl/**	loll

22.		/r/	**/rəʊlə/**	roller
23.		/w/	/**wʊd**/	wood
24.		/j/	/**jʌŋ**/	young

2.3.2 The Vowel Phonemes of English

The English vowel system is characterized by both 12 pure vowels, 8 diphthongs and 5 triphthongs. The following table presents the pure vowels of English.

Table 12: The Monophthongs of English

	FRONT	**CENTRAL**	**BACK**
HIGH	**i:** **ɪ**		**ʊ** **u**:
MID	**e**	**ə** **ɜ**: **ʌ**	**ɔ**:
LOW	**æ**		**ɒ** **ɑ**:

Roach (2000: 14) explains that the English vowel system is composed of six short vowels namely /ɪ/, /e/, /æ/, /ʌ/, /ɒ/, /ʊ/ and one central vowel known as schwa /ə/, five long vowels namely /iː/, /ɜː/, /ɑː/, /ɔː/ and /uː/, eight more complex vowels; diphthongs, and five more complex vowels; triphthongs. The diphthongs are namely /**ɔɪ**/ illustrated in the word 'buoy' /bɔɪ/, /**ʊə**/ illustrated in 'gourd' /g ʊəd/, /**aɪ**/ found in the word 'fry' /fraɪ/, /**aʊ**/ found in the word 'owlet' /aʊlət/, /**ɪə**/ as in tier /tɪə/, /**eə**/ as in 'snare' /sneə/, /**əʊ**/ as in 'slowly' /sləʊli/ and /**ei**/ as in 'tray' /treɪ/ and five most complex vowels; triphthongs[14]. The triphthongs are the following: /**əʊə**/ as in mower /məʊə/, /**aɪə**/ as in hire /haɪə/, /**eɪə**/ as in payer /peɪə/, /**aʊə**/ as in power /paʊə/ and /**ɔɪə**/ as in royal /rɔɪəl/.

[14] The production of diphthongs is characterized by gliding from one vowel to another, with the second vowel being weaker and shorter; triphthongs are characterized by two sections of vowels gliding. A pure vowel remains constant in its articulation.

Table 13: English Monophthongs in some English Words

No.	Grapheme	Phoneme	Example	Gloss
1.	i	**/ɪ/**	**/wɪt/**	wit
2.	e/ u	**/e/**	**/sel/, /beri/**	cell, bury
3.	a	**/æ/**	**/ænəʊd/**	anode
4.	u	**/ʌ/**	**/ɡ ʌn/**	gun
5.	o	**/ɒ/**	**/kɒt/**	cot
6.	u/ oo	**/ʊ/**	**/pʊlpɪt/, /fʊt/**	pulpit, foot
7.	er/ or/ a/ ar	**/ə/**	**/ʧɑːʤə/, /dɒktə/ /ənɔɪ/, /bɜːɡ lə/**	charger, doctor, annoy, burglar
8.	ea/ ee/	**/i**ː/	**/wi**ː**k/, /wi**ː**d/**	weak, weed
9.	er/ ir /ur /ear	**/ɜ**ː/	**/mɜ**ː**si/, /ʃɜ**ː**t/, /tɜ**ː**n/, /ɜ**ː**n/**	mercy, shirt, turn, earn
10.	our/ aw/ ow/ oo/ or/ ore/ au	**/ɔ**ː/	**/kɔ**ː**t/, /pɔ**ː**/, /lɔ**ː**/, /pɔ**ː**/, /pɔ**ː**k/, /pɔ**ː**/, /pɔ**ː**pə/**	court, paw, low, poor, pork, pore, pauper
11.	ar	**/ɑ**ː/	**/kɑ**ː**t/**	kart
12.	oo/ u	**/u**ː/	**/hu**ː**t/, /ʃu**ː**t/**	hoot, chute

There are notable differences between the Rabai and the English sound inventories. Rabai has thirty-four consonants while English has twenty-four. In addition, Rabai has six prenasalized obstruents, which are absent in English. Also, while English has twelve pure vowels, Rabai has a five of them. Rabai has velar fricatives /ɣ/ and /x/ as well as the palatal nasal /ɲ/, segments which English lacks. Additionally, while Rabai encompasses three affricates, the voiced /ʣ/ and the voiceless /ʦ/ and /ʧ/, English has two affricates, namely the voiced and voiceless palato-alveolar affricates /tʃ/ and /dʒ/.

2.4 The Kiswahili Phonemic Inventory

The sound inventory of Kiswahili is composed of 32 consonants and 5 vowels. Six of its consonantal phonemes are prenasalized. The four tables below expound on this

inventory. The first and the second tables highlight on Kiswahili consonantal phonemes. The other two tables deal with Kiswahili vowel phonemes.

Table 14: The Consonants of Kiswahili

	Bilabial	Labio-dental	Dental	Alveolar	Palato-alveolar	Palatal	Velar	Glottal
Stops	p b			t d		ɟ	k ɡ	
	m			n		ɲ	ŋ	
Fricative		f v	θ ð	s z	ʃ		x ɣ	h
Affricate					ʧ			
Liquid				l				
Trill				r				
Glide	w					j		

Polome (1967:38-39) adds aspirated segments to the consonant phonemes of the language, namely, the voiceless aspirate bilabial plosive, the voiceless aspirate alveolar plosive, the voiceless aspirate palato-alveolar affricate and the voiceless aspirate velar plosive. However, these are restricted to certain dialects especially outside the mainland. In some cases, they may appear as allophones of their non-aspirate counterparts, a contrast seen in class 9-10 of nouns their augmentatives (see Polome (1967:39)). International Phonetic Association (1949:46) notes, "Aspirated ph, th, kh, ...occur in Zanzibar speech; the aspiration is slight, but distinctive. In upcountry Swahili the unaspirated sounds are substituted for these." Thus, these aspirated phonemes are restricted to certain dialects of the language.

Standard Kiswahili therefore has seven plosives, ten fricatives, one affricate and eight approximant consonants. Of the ten fricatives, two are dental, namely, /ð/ and /θ/, two labio-dental, namely, /v/ and /f/, two alveolar, namely, /z/ and /s/, one alveo-palatal, namely, /ʃ/, and one glottal, namely /h/. As pertains the plosives in the language, two

are bilabial, namely, /b/ and /p/, two are alveolar, namely, /d/ and /t/ while the remaining two are velar, namely, /ɡ / and /k/ with each pair having a voiced and a voiceless segment respectively. The only affricate in the language is the voiceless alveo-palatal one, /ʧ/. The eight approximants include four nasals namely, a velar, /ŋ/, a palatal, /ɲ/, an alveolar, /n/ and a bilabial /m/, an alveolar trill /r/, an alveolar lateral, /l/, a labial semivowel /w/ and a palatal glide, /j/.

Table 15: Kiswahili Consonants as Used in some Kiswahili Words

NO.	**Grapheme**	**IPA Symbol**	**Example**	**Gloss**
1.	p	p	papa /**papa**/	shark
2.	b	b	baba /**baba**/	father
3.	m	m	mama /**mama**/	mother
4.	mb	mb	pamba /**pamba**/	cotton/ beautify
5.	t	t	tatu **/tatu**	three
6.	d	d	damu **/damu**/	blood
7.	n	n	nane **/nanɛ/**	eight
8.	nd	nd	ukanda /**ukanda**/	region
9.	ny	ɲ	nyama **/ɲama/**	meat
10.	k	k	kuku **/kuku/**	chicken
11.	nk	ŋk	panka /**paŋka**/	fan
12.	g	ɡ	gonga **/ɡ ɔŋɡ a/**	knock
13.	ng	ŋg	pengo /**pɛŋg ɔ**/	blank
14.	ng’	ŋ	ng’ombe **/ŋɔmbɛ/**	cattle
15.	f	f	funga /**fuŋg a/**	fast (verb)
16.	v	v	uvumilivu /**uvumilivu**/	long suffering
17.	dh	ð	nidhamu /**niðamu/**	discipline
18.	s	s	masikio /**masikiɔ**/	ears

19.	z	z	uzito **/uzitɔ/**	weight
20.	nz	nz	chanzo /**ʧanzɔ**/	cause
21.	sh	ʃ	shangwe **/ʃaŋg wɛ/**	joy
22.	gh	ɣ	ghali **/ɣali/**	expensive
23.	kh	x	khalifa /**xalifa**/	caliph
24.	h	h	hadithi **/hadiθi/**	narrative
25.	ch	ʧ	chura **/ʧura/**	a frog
26.	j	ɟ	jogoo **/ɟɔg ɔ:/**	a cock
27.	nj	ɲɟ	kiganja /**kiɡ aɲɟa**/	palm
28.	l	l	ulimi /**ulimi/**	tongue
29.	r	r	rarua **/rarua/**	tear
30.	th	θ	thelathini/**θɛlaθini**/	thirty
31.	w	w	wema /**wɛma**/	goodness
32.	y	j	yai /**jaji**/	an egg

The table above adds six prenasalized obstruents to the Kiswahili phonemic inventory. These are namely, the prenasalized bilabial stop /mb/, the prenasalized alveolar stop /nd/, the prenasalized alveolar fricative /nz/, the prenasalized palatal stop /ɲɟ/, the prenasalized voiceless velar stop /ŋk/ and the prenasalized voiced velar stop /ŋg /. They are presented orthographically as ‘mb’, ‘nd’, ‘nz’, ‘nj’, ‘nk’ and ‘ng’ respectively.

There are slight differences between the Kiswahili consonant chart and that of the Rabai language. While Rabai has two alveolar affricates and one palato-alveolar affricate, Kiswahili has only the voiceless palato-alveolar affricate. Moreover, Rabai has a voiceless bilabial fricative which is absent in Kiswahili. However, Rabai lacks the voiceless dental fricative present in Kiswahili. Additionally, some dialects of Kiswahili present aspirates with aspiration being distinctive. The following table gives examples of Kiswahili words that illustrate its consonants.

Table 16: Kiswahili Vowels

TONGUE HEIGHT	TONGUE POSITIONS IN THE MOUTH		
	FRONT	CENTRE	BACK
HIGH	i		u
MID	ɛ		ɔ
LOW		a	

It is evident that Kiswahili language has a five vowel system just as Rabai. The use of the Kiswahili vowels is illustrated in the table below.

Table 17: Kiswahili Vowels in some Kiswahili Words

Grapheme	Phoneme	Example	Gloss
a	**a**	pana /**pana**/	wide
e	**ɛ**	nywele /**ɲwɛlɛ/**	hair
i	**i**	kisima **/kisima/**	well
o	**ɔ**	dondoo **/dɔndɔ:/**	excerpt
u	**u**	magugu **/mag ug u/**	weeds

2.5 Conclusion

This chapter has discussed the phonemes found in Rabai, Kiswahili and English. The most critical section in the chapter was that which dealt with Rabai phonemes, given that the language's inventory had to be established. Although the sound inventories of Kiswahili have been widely expounded by various scholars, it was deemed necessary to have them here so as to lay the benchmark against which the phonological adaptation processes in Rabai loanwords would be analyzed.

Various distinctions among these inventories have been pointed out. It was established that Rabai has the highest number of consonant phonemes at thirty-four. English has twenty-four consonant phonemes and Kiswahili has thirty-two consonantal phonemes. As far as the vowels of these languages are concerned, English has the highest number

of pure vowels, having 12 of them. Kiswahili has 5 vowels while Rabai has 5 vowels. Nevertheless, the three languages have some similar sound segments in particular areas.

The next chapter will analyze the sound changes witnessed in Rabai loanwords from English and Kiswahili. Given the similarities and differences between the inventory of Rabai and those of the recipient languages, the succeeding section will illustrate some sounds which are retained and those that are substituted or eliminated as determined by the Rabai phonological system.

CHAPTER THREE

THE PHONOLOGICAL PROCESSES INVOLVED IN THE ADAPTATION OF RABAI LOANWORDS FROM ENGLISH AND KISWAHILI.

3.1 Introduction

This chapter expounds Rabai loanword adaptation. The chapter has two main sections. The first section deals with adaptation processes of Rabai loanwords from English, while the second section deals with the adaptation processes of Rabai loanwords from Kiswahili. Each of these sections has subsections dealing with the adaptation processes of consonants and those of vowels. These processes are discussed within the framework of Optimality Theory.

3.2 Adaptation Processes of Rabai Loanwords from English.

In this section, Rabai vowel adaptation processes and Rabai consonant adaptation processes are discussed. The vowel adaptation processes discussed are elision, insertion, monophthongization, diphthongization and shortening. Insertion is further divided into various processes depending on the position of the inserted segment in a word. The various insertion processes are paragoge and anaptyxis. The consonant processes are substitution, the deletion process apheresis as well as prothesis.

3.2.1 Rabai Vowel Adaptation Processes

3.2.1.1 Vowel Epenthesis

This is a process whereby one or more vowels are added to an English input. In Rabai, it is realized through **paragoge** and **anaptyxis**.

The process of paragoge adds a vowel to the end of an English input. In the data provided below, all the outputs obey the markedness constraint of NOCODA, because they have open syllables as required by the Rabai syllable structure.

1. English input	**Rabai output**	**Gloss**
/bʌʤɪt/	/bɑɟɛt**i**/	budget
/ɒfɪs/	/hɔfɪs**i**/	office
/bu:t/	/but**i**/	boot

/brʌʃ/	/brɑʃ**i**/	brush
/kwɪniːn/	/kwinini**i**/	quinine
/kiːbɔːd/	/kibɔd**i**/	key board
/bɒks/	/bɔkis**i**/	box
/sɔːs/	/sɔs**i**/	sauce
/klʌʧ/	/klɑʧ**i**/	clutch
/blæŋkɪt/	/brɑŋg ɛt**i**/	blanket
/tjuːb/	/ʧub**u**/	tube
/zɪp/	/zip**u**/	zip
/g ləʊb/	/g ulɔp**u**/	globe
/stəʊv/	/sitɔv**u**/	stove
/wiːv/	/wiv**u**/	weave
/skɜːt/	/sikɑt**i**/	skirt
/maɪk/	/mɑiki/	mike/microphone

In most of the outputs, /i/ has the highest frequency of being inserted, being the most natural front vowel. It is followed by /u/, the most natural back vowel (see Hyman (1975:149-151) and Katamba 1989:108-109). All the above inputs violate the faithfulness constraint that deters epenthesis, DEP-V, because the epenthetic segments at the end of each output lack counterparts in their respective inputs. Nevertheless, the faithfulness constraint at work here is held at a lower rank than is the markedness constraint, NOCODA, hence the appropriateness of the word final epenthetic sounds in the outputs in the Rabai language. Below is a tableau that illustrates the interaction of these constraints and three more others in the phonological adaptation of the word 'globe' in the Rabai language. The other three constraints, COMPLEX^{VOW} (which blocks certain strings of vowels within a syllable), *COMPLEX (which blocks certain

consonant clusters in the language) and IDENT-IO (voice), (the requisite against change of voice), show other phonological adaptation processes at work in the adaptation of this word into Rabai, but which will be discussed in later sections.

Table 18: English Input and its Rabai Equivalent for the Word 'globe'

Input: globe /ɡ ləʊb/	**NOCODA**	**COMPLEX^{VOW}**	***COMPLEX**	**IDENT-IO (voice)**	**DEP-V**
a. /ɡ ləʊb/	***!**	***!**	***!**		
b. /ɡ ləʊbu/		***!**	***!**		*****
c. /ɡ uləʊpu/		***!**		*****	******
☞ **d. /ɡ ulɔpu/**				*****	******

The optimal output form, /**ɡ ulɔpu**/, gets selected for obeying the highly ranked markedness constraints, *COMPLEX, COMPLEX^{VOW} and NOCODA. The faithfulness constraints, DEP-V and IDENT-IO (voice) are flouted by the optimal choice. DEP-V is violated through the various insertions within the output, since there are no corresponding segments of the epenthetic sounds in the input. The outputs that violate the constraint, IDENT-IO (voice) do so by substituting the voiced bilabial fricative /b/ with its voiceless counterpart /p/. Those outputs that violate the constraint COMPLEX^{VOW} have the English diphthong /əʊ/. The optimal output violates only these faithfulness constraints. The monosyllabic input has a coda as well as a consonant cluster, units which are illicit in the Rabai language. The coda is eliminated through paragoge of the vowel /u/. The CC cluster, **ɡ l**, is broken through insertion of the vowel /u/, a process called anaptyxis. Thus, the input is re-syllabified into a tri-syllabic output.

