



HAL
open science

Njem tonology

Pius W. Akumbu

► **To cite this version:**

Pius W. Akumbu. Njem tonology. Humanities and Social Sciences. University of Yaounde 1, 2007. English. NNT: . tel-03692270

HAL Id: tel-03692270

<https://hal.science/tel-03692270>

Submitted on 14 Jun 2022

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Njém Tonology

Defence Date: 19-01-2007

Jury:

President: Edmond Biloa

Rapporteur 1: Beban Sammy Chumbow

Rapporteur 2: Ngessimo Mutaka

Member: Ebobisse Carl

Member: Robert Hedinger

Pius Wuchu Akumbu

Njém Tonology

Pius Wuchu Akumbu

SIL International®

2012

SIL e-Books
45

©2012 SIL International®

ISBN: 978-1-55671-339-2
ISSN: 1934-2470

Fair-Use Policy:

Books published in the SIL e-Books (SILEB) series are intended for scholarly research and educational use. You may make copies of these publications for research or instructional purposes free of charge (within fair-use guidelines) and without further permission. Republication or commercial use of SILEB or the documents contained therein is expressly prohibited without the written consent of the copyright holder(s).

Editor-in-Chief
Mike Cahill

Managing Editor
Bonnie Brown

REPUBLIC OF CAMEROON
Peace-Work-Fatherland

REPUBLIQUE DU CAMEROUN
Paix-Travail-Patrie

THE UNIVERSITY OF YAOUNDE I

UNIVERSITÉ DE YAOUNDÉ I

Faculty of Arts, Letters
and Social Sciences

Faculté des Arts, Lettres
et Sciences Humaines

Department of African
Languages and Linguistics

Département de Langues
Africaines et de Linguistique



NJÉM TONOLOGY

A Thesis Submitted in Partial Fulfilment of the Requirements for the Award of
a Ph.D (Doctorat) in Linguistics

By
AKUMBU Pius WUCHU
DEA, Linguistics

Supervised by

Beban Sammy CHUMBOW
Professor of Linguistics

Ngessimo M. MUTAKA
Professor of Linguistics

Yaounde, March 2006

DEDICATION

To my mother, Phubong Regina, for she has really been wonderful to me.

ACKNOWLEDGEMENTS

It is impossible to realize a major project as the present thesis single-handedly. I received contributions from several people and would like to thank them here.

The most important acknowledgement, by far, is to Professor Chumbow who still found time to read through my manuscripts and discuss the work with me, in spite of his large scale of administrative duties. He made fascinating comments and remarks that were very useful in firming up this thesis.

I owe a very special debt to Professor Mutaka who has been a real source of inspiration and encouragement to me. While I was writing, his expression of confidence and all the comments and suggestions he made spurred me a lot. Even when I wrote nauseating things or was obstinate in my views he gradually and convincingly brought me to reason with him. He has done just a lot to my benefit and even my contact with this language was his initiative. I hope he will find in this thesis the fruit of his labour.

My experience throughout the years of this project has made me to realize, just as Isaac Newton did, that “If I have seen further than others it has been by standing on the shoulders of giants”. I must therefore

acknowledge my mentors at SIL International, and in particular Ginger Boyd. Because of her I came close to this organization and to all those who got to know and assist me. She taught me so many things and also encouraged me enormously.

Robert Hedinger is the hidden giant behind my success. He became interested in this work at a very preliminary stage and actually gave me a financial grant that covered all my field trips. Before and after this he made sure that I checked and corrected all what I was writing. I really realize how much interest he put in just to let me succeed.

Keith and Mary Beavon are a major foundation to my success as well. When they asked for someone to work on this language, Prof. Mutaka chose me. They sponsored the work I did at the beginning. Even though it was less successful at that stage, they still spoke a few words of encouragement to me from time to time. They provided me with a full range of data that I would surely have taken many years to collect. When I got stuck at any point I ran back to Keith and he never hesitated to discuss my data with me.

During a tone workshop held at SIL International in Yaounde between October and December 2000, I was fortunate to meet Jim Roberts and Keith Snider. The orientation given to this work is based

largely on their proposals. Jim particularly monitored the original material I put together on Njém. He checked the proposal to this thesis thoroughly and also provided enlightening comments as I was writing. Keith, on the other hand, gave me the basic textbook on which this work is built and also took some pains to read through my manuscripts and send back comments.

I should also like to thank Steve Anderson for he has been a major source of inspiration and courage to me. He rendered all kinds of services that I demanded. As I started writing, a process that was very cumbersome with paper alone, he provided a laptop to me. When Robert Hedinger was not there, Steve did all the monitoring and his comments were splendid.

I met many people and gathered a lot of experience while doing socio-linguistic survey with SIL International between 2000 and 2004 and I am sure Ed and Beth Brye will understand how relevant this turned out to be for me. During all my survey trips Ed always kept me amused. He let me know that I had a lot of foresight and some day he told me “...you have a lot of potentials and people like you often choose the hard way whenever they have a choice”. This statement helped me to start work on Njém again; I was about to do something else.

I am also grateful to all the lecturers of the Department of Linguistics, The University of Yaounde I, for their input during the many years they have taught me. I am thinking especially of Edmond Biloa, Jean-Marie Essono, Pius Tamanji, John Ogwana, Nseme Cledor, Mbah Gabriel, Sadembouo Etienne, Domche Engelbert, Bitjaa Kody-Zachee, and Ndamsah Gratiana.