The adaptation strategy of **anaptyxis** inserts a vowel between two consonants in an input to break an unacceptable consonant cluster. The main constraint that is violated is *COMPLEX, which deters complex consonant clusters within syllables.

2. English input Rabai output Gloss

/kæpsju:ls/	/kɑp**i**sɔsi/	capsule
/stəʊv/	/s**i**tɔvu/	stove
/bælkəni/	/bɑr**i**kɔni/	balcony
/skɜ:t/	/s**i**kɑti/	skirt

The unacceptable clusters in the data above are ‘ps’, ‘tl’, ‘sp’, ‘st’, ‘lk’ and ‘sk’ respectively. All these clusters are penalized by *COMPLEX and therefore are eliminated through anaptyxis. The following table illustrates how the process works for the word ‘skirt.’

Table 19: English Input and Rabai Output for the Word ‘skirt.’

Input: /skɜ:t/	**NOCODA**	***COMPLEX**	**DEP-V**	**COMPLEX^{VOW}**
a. /skɜ:t/	***!**	***!**		***!**
b. ☞/sikɑti/			*	
c. /sikɜ:ti/			*	***!**

Candidate a. above has a coda, thus violates the NOCODA markedness constraint in Rabai. Further, it has a complex consonant cluster, sk, which is illicit in the Rabai language. It also has the vowel /ɜ:/ which is absent in Rabai. Candidate c. has the vowel /ɜ:/ and is thus unacceptable just like a is. Candidate b. holds the the optimal position for obeying markedness limitations. DEP-V, is the only limit that b. exceeds, by inserting /i/ to break the sk cluster, and /i/ at the end to eliminate a coda, adjustments which the Rabai language accepts.

3.2.1.2 Vowel Syncopation

This is the deletion of word medial vowels. The following is an example:

3. English input	**Rabai output**	**Gloss**
/hændbæg /	/bɛg i/	handbag

Table 20: English Input and Rabai Output for the Word 'handbag'

Input: /hændbæg /	**NOCODA**	**COMPLEX^{VOW}**	**MAX-C**	**DEP-V**	**MAX-V**
a. ☞/bɛg i/			*	*	*
b. /bæg /	*!	*!	*		
c. /bægi/		*!	*	*	

In the table above, the optimal candidate violates the faithfulness constraints MAX-V, DEP-V and MAX-C. MAX-C is violated when the consonants in the syllable margins of the first syllable in the input, /h/, /n/ and /d/ are elided. MAX-V is violated when the vowel in the initial syllable of the input, /æ/, is substituted with /ɛ/. The insertion of /i/ after /g / breaks the DEP-V constraint. The unsuitable possible outputs, b and c, break markedness constraints. Candidate b. has a coda and a complex vowel /æ/ which is absent in Rabai. c. has the same complex vowel. The two candidates are thus eliminated in favor of the first one which breaks only faithfulness constraints.

3.2.1.3 Monophthongization

This process changes diphthongs into short vowels. This process is against IDENT IO, the reason being that the double gliding aspect in the triphthong is lost.

4. English input	**Rabai output**	**Gloss**
/di:kəʊdə/	/dɛkɔdɑ/	decoder
/g ləʊb/	/g ulɔpu/	globe
/bəʊlt/	/bɔlti/	bolt
/prəʊg ræm/	/prɔg rɑmu/	program
/ɪndɪkeɪtə/	/indikɛtɑ/	indicator

The following table works out the generation of the Rabai output for the word 'decoder'.

Table 21: English Input and Rabai Output for the Word 'decoder'

Input: /di:kəʊdə/	**IDENT IO (long)**	**COMPLEX^{VOW}**	**IDENT IO (high)**
a. ☞/dɛkɔdɑ/	*		*
b. dikəʊdɑ	*	*!	*
c. /dikɔdə/	*	*!	*

The optimal candidate is a. because it eliminates a complex vowel (the diphthong) with a simpler one, /ɔ/. However, this candidate violates other constraints that dictate that some input features must be maintained. One such constraint is IDENT IO [long], which gets violated through the shortening of /i:/. The other one is IDENT IO [high], which is violated through the lowering of the first vowel, /i:/ to /ɛ/. The second candidate is unacceptable because it contains the diphthong, which in this case is a complex vowel. The third candidate presents a schwa which has no correspondent in the Rabai language, and is therefore unacceptable. One point is clear that speakers of any language will try to simplify loanwords to fit their phonological system.

3.2.1.4 Diphthongization

The process forms diphthongs from triphthongs. Just like the afore discussed monophthongization, the constraint, IDENT IO [F] is violated, through substituting triphthongs with diphthongs. The following example illustrates the process.

5. English input	**Rabai output**	**Gloss**
/t**aɪə**/	/t**ɑi**ri/	tire/tyre

The output above IDENT IO, DEP-C as well as IDENT IO [-High, -Low] faithfulness constraints. IDENT IO is violated through the production of a disyllabic output, yet the input was monosyllabic and in the processes of inserting the consonant /r/ and the raising of /ə/ to /i/ as well as in the reduction of the triphthong /**aɪə**/ into the diphthong /**ɑi**/. The insertion of the consonant /r/ breaks DEP-C, because /r/ is absent in the input. IDENT IO [High, Low] gets violated through the raising of the schwa to the front high vowel /i/.

Table 22: English Input and Rabai Output for the Word 'tyre'

Input: /taɪə/	**NOCODA**	**COMPLEX^{VOW}**	**IDENT IO**	**IDENT IO [High, Low]**	**DEP-C**
a. /taɪə/			*		
b. ☞ /taiɾi/		*!		*	*
c. /taɪr/	*!		*		*

The first output is unacceptable because it is irrelevant to a great extent with respect to the constraints in this case. The third one is also unacceptable because it violates a highly regarded constraint in the Rabai language, NOCODA, by presenting a syllable coda.

3.2.1.5 Vowel Shortening

This process eliminates the feature LONG that an input vowel had, thus violating the constraint, IDENT-IO (long). The data below illustrates such a violation.

6. English input	**Rabai output**	**Gloss**
/tj**u**:b/	/ʧ**u**bu/	tube
/k**ɔ**:t/	/k**ɔ**ti/	court
/g ɪt**ɑ:**/	/g it**ɑ**/	guitar
/kwɪn**i**:n/	/kwin**i**ni/	quinine
/k**i**:b**ɔ**:d/	/kib**ɔ**di/	key board
/kæpsj**u**:ls/	/kɑpis**ɔ**si/	capsules
/t**i**:v**i**:/	/tiv**i:**/	T.V(television)
/k**ɑ:**tn/	/k**ɑ**t**ɔ**ni/	carton
/ʧ**ɑ**:dʒə/	/ʧ**ɑ**ɟɑ/	charger

The table below shows how the process occurs for the word 'tube'

Table 23: English Input and Rabai Output for the Word 'tube'

Input: /tju:b/	**NOCODA**	**COMPLEX^{VOW}**	**IDENT IO (long)**	**DEP-V**
a. /ʧub/	***!**		*****	
b. /ʧu:bu/		***!**		*****
c. ☞/ʧubu/			*****	*****

In the example illustrated in the table, the initial consonant cluster, 'tj', is substituted with an affricate /ʧ/. According to Campbell (1999:39), this is a case of palatalization whereby alveolar sounds become palato-alveolar ones. The process is triggered by /j/, which is the second segment in the cluster. Thus, /t/ is palatalized into /ʧ/ when it precedes the palatal glide /j/. The first output is unacceptable because it has a closed syllable, which is unacceptable in the Rabai language. The second output is unacceptable because it has a long vowel which would make the word more complex in terms of stress after the epenthetic /u/ is inserted at the end. The epenthetic /u/ in b. and c. causes a violation of the DEP-V constraint because it has no correspondent in the input. The following table presents a rather unusual output, **/tivi:/**. In it, there is a long vowel, which is retained from the input.

Table 24: English Input and Rabai Output for the Word 'T.V'

Input: /ti:vi:/	**IDENT IO (long)**	**COMPLEX^{VOW}**
a. ☞/tivi:/	*****	***!**
b. /ti:vi/	*****	***!**
c. /tivi/	*****	

The optimal output violates a markedness constraint, COMPLEX^{VOW} by retaining a long vowel, /iː/. This is rather odd as it is predicted that all long vowels in the input are shortened, hence raising questions on adequacy of the Optimality Theory in this analysis. The third candidate, which would have been the optimal one if OT's markedness constraints applied fully as predicted, is eliminated, thus adding to the inadequacy of some of the tenets of O.T. The second candidate is also eliminated, although it violates the same constraint as the optimal candidate, though at the first

syllable. The only explanation for having a. as the optimal choice would be to have an output that is partially similar to the input in tone.

3.2.1.6 English Input'sVowel Lowering

This kind of a process involves a shift of vowel height features extending from the highest vowel, /i/ to the lowest one. The feature [+High] of a vowel shifts to [-High, -Low] while in other cases, the feature [-High, -Low] shifts to [+Low]. The following are examples in some Rabai words.

7. English input	Rabai output	Gloss
/bʌʤɪt/	/bɑɟɛti/	budget
/brʌʃ/	/brɑʃi/	brush
/kæpsj**u**:ls/	/kɑpisɔsi/	capsules

In the word / bʌʤɪt/, the mid-vowel /ʌ/ which is [-High, - Low] changes into /ɑ/, which is [+Low]. /ɪ/, which is [+High] becomes /e/ whose features are [-High, -Low]. The Rabai word for 'brush', /brɑʃi/, shows /ʌ/ changing into /ɑ/. As for the word /kæpsj**u**:ls/ 'capsules', the high back long vowel /u:/ becomes /ɔ/, a mid-low vowel. Such feature changes violate the constraint, IDENT-IO (F) since some features of certain segments are not preserved. These features include [High] as for the input segment **/ɪ/** and [-High, - Low] as for the input segment **/ʌ/** as regards the word 'budget' illustrated in the table below.

Table 25: English Input and the Rabai Output for the Word 'budget'

Input: /bʌʤɪt/	**NOCODA**	**DEP-V**	**IDENT IO [–High, -Low]**	**IDENT IO [High]**
a. /bɑɟit/	***!**		*	*
☞b. /bɑɟɛti/		*	*	*

The non-optimal candidate presents a coda in the second syllable hence is unacceptable. Both candidates violate the IDENT IO (F) constraint through vowel lowering. It is the lowest ranked constraint in this case. In a., /ʌ/ changes into /ɑ/, while /ɪ/ is raised into /i/. Additionally, the optimal one violates the DEP-V constraint through the epenthesis

of /i/ at the end, which is of a lower rank than other constraints because it is done to eliminate a syllable coda.

3.2.2 Consonant Adaptation Processes of English Inputs into Rabai Outputs

3.2.2.1 Consonant Substitution

The process involves replacing a consonant with another whose articulation is of a different manner or voice. The main constraint violated is the IDENT-IO (F). The following are examples.

8. English input	**Rabai output**	**Gloss**
/b**l**æŋ**k**ɪt/	/b**r**ɑŋ**g** ɛti/	blanket
/naɪlɒn/	/**l**ɑilɔni/	nylon

In the first case, /k/ changes into /ɡ /. In the same case, /ɪ/ is raised to /i/. In the second example, **/n**aɪlɒn/, /n/ changes into /l/. All these cases are a form of **weakening,** because the sounds used as substitutes are more sonorous hence weaker than the sounds they are replacing. The voiceless stop /k/, is less sonorous but stronger[15] than its voiced counterpart, /ɡ / given that '... both synchronically and diachronically, voiceless consonants change into voiced ones in environments similar to those where the reduction in the strength of the obstruction in the production of consonants takes place (Katamba 1989:105)'. The high vowel /ɪ/ is more sonorous but weaker than /i/. Moreover, the liquid /l/ is more sonorous but less strong than the nasal /n/. Table 23 below illustrates substitution in the input **/blæŋkɪt/.**

[15] The strength of a phoneme is related to its sonority. Katamba (1989:104) notes that 'the sonority hierarchy is an inverse restatement of the sonority hierarchy.' Vowels therefore, are the most sonorous of all segments, but the weakest, while voiceless plosives, rank lowest in sonority, but highest in strength. Approximants are therefore weaker but more sonorous than fricatives, while fricatives are weaker but more sonorous than affricates. Among the approximants, vowels are the weakest while the nasals are the strongest. The others are glides and liquids, with glides being weaker but more sonorous than the liquids. In addition, stops are less sonorous but stronger than affricates. The same concept of strength applies to voicing, whereby voiceless obstruents are the stronger and therefore less sonorous than their voiced counterparts. Thus, the weakening of a segment is an increase in its sonority.

Table 26: English Input and Rabai Output for the Word 'blanket'

Input: /blæŋkɪt/	**NOCODA**	**DEP-V**	**IDENT IO [voice]**	**IDENT IO (Manner)**	**IDENT IO [High]**
☞a. /brɑŋg ɛti/		*	*	**	*
b. /brɑŋg ɛt/	*!	*	*	**	*
c /brɑŋkɛti/		*		*	*

Output a. lacks a coda, unlike b., thus obeys the highly ranked constraint. However, it violates, DEP-V through the paragoge of /i/; IDENT IO (Manner) through substituting a liquid, /l/, with a trill, /r/; IDENT IO [voice] and IDENT IO [High] through lowering /ɪ/ to /ɛ/. Output b. has a coda hence is unsuitable in the Rabai language. C. is an interesting output because it is ruled out though having the sound /**ŋk**/ which is acceptable in the language. The sound is only found in some of the borrowed vocabulary in the language, such as /**siŋki**/ 'sink' and /**bɑŋkɑ**/ 'fan' (borrowed from Kiswahili as /**pɑŋkɑ**/). The reason could be that the sound /ŋk/ has not yet been fully incorporated into the Rabai language.

3.2.2.2 Consonant Deletion

This process eliminates certain correspondent consonants of the input. Thus, MAX-C is the lowest ranked constraint in this case because for the process to occur, this constraint has to be violated. In Rabai, this process is realized in two ways, namely, syncopation and apocopation.

The syncopation of consonants is the deletion of consonants that are in word medial positions. The data below illustrates syncopation of English input consonants.

9. English input	**Rabai output**	**Gloss**
/mɪʃən**r**i/	/mumiʃɛni/	missionary
/kæps**j**u:**l**s/	/kɑpisɔsi/	capsules

Table 27: English Input and Rabai Output for the Word 'missionary'

Input: /mɪʃənri/	**NOCODA**	**DEP-V**	**DEP-C**	**MAX-C**
☞a. /mumiʃɛni/		*	*	*
b. /mmiʃɛni/			*	*
c. /mumiʃɛn/	*!			*

In the input above, the optimal output undergoes both phonological and morphological adaptation processes simultaneously in order to fit into Rabai. This is because some phonological adaptation processes that take place cause the word to fit into the Rabai morphological system. These processes are the prosthesis of /m/ word initially and the anaptyxis of /u/ after the /m/. The resultant syllable, /mu/ represents the class marker of class 1-2 of nouns in the Rabai language. Other phonological processes that take place are the syncopation of /r/ and the substitution of the schwa in the input with the mid front vowel, /ɛ/. These processes lead to a violation of three lowly ranked constraints. The first one is MAX-C, broken through the deletion of /r/. The second and third ones are DEP-V as well as DEP-C, broken through /u/ insertion as well as the prothesis of /m/, respectively. The second candidate cannot be the optimal one, though it presents an initial syllable with an acceptable syllabic /m/. This is because its initial syllable is not the class marker for class 1-2 nouns in the Rabai language. The third candidate has a coda at its final syllable, which therefore violates the markedness constraint, NOCODA, something which is unacceptable in the Rabai language.

Consonant apheresis, is a process which leads to a loss of input consonants at word initial positions. In the English input below, which was illustrated on Table 20, the initial fricative, /h/ is lost. This elision process violates the MAX-C constraint because the elided /h/ lacks a corresponding output segment.

10. English input	**Rabai output**	**Gloss**
/hændbæg /	/bɛg i/	handbag

The apheresis of **/h/** occurs simultaneously with the syncopation of the following vowel **/æ**/, as well as the elision of the nasal **/n**/ and the plosive, /**d**/. The output above seems to be as a result of the splitting of the compound 'handbag' into its constituent parts, 'hand' and 'bag' and the retention of the second part of it, 'bag'. The word 'bag' is the adapted to fit into the Rabai language, by raising the vowel **/æ**/ to **/ɛ/** and inserting the vowel /**i**/ to its end, hence /**bɛg i**/. However, the original meaning is retained, despite having the modifier part, '**hand'**, being elided. In the input language, the word 'bag' bears a wide range of meaning, since it stands for all types of bags. However, in the Rabai language, the meaning of the word 'bag' is carried by the word '**mfuko'** in the language. Thus, having the word 'begi' to mean a specific bag (the handbag) in the language is not confusing. Thus, though the reversal of the morphological process of compounding occurs, the semantic aspect of the input compound (i.e. the referent), is retained in the output.

3.2.2.3 Consonant Insertion

In this case, Rabai consonants are inserted into English inputs, thus violating the DEP-C faithfulness constraint, which requires that for every output consonant, there should be an input correspondent. The epenthesis of consonants is realized through **anaptyxis** and **prothesis**.

As regards anaptyxis, Rabai consonants are inserted at medial positions of inputs. The data below illustrates anaptyxis.

11. English input	**Rabai output**	**Gloss**
/taɪə/	/tɑi**r**i/	tire
/ʃaʊə/	/ʃɑ**w**ɑ/	shower
/mɔ:rʧueri/ *NAME*	/mɔʧ**w**ɑri/	mortuary

In the first example, a trill is inserted as the triphthong in the input is reduced to a diphthong in the output. In the rest of the examples, glide epenthesis takes place. The following table illustrates how the Rabai output for the word 'mortuary' is arrived at.

Table 28: English Input and Rabai Output for the Word 'mortuary'

Input: /mɔ:rʧueri/	DEP-C	IDENT IO (long)	COMPLEX^{VOW}	NOCODA
a. /mɔʧuɛri/		*	*!	
b. /mɔ:rʧɑri/		*	*!	*!
c. ☞/mɔʧwɑri/	*	*		

In the table, a. cannot fit in Rabai because it contains a complex vowel /ue/ which requires simplification in order to fit into the Rabai phonological system. The candidate labelled b. bears a coda and therefore, gets disregarded. Moreover, it oversimplifies the diphthong /ue/ in to /a/, as it fails to cater for the strongest part of the diphthong /u/. It also retains the long /ɔ:/ sound, which rarely occurs at word initial positions after /m/ in the Rabai language. The nasal /m/ precedes a short vowel or occurs independently as a syllabic segment at word initial positions to mark noun class. C. stands as the optimal candidate because it caters for the diphthong in the input, by substituting its strongest part, /u/ with the glide /w/, which is a high back sound as /u/ is. It also eliminates the coda in the initial syllable of the input, through syncopation. The input is possibly **/mɔ:rʧueri/,** which is the North American English pronunciation of the word 'mortuary' and not the Standard British English one **/mɔ:ʧəri/.** This is because it is much easier for the glide /ua/ to be substituted by /wɑ/ than it is for the schwa, a weak sound in English, to be strengthened into a glide and more so a glide and a low vowel.

The process of prothesis in Rabai occurs when consonants are inserted to the beginning of English inputs. This makes initial syllables in the outputs have onsets which were absent in the corresponding inputs. Recall the processes illustrated on table 2 of chapter one.

Table 29: English Input and Rabai Output of the Word 'office'

Input: office /ɒfɪs/	NOCODA	DEP-V	ONSET	DEP-C
a. /ɒ.fɪs/	*!		*	
b. /ɔ.fi.si/		*	!*	
☞ c. /hɔ.fi.si/		*	`	*

The fricative /h/ is inserted to the beginning of the input, a process that violates the DEP-V constraint. Moreover, the vowel /ɒ/ is substituted with /ɔ/, as /ɪ/ is raised to /i/ thus violating the IDENT IO (F) constraint. DEP-V is also violated when /i/ is inserted to the end of the word.

3.3 Adaptation Processes of Rabai Loanwords from Kiswahili

3.3.1 Rabai Vowel Adaptation Processes

3.3.1.1 Vowel Epenthesis

The process involves insertion of vowels into Kiswahili inputs to make them suit into the Rabai phonological system. The highest ranked constraints in this case are *COMPLEX and NOCODA. *COMPLEX has to do with illicit consonant clusters, while NOCODA deters syllable codas. The lowest ranked constraint violated in this case is DEP-V reason being that the vowels that are inserted in the outputs lack correspondent ones in the inputs.

The only epenthetic process involved here is **anaptyxis**, in which case epenthetic segments are inserted between consonants to break unacceptable clusters. End epenthesis (paragoge) is not common as far as Kiswahili inputs are concerned because Kiswahili has open syllables at word final positions. The only exception where paragoge would apply would be in some Rabai loanwords borrowed from Arabic through Kiswahili, words which would have closed word final syllables. However, the analysis of such loanwords is not included in this study. The word medial clusters that are broken through anaptyxis are as a result of borrowing from other languages. In 12 below, the Kiswahili word library, '/mɑktɑbɑ/,' was coined from the Arabic derivative, 'maktabat'. However, the consonant cluster, 'kt' was retained in the Kiswahili word. In Rabai, this cluster is broken through epenthesis of /i/.

12. Kiswahili input	**Rabai output**	**Gloss**
/bajiskɛli	/bɑs**i**kili/	bicycle
/skrubu/	/s**u**k**u**rubu/	screw
/skuli/	/s**i**kuli/	school
/inspɛkta/	/sipɛkitɑ/	inspector

/aspirini/	/s**i**pirini/	aspirin
/pistɔni/	/pis**i**tɔni/	piston
/mukristɔ/	/muk**i**ristɔ/	Christian
/mwislamu/	/mus**i**lɑmu/	Moslem
/maktaba/	/mɑk**i**tɑbɑ/	library
/kamiʃna/	/kɑmiʃɛnɑ/	commissioner

All these examples are borrowed into Rabai from English through Kiswahili except /mɑkitɑbɑ/ 'library'. The word 'aspirin' is of special concern because it has been borrowed through a series of languages. It was borrowed by English from German. Kiswahili borrowed it from English, while Rabai borrowed it from English through Kiswahili. The word /mɑkitɑbɑ/ 'library' has been borrowed from Arabic through Kiswahili. They however undergo further phonological adaptations in order to fit into the Rabai phonological system. However, in Rabai, the now Kiswahili input, /aspirini/, undergoes anaptyxis as the 'sp' cluster gets broken through the insertion of /i/. In addition, the word undergoes another process, apheresis, as the initial vowel, /a/, gets deleted. The following table illustrates anaptyxis in the Kiswahili input for the word 'library', /maktaba/.

Table 30: Kiswahili Input and Rabai Output for the Word "maktaba" 'library'

Input/maktaba/	**NOCODA**	***COMPLEX**	**DEP-V**
a. /mɑktɑbɑ/	***!**	***!**	
☞b. /mɑkitɑbɑ/			*****
c. /mɑktɑb/	***!**	***!**	

In this illustration, a cannot be the optimal output because it presents a complex consonant cluster in the Rabai language. Additionally, the two consonants in same cluster can be analyzed as different parts of two distinct syllables: /k/ as a syllable coda, which then would be illicit in the Rabai language, and /t/ as a syllable onset. The third possible output is unsuitable in Rabai because it presents a syllable coda at the end as

well as a complex consonant cluster which in a way, just like the afore discussed a, would present a coda.

3.3.1.2 Vowel Elision

MAX-V is violated when any input vowel is deleted, the reason being that there will be no correspondent segment that will be left in the output as a trace of an elided input vowel. The elision of Kiswahili input vowels occurs through **apheresis** and **apocopation**.

Through apheresis, initial input vowels are elided. The data labelled 13 illustrates apheresis of vowels. The constraints at work in the cases presented below are *COMPLEX, DEP-V, MAX-V and IDENT IO (Manner). The most highly ranked constraint is *COMPLEX. DEP-V is disobeyed when anaptyxis takes place to split certain illicit clusters in certain inputs below. The constraint, IDENT IO (Manner), is included in this section, the reason being that there are certain consonantal phonemes that change their manner of articulation in the process of phonological adaptation of the inputs in which they are contained. IDENT IO [-High, -Low] works in the case of the input /ɔpɛrɛʃɛni/ because eliding /ɔ/ occurs simultaneously with the raising of /a/ to /ɛ/. An example is the input for the word 'exhibit' illustrated in table 27 below. MAX-V is the lowest ranked constraint as it is the one violated when initial input vowels are deleted.

13. Kiswahili input	**Rabai output**	**Gloss**
/**ɛk**s**i**biti/	/ʧ͡ʃisibiti/	exhibit
/ɔpɛrɛʃɛni/	/pɑrɛʃɛni/	operation
/**i**nspɛkta/	/sipɛkitɑ/	inspector
/**a**sprini/	/sipirini/	aspirin

In the inputs above, the initial vowels deleted are /ɛ/, /ɔ/, /i/ and /a/ respectively. These elisions lead to the loss of the initial syllables whose peaks were occupied by the deleted vowels. In other inputs, the elision of the initial vowel precedes the syncopation of the succeeding consonant, such as in the third example above, where /n/ is syncopated after

the elision of /i/. The table below illustrates how the Rabai output for the word 'exhibit' is generated.

Table 31: Kiswahili Input and Rabai Output for the Word "eksibiti" 'exhibit'

Input: /ɛksibiti/	***COMPLEX**	**DEP-V**	**MAX-V**	**IDENT IO (Manner)**
a. /ʧsibiti/	***!**		*	*
b. /ksibiti/	***!**		*	
☞c. /ʧisibiti/		*	*	*

The optimal output in the table above inserts /i/ between /k/ and /s/, which form a complex cluster. It also exhibits the affrication of /k/ into /ʧ/, a process which can be termed as palatalization (Campbell 1999:39). It is possible that this kind of palatalization was conditioned, thus took place after the epenthesis of /i/, such that /k/ changed into /ʧ/ after the front vowel /i/. This kind of palatalization also occurred in other Kiswahili inputs such as **/krismasi/** which becomes **/ʧisimisi/** in Rabai. Palatalization causes a violation of the IDENT IO (Manner) constraint in a. and c. because a stop is changed into an affricate. Moreover, the same process causes a violation of the IDENT IO [Place] constraint because a velar sound becomes a palato-alveolar one. It is possible that the apheresis of /e/ occurred before palatalization in order to eliminate a possible coda created by /k/.

As regards the other three examples presented above, /pɑrɛʃɛni/ 'operation' /sipɛkitɑ/ 'inspector' and /sipirini/ 'aspirin', there is no morphological remodeling that occurs in order to make the outputs fit into noun classes in the Rabai language. The deletions that occur complicate the matter making these outputs rather unusual in terms of Bantu morphology. This is something that is unexpected in a natural Bantu language that is introduced through borrowing.

The process of vowel **apocopation** in Rabai involves the deletion of final Kiswahili input vowels. The following is an example in which the vowel apocopation is followed by the syncopation of the preceding consonant and finally, metathesis of vowels.

14. Kiswahili input **Rabai output** **Gloss**

/ʧɛrɛhan**i**/ /ʧarɛhɛ/ sewing machine

Table 32: Kiswahili Input and Rabai Output for the Word "cherehani" 'sewing machine'

Input: /ʧɛrɛhani/	**NOCODA**	**IDENT IO (Low)**
a. /ʧɛrɛhɑn/	***!**	
☞b. /ʧarɛhɛ/		*****
c. /ʧɛrɛhɑ/		

In the input above, the final vowel /i/ is apocopated. The same applies to the nasal /n/ which precedes the vowel. After these deletions, the now final vowel /a/ swops position with the vowel /ɛ/ which is in the first syllable in the input, a process called metathesis which in this case causes a violation of the IDENT IO (Low) constraint because a low vowel takes the position of a mid-low vowel. The /a/ then is substituted with /ɑ/, whose features are [+Back, -Round]

3.3.1.3 Kiswahili Input's Vowel Raising

15. Kiswahili input **Rabai output** **Gloss**

/aksɛlɛrɛta/ /ɑg iz**i**lɛrɛtɑ/ accelerator

/krism**a**si/ /ʧisim**i**si/ Christmas

/bajiskɛli /bɑsik**i**li/ bicycle

Table 33: Kiswahili Input and Rabai Output for the Word "akselereta" 'accelerator'

Input: /aksɛlɛrɛta/	**NOCODA**	***COMPLEX**	**IDENT IO (voice)**	**IDENT IO[-High, -Low]**	**DEP-V**
a. ɑksɛlɛrɛtɑ/	***!**	***!**			
b. /ɑg zilɛrɛtɑ/	***!**	***!**	******	*****	
☞c. /ɑg izilɛrɛtɑ/			******	*****	*****

In the table above, the output violates IDENT IO (Voice) through weakening the input consonants /k/ and /s/ into their voiceless counterparts. Moreover, it disobeys IDENT IO [-High, -Low] through raising the mid vowel /ɛ/ to /i/. Also, DEP-V is disobeyed when /i/ is inserted between /ɡ / and /z/ to eliminate the cluster that the two consonants had previously formed. The unsuitable outputs violate the highly ranked NOCODA constraint because the cluster/ɡ z/ that they have presents /ɡ / as a syllable coda of the initial syllable. The two also have an illicit cluster /ɡ z/ thus violating the *COMPLEX cluster.

3.3.1.4 Kiswahili input's vowel lowering

As far as vowel lowering for Kiswahili is concerned, the mid vowel /ɛ/ is lowered to /a/. The following are examples.

16. Kiswahili input	**Rabai output**	**Gloss**
/ɔpɛrɛʃɛni/	/p**a**rɛʃɛni/	operation
/ɔpɛrɛta/	/ɔp**a**rɛtɑ/	operator
/bɛkɛri/	/bɛk**a**ri/	bakery

Table 34: Kiswahili Input and Rabai Output for the Word 'operation'

Input: /ɔpɛrɛʃɛni/	**MAX-V**	**IDENT IO [-High,-Low]**
☞a. /pɑrɛʃɛni/	*	*
b. /pɛrɛʃɛni/	*	
c. /ɔpɑrɛʃɛni/		*

The optimal candidate violates lowly ranked constraints through vowel lowering as well as elision of the initial vowel. The other possible outputs measure as irrelevant with respect to one of the two constraints.

3.3.2 Consonant Adaptation Processes of Rabai Loanwords from Kiswahili

3.3.2.1 Consonant Substitution

This process causes a change of some feature specifications of some input consonants as some other output consonants are used in the place of some input consonants.