I am equally grateful to Rolex Koumato, my principal informant, and Anvamzoh Etienne of Mballam II for verifying and augmenting the data used in this study.

On a non-academic perspective, I wish to express my gratitude to my entire family for all the prayers and, most of all, the confidence that they have in me. I should sincerely thank my wife, Vivian, for doing most of the housework alone and for accepting that I get up late some nights to scribble down something that I would have otherwise forgotten. I cannot forget my friends, Hamajoulde Djidda, Nkwenti Nico, Ponghiguele Robert, and Tiambei Francis who always pressed me on.

I know that it was the wish of God that this project should be realized and also that all inadequacies in it lie on my inability to make good use of all what I have learnt.

ABSTRACT

This study describes and explains the make-up and realization of tone in Njém, a narrow Bantu language spoken from the forest region of South Eastern Cameroon over to Northern Congo. The nouns have mostly monosyllabic and disyllabic roots. The verb roots are predominantly monosyllabic (CV and CVC) and disyllabic (CVCV) except when reduplicated. They undergo segmental and suprasegmental processes both at word and phrasal level that this work seeks to explain.

In order to attain the objective of this study, the Register Tier Theory (Inkelas 1987, Inkelas et al. 1987, Snider 1990, 1999) model has been used. The geometric arrangement of tone in this model (see Snider 1999: 23) lends itself adequately to the representation and explanation of tone, found to be a complex issue in most languages that are tonal.

The analysis reveals that Njém has two underlying tones - H and L. The nouns exhibit four underlying tonal melodies, namely, H, L, HL, and LH whereas the verbs exhibit two - H and L. Segmental and/or suprasegmental processes trigger the other surface realizations.

One of such tonological processes that happens to be the major finding of this work, is the upstep of low tones. Snider (1999) predicts that any floating tone can trigger the upstep of any tone provided the

register of the floating tone is opposite in value to the tone that undergoes upstep. He cites some tones that cause others to be downstepped (Snider 1999: 53 fn 23) for illustration. The fact that he does not cite low tones that undergo upstep suggests that such cases were not available at the time. It is shown in this work that not only do tones of Njém undergo downstep (as predicted by Snider) but also that even low tones undergo upstep. This shows that both downstep and upstep can be accounted for by the RTT model in a unified manner. The illustration of this phenomenon in this study stands out clearly as a major contribution, which confirms that RTT can aptly handle complex tonal phenomena of tone languages.

RESUME

Cette étude décrit et explique la combinaison et le déploiement du ton en njém, une langue bantoue parlée dans la région forestière du sud-est Cameroun jusqu'au nord du Congo. Les noms ou substantifs ont dans la plupart des cas des structures radicales monosyllabiques et dissyllabiques. Les radicaux verbaux sont généralement monosyllabiques (CV et CVC) et dissyllabiques (CVCV), sauf dans les cas des radicaux rédupliques. Ces structures subissent des processus segmentaux et suprasegmentaux à la fois au niveau lexical et syntagmatique que ce travail cherche à expliquer.

Pour atteindre le but de cette étude, le modèle de la Théorie de Registre à Paliers (Inkelas 1987, Inkelas et al. 1987, Snider 1990, 1999) est utilisé. L'organisation géométrique des tons dans ce modèle (voir Snider 1999: 23) se prête aisément à la représentation et à l'explication des tons qui posent souvent de sérieux problèmes dans les langues tonales.

L'analyse montre que le njém possède deux tons au niveau sous-jacent : le ton haut (H) et le ton bas (B). Les noms révèlent la présence de quatre mélodies tonales sous-jacentes, notamment H, B, HB, et BH tandis

que les verbes en exhibent deux : H et B. Les processus segmentals et/ou suprasegmentals entraînent d'autres réalisations au niveau phonétique.

L'un de ces processus tonologiques, qui s'avère être le résultat fondamental de cette étude, est le haussement des tons bas. Snider (1999) prédit que n'importe quel ton flottant peut entraîner le haussement d'un autre ton pourvu que le registre du ton flottant soit d'une valeur opposée au ton qui subit le haussement. Pour l'illustrer, il donne des exemples des tons qui provoquent l'abaissement d'autres tons (Snider 1999: 53 fn 23). Le fait qu'il ne présente pas de cas où les tons bas subissent le haussement montre que ces cas n'étaient pas disponibles en ce moment. Il est démontré dans ce travail que non seulement les tons du njém subissent l'abaissement (comme prédit par Snider) mais aussi les tons bas subissent le haussement. Cela montre que l'abaissement et le haussement tonals peuvent être tous les deux expliqués de façon unique par la Théorie de Registre à Paliers. L'illustration de ce phénomène dans cette étude est à coup sûr une contribution majeure et démontre à souhait que la Théorie de Registre à Paliers peut adroitement rendre compte des phénomènes tonals complexes des langues à tons.