17. Kiswahili input	Rabai output	Gloss
/**p**aŋka/	/**b**ɑŋkɑ/	fan
/ɛ**ks**ibiti/	/**ʧ**isibiti/	exhibit
/**k**itabu/	/**ʧ**itɑbu/	book
/**k**labu/	/**ʧ**ilɑbu/	club
/m**t**ambɔ/	/mu**h**ɑmbo/	machine
/**kr**ismasi/	/**ʧ**isimisi/	Christmas

In the examples above, /b/ replaces its voiceless counterpart hence weakening; whilst /k/ in second, third, fourth and sixth cases is affricated, hence palatalization. The first three of the four cases in which the palatalization of /k/ occurs get the {ʧi-} class morpheme. In the fifth example, /t/ is weakened to the glottal fricative /h/. This points towards the ancestry of this language, whereby the place of the proto-Bantu sound *t was taken by the fricative /h/ in Mijikenda languages (see Katamba 1979:28). This is true in some other native Rabai terms such as **/muhɔ/** 'river' and **/muhi/ 'tree'** as opposed to /**mtɔ**/ and /**mti**/ in Kiswahili. The /u/ that is inserted after /m/ to form {**mu**} makes the word fit into class 3 of nouns in the Rabai language in which nouns with varying semantic properties (such as the ones in this case) but similar effects syntactically. Thus, although /m/ is syllabic in the Rabai language, it cannot serve as the class marker in this case because the class marker in this case where {mu} is the prefix of this class.

The following table illustrates how certain constraint of OT apply in the adaptation of the input **/krismɑsi/** into the Rabai phonological structure.

Table 35: Kiswahili Input and Rabai Output for the Word 'Christmas'

Input: /krismasi/	***COMPLEX**	**MAX-C**	**IDENT IO [Low]**	**DEP-V**
a. /kismɑsi/	***!**			
☞b. /ʧisimisi/		*	*	*
c. /ʧisimɑsi/		*		*

There are four main processes that take place in the phonological adaptation of the input illustrated above. The first process is the elision of the consonant /r/ which otherwise would have formed a complex consonant cluster, kr, in the Rabai language. This is followed by the palatalization of /k/ into /ʧ/ as it precedes the front vowel /i/. Furthermore, the vowel /i/ is inserted between /s/ and /m/ to break the cluster that the two consonants had formed initially. That cluster is what makes candidate a. above unfit as the optimal choice since it violates *COMPLEX. The final process that occurs is the raising of the low vowel /a/ to /i/. This raising causes a violation of IDENT IO (LOW) constraint. The last possible candidate is unsuitable because the IDENT IO (LOW) constraint is irrelevant to it.

3.3.2.2 Consonant Elision

Just as MAX-V in vowel deletion blocks vowel deletion, the constraint that is ranked least in this case deters consonant deletion. In this case, it is MAX-C. The consonants deleted from Kiswahili inputs as they get adapted into Rabai are either word initial ones, in which case **apheresis** applies, or word medial ones, in which case **syncopation** applies.

The process of apheresis causes a loss of initial segments from Kiswahili inputs. In the example illustrated below, the input loses /h/. Additionally, the same input also loses the first vowel, /i/, hence vowel syncopation. The syncopation resulted from /h/ deletion, an elision that made the word to be re-syllabified as having an initial syllable with the coda /s/.

18. Kiswahili input	**Rabai output**	**Gloss**
/**h**istɔrija/	/stɔrijɑ/	history
/**hɔ**spitali/	/sipitɑli/	hospital

In the examples given above, the initial consonants and vowels are elided. These processes violate MAX-C by deleting the initial consonants, and MAX-V by deleting the vowels in the initial syllables of the inputs.

Table 36: Kiswahili Input and Rabai Output for the Word "historia" 'history'

Input: /histɔrija/	**NOCODA**	***COMPLEX**	**MAX-C**	**MAX-V**
a. /istɔrijɑ/	***!**			
☞b. /stɔrijɑ/		***!**	*	*

Input a. above has a coda which is represented by /s/, thus violates the NOCODA constraint, which penalizes final syllable margins, and is thus eliminated. The second input violates MAX-C, through the deletion of /h/, as well as MAX-V, through the deletion of /i/. In addition, the optimal candidate has a foreign cluster, but it is chosen as the optimal candidate without being blocked by *COMPLEX. This rules out the prediction of the Optimality theory that markedness constraints cannot be broken in natural languages. *COMPLEX, a markedness constraint which penalizes foreign consonant clusters fails in the selection some outputs such as the one presented above. The same is the case with the /br/ cluster in the input /brʌʃ/, which is retained in the output /brɑʃi/. This is rather odd as far as some tenets of the theory are concerned. This makes the theory inadequate n explaining such unusual retention of clusters. Additionally, some outputs are rather odd in terms of Bantu morphology when it comes to the processes of syncopation and apheresis. The two examples given above, /stɔriyɑ/ 'history' and /sipitɑli/ 'hospital', are not modified morphologically to fit into noun classes as they are left hanging. One has to use them with modifiers in order to demystify the noun classes into which they belong.

Through the process of consonant syncopation, consonants at medial positions of Kiswahili inputs are elided. The data 20 below illustrates this process.

19. Kiswahili input	**Rabai output**	**Gloss**
/m**w**islamu/	/musilɑmu/	Moslem
/ʧɛrɛha**n**i/	/ʧɑrɛhɛ/	sewing machine
/i**n**spɛkta/	/spɛkitɑ/	inspector
/ba**j**iskɛli	/bɑsikili/	bicycle

In the first case, /w/ is elided, while in the second and third examples, /n/ is deleted. In the final example, /j/ is elided. Table 34 below illustrates how the theory of optimality works on the input, **/mwislɑmu**/.

Table 37: Kiswahili Input and Rabai Output for the Word 'Moslem'

Input: /mwislamu/	***COMPLEX**	**DEP-V**	**MAX-C**	**MAX-V**
a. /muslɑmu/	***!**		*	
b. /mslɑmu/	***!**		*	
☞c. /musilɑmu/		*	*	*

For the input illustrated above to fit into the Rabai phonological system, several processes occur. First, the glide /w/ is elided. This is followed by the syncopation of the vowel /i/ which was after the glide and the epenthesis of /u/ in the place initially occupied by the glide and the elided vowel. Moreover, the 'sl' cluster is broken through the epenthesis of /i/ between the two consonants. The vowel /u/ which is inserted in the place of the glide and the vowel /i/ makes the word fit into noun class 1-2, in which nouns have the class morpheme {mu-}. All these processes give the optimal output, c. It is through these processes that c. violates the constraints DEP-V, MAX-C and MAX-V: MAX-C through the elision of the glide, DEP-V through the epenthesis of /u/ and MAX-V through the deletion of /i/. The first and second possible outputs have complex consonant clusters and therefore neither a. nor b. counts as the optimal candidate.

3.3.2.3 Metathesis

The process involves swopping of positions by certain phonemes. Input consonants swop positions in the output.

20. Kiswahili input	**Rabai output**	**Gloss**
/bɛ**s**ɛ**n**i/	/bɛ**n**ɛ**s**i/	basin
/**tr**ɛla/	/**r**i**t**ɛlɑ/	trailer

In 21. above, /s/ and /n/ in the input /bɛ**s**ɛ**n**i/ swop positions in the output, /bɛ**nɛs**i/, while /t/ and /r/ in the input /**tr**ɛlɑ/ swop positions in the output, /**r**i**t**ɛlɑ/. Metathesis in the two

cases violates the constraint IDENT IO (F), since the outputs do not retain some phonemic qualities of in the generated Rabai words. The table below illustrates how metathesis works.

Table 38: Kiswahili Input and Rabai Output for the Word 'trailer'

Input:/trɛla/	**IDENT IO (F)**	**DEP-V**	***COMPLEX**
a. /trɛlɑ/			***!**
b. /rtɛlɑ/		*****	***!**
c. ☞ /ritɛlɑ/	*****	*****	

The first candidate, a, is unacceptable because it has a cluster, /tr/, which is illicit in the Rabai language. Also, the constraints at work in this case score as irrelevant to a larger extent thus making it totally unacceptable. The optimal candidate violates IDENT IO (F) on the feature specifications, manner and voice. While the input had /t/ (a voiceless alveolar plosive) as its initial sound, the output takes the next consonant, /r/ (a voiced alveolar trill) as its initial and /t/ in the input. However, it satisfies a highly ranked markedness constraint, *COMPLEX, for breaking an illicit consonant cluster, /rt/. The second candidate violates the highly ranked constraint, *COMPLEX since it has a complex or unacceptable cluster in Rabai, /rt/. It is then clear that the epenthetic segment, /i/ gets inserted into the word after metathesis has taken place.

3.3.2.4 Glide Epenthesis

The process involves the insertion of a glide between vowels to break a vowel sequence. An example is illustrated below.

21. Kiswahili input	**Rabai output**	**Gloss**
/iɔdini/	/ɑjɔdini/	iodine

Table 39: Kiswahili Input and Rabai Output for the Word 'iodine'

Input: /iɔdini/	**COMPLEX^{VOW}**	**DEP-C**	**MAX-V**	**IDENT IO [High]**
☞a. /ɑjɔdini/		*	*	*
b. /iɔdini/	*!			
c. /ɑɔdini/	*!			*

The input illustrated above undergoes two phonological adaptation processes. First, a complex vowel sequence /iɔ/ is broken as /j/ is inserted between the vowels. The insertion breaks the DEP-C constraint, because the inserted glide has no correspondent segment in the input. Additionally, the vowel /i/ is lowered to /ɑ/ thus violating the IDENT IO [High] constraint. Nevertheless, the optimal candidate obeys the highly ranked constraint; COMPLEX^{VOW} through eliminating a sequence of vowels.

3.5 Conclusion

This chapter has discussed the phonological adaptation processes that inputs from English and Kiswahili undergo in order to fit into the Rabai language. Some input consonants are either elided or substituted in the output. Other input consonants swopped positions. In other cases, the clusters that some input consonants form are broken through anaptyxis to eliminate illicit clusters in the Rabai language. Moreover, consonant syncopation may also occur to eliminate an unacceptable cluster. The adaptation processes that involve vowels discussed in this chapter are varied insertion processes, elisions, diphthongization, monophthongization, lowering, shortening and raising. A number of these adaptation processes, especially those that changed some feature specifications of the input segment, led to the lenition of the original input segment. A few of the processes, such as vowel raising, led to the strengthening of the original input segment. The manner in which these vowel processes occur differs with the input language. Among such process, are paragoge and monophthongization. Paragoge does not occur in Kiswahili inputs given that most of these inputs end in vowels. Additionally, monophthongization is absent as far as Kiswahili inputs are concerned, given the fact that different Kiswahili vowels in a sequence belong to

different syllables, thus eliminating diphthongs in the language. Thus Rabai outputs need not require the process since there are no codas that require to be eliminated.

Various constraints within the OT controlled the adaptation of inputs into Rabai. These are the highly ranked markedness constraints; $COMPLEX^{VOW}$, NOCODA, and *COMPLEX as well as the lowly ranked faithfulness constraints; IDENT IO (F) (in cases of certain feature changes), MAX-V, DEP-V, MAX-C and DEP-C. Those that were broken by the optimal outputs were the least ranked with respect to the process that was involved in the adaptation of given inputs. However, some tenets of this framework blur the difference between non-violable and violable requisites as seen in cluster retention. Some consonant clusters are not penalized by the markedness constraint, *COMPLEX. This is rather odd given that the theory predicts total adherence of markedness constraints by outputs. Such an unexpected violation of a markedness constraint being witnessed in a natural language, Rabai, makes the theory inadequate to some extent. Additionally, the same violation makes the outputs with foreign clusters rather unusual phonologically, because they introduce clusters that native Rabai words lack. Moreover, in some outputs, it was observed that morphological remodeling did not occur. This left such outputs 'hanging' and is rather unusual as far as Bantu morphology is concerned. The classes into which they fit can only be ascertained when the nouns are used with modifiers.

CHAPTER FOUR

THE ADAPTATION OF THE SYLLABLE STRUCTURE OF RABAI LOANWORDS FROM ENGLISH AND KISWAHILI

4.1 Introduction

The current chapter expounds on the adaptation of the syllable structure of Rabai loanwords from English and Kiswahili. The first three sections in the chapter deal with the structural properties of the syllables of the three languages involved. These initial sections help in showing the differences that exist among Rabai syllable structure and those of English and Kiswahili. The differences drawn are key in the analysis of the adaptation of Rabai loanwords from these languages within OT that will follow in the other sections of the chapter.

Katamba (1989: 169) specifies various functions of the syllable structure. One such function is phonotactic regulation whereby the combination of consonants and vowels is controlled depending on the language. Thus, as it is discussed in the three preceding sections, only certain combinations of consonants and vowels are allowed in each language. Moreover, certain consonant clusters fall in the same syllable in one language while in another language, the segments in these clusters are broken inform two parts, each being of a different syllable. This is because every language has its distinct patterns that its phonemes follow in syllables. There are also specific phonemes that fall in syllable margins in languages that have closed syllables. In addition, what would have appeared as a syllable coda in a language with closed syllables is an onset of a succeeding syllable in a language that has open syllables. For example, the English word 'blanket'/blæŋkɪt/ has two syllables: /**blæŋ.kɪt**/. The first one ends with the consonant /**ŋ**/. The same word in Rabai is /**brɑŋg ɛti**/ which has three syllables /**brɑ.ŋg ɛ.ti**/. Taking the phonological adaptation processes of the phonemes aside and concentrating on the syllable structure of the first and second syllables, we find that the coda in the first syllable of the English word 'blanket' is part of the initial margin of the succeeding syllable in its Rabai equivalent.

4.2 The Syllable Structure of the English Language

The English language has both open and closed syllables. These range from single segment syllables to the complex syllables which may hold up to three consonants in their onsets, a complex vowel such as a diphthong in the peak and up to four consonants

in the coda. Other syllables in the language will have their peaks occupied by more complex vowels; the triphthongs which make them very heavy as compared to other syllables that will have pure vowels in their nuclei positions. Thus, English has three main syllable structures with each part of the structure bearing one or more segments: The V structure (where the V node dominates a vowel), the CV structure the CVC structure as well as the V structure (where the V node dominates a syllabic consonant[16]. These descriptions lead to various possible syllable patterns in the English language: The V pattern, the VC pattern, the VCC pattern, the CV pattern, the CVC pattern, the CCV pattern, the CCVC pattern, the CCCVC pattern, the CCCVCC pattern as well as the CCCV pattern. The data below provides some English terms and their syllable structures:

22. Phonemic transcriptions	**Syllable structure**	**Gloss**
/drɑːmə/	**CV.CV**	drama
/ʃʌtl/	**CV.V**	shuttle
/ventʃə/	**CVC.CV**	venture
/ɑːnt/	**VC**	aunt

The V structure consists only the core of a syllable. This is evident in the article **a**, /**ə**/, made up of a pure vowel and the noun **'ear' /ɪə**/ made up of a diphthong as illustrated below:

Figure 3: The Syllabification of /ə/ 'a'

[16] The syllable diagrams used in this study are adopted from CV phonology.

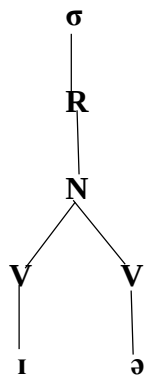


Figure 4: The Syllabification of /ɪə/ 'ear'

The VC structure has a core which may be occupied by a pure vowel as in the word 'edge' **/edʒ/** or a diphthong as in the word 'ail' **/eɪl/** and a coda with one or more consonants. The figure below illustrates the syllabification of the word 'edge'.