TABLE OF CONTENTS

	Page
Dedication.....	ii
Acknowledgements.....	iii
Abstract.....	vii
Résumé.....	ix
Table of Contents.....	xi
List of Figures.....	xviii
List of Tables.....	xx
Abbreviations and Symbols.....	xxi
CHAPTER 1 INTRODUCTION.....	1
1.0 Introduction.....	2
1.1 Demography.....	2
1.2 Socio-Cultural Situation.....	6
1.3 Historical Background.....	8
1.4 Linguistic Classification.....	10
1.5 Scope of Work.....	10
1.6 Literature Review.....	11
1.7 Objectives.....	12
1.8 Theoretical Frameworks.....	12
1.8.1 Register Tier Theory.....	12
1.8.2 Lexical Phonology.....	14

1.8.3	Feature Geometry.	17
1.9	Methodology.....	19
1.10	Overview.....	21
CHAPTER 2 SEGMENTAL PHONOLOGY.....		23
2.0	Introduction.....	24
2.1	Consonants.....	24
2.1.1	Phonetic Consonant Inventory.....	25
2.1.2	Contrastive Distribution.....	27
2.1.2.1	The Labials.....	27
2.1.2.2	The Alveolars.....	28
2.1.2.3	The Velars.....	29
2.1.2.4	The Labial-Velars.....	29
2.1.2.5	The Nasals.....	30
2.1.2.6	The Semi-Consonants.....	30
2.1.3	Complementary Distribution.....	31
2.1.4	Free Variation.....	40
2.1.5	Consonant Distribution.....	41
2.1.5.1	Root-Initial Consonants.....	41
2.1.5.2	Root-Medial Consonants.....	43
2.1.5.3	Root-Final Consonants.....	44
2.1.5.4	Consonant Clusters.....	45
2.2	Vowels.....	46

2.2.1	The Front Vowels	47
2.2.2	The Back Vowels	48
2.2.3	Vowel Distribution.....	50
2.2.4	Long Vowels.....	52
2.3	Tones.....	53
2.4	Canonical Syllable Structure.....	55
2.5	Features.....	57
2.5.1	Features Used for Consonants.....	58
2.5.2	Features Used for Vowels.....	61
2.5.3	Consonant Feature Matrix.....	63
2.5.4	Vowel Feature Matrix.....	64
2.6	Phonological Processes.....	65
2.6.1	Consonants.....	65
2.6.1.1	Nasal Assimilation.....	65
2.6.1.2	Devoicing.....	67
2.6.1.3	Irregular Prefixes.....	71
2.6.2	Vowels.....	74
2.6.2.1	Devocalization.....	74
2.6.2.2	Vowel Elision.....	77
2.6.2.3	Vowel Feature Spread.....	80
2.7	Conclusion.....	83

CHAPTER 3 MORPHO-SYNTAX.....	86
3.0 Introduction.....	87
3.1 Noun Morphology.....	87
3.1.1 Morphological Structure of Nouns.....	87
3.1.2 Morphological Structure of Derived Nouns.....	89
3.1.3 Noun Class System.....	91
3.1.3.1 Gender 1 / 2.....	95
3.1.3.2 Gender 3 / 4.....	97
3.1.3.3 Gender 5 / 6.....	97
3.1.3.4 Gender 7 / 8.....	100
3.1.3.5 Gender 9 / 6.....	100
3.1.3.6 Gender 11 / 4.....	101
3.1.4 Agreement Patterns.....	102
3.2 Verb Morphology.....	103
3.2.1 Morphological Structure of Verbs.....	104
3.2.2 Stem Morphology.....	106
3.2.2.1 Extensions.....	106
3.2.2.1.1 The Reciprocal.....	107
3.2.2.1.2 The Instrumental.....	108
3.2.2.1.3 The Applicative.....	109
3.2.2.1.4 The Passive.....	110
3.2.2.1.5 The Reflexive.....	112

3.2.2.1.6	The Causative.....	113
3.2.2.2	The Root.....	114
3.2.3	Pre-Stem Morphology.....	116
3.2.3.1	Negation.....	116
3.2.3.2	Tense Markers.....	120
3.2.3.2.1	The Present Tense	120
3.2.3.2.2	The Future Tense	121
3.2.3.2.3	The General Past Tense	122
3.2.3.2.4	The Remote Past tense.....	126
3.2.3.3	Subject Markers.....	128
3.3	Syntactic Structure.....	135
3.3.1	Basic Word Order.....	135
3.3.2	Phrase-Internal Structure.....	136
3.4	Conclusion.....	138
CHAPTER 4 TONE IN NOUNS.....		139
4.0	Introduction.....	140
4.1	Morpheme Structure of Noun Roots.....	140
4.2	Contrastive Underlying Tonal Melodies of Noun Roots.....	141
4.2.1	H Melody.....	142
4.2.2	L Melody.....	148
4.2.3	HL Melody.	150
4.2.4	LH Melody.....	157

4.3	Tonal Effect of Noun Class Prefixes.....	167
4.4	Tone in Derived Nouns.....	172
4.5	Tone in Noun Phrases.....	174
4.5.1	Morphosyntactic Structure of the Noun Phrase.....	174
4.5.2	High Tone Spread.....	177
4.6	Associative Constructions.....	181
4.7	Conclusion.....	188
	CHAPTER 5 TONE IN VERBS.....	190
5.0	Introduction.....	191
5.1	Morpheme Structure of Verb Roots.....	191
5.2	Contrastive Underlying Tonal Melodies for Verb Roots.....	192
5.3	Phonology of the Infinitive.....	193
5.4	Phonology of the Imperative.....	196
5.4.1	[k] + High Tone.....	197
5.4.2	[go] + High Tone.....	198
5.4.3	[ɲ] + High Tone.....	199
5.4.4	[V] + High Tone.....	200
5.4.5	[i:] + High Tone.....	201
5.4.6	[a:] + High Tone.....	202
5.5	Phonology of the Habitual.....	205
5.6	Downstep and Upstep	208
5.7	Tone in Verb Phrases.....	219

5.7.1	Morphosyntactic Structure of the Verb Phrase.....	219
5.7.2	Reduplication.....	221
5.8	Conclusion.....	224
CHAPTER 6 GENERAL CONCLUSION.....		225
6.0	Summary	226
6.1	Summary of Rules.....	227
6.1.1	Phonological Rules.....	227
6.1.2	Tonological Rules.....	232
6.2	Register Tier Theory Model.....	238
References.....		241
Appendices.....		249
Appendix A.....		249
Appendix B.....		252
Appendix C.....		255
Appendix D.....		259
Appendix E.....		262

LIST OF FIGURES

Figure	Page
1 Location of Njém.....	4
2 Njém and Some Neighbouring Languages.....	5
3 H Melody is realized as H.....	143
4 Upstep of H after another H.....	145
5 Downgliding of Final L.....	149
6 Downstep of second H in a H L H sequence.....	152
7 HL H surfaces as H.....	155
8 LH Melody surfaces as L.....	158
9 LH Melody is realized as L before H.....	164
10 LH Melody is realized as LH before L.....	166
11 Downstep of H.....	210
12 Upstep of L.....	215

LIST OF TABLES

Table	Page
1 Phonetic Consonant Inventory	26
2 d ~ r Distribution	31
3 d ~ r Distribution in some Zone A80 Languages	33
4 ɲ ~ ŋ Distribution	36
5 k ~ ' Distribution	38
6 k ~ ' Distribution in some Zone A80 Languages	39
7 Complementary Distribution in Njém	40
8 Root-initial Consonants	42
9 Root-medial Consonants	43
10 Root-final Consonants.....	44
11 Root-medial Consonant Clusters	45
12 Phonemic Consonants.....	46
13 Phonemic Vowels.....	47
14 Sequences of Vowels in Roots (V.CV).....	51
15 Sequences of Vowels in Roots (V1.V2).....	51
16 Short and Long Vowels.....	52
17 Consonant Feature Matrix.....	63

18	Vowel Feature Matrix.....	64
19	Voicing in some Zone A80 Languages.....	69
20	Irregular Prefixes in some Zone A80 Languages.....	72
21	Proto-Bantu Noun Class Prefixes.....	92
22	Njém Noun Class Prefixes.....	93
23	Concord Morphemes.....	95
24	Tense Markers.....	120
25	Subject Markers.....	128
26	Morpheme Structure of Noun Roots.....	140
27	Contrastive Underlying Tonal Melodies for Noun Roots.....	141
28	Associative Markers.....	181
29	Morpheme Structure of Verb Roots.....	191
30	Contrastive Underlying Tonal Melodies for Verb Roots.....	192

ABBREVIATIONS AND SYMBOLS

1s	First person singular pronoun
2s	Second person singular pronoun
3s	Third person singular pronoun
1p	First person plural pronoun
2p	Second person plural pronoun
3p	Third person plural pronoun
APP	Applicative
AM	Associative marker
ATR	Advanced tongue root
C	Consonant
CAUS	Causative
CER	Certainty
CL	Class marker
CON	Concord Morpheme
Constri	Constricted glottis
DN	Derived noun
EXT	Extension
FOC	Focus marker
F	Feature
FL	Final low tone
fn	Foot note
FUT	Future tense

FV	Final vowel
G	Glide
gl	Glottis
H	High tone
h	High register feature
HAB	Habitual
HOR	Hortative
HTS	High tone spread
IHA	Imperative high association
IMP	Imperative
IPF	Imperfective
INF	Infinitive
INS	Instrumental
IPA	International Phonetic Alphabet
L	Low tone
l	Low register feature
N	Syllabic nasal/Noun
NC	Noun class
NEG	Negation marker
NF	Nominal form
O	Object
OCP	Obligatory Contour Principle
PASS	Passive

PB	Proto Bantu
Pfx	Prefix
PR	Phonetic representation
PRES	Present tense
PSF	Present, with subject focalised
PSM	Pre-stem material
PST	General past tense
P2	Remote past tense
R	Rhyme
REC	Reciprocal
RED	Reduplication suffix
REF	Reflexive
RT	Root
RTT	Register Tier Theory
S	Subject
Sfx	suffix
SM	Subject marker
TBU	Tone-bearing unit
TM	Tense marker
TRN	Tonal root node tier
UAC	Universal Association Conventions
UR	Underlying representation
V	Vowel/Verb

V:	Long vowel
ˊ	High tone
ˇ	Rising tone
ˋ	Low tone
ˆ	Falling tone
Vd	Voice
VF	Verbal form
[]	Phonetic transcription
/ /	Phonological transcription
μ	Tone-bearing unit tier
↓	Downstep
↑	Upstep
∅	Is deleted/Zero morpheme
+	Morpheme boundary
#	Word boundary
#_	Initial position
_ #	Final position
/	Context/Environment
σ	Syllable
→	Becomes or is realized as