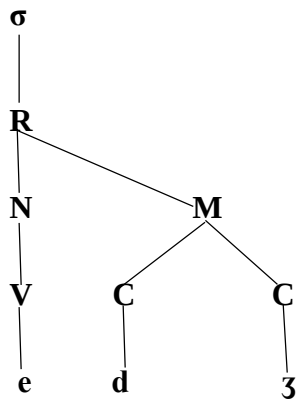


Figure 5: The Syllabification of /edʒ/ 'edge'

The second V structure has a syllabic consonant in the peak of the syllable. It yields the CV pattern, where the second V node is occupied by the syllabic consonant. Syllabic consonants in the English language include the alveolar lateral liquid **/l/** as in /**spɪtl**/ 'spittle' and the alveolar nasal **/n/** as in /**bʌtn**/ 'button'. The following diagram illustrates the syllabification of 'spittle':

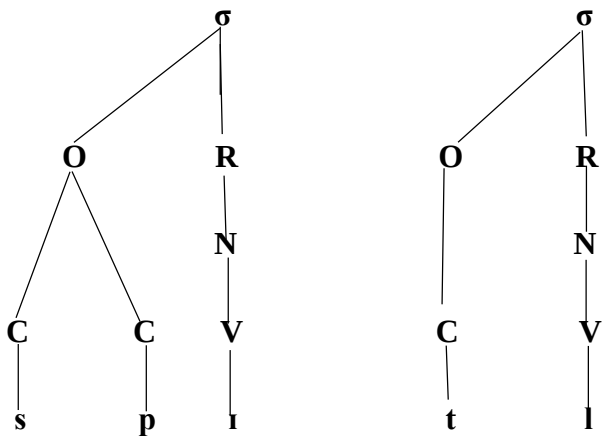


Figure 6: The Syllabification of /spɪtl/ 'spittle'

The CVC structure is composed of an onset with at least one consonant, a nucleus with at least one syllabic segment and a coda with at least one consonant. This is the structure which yields CVC pattern as in /**pæn/** 'pan', the CCVC pattern as in **/bru:m/** 'broom', the CCVCC pattern as in /**blentʃ**/ 'blench', the CCCVCC pattern as in **/strɪkt/** 'strict', the CCVCCC pattern as in /**skʌlpt**/ 'sculpt' and the CCCVCCC pattern as in /**skrɪpts**/ 'scripts'. An example of the CVC structure is illustrated below in the syllabification of the word '**strict**' **/strɪkt/.**

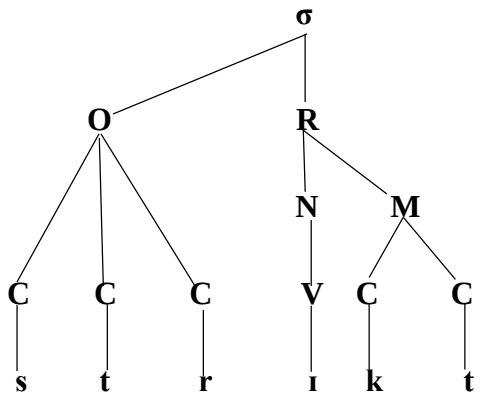


Figure 7: The Syllabification of /strɪkt/ 'strict'

4.3 Syllable Structures exhibited in Kiswahili

Kiswahili has open syllables as exhibited by V (in case of vowels and the syllabic nasals /m/ and /n/) and CV structures. The V structure may have one vowel as in /**ɑ**/ 'the first letter in the alphabet', or two vowels as in /**ɑɑ**/ 'an exclamation that indicates surprise' or the nasal /m/. The CV structure presents syllable onsets which can accommodate up to three consonants as is the case in many Kiswahili loanwords from English. An example is in the Kiswahili word for 'strawberry', /**strɔbɛri**/, where the first syllable,

/strɔ/ has three consonants in its onset. In addition, the CV structure has a core which can accommodate one vowel as in **/hɛmɑ/** 'hema' 'tent' or two vowels as in **/kɑ:/** 'kaa' 'charcoal'. The data below provides some Kiswahili native terms and their syllable structures:

23. Phonemic transcriptions	**Syllable structure**	**Gloss**
/ag ɔ/	**V.CV**	thigh
/mbwa/	**V.CV**	dog
/ɡ awɔg awɔ/	**CV.CV.CV.CV**	flat fish

The following diagrams present the syllables in the Kiswahili words for 'thigh'**/ag ɔ/** and 'hair' **/ɲwɛlɛ/** respectively.

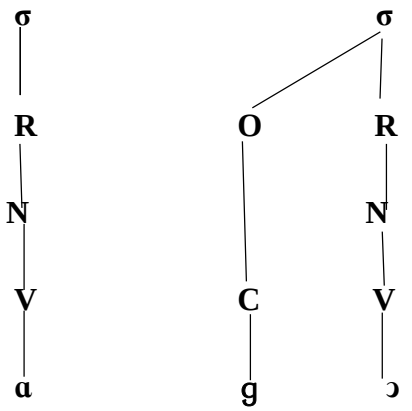


Figure 8: The Syllabification of 'ago' /ag ɔ/ 'thigh'

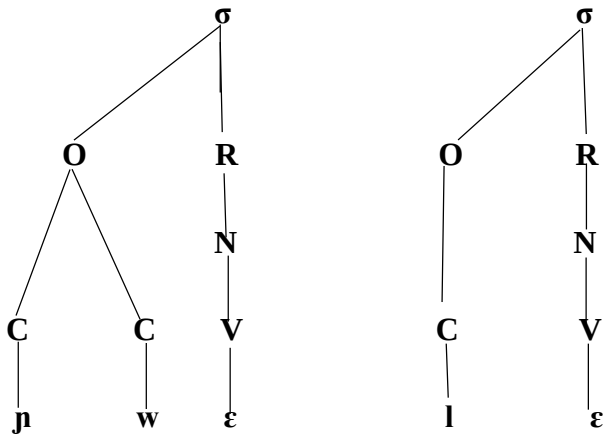


Figure 9: The Syllabification of 'nywele' /ɲwɛlɛ/ 'hair'

There are certain syllables in the Kiswahili language that are closed and will therefor exhibit the CVC or VC structures. These closed syllables are exhibited in many loanwords in the language, such as those borrowed from Arabic and English. Examples

are the words **‘aljebra’** ‘algebra’ and **‘ardhia’ /arðiɑ/** ‘port charges,’ from Arabic and **‘asbesto’/asbɛstɔ/** ‘asbestos’ from English.

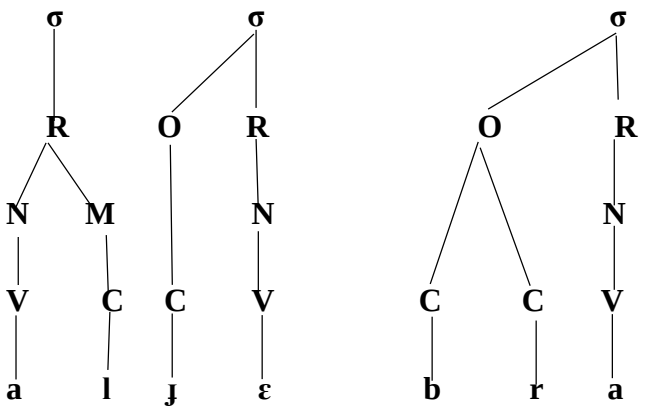


Figure 10: The Syllabification of ‘aljebra’/alɟɛbra/ ‘algebra’

In the word ‘aljebra’ /alɟɛbra/, the first syllable has a coda, something which is impermissible in many Bantu languages, but which has been incorporated into Kiswahili through borrowing. Similarly, in the word /**asbɛstɔ**/ ‘asbestos’ syllabified below, the first syllable has a coda as a result of borrowing.

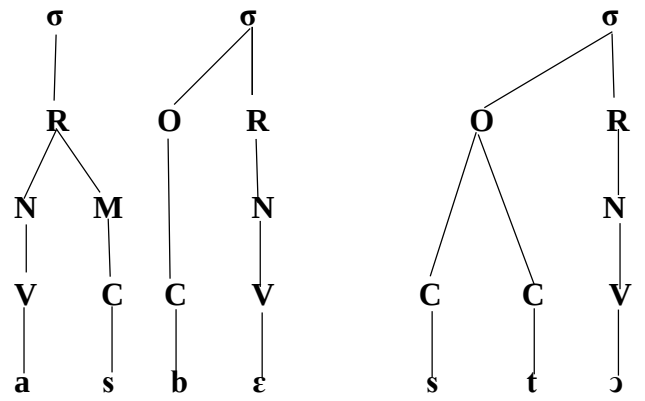


Figure 11: The Syllabification of ‘asbesto’ /ɑsbɛstɔ/ ‘asbestos’

4.4 The Rabai Syllable Structure

Rabai language has open syllables. Thus, it exhibits the V (whereby the syllabic nasal /m/ or a vowel is the only segment in the syllable) and CV syllable structures. The CV structure can have up to two vowels in the core, as in the word **/dii/** ‘repeatedly’. The data below provides some Rabai native terms and their syllable structures:

24. Phonemic transcriptions	Syllable structure	Gloss
/ruɑ/	**CV.V**	flower
/izu/	**V.CV**	banana
/muhɔ/	**CV.CV**	river
/ʧumbwɑ/	**CV.V.CV**	orange
/lurimi/	**CV.CV.CV**	tongue

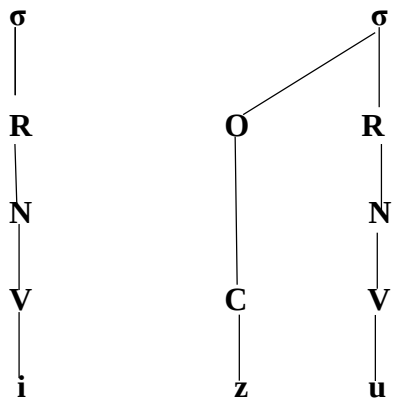


Figure 12: The Syllabification of 'izu' /izu/ 'banana'

Rabai language has certain clusters that occur in its native vocabulary. These include /lw/ as in /**ʧulwɑ**/ 'frog', /**mw**/ as in /**mwiri**/ 'body', /**bw**/ as in /**ʧumbwɑ**/ 'an orange', /**ɸy**/ as in /**luɸyɛrɔ**/ 'broom' and /**ʦw**/ as in /**mutswɑnɔ**/ 'sweetness'. The first example, /**lw**/ is expected because liquids are among the consonants which are highly susceptible of forming consonant clusters (Ladefoged& Maddieson 1996:182). Consonantal plus glide clusters are common and acceptable in many Bantu languages because the sonority distance between various consonantal phonemes and the glides is higher as compared to that between varied groups of consonantal phonemes. However, as it is discussed in the preceding section, the language has a few clusters which have been retained in some of its loanwords, which are not in its native terms. Many of the clusters that enter the language through borrowing are broken through anaptyxis.

4.5 The Adaptation of English and Kiswahili Syllable Structures into Rabai

There are various changes that input syllables from English and Kiswahili undergo in order to fit into the phonotactic pattern of the Rabai language. A greater number of

heavy syllables are simplified into lighter ones. These include syllables that had diphthongs and triphthongs as well as long vowels in their peaks. Through such processes as diphthongization, vowel shortening and monophthongization, heavy syllables become light. Additionally, many inputs are re-syllabified especially after epenthesis.

4.5.1 The Re-syllabification of Inputs

Various Kiswahili and English inputs are re-syllabified after various insertions, elisions and metathesis. Usually, epenthesis occurs in order to eliminate unsuitable consonant clusters as well as codas. Thus, clusters will be broken such that the initial segments forming them will be made to occupy separate syllables from those occupied by succeeding consonantal segments that were part of the clusters. When codas are eliminated through insertions, they become syllable onsets of other syllables. These processes lead to an increase in the number of syllables that an input held. The data below illustrates these processes.

25a. English input	**Syllables**	**Rabai output**	**Syllables**	**Gloss**
/bʌʤɪt/	CV.CVC	/bɑɟɛt**i**/	CV.CV.CV	budget
/brʌʃ/	CCVC	/brɑ**ʃi**/	CCV.CV	brush
/bɒks/	CVCC	/bɔkis**i**/	CV.CV.CV	box
/klʌʧ/	CCVC	/klɑ**ʧi**/	CCV.CV	clutch
/blæŋkɪt/	CCVC.CVC	/brɑŋg ɛt**i**/	CCV.CV.CV	blanket
/zɪp/	CVC	/zip**u**/	CV.CV	zip

All the English inputs above would violate the NOCODA markedness constraint which is ranked highest in the Rabai language if they were to be produced as the outputs. The inputs would do so through the codas that they have at word final positions except for the input /blæŋkɪt/, in which a violation of the said constraint is evident in the two syllables that the word has. The codas get broken through paragoge. Additionally, /bɒks/ would violate the cluster constraint, *COMPLEX if produced as the Rabai output. It has the cluster /ks/ which is unacceptable in Rabai. The cluster /ks/ is broken

through anaptyxis of /i/ between the two consonants. The paragoge of /i/ also occurs after /s/ to eliminate the possible coda. In the input /**blæŋkɪt/,** the nasal and voiceless stop cluster /ŋk/ is reduced into a nasal and voiced stop cluster, /**ŋg** /. The coda of the first syllable in /**blæŋkɪt**/, merges with the onset of the second, to form the initial margin of the succeeding syllable in /**brɑŋg ɛti**/, hence, /**brɑ. ŋg ɛ. ti**/. This kind of fusion violate UNIFORMITY- IO (velar) constraint, which is against merging.

25b. Kiswahili input	**Syllables**	**Rabai output**	**Syllables**	**Gloss**
/kamiʃna/	CV.CV.CCV	/kɑmiʃɛnɑ/	CV.CV.CV.CV	commissioner
/skrubu/	CCCV.CV	/s**u**k**u**rubu/	CV.CV.CV.CV	screw
/skuli/	CCV.CV	/sikuli/	CV.CV.CV	school
/mwislamu/	CCV.CCV.CV	/mus**i**lɑmu/	CV.CV.CV.CV	Moslem
/maktaba/	CVC.CV.CV	/mɑk**i**tɑbɑ/	CV.CV.CV.CV	library

In the input /kamiʃna/, there is need to break the cluster /ʃn/, which is done through the epenthesis anaptyxis of /ɛ/. Each consonant in the initial cluster gets attached to a different syllable after anaptyxis. The output has four syllables, as opposed to the input which has three of them.

As regards /skrubu/, the /skr/ cluster is unacceptable in Rabai language. It is eliminated through the insertion of /u/ between the first two consonants as well the insertion of /u/ after /k/ to eliminate the /kr/ cluster. Table 38 below illustrates these processes.

Table 40: The Re-syllabification of the Kiswahili Input for the Word 'screw' in Rabai

INPUT: /skrubu/				
POSSIBLE OUTPUTS		**a. /skrubu/**	**b. /sukrubu/**	**☞c. /sukurubu/**
CONSTRAINTS	***COMPLEX**	***!**	***!**	
	DEP-V		*****	*****
NUMBER OF SYLLABLES		**2**	**3**	**4**

The three initial consonants in the input, /skr/, are broken into three onsets of three different consonants in the output. The initially disyllabic word is changed into an output with four syllables.

In /skuli/, the need to eliminate the /sk/ cluster leads to the anaptyxis of /i/ between the two consonants. The cluster, /sk/, initially formed the initial syllable onset, but after the epenthesis, each consonant becomes a syllable onset of a different syllable, with /s/ remaining in the initial one and /k/ shifting to the succeeding one. In this case, from a disyllabic input, a tri-syllabic output results after phonological adaptation.

The Kiswahili input /mwislamu/ has the illicit /sl/ cluster in its second syllable. This one is broken through the anaptyxis of /i/ thus leading to an additional syllable, /si/. In addition, other processes take place in the adaptation of the same input. One process is the elision of the glide, /w/. This is followed by the syncopation of the vowel /i/ which was after the glide and the epenthesis of /u/ in the place initially occupied by the glide and the elided vowel. The vowel /u/ which is inserted in the place of the glide and the vowel /i/ makes the word fit into noun class 1, in which nouns have the singular class morpheme {mu-}.

In the Rabai language, /kt/ in /maktaba/would form an unacceptable cluster. The consonant /k/ found in the initial syllable forms a final syllable margin in Kiswahili, a margin which Rabai syllable structure penalizes. Thus, the cluster is eliminated through the epenthesis of /i/. The word which was initially tri-syllabic gets one more syllable in Rabai.