CHAPTER ONE

GENERAL INTRODUCTION

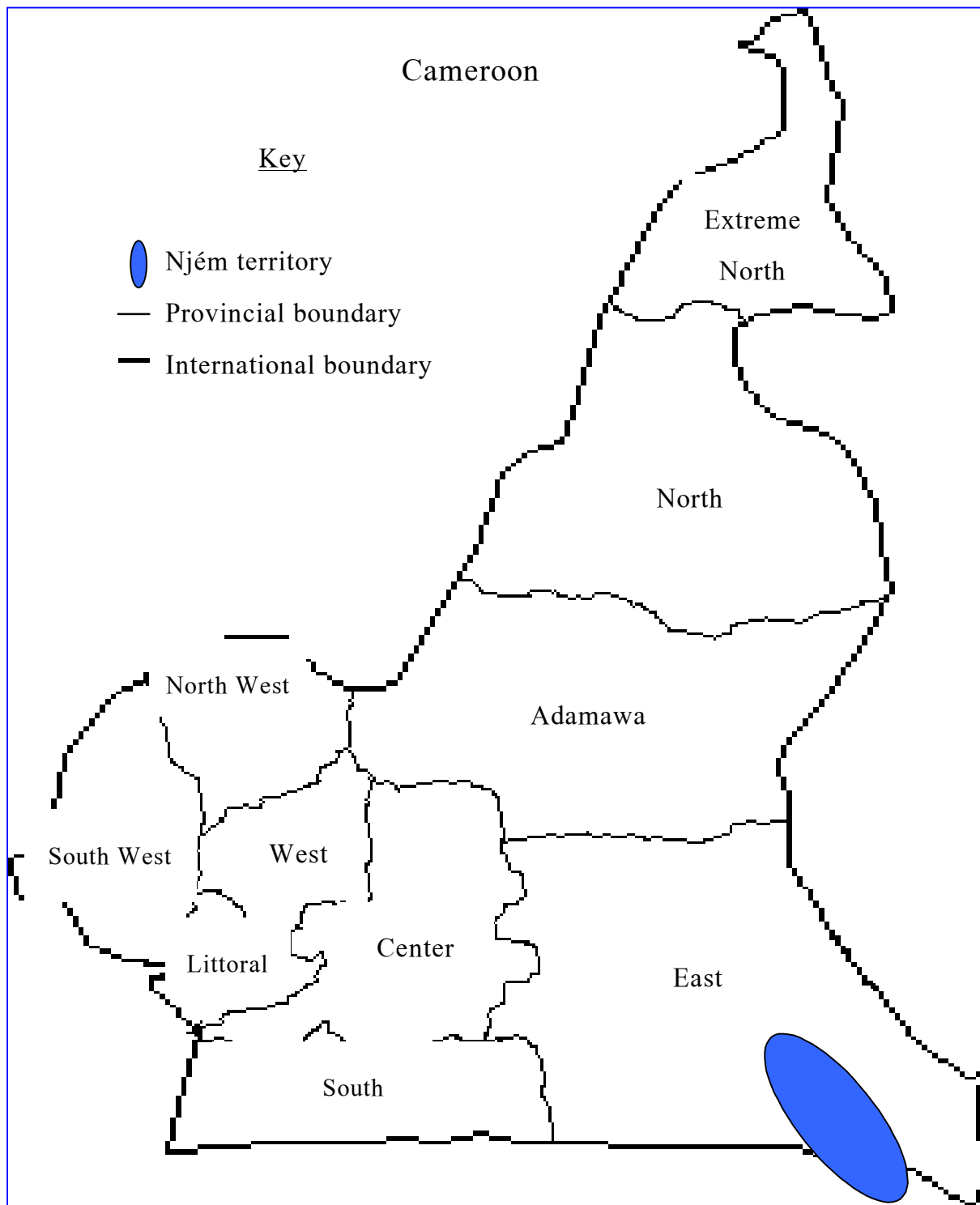
1.0 Introduction

The purpose of this thesis is to discuss the phonology of Njém, a language spoken in South-east Cameroon and in Northern Congo, while directing special attention to the behaviour of tones. No extensive analysis of this language has previously been undertaken, so this stands out as the initial work that presents the fundamental characteristics of the language. This introductory chapter begins by a presentation of the demographic, the socio-cultural, and the linguistic situations of the language as well as its historical background. It further exposes the previous works done on the language, the theoretical frameworks and the methodology used in this study. It ends up with an overview of the rest of the chapters of the work

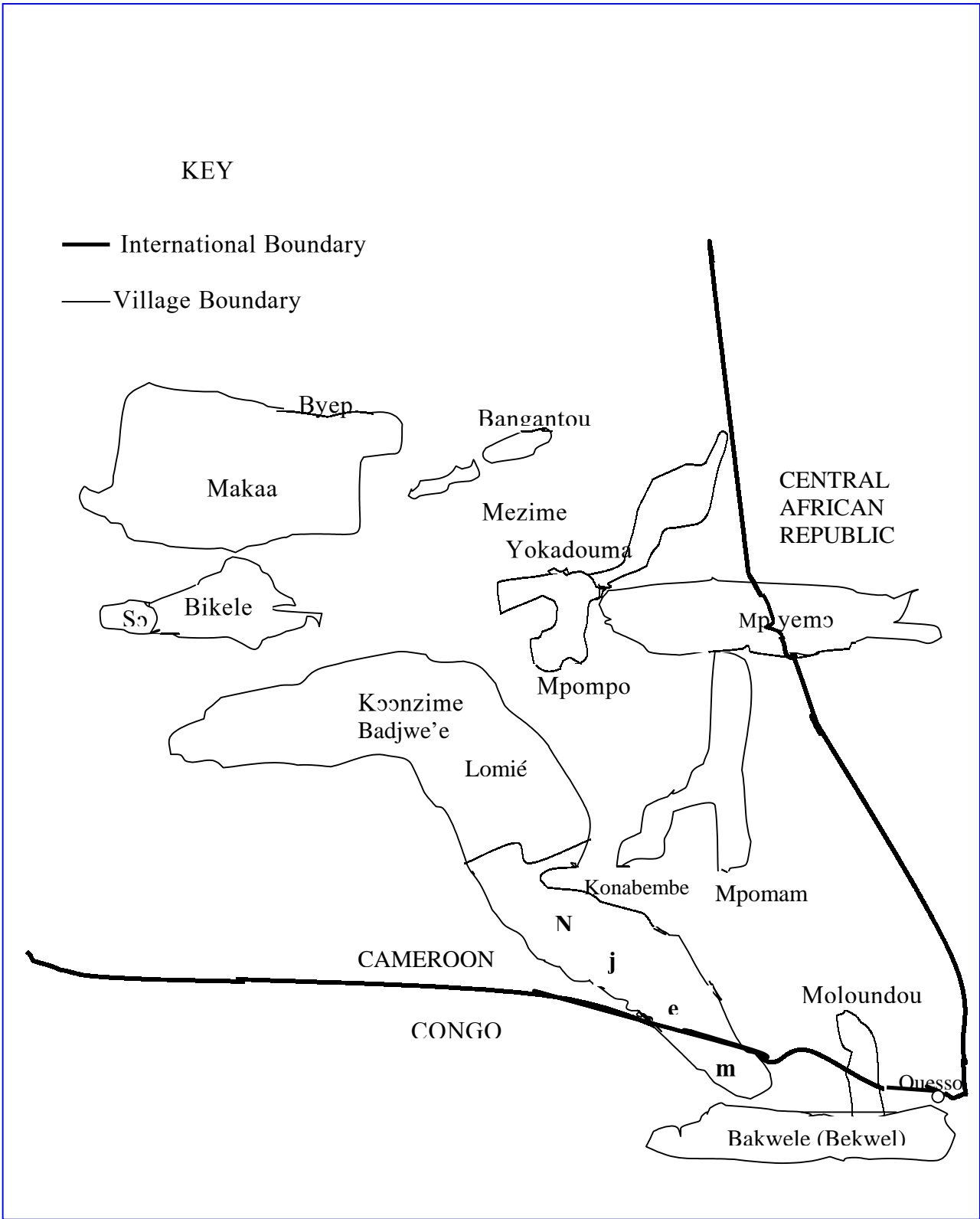
1.1 Demography

Njém is a Bantu language spoken south of River Dja in South-east Cameroon and in Souanké, Northern Congo. There are an estimated 9000 speakers of this language. According to Mary Beavon (personal communication) about 4000 of them are found in Cameroon in the two subdivisions of Ngoyla and Djoum, in the major town of Ngoyla and major villages of Mbalam I, Mbalam II, and Etekessang. Almost 5000 of them are in Congo in the District of Souanké (see figure 1 and 2 below).

The people themselves think that the dialects spoken in both countries are perfectly intelligible to them. The rest of this work is based on the dialect spoken in Ngoyla Subdivision of the Upper Nyong Division, East Province of Cameroon.



Source: Adapted from ALCAM 1983
 Figure 1. Location of Njém



Source: Realized with the assistance of Keith Beavon
 Figure 2: Njém and some neighbouring languages

1.2 Socio-Cultural Situation

The Njém people live in dense forests in the area south of river Dja. With their small population spread over a large surface area, density is below three persons per Square Kilometer (Keith Beavon, personal communication). This, coupled with the less-fertile lands, does not permit a rapid development of their milieu. They live in small hamlets, are generally isolated from one another, and are mostly found along the main road. There is very little traffic on this road during the rainy season and the region is mostly cut off from the rest of the country during the dry season when the Dja River dries off and the ferry can no longer cross. Being aware of their situation however encourages the population to plan how to live. Since they cannot constantly participate in any major markets, they arrange and survive on their personal resources. They cultivate and produce what they need in their daily lives and display surplus crops along the road for passers-by or take them to far off markets since they occasionally need money for school requirements, and basic needs such as sugar, soap, kerosene, clothes, and zinc.

In the small hamlets are found members of the same clan except in situations where a wife was taken from a different village. The number of households in an average hamlet does not go beyond twenty (20). Houses are built on both sides of the road with the courtyards facing that road. A

typical compound is made up of two small buildings, one used as a kitchen and the other for passing the night. The kitchen is usually smaller even though the women and children spend most of the time there. A few modern houses can be found, but they are really rare.

With the very vast forests at the disposal of the people, there is no need for them to cling to a piece of land. No authorization is needed to cultivate an area. A few educated people however establish land titles nowadays. The infertility of the lands explains the fact that the people do not like to own specific pieces forever. They do not usually cultivate the same farm for more than two years. After this they leave it for many years and clear land in a different location for new farms.

In most of the region occupied by the Njém are also found native-Baka-speaking pygmies who live in the forests. However, most of them use Njém when they come to the villages.

Education is increasingly attracting the attention of the people as most of their children now attend school. Even though the entire subdivision has only one understaffed secondary school, located in Ngoyla, there are many primary schools in the rest of the villages. Some of the children also attend secondary school out of the subdivision particularly in Lomié, where a related language (Kɔɔnzime) is spoken. Most of the Njém speakers use Kɔɔnzime when in contact with the Nzime

(speakers of Koonzime). Nevertheless, they prefer that Njém should be developed, too. Their enthusiasm and attitudes show that it is a vital language.