The elisions that lead to re-syllabification include **apheresis** and **syncopation**.

26. Kiswahili input	**Rabai output**	**Gloss**
/**i**nspɛkta/	/sipɛkitɑ/	inspector
/**a**sprini/	/sipirini/	aspirin
/histɔrija/	/stɔrijɑ/	history
/**h**ɔspitali/	/sipitɑli/	hospital

In the inputs above, the initial vowels /i/and /a/in the first and second examples are deleted respectively, while /i/ is syncopated in the third example, thus violating the MAX-V constraint. The consonant /n/ in the first case is syncopated. Thus, the consonant /s/ which initially occupied the second syllable in the first example becomes the onset of the first syllable in the output while /p/ which initially formed a cluster with /s/ becomes the onset in the succeeding syllable. As regards 'aspirin', /s/ shifts to form the onset in the initial syllable after the apheresis of /a/ and the anaptyxis of /i/ after /s/.

As for the third input, /**histɔrija**/, the initial consonant, /h/, is elided, thus violating the MAX-C constraint for the failure to retain an input consonant. Thus, after the elision of /h/ and /i/ in the third example, the consonants /s/ and /t/ which formed a cluster in the second syllable of the input become the onset of the first syllable in the output. However, the cluster /**st**/ is neither broken nor blocked by *COMPLEX. This leaves one to question the adequacy of Optimality Theory, which blocks the violation of markedness constraints. One such constraint is *COMPLEX which in this case is violated by a natural language through the retention of a cluster that is absent in the language's native vocabulary. In this case, the theory is disproved. The final output has syncopated the vowel /ɔ/ and elided the initial consonant, /h/.

The four examples presented above raise questions on the adequacy of the theory's tenets in explaining some phonological adjustment processes. They are rather odd in three main ways. First, in terms of the Optimality theory, especially with respect to the third example afore discussed, because of the violation of a markedness constraint by a natural language. Moreover, they are odd in terms of Bantu phonology, which bars certain obstruent clusters, such as /**st**/. Such a cluster should be broken, the reason being

that the only native clusters available in Bantu languages are consonant-glide clusters. Additionally, they are unusual in terms of Bantu morphology in the assignment of noun classes. The outputs are not modified morphologically to fit into the class system of the language, as seen in other outputs such as /**ʧitɑbu**/ 'book' whose Kiswahili input is /**kitabu**/ 'book' which is remodeled to fit into class7-8 of the Rabai language. However, these unique cases are left hanging. For example, one can only tell that the noun /**sipɛkitɑ**/ belongs to class 1-2 after it is used with modifiers.

Through metathesis, some input consonants shift their positions in the output, thereby changing their positions in input syllables. See the examples in 27 below.

27. Kiswahili input	**Rabai output**	**Gloss**
/bɛ**sɛn**i/	/bɛ**nɛs**i/	basin
/**tr**ɛla/	/**rit**ɛlɑ/	trailer
/ba**ji**skɛli/	/b**ɑ**sikili/	bicycle

In the first example, /n/ is swopped with /s/ in the output, thus making the two to occupy onsets belonging to syllables different from the ones they occupied initially. In the second example, /tr/ is a cluster in the input. However, in the output, the two shift positions thus forming an unacceptable cluster which is broken through the anaptyxis of /i/. Although the two consonants occupy the onset of the first syllable in the input, each becomes an onset of a different syllable in the output. The first syllable's onset in the output is occupied by /r/, while that of the second syllable is occupied by /t/. In the final example, the second syllable is elided while /i/ is inserted between /s/ and /k/ to break the cluster that the two consonants had formed in the input. This makes /s/ in the third syllable to become the onset in the second syllable.

4.5.2 Weight Reduction in Syllables

Some phonological adaptation processes make Rabai outputs get lighter syllables than their corresponding inputs. This violates the IDENT IO (F) constraint that requires the features of outputs to correspond to those of the input. These processes include various insertions such as paragoge which eliminate codas found in certain inputs. In Katamba (1989: 176), the assertion that heavy syllables have several segments in their rhymes

and that light syllables have single segments in their rhymes is made. Data labelled 28 below illustrates this.

28. English input	**Rabai output**	**Gloss**
/bælkəni/	/bɑr**i**kɔn**i/**	balcony
/kæpsju:ls/	/kɑpisɔs**i**/	capsules
/bʌʤɪt/	/bɑɟɛt**i**/	budget
/brʌʃ/	/brɑʃ**i**/	brush

All the vowels in bold type have been inserted to eliminate branching rhymes caused by codas. Other heavier syllables that are reduced to lighter ones are those that contain diphthongs, triphthongs and long vowels in their cores. This occurs through the processes of monophthongization, diphthongization as well as vowel shortening. The data that follows illustrates these processes:

29a. English input	**Rabai output**	**Gloss**
/prəʊg ræm/	/prɔg rɑmu/	program
29b. English input	**Rabai output**	**Gloss**
/t**aɪə**/	/t**ɑi**ri/	tyre
29c. English input	**Rabai output**	**Gloss**
/g ɪt**ɑ:**/	/g it**ɑ**/	guitar

29a. illustrates monophthongization of a diphthong (/**əʊ**/ becomes /**ɔ**/); 29b. illustrates diphthongization of the triphthong in the input (/**aɪə**/ becomes /**ɑi**/); 29c. illustrates vowel shortening whereby /**ɑ:**/ becomes /**ɑ/.** All these processes violate the IDENT IO (F) constraint for changing the features of some input vowels.

4.5.3 Cluster Tolerance

Many of the consonant clusters are broken through epenthesis with a few being retained at word initial and medial positions. The retained ones include /pr/ and/gr/ as in /prɔg rɑmu/ ‘program’, /br/ as in /brɑʃ**i**/ ‘brush’ and /brɑŋg ɛt**i**/ ‘blanket’ and /kl/ as in /klɑʧ**i**/ ‘clutch’, /st/ as in /stɔrijɑ/ ‘history’. One would expect this retention to be blocked by the markedness constraint, *COMPLEX but that does not happen. This disproves the principle of violability of OT, which dictates that the violation of

markedness constraints such as *COMPLEX by an output is penalized. Thus, the principle does not hold water in the aforementioned outputs.

4.6 Conclusion

The current chapter has delved into syllable adjustment strategies that inputs from English and Kiswahili undergo in order to match the Rabai syllable structure. It began by discussing the syllable structures of the three languages. Of the three languages, English allows the highest number of consonants in a cluster, with a syllable onset consisting of up to three consonants. Kiswahili tolerates some clusters in some of its loanwords, which in some cases lead to syllable codas, a phenomenon that is unique to Bantu languages.

The syllable adaptation processes discussed are re-syllabification, weight reduction and cluster tolerance. The process of re-syllabification is caused by various insertions such as paragoge, which extends the length of a word, making codas to become syllable onsets, anaptyxis, which breaks consonant clusters, making each consonant in the initial cluster to belong to a different syllable, and metathesis which shifts the positions of given consonants within a word, thus changing the positions they had occupied in input syllables. A great number of input syllables lose weight through such processes as vowel shortening, diphthongization, monophthongization. Others lose weight through various vowel insertion processes such as paragoge and anaptyxis which eliminate branching rhymes. Further analysis showed that the Rabai language does not tolerate codas but tolerates some clusters at word initial and medial positions in some of its loanwords from English and Kiswahili. This is rather unusual in terms of the theory, which predicts that markedness constraints cannot be violated in a natural language. Such a violation does happen in Rabai as certain clusters are not penalized by *COMPLEX, a markedness constraint. Thus, one questions the adequacy of the Optimality Theory in dealing with such tolerance of non-native clusters.

CHAPTER FIVE
A SUMMARY OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of Findings

This part provides a summation of the findings emanating from this investigation. Each of the subsections under this section matches one of the objectives that this study set out to achieve. However, the final subsection of this summary commends on the adequacy of Optimality Theory, the theory employed in this work.

5.1.1 Rabai Phonemic Inventory

This is a subsection that deals with the findings attained with respect to the first objective: To establish the phonemes of the Rabai language. Rabai language has thirty-four consonants and five vowels. The consonants include seven plosives, three affricates, ten fricatives, four nasals, six prenasalized obstruents, two semivowels, a lateral and a trill. The plosives form a symmetrical pattern, with bilabial, alveolar and velar ones occurring in voiced and voiceless pairs, with the only exception being in the palatal ones where there is a gap in the place of the voiceless plosive. There are two alveolar affricates and a voiceless palato-alveolar affricate in Rabai. The lack of a voiced palato-alveolar affricate presents a gap in symmetry. The fricatives also tend to be symmetrical as far as labiodental, alveolar and velar fricatives are concerned. The only gaps associated with the fricatives are the lack of the voiced bilabial, voiceless dental and the voiced palato-alveolar fricatives. Thus, the Rabai inventory is partially symmetrical, utilizing four ways of articulating segments and eight places that these segments get articulated. The consonants occur in word initial and medial positions and primarily occupy syllable onsets, except for the bilabial nasal, which is syllabic in some cases.

The vowel system is triangular and presents three levels of aperture namely, close, half-open and open. Two of the vowels are high vowels, while two are mid-low ones, each pair’s members being distinguished with the parameter of roundness. The fifth one is a low back unrounded vowel.

5.1.2 The Phonological Adaptation Processes of Rabai Loanwords from English and Kiswahili

The findings under this sub-heading emanate from the second objective of this study that set out to investigate the phonological adaptation processes in Rabai loanwords borrowed from English and Kiswahili. The study has discussed the phonological adaptation processes of Rabai loanwords from English and Kiswahili that involve consonants and vowels. Some input consonants are elided through the processes of syncopation, apheresis and apocopation, while others are inserted word medially or initially (prothesis). In addition, others are substituted in the output. Most of the consonant processes lead to outputs that adhere to Bantu phonology and morphology. These include substitution which is accompanied by affrication of initial consonants to make the nouns involved fit into a grammatical class. In some other inputs, substitution makes some outputs match some diachronic changes that occurred in the Rabai language. However, apheresis and syncopation of word initial segments produces some odd outputs. One cannot help but see that they are indeed, marked forms in the language. Some of the outputs are odd in terms of the theory used, since they violate a markedness constraint, *COMPLEX by having complex clusters, which are also unusual in Bantu phonology. The same outputs are also odd in terms of Bantu morphology since they lack class markers. Other input consonants swop positions, a process that occurred in some Kiswahili inputs. In other cases, the clusters that some input consonants form are broken through anaptyxis and in some cases, consonant syncopation.

The adaptation processes that involve vowels discussed are varied insertion processes such as paragoge and anaptyxis, elisions, such as syncopation, apocopation and apheresis, diphthongization, monophthongization, lowering, shortening and raising. A number of these adaptation processes such as affrication that occurs with substitution, weaken some input segments in the output. Other processes such as vowel raising, led to the strengthening of the original input segment.

The occurrence of certain phonological adaptation processes differs with the input language. Metathesis for instance, occurs in some Kiswahili inputs. In addition, paragoge, a vowel process, is not witnessed in Kiswahili inputs analyzed in this study, given that the words end in vowels. Moreover, monophthongization is absent as far as

Kiswahili inputs are concerned, given the fact that different Kiswahili vowels in a sequence belong to different syllables, thus eliminating diphthongs in the language.

5.1.3 The Syllable Adaptation Processes of Rabai Loanwords from English and Kiswahili

Under this sub-heading, a summation of the findings resulting from the third objective, to analyze the adaptation of English and Kiswahili syllable structures into the Rabai syllable structure, is given. The syllable adaptation processes discussed are re-syllabification, weight reduction and cluster tolerance. These processes are aimed at producing output syllables which have non-branching rhymes and simple syllabic segments in their peaks.

The process of re-syllabification is caused by metathesis and various insertions such as paragoge, merging of certain consonants in certain output syllables and anaptyxis. Paragoge causes final syllables' codas in inputs to become the onsets of additional syllables caused by the insertion of vowels word finally. The inputs that saw re-syllabification through paragoge are those from English, given that English inputs had many closed syllables. In certain outputs, segments which initially formed codas in the input merge with the onsets of subsequent syllables forming nasal obstruent clusters. The loss of the codas through merging causes a reduction in syllable weight in the syllables hat lose the codas. Metathesis that was witnessed in this study causes re-syllabification in two ways. One, a consonant that initially occupied the onset of one syllable becomes the onset of either a preceding or a succeeding syllable. Secondly, two consonants that formed a cluster in an input swop positions within the cluster, and after subsequent insertion of a vowel to break the cluster, the two become onsets of two separate syllables.

Syllable weight loss occurs through vowel shortening, diphthongization, monophthongization, paragoge, anaptyxis, syncopation, apocopation, apheresis and the merging of some segments in certain syllables. The shortening of vowels, diphthongization and monophthongization reduce syllable weight by substituting complex vowels in inputs with simple vowels. Through paragoge, final word codas in inputs are eliminated, thus reducing the weight of initially heavy syllables. Anaptyxis breaks inputs' medial codas thus eliminating the weight that came with branching rhymes. Apocopation causes final input consonants to be eliminated; hence the loss of

final syllable codas and syllable weight reduction. It occurred in some English inputs. Additionally, the apocopation of final vowels and of the preceding consonants in some English inputs causes total syllable weight loss. Total syllable weight loss is also caused by the apheresis of initial consonants in inputs and subsequent syncopation of the next segment, a vowel, thus leading to the loss of a whole syllable such as the change from the Kiswahili word /**histɔrija/** to the Rabai word **/stɔrijɑ/ '**history**'**.

Complex consonant clusters are uncommon in the Rabai language. However, the study has established some clusters that are retained in some of its loanwords from English and Kiswahili. The main clusters that are retained in these loanwords are obstruent and liquid ones such as /br/, /pr/, /gr/, /kl/, /fr/, /pl/, and /tr/, perhaps because liquids are more susceptible cluster segments (Ladefoged& Maddieson 1996:182). In other cases, obstruent and liquid clusters are not retained, but the liquid swops position with the obstruent, hence metathesis. Subsequently, vowel insertion occurs in order to break the newly formed cluster. Other clusters that are retained are fricative and stop ones, particularly /ft/ and /st/. However, this retention of some foreign clusters violates the markedness constraint, *COMPLEX. This is rather unusual in terms of the theory used in analyzing data in this study. The outputs with the clusters mentioned above ought to be blocked by *COMPLEX. However, they are chosen as the optimal candidates in a set of possible outputs. One would expect that the outputs that fit as the optimal ones in a string of possible outputs violates faithfulness constraints only. The retention of foreign consonant clusters in some optimal Rabai outputs is a contradiction of the theory by a natural language.

5.1.4 Commentary on Optimality Theory

There are various constraints within the OT that controlled the adaptation of inputs into Rabai. These are the highly ranked markedness constraints; $\text{COMPLEX}^{\text{VOW}}$, NOCODA, and *COMPLEX as well as the lowly ranked faithfulness constraints; IDENT IO (F) (in cases of certain feature changes), MAX-V, DEP-V, UNIFORMITY IO, MAX-C and DEP-C. Optimal outputs can violate faithfulness constraints. However, the theory predicts that the violation of markedness constraints limits a possible output from being the optimal choice in a set of possible outputs. In the study, there is a number of optimal outputs that violate the markedness constraint, *COMPLEX. The fact that

one of the theory's tenets is contradicted in a natural language is a shortcoming of the theory that I did not expect.

5.2 Conclusion

This study has established the Rabai phonemic inventory. It has also analyzed the phonological adaptation processes that Rabai loanwords from English and Kiswahili undergo. Further analysis has been carried out on the adaptation of English and Kiswahili inputs' syllable structures into the Rabai language. This analysis has incorporated the constraints of Optimality Theory. The theory was adequate to some extent, but one of its tenets, which predicts non-violation of markedness constraints in optimal outputs, has been disproved in the Rabai language.