1.3 Historical Background

The Njém oral tradition traces its origin back to a time when they cohabited with the Ngumba and the Bulu in Kribi. They happened to be the weakest of the three. The Bulu were the strongest, mainly because of their medicinal (magical) strength and possession of guns. Because of this strength they obliged the Njém to always hunt for them.

At a certain time, the Bulu left Kribi and settled further away around River Mom bringing with them the Njém (their hunters). Later on, a conflict developed between the two groups because the Njém won the spears game (a game played in those days with spears to identify superiors). This led to a lot of hatred and hostility between the two. In a quest for a solution, Ncabem, considered by the Njém as their leader, contacted his uncle, a Bulu and strongest of them in terms of magic. Because his plans were not known, his uncle went ahead and initiated him. At the end of the initiation Ncabem was given a stick. He decided to test its strength and successfully stabbed his all-powerful uncle to death.

When another day for hunting came, the Bulu again gave them guns. Ncabem advised the Njém to hide all the guns and to escape. The

Bulu later noticed this and started chasing them. The Njém took the direction of River Lobo and had to cross at the confluence of this river and River Dja, precisely at Djoum. Some oral accounts hold that in order to cross, Mampeh placed his left leg on the water and ordered it to stretch over it, forming a bridge. Another version claims that Menzimenzi rather ordered his penis to lengthen over the river permitting the people to cross. This version seems to be more widespread in the Njém oral tradition as many of them are aware of *kúl lé lò*: (the crossing object over a river, referring to the penis).

The stick given to Ncabem by his uncle served as a guide after they succeeded to escape. It can still be found in Souanké where the strongest of the Njém settled. Following instructions from this stick, they moved towards the Fein Mountain, presently a tourist site at Djoum. They met the Dzenzem, a tribe of Souanké, on the opposite side of the mountain. The now powerful Njém organized themselves into small families and started chasing the Dzenzem towards the Dja. They got to the river and continued chasing them downward, installing families as they advanced. Ncabem appointed a head for each family and installed the first at Nkolndong under Atakuho. This continued along the river until they got to Souanké where Ncabem himself settled. In 1968, the Ngoyla district was created and later on it was transformed into a subdivision.

1.4 Linguistic Classification

Njém is a Bantu language of the Makaa-Njem sub-group. It is classified as A.84 (Guthrie 1971: 33, Maho 2003: 642), with the following code: Njém (Zimu, Djem).

Grimes (2000) uses a three-letter code: NJE to refer to this language. It is further classified as Niger-Congo, Atlantic-Congo, Volta-Congo, Benue-Congo, Bantoid, Southern, Narrow Bantu, Northwest, A, Makaa-Njem (A.80).

This language is numbered 432 in the Atlas Administratif des Langues Nationales du Cameroun, (Breton and Fohtung 1991).

Dieu and Renaud (1983) classify Njém under the Atlas Linguistique du Cameroun (ALCAM) code 432.

1.5 Scope of Work

This work describes the tone system of Njém. It presents a sketch of the phonology of the language and gives an outline of the noun and verb systems. The analyses cover the behaviour of segments and tones at word level as well as at phrasal level. This means that it examines changes that occur during the word-building process and when words come together in phrasal constituents. However, the syntactic structure of the language is introduced only briefly in this thesis.

1.6 Literature Review

Njém is one of the Cameroonian languages that have not attracted much attention from linguists. The works that are available on this language have been done mostly by Keith Beavon (SIL International, Yaounde).

In (1996), Beavon wrote “Quelques observations sur le système tonal du Njém” (ms). In this short paper, he identifies three level tones and discusses some phonetic, phonological, and morphological rules that apply in the language.

In (2000), he wrote “Une esquisse de grammaire et de phonologie Njém” (ms). He demonstrates that this language has eleven (11) vowel phonemes, nineteen (19) consonant phonemes and three (3) contrastive tone levels. Furthermore, he argues for the existence of polar tones in grammatical constructions in Njém.

In (2000), Akumbu wrote “Tone in Njém nouns” (ms). He argues for the existence of four underlying tonal melodies: H, L, LH and HL on Njém nouns and identifies three sets of associative constructions based on the behaviour of tones in each set.

The above literature review shows that not much has been done on Njém, and more importantly, that no work has exploited the Register Tier Theory nor ordered grammar in the form of Lexical Phonology in this

language. This implies that the topic “Njém Tonology” has been worth researching especially as it is original in its conception, planning, and execution.

1.7 Objectives

There are two principal reasons for undertaking this task. The first objective is to describe the tonal processes that occur in Njém in such a way as to be able to account for all the surface tone melodies. This, it is hoped, will serve as a basis for establishing a consistent and practical tone orthography for the language.

The second objective is to participate in the quest for a universal theoretical framework in which tonal (phonological) processes can be appropriately explained. This will be done by verifying the axioms of Register Tier Theory and Lexical Phonology in Njém since theories of language can only be properly evaluated with worked-out grammars that make use of them in handling phenomena.

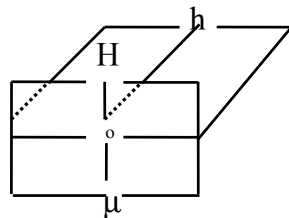
1.8 Theoretical Frameworks

1.8.1 Register Tier Theory

The Register Tier Theory (RTT) (Inkelas 1987, Inkelas et al. 1987, Snider 1990, 1999) recognizes the following autosegmental features and tiers: the register features *h* and *l* on a REGISTER TIER, the tonal

features H and L on a TONAL TIER, a TONAL ROOT NODE TIER (TRN), and a TONE-BEARING UNIT TIER (TBU). These tiers are geometrically arranged according to the configuration in (1) taken from Snider (1999: 23).

1) Geometry of tone



Register tier

Tonal tier

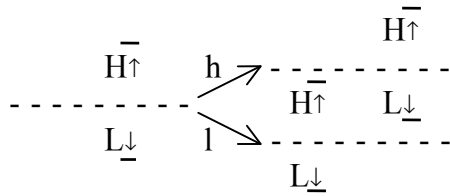
Tonal root node tier

Tone-bearing unit tier

“Features on the Register tier and the Tonal tier are linked to structural nodes on the TRN. Geometrically, these tiers form a separate plane with respect to the TRN. Nodes on the TRN are, in turn, linked to moras (μ) on the TBU tier” (Snider 1999: 23).

The register features h and l are defined (Snider 1999: 25) as... “effect a register shift h=higher, and l=lower relative to the preceding register setting”, and the tonal features H and L as ... “realize this TBU at H=high pitch, and L=low pitch relative to the current register.” This is shown in (2) (the dotted lines represent registers and the solid lines represent tones).

2) Register features and tonal features



The geometry in (1) and the features in (2) make it possible to specify up to four logically possible tonal distinctions, namely, a high tone on a high register, a high tone on a low register, a low tone on a high register, and a low tone on a low register. Notice firstly that the register feature of any given TBU is specified in relation to that of the preceding register. The register of the initial TBU for its part is construed to be higher than or lower than the reference point that native speakers usually have in mind when beginning an utterance. Secondly, the tonal feature associated to any given TBU specifies whether the tone is low or high in relation to the current register. This theory is useful in this work because it makes it possible for insightful explanations to be given for the application of tonal processes like assimilations, downstep and upstep that occur in this language.

1.8.2 Lexical Phonology

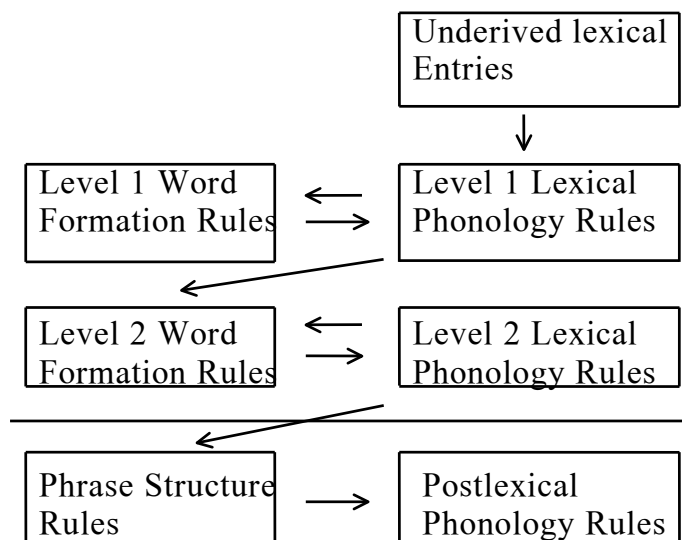
Lexical Phonology (Kiparsky 1982, 1985, Mohanan 1986, Pulleyblank 1986) moves away from the Standard Generative Phonology

premise that morphology and phonology are separated. It holds that phonological rules interact with word formation rules. In fact, it is a synthesis of two theories - a theory of phonology and a theory of morphological word-formation rules (Snider 1999). This tenet stems from the assumption that a word is formed at different stages called levels, and at each level, phonological rules are present and so they apply. Lexical Phonology has two main components: the lexical and the postlexical components. Words are formed in the lexicon where lexical rules apply and then sent into the syntax and finally to the postlexical component where postlexical rules apply.

The Lexical Phonology model is organized as follows:

3)

Lexical Component



Postlexical Component

Source: Snider (1999: 13)

This organization suggests that the lexicon is not only a store of underived lexical items. It contains word-formation and phonological rules. These rules are hierarchically organized into levels (domain of rule application). A level may be cyclic in that during a derivation there is a constant cycling of data through interlocking phonological and morphological rules (Katamba 1989). The two broad classes of rules are distinct in that whereas lexical rules apply to the results of word formation processes, postlexical or phrasal rules apply to the results of phrase formation. These can further be distinguished as follows:

4) Lexical Rules	Postlexical Rules
1. There may be lexical exceptions.	Apply across the board without exception.
2. Can lack phonetic motivation.	Never lack phonetic motivation.
3. Preserve structure, i.e., the output of a rule is a contrastive (phonemic) element.	Are not necessarily structure preserving.
4. Native speakers are aware of the rules' applications.	Rules operate below the level of native-speaker awareness.
5. May refer to the internal structure of a word.	May never refer to the internal structure of a word.

- | | | |
|----|---|--|
| 6. | May never refer to the internal structure of a phrase (e.g., word boundaries, end of phrase, etc.). | May refer to the internal structure of a phrase. |
| 7. | Are subject to cyclicity. | Are not cyclic. They only apply once. |
| 8. | Apply before postlexical rules. | Apply