5.3 Recommendations for further Study

This study delved into phonological adaptation processes that Rabai loanwords from English and Kiswahili within the confines of Optimality Theory. It limited itself to consonants, vowels and the syllable. I therefore suggest a further investigation in other fields that deal with loanword adaptation. Certain phonological changes such as affrication point towards morphological adaptation. A study on morphological adaptation processes of loanwords will highlight on the simultaneous morphological and phonological adaptation processes that Rabai loanwords undergo. The same study will explain the lack of class markers in some of the optimal outputs analyzed in this study. Rabai has borrowed words from Arabic, given the continued interaction between Rabai speakers and Arabic speakers, as well as the introduction of Arabic culture through Islamic religion into the region. In addition, there are various Rabai loanwords borrowed from Arabic through Kiswahili. A study on the adaptation of Rabai loanwords from Arabic will highlight on the adaptation processes involved. Finally, I suggest some reworking on some tenets of OT, that delimit the application of markedness constraints.

REFERENCES

Aissen, J. (1999). Markedness and Subject Choice in Optimality Theory. *Natural Language & Linguistic Theory, 17*(4), 673-711. Retrieved from http://www.jstor.org/stable/4047932.

Anttila, R. (1972). *An Introduction to Historical and Comparative Linguistics*. New York: Macmillan.

Archangeli, D. (1999). Introducing Optimality Theory. *Annual Review of Anthropology, 28*, 531-552. Retrieved from http://www.jstor.org/stable/223405.

Bakari, M. (1982). *The Morphophonology of Kenyan Swahili Dialects.* Unpublished Ph.D. Dissertation, University of Nairobi.

Boen, P. (2014). *Loan words in Nandi from English and Kiswahili Languages*. An Unpublished M.A. Thesis, University of Nairobi.

Bruce Tesar, & Smolensky, P. (1998). Learnability in Optimality Theory. *Linguistic Inquiry, 29*(2), 229-268. Retrieved from http://www.jstor.org/stable/4179017.

Burke, D.M., MacKay, D.G., & James, L.E. (2000). Theoretical approaches to language and aging. In T. Perfect & E. Maylor (Eds.), *Models of cognitive aging* (pp. 204-237). Oxford: Oxford University Press.

Campbell, L. (1999). *Historical linguistics: An Introduction.* Cambridge. The MIT Press.

Catherine O. Ringen, & Vago, R. (1998). Hungarian Vowel Harmony in Optimality Theory. *Phonology, 15*(3), 393-416. Retrieved from http://www.jstor.org/stable/4420136.

Chacha, M. (2009). "The Adaptation of Swahili Loanwords from Arabic: A Constraint –based Analysis". *The Journal of Pan African Studies* Vol.2, no.8.

Chege, S.N. (2009). *Morphophonological Modifications of English and Kiswahili Loanwords in Maasai*. Unpublished M.A. Dissertation, University of Nairobi.

Fromkin, V., Rodman, R. and Hyams, N. (2011). *An Introduction to Language* (9th ed.). Boston: Wadsworth Cengage Learning.

Goldsmith, J. (1990) *Auto-segmental and Metrical Phonology: An Introduction.* Oxford: Blackwell.

Golston, C. (1996). Direct Optimality Theory: Representation as Pure Markedness. *Language, 72*(4), 713-748. doi:10.2307/416100.

Gordon, M. (2004). Positional Weight Constraints in Optimality Theory. *Linguistic Inquiry, 35*(4), 692-703. Retrieved from http://www.jstor.org/stable/4179302.

Greenberg, J. (1963). *The Languages of Africa,* 2nd ed., Bloomington: Indiana University Press.

Guthrie, M. (1971). *Comparative Bantu,* Vol. 2, Farnborough: Gregg International Publishers Ltd.

Hall, T. (2006). Derived Environment Blocking Effects in Optimality Theory. *Natural Language&LinguisticTheory,24*(3),803-856.Retrieved fromhttp://www.jstor.org/stable/27642840.

Heine, B. and Möhlig, G.J.W (1980). *Language and dialect atlas of Kenya*. Berlin Reimer.

Hinnebusch, T.J. (1973). *Prefixes, Sound Change and Subgrouping of Coastal Kenyan Bantu Languages.* Unpublished Ph.D. Dissertation, University of California, Los Angeles.

International Phonetic Association (1949). *The Principles of the International Phonetic Association*. London: Department of Phonetics, University College, London.

Iribemwangi, P. (2008). "A Synchronic Segmental Morphophonology of Standard Kiswahili." Unpublished Ph.D. Thesis, University of Nairobi.

James de Vere Allen, & Allen, J. (1973). Shungwaya, the Mijikenda and the Traditions. *The International Journal of African Historical Studies, 16* (3), 455-485.doi:10.2307/218746.

Lakoff, G. (1970). Global rules. *Language,* 46. 627-639.

Ladefoged, P. & Maddieson, I. (1996). *The Sounds of World's Languages.* Oxford: Blackwell Publishers Ltd.

Lombardi, L. (1999). Positional Faithfulness and Voicing Assimilation in Optimality Theory. *Natural Language & Linguistic Theory, 17*(2), 267-302. Retrieved from http://www.jstor.org/stable/4047990.

Kager, R. (1999). Optimality Theory. Cambridge: Cambridge University Press.

Karuru-Iribe, D.W. (2012). *Phonological and morphological adaptation of loanwords in Gĩ-gichũgũ: An application of source-similarity model.* Unpublished M.A. Project, University of Nairobi.

Katamba, F. (1979). *Theoretical Linguistics*. Vol.6 (1). Berlin: Walter de Gruyter& Co.

Katamba, F. (1989). *An Introduction to Phonology*. London: Longman Group.

Kisseberth, C. W. (1973). Is rule ordering necessary in phonology? In Braj B. Kachru, Robert B. Lees, Yakov Malkiel, Angelina Pietrangeli & Sol Saporta (eds.) *Issues in linguistics* '. Papers in honor of Henry and Renee Kahane. Urbana: University of Illinois Press. 418-441.

Kitavi, H.M. (1992). *A comparative study of the Kitui North and Machakos dialects of Kikamba.* Unpublished M.A. Thesis, University of Nairobi.

Maria, G. (2004). Relational Hierarchies in Optimality Theory: The Case of Syllable Contact. *Phonology, 21*(2), 201-250. Retrieved from http://www.jstor.org/stable/4615507.

Mberia, K. wa. (1993). *Kitharaka Segmental Morphology with Special Reference to Noun and Verb*. An Unpublished PhD Dissertation, University of Nairobi.

Mbonankira, G. (2004). *The Accommodation of Kiswahili and English Loanwords into Kinyarwanda.* An Unpublished M.A Thesis, University of Nairobi.

McCarthy, J. (1997). Process-Specific Constraints in Optimality Theory. *Linguistic Inquiry, 28*(2), 231-251. Retrieved from http://www.jstor.org/stable/4178976.

McIntosh, J. (2009). Elders and 'Frauds': Commodified expertise and Politicized Authenticity among Mijikenda. *Africa: Journal of the International African Institute*, 35-52. Retrieved from http://www.jstor.org/stable/29734389.

Morton, R. (1977). New Evidence Regarding the Shungwaya Myth of Mijikenda Origins. *The International Journal of African Historical Studies*, *10*(4), 628-643.doi: 10. 2307/216932.

Mutahi, K.E. (1977). *Sound change and the classification of the dialects of Southern Mt. Kenya.* Unpublished PhD Thesis, University of Nairobi.

Mutua, B. N. (2013). *A Constraint Based analysis of Kikamba Navitized Loanwords*. An Unpublished M.A Thesis, Kenyatta University.

Mwaliwa, H. (2014). *An Analysis of the Syllable Structure of Standard Kiswahili Loanwords from Modern Standard Arabic*. An Unpublished Doctoral Thesis, University of Nairobi.

Ngugi, K.G. (2008). *Phonological and morphological adaptation of English loan words into the Kikabete dialect of Gikuyu language.* Unpublished M.A. Thesis, University of Nairobi.

Nillole, S. (2013). A Grammar of Digo. SIL International Publications in Linguistics.

Nurse, D. (1982). Segeju and Daisũ: A Case Study of Evidence from Oral Tradition and Comparative Linguistics. *History in Africa*, *9*, 175-208. doi: 10.2307/3171605.

Nurse and Hinnebusch (1993) Swahili and Sabaki: A Linguistic History. London: University of California Press.

Orgun, C. (2001). English r-Insertion in Optimality Theory. *Natural Language & Linguistic Theory*, *19*(4), 737-749. Retrieved from http://www.jstor.org/stable/4048006.

Polome, E.C. (1967). *Swahili Language Handbook*. Washington D.C: Centre for Applied Linguistics.

Shidiavai, M. (2015). 'The Phonological Adaption of Kiswahili and English Loanwords into Lwidakho.' An Unpublished M.A Thesis, University of Nairobi.

Shume, F. U. (2017). *Loan Words from English and Orma Languages in Kipokomo.* Unpublished M.A. Thesis, University of Nairobi.

Sirya *et al* (1993). *The Verbal Morphology of Kigryama: A Description of the Structure of Verbs and the Tense and Aspect System in the Giryama Language of Kenya.* Bible Translation and Literacy.

Spear, T. (1974). Traditional Myths and Historian's Myths: Variations on the Singwaya Theme of Mijikenda Origins. *History of Africa, 1,* 61-84.doi:10.2307/3171761.

_____ (1977). Traditional Myths and Linguistic Analysis: Singwaya Myth Revisited. *History of Africa, 4,* 229-246.doi:10.2307/3171586.

_____ (1994). *The International Journal of African Historical Studies, 27*(3), 630-634.doi:10.2307/220763.

Trudgill, P. (2000). *Sociolinguistics: An introduction to language and society* (4th ed.). London: Penguin Group.

Walsh, M. (1992). MIJIKENDA ORIGINS: A REVIEW OF EVIDENCE. *Trans-African Journal of History, 21,* 1-18. Retrieved from http://www.jstor.org/stable/24520417

Wardhaugh, R. (2006) *An Introduction to Sociolinguistics* (5th ed.). New York: Wiley-Blackwell.

Wolf, M. (2011). Limits on global rules in Optimality Theory with Candidate Chains. *Phonology, 28*(1), 87-128. Retrieved from http://www.jstor.org/stable/41303155

Yip, M. (1993). Cantonese Loanword Phonology and Optimality Theory. *Journal of East Asian Linguistics, 2*(3), 261-291. Retrieved from http://www.jstor.org/stable/20100642.

APPENDICES

APPENDIX I: SAMPLE QUESTIONNAIRE

I am Judith Mwikali Mbwika, a postgraduate student at the University of Nairobi. I have an interest in Rabai sounds and Rabai borrowed words from English and Kiswahili. In the two word lists below, I have provided some English words and some Kiswahili words on one column.

A) Please provide the following information about yourself:

Age: ……....……

Gender: …….....

Level of education: ……

B) Please provide an equivalent word in Rabai language in the column labelled Rabai.

I) English words **Rabai equivalents**

1. Missionary
2. Spanner
3. Budget
4. Juice
5. Bank
6. Handbag
7. Balcony
8. Credit
9. Card
10. Wig
11. Weave
12. Boot
13. Pastor
14. File
15. Carton
16. Beetroot
17. Rail
18. Radio

19. Stove
20. Tube
21. Brush
22. Tray
23. Capsules
24. Blanket
25. Box
26. Report
27. Freezer
28. Calendar
29. Quinine
30. Bulb
31. Keyboard
32. Microphone
33. Switch
34. Sauce
35. Fridge
36. Plot
37. Net
38. Office
39. Packet
40. Spring
41. Committee
42. Decoder
43. Television (T.V)
44. Sweater
45. Shower
46. Battery
47. Nylon
48. Secondary
49. Vest
50. Rake
51. Programme
52. Tile

53. Court
54. Coat
55. Charger
56. Indicator
57. Ring (of a piston)
58. Guitar
59. Tyre
60. Mortuary

II) Kiswahili words **Rabai equivalents**

1. Trela
2. Ekzibiti
3. Asprini
4. Mskiti
5. Pistoni
6. Mkristo
7. Skuli
8. Mwislamu
9. Biskuti
10. Digrii
11. Albamu
12. Maktaba
13. Hospitali
14. Ekaristi
15. Koliflawa
16. Lifti
17. Bekeri
18. Iodini
19. Operesheni
20. Advansi
21. Kansa
22. Akselereta
23. Altaneta

24. Ekzosi
25. Manispaa
26. Kilometa
27. Klachi
28. Opereta
29. Klabu
30. Mbaptisti
31. Shifta
32. Inspekta
33. Krismasi
34. Eksirei
35. Daktari
36. Historia
37. Dipfriza
38. Kamishna
39. Kashfa
40. Jiografia
41. Balbu
42. Erieli/Erio
43. Diski
44. Aproni
45. Diskaunti
46. Sketi
47. Ghorofa
48. Elektroskopu
49. Bakteria
50. Disko
51. Panka
52. Sinki
53. Dikteta
54. Eskaleta
55. Baiskeli
56. Beseni
57. Kitabu

58. Skrubu
59. Mtambo
60. Cherehani

III) English native terms **Rabai native terms**

1. Meat
2. Mango
3. Grass
4. Maize
5. Teeth
6. Farm
7. Land
8. Gourd
9. House
10. Girl
11. Boy
12. Man
13. Woman
14. Baby
15. Grandmother
16. Mother
17. Father
18. Uncle
19. Aunt
20. Grandfather
21. Cow
22. Dog
23. Chicken
24. Duck
25. Sand
26. Warmth
27. Body
28. Hair

29. Hand
30. Finger
31. Tree
32. Love
33. Journey
34. Marriage
35. Wedding
36. Feast
37. Door
38. Coconut palm
39. Coconut
40. Broom
41. Flower
42. Bird
43. Fish
44. Goat
45. River
46. Ocean
47. Clouds
48. Friend
49. Enemy
50. Banana
51. Cat
52. Darkness
53. Eyes
54. Ears
55. Nose
56. Mouth
57. Head
58. Toes
59. Nails
60. Earrings
61. Lemon
62. Seed

63. Well
64. Beans
65. Legs
66. Skin
67. Beauty
68. Milk
69. Sleep
70. Sickness
71. Friendship
72. Donkey
73. Madness
74. Hatred
75. Farmer
76. Witch
77. Gold
78. Orange
79. Water
80. Mud
81. Sweetness
82. Ladle
83. Mason
84. Carpenter
85. Basket
86. Mat
87. Color
88. People
89. Slave
90. Tongue
91. Heart
92. Market
93. Stomach
94. Kidney
95. Liver
96. Blood

97. Cleanliness
98. Dirt
99. Giraffe
100. Lion
101. One
102. Two
103. Three
104. Four
105. Five
106. Six
107. Seven
108. Eight
109. Nine
110. Ten
111. Here
112. Stirring rod
113. Bees
114. Talk
115. Ship
116. Tomatoes
117. Safari ants
118. Frog
119. Beer
120. Spoon

APPENDIX II: RABAI LOANWORDS FROM ENGLISH

English words	IPA	Rabai equivalents	IPA
1. Missionary	/mɪʃənri/	mumisheni	/mumiʃɛni/
2. Spanner	/spænə/	supana	/supɑnɑ/
3. Budget	/bʌʤɪt/	bajeti	/bɑɟɛti/
4. Juice	/ʤu:s/	juisi	/ɟuisi/
5. Bank	/bæŋk/	benki	/bɛŋki/
6. Handbag	/hændbæg /	begi	/bɛg i/
7. Balcony	/bælkəni/	barikoni	/bɑrikɔni/
8. Credit	/kredɪt/	kirediti	/kirɛditi/
9. Card	/kɑ:d/	kadi	/kɑdi/
10. Wig	/wɪg /	wigi	/wig i/
11. Weave	/wi:v/	wivu	/wivu/
12. Boot	/bu:t/	buti	/buti/
13. Pastor	/pɑ:stə/	pasta	/pɑstɑ/
14. File	/faɪl/	faili	/fɑili/
15. Carton	/kɑ:tn/	katoni	/kɑtɔni/
16. Beetroot	/bi:tru:t/	bitiruti	/bitiruti/
17. Rail	/reɪl/	reli	/rɛli/
18. Radio	/reidiəʊ/	rodio	/rɔdiɔ/
19. Stove	/stəʊv/	sitovu	/sitɔvu/
20. Tube	/tju:b/	chubu	/ʧubu/
21. Brush	/brʌʃ/	brashi	/brɑʃi/
22. Tray	/treɪ/	tirei	/tirɛi/
23. Capsules	/kæpsju:ls/	kapisosi	/kɑpisɔsi/
24. Blanket	/blæŋkɪt/	brangeti	/brɑŋg ɛti/
25. Box	/bɒks/	bokisi	/bɔkisi/
26. Report	/rɪpɔ:t/	ripoti	/ripɔti/
27. Freezer	/fri:zə/	friza	/frizɑ/
28. Quinine	/kwɪni:n/	kwinini	/kwinini/
29. Bulb	/bʌlb/	balbu	/bɑlbu/
30. Keyboard	/ki:bɔ:d/	kibodi	/kibɔdi/
31. Calendar	/kælɪndə/	kalenda	/kɑlɛndɑ/

32. Microphone	/maɪkrəfəʊn/	maiki	/mɑiki/
33. Switch	/swɪʧ/	swichi	/swiʧi/
34. Sauce	/sɔːs/	sosi	/sɔsi/
35. Fridge	/frɪʤ/	friji	/friɟi/
36. Plot	/plɒt/	ploti	/plɔti/
37. Net	/net/	neti	/nɛti/
38. Office	/ɒfɪs/	hofisi	/hɔfisi/
39. Packet	/pækɪt/	pakiti	/pɑkiti/
40. Spring	/sprɪŋ/	springi	/spriŋg i/
41. Committee	/kəmɪti/	kamiti	/kɑmiti/
42. Decoder	/diːkəʊdə/	dekoda	/dɛkɔdɑ/
43. Television (T.V)	/tiːviː/	tivii	/tiviː/
44. Sweater	/swetə/	sweta	/swɛtɑ/
45. Shower	/ʃaʊə/	shawa	/ʃɑwɑ/
46. Battery	/bætri/	betri	/bɛtri/
47. Nylon	/naɪlɒn/	lailoni	/lɑilɔni/
48. Secondary	/sekəndri/	sekondari	/sɛkɔndɑri/
49. Vest	/vest/	vesti	/vɛsti/
50. Rake	/reɪk/	reki	/rɛki/
51. Programme	/prəʊg ræm/	programu	/prɔg rɑmu/
52. Tile	/taɪl/	taili	/tɑili/
53. Court	/kɔːt/	koti	/kɔti/
54. Coat	/kəʊt/	koti	/kɔti/
55. Charger	/ʧɑːʤə/	chaja	/ʧɑɟɑ/
56. Indicator	/ɪndɪkeɪtə/	indiketa	/indikɛtɑ/
57. Ring (of a piston)	/rɪŋ/	ringi	/riŋg i/
58. Guitar	/g ɪtɑː/	gita	/g itɑ/
59. Tyre	/taɪə/	tairi	/tɑiri/
60. Mortuary	/mɔːrtueri/	mochwari	/mɔʧwɑri/

APPENDIX III: RABAI LOANWORDS FROM KISWAHILI

	Kiswahili words	IPA	Rabai equivalents	IPA	Gloss
1.	Trela	/trɛla/	ritela	/ritɛlɑ/	trailer
2.	Ekzibiti/Kizibiti	/ekzibiti/kizibiti	chisibiti	/ʧisibiti/	exhibit
3.	Asprini	/asprini/	sipirini	/sipirini/	Aspirin
4.	Msikiti	/msikiti/	musikiti	/musikiti/	mosque
5.	Pistoni	/pistɔni/	pisitoni	/pisitɔni/	piston
6.	Mkristo	/mkristɔ/	mukiristɔ	/mukiristɔ/	Christian
7.	Skuli	/skuli/	sikuli	/sikuli/	school
8.	Mwislamu	/mwislamu	musilamu	/musilɑmu/	Moslem
9.	Biskuti	/biskuti/	bisikuti	/bisikuti/	biscuit
10.	Digrii	/dig ri:/	digrii	/dig ri:/	degree
11.	Albamu	/albamu/	alibamu	/ɑlibɑmu/	album
12.	Maktaba	/maktaba/	makitaba	/mɑkitɑbɑ/	library
13.	Hospitali	/hɔspitali/	sipitali	/sipitɑli/	hospital
14.	Ekaristi	/ɛkaristi/	ekaristi	/ɛkɑristi/	Eucharist
15.	Koliflawa	/kɔliflawa/	koliflawa	/kɔliflɑwɑ	cauliflower
16.	Lifti	/lifti/	lifti	/lifti/	lift
17.	Bekeri	/bɛkɛri/	bekari	/bɛkɑri/	bakery
18.	Iodini	/iɔdini/	ayodini	/ɑjɔdini/	iodine
19.	Operesheni	/ɔpɛrɛʃɛni/	paresheni	/parɛʃɛni/	operation
20.	Advansi	/advansi/	adivansi	/ɑdivɑnsi/	advance
21.	Kansa	/kansa/	kansa	/kɑnsɑ/	cancer
22.	Akselereta	/aksɛlɛrɛta/	agizilereta	/ɑg izilɛrɛtɑ/	accelerator
23.	Altaneta	/altanɛta/	alitaneta	/ɑlitɑnɛtɑ/	alternator
24.	Ekzosi pipe	/ɛkzɔsi/	egzosi	/ɛg izɔsi/	exhaust
25.	Manispaa	/manispa:/	manusupaa	/mɑnusupɑ:/	municipal
26.	Kilometa	/kilɔmɛta/	kilomita	/kilɔmitɑ/	kilometre
27.	Klachi	/klaʧi/	klaʧi	/klɑʧi/	clutch
28.	Opereta	/ɔpɛrɛta/	pareta	/pɑrɛtɑ/	operator
29.	Klabu/kilabu	/klabu/kilabu/	chilabu	/ʧilɑbu/	club
30.	Mbaptisti	/mbaptisti/	mubaptisti	/mubɑputisti/	Baptist

31. Shifta	/ʃîfta/	shifta	/ʃîftɑ/	shifter
32. Inspekta	/inspɛkta/	sipekita	/sipɛkitɑ/	inspector
33. Krismasi	/krismasi/	chisimisi	/ʧîsimisi/	Christmas
34. Eksirei	/ɛksirɛji/	ekisirei	/ɛkisirɛji/	X-ray
35. Daktari	/daktari/	dakitari	/dɑkitɑri/	doctor
36. Historia	/histɔrija/	storia	/stɔrijɑ/	history
37. Dipfriza	/dipfriza/	dipufriza	/dipufrizɑ/	deep freezer
38. Kamishna	/kamiʃna/	kamishena	/kɑmiʃɛnɑ/	commissioner
39. Kashfa	/kaʃfa/	kashifa	/kɑʃifɑ/	scandal
40. Jiografia	/ʄijɔg rafija/	Jografia	/ʄɔg rɑfijɑ/	Geography
41. Balbu	/balbu/	balbu	/bɑlibu/	bulb
42. Erieli/Erio	/ɛriɛli/ɛrijɔ	erioli	/ɛrijɔli/	aerial
43. Diski	/diski/	disiki	/disiki/	disk
44. Aproni	/aprɔni/	apuroni	/ɑpurɔni/	apron
45. Diskaunti	/diskawunti/	disikawunti	/disikɑwunti/	discount
46. Sketi	/skɛti/	sikati	/sikɑti/	skirt
47. Ghorofa	/ɣɔrɔfa/	gorofa	/g ɔrɔfɑ/	a multi-storied building
48. Elektroskopu	/ɛlɛktrɔskɔpu/	elekitrosikopu	/ɛlɛkitrɔsikɔpu/	electroscope
49. Bakteria	/baktɛrija/	bakiteria	/bɑkitɛrijɑ/	bacteria
50. Disko	/diskɔ/	disiko	/disikɔ/	disco
51. Panka	/paŋka/	banka	/bɑŋkɑ/	fan
52. Sinki	/siŋki/	sinki	/siŋki/	sink
53. Dikteta	/diktɛta/	dikiteta	/dikitɛtɑ/	dictator
54. Eskaleta	/ɛskalɛta/	esikaleta	/ɛsikɑlɛtɑ/	escalator
55. Baiskeli	/bajiskɛli/	basikili	/bɑsikili/	bicycle
56. Beseni	/bɛsɛni/	benesi	/bɛnɛsi/	basin
57. Kitabu	/kitabu/	chitabu	/ʧîtɑbu/	book
58. Skrubu	/skrubu/	sukurubu	/sukurubu/	screw
59. Mtambo	/mtambɔ/	muhambo	/muhɑmbɔ/	machine
60. Cherehani	/ʧɛrɛhani/	charehe	/ʧɑrɛhɛ/	sewing machine
61.				

APPENDIX IV: RABAI NATIVE TERMS

English Gloss	Rabai Equivalent	Phonemic transcription
1. Meat	nyama	/ɲɑmɑ/
2. Mango	embe	/ɛmbɛ/
3. Grass	nyasi	/ɲɑsi/
4. Maize	tsere- matsere	/ʦɛrɛ/-/mɑtsɛrɛ/
5. Teeth	meno	/mɛnɔ/
6. Farm	munda	/mundɑ/
7. Land	tsi	/ʦi/
8. Gourd	chirenje	/ʧirɛɲʤɛ/
9. House	nyumba	/ɲumbɑ/
10. Girl	musichana	/musiʧɑnɑ/
11. Boy	muvulana	/muvulɑnɑ/
12. Man	mwanalume	/mwɑnɑlumɛ/
13. Woman	mwanamche	/mwɑnɑmʧɛ/
14. Baby	mwana	/mwɑnɑ/
15. Grandmother	wawe	/wɑwɛ/
16. Mother	mayo	/mɑjɔ/
17. Father	baba	/bɑbɑ/
18. Uncle	aphu/a<u>v</u>u	/ɑɸu/
19. Aunt	tsangazimi	/ʦɑŋg ɑzimi/
20. Grandfather	tsawe	/ʦɑwɛ/
21. Cow	ng'ombe	/ŋɔmbɛ/
22. Dog	kuro	/kurɔ/
23. Chicken	kuku	/kuku/
24. Duck	bata	/bɑtɑ/
25. Sand	tsangarawe	/ʧɑŋg ɑrɑwɛ/
26. Warmth	dzoho	/ʤɔhɔ/
27. Body	mwiri	/mwiri/
28. Hair	nyere	/ɲɛrɛ/
29. Hand	mkono	/mkɔnɔ/
30. Finger	chala	/ʧɑlɑ/
31. Tree	muhi	/muhi/

32. Love	penzi	/pɛnzi/
33. Journey	safari	/sɑfɑri/
34. Marriage	ndowa	/ndɔwɑ/
35. Wedding	harusi	/hɑrusi/
36. Feast	sherehe	/ʃɛrɛhɛ/
37. Door	muriango	/muriɑŋg ɔ/
38. Coconut palm	munazi	/munɑzi/
39. Coconut	nazi	/nɑzi/
40. Broom	luphyero/luv̲yero	/luɸjɛrɔ/
41. Flower	rua	/ruɑ/
42. Bird	tsongo	/tsɔŋg ɔ/
43. Fish	samaki	/sɑmɑki/
44. Goat	mbuzi	/mbuzi/
45. River	muho	/muhɔ/
46. Ocean	bahari	/bɑhɑri/
47. Clouds	mengu	/mɛŋg u/
48. Friend	msena	/msɛnɑ/
49. Enemy	hadui	/hɑdui/
50. Banana	izu	/izu/
51. Cat	paka	/pɑkɑ/
52. Darkness	dzisa	/ʣisɑ/
53. Eyes	matso	/mɑtsɔ/
54. Ears	masikiro	/mɑsikirɔ/
55. Nose	pula	/pulɑ/
56. Mouth	mulomo	/mulɔmɔ/
57. Head	chitswa	/ʧitswɑ/
58. Toes	vyala vya maguluni	/vyɑlɑ vyɑ
mɑg uluni/		
59. Nails	kombe	/kɔmbɛ/
60. Earrings	vipuli	/vipuli/
61. Lemon	kapu	/kɑpu/
62. Seed	mbeyu	/mbɛju/
63. Well	chisima	/ʧisimɑ/
64. Beans	maharabwe	/mɑhɑrɑbwɛ/

65. Legs	magulu	/mɑg ulu/
66. Skin	chingo	/ʧĩŋg ɔ/
67. Beauty	udzo	/udzɔ/
68. Milk	mazia	/mɑziɑ/
69. Sleep	usinzizi	/usinzizi/
70. Sickness	ukongo	/ukɔŋg ɔ/
71. Friendship	usena	/usɛnɑ/
72. Donkey	punda	/pundɑ/
73. Madness	vitswa	/vitswɑ/
74. Hatred	chuki	/ʧuki/
75. Farmer	mkurima	/mkurimɑ/
76. Witch	mtsai	/mtsɑi/
77. Gold	dhahabu	/ðɑhɑbu/
78. Orange	chumbwa	/ʧumbwɑ/
79. Water	madzi	/mɑʤi/
80. Mud	tophe/tove	/tɔɸɛ/
81. Sweetness	mutswano	/mutswɑnɔ/
82. Ladle	chipawa	/ʧipɑwɑ/
83. Mason	fundi wa nyumba	/fundi wɑ ɲumbɑ/
84. Carpenter	fundi wa mbao	/fundi wɑ mbɑɔ/
85. Basket	chikahana	/ʧikɑhɑnɑ/
86. Mat	mucheka	/muʧɛkɑ/
87. Color	rangi	/rɑŋg i/
88. People	atu	/ɑtu/
89. Slave	mutumwa	/mutumwɑ/
90. Tongue	lurimi	/lurimi/
91. Heart	moyo	/mɔjɔ/
92. Market	soko	/sɔkɔ/
93. Stomach	ndani	/ndɑni/
94. Kidney	figo	/fig ɔ/
95. Liver	ini	/ini/
96. Blood	mulatso	/mulɑtsɔ/
97. Cleanliness	usafi	/usɑfi/
98. Dirt	uchafu	/uʧɑfu/

99. Council of elders		dhome	/ðɔmɛ/
100.	Lion	tsimba	/ʦimbɑ/
101.	One	mwenga/motsi	/mwɛŋg ɑ/mɔʦi/
102.	Two	mbiri	/mbiri/
103.	Three	tahu	/tɑhu/
104.	Four	nee	/nɛ:/
105.	Five	tsano	/ʦɑnɔ/
106.	Six	handaho	/hɑndɑhɔ/
107.	Seven	fungahe	/fuŋg ɑhɛ/
108.	Eight	nane	/nɑnɛ/
109.	Nine	chenda	/ʧɛndɑ/
110.	Ten	kumi	/kumi/
111.	Here	phano/v̲ano	/ɸɑnɔ/
112.	Stirring rod	mfidzo	/mfiʤɔ/
113.	Bees	nyuchi	/ɲuʧi/
114.	Talk	gomba	/g ɔmbɑ/
115.	Ship	ng’onzi	/ŋɔnzi/
116.	Tomatoes	tindi	/tindi/
117.	Safari ants	tsalafu	/ʦɑlɑfu/
118.	Frog	chulwa	/ʧulwɑ/
119.	Beer	uchi	/uʧi/
120.	Spoon	chijiko	/ʧiɟikɔ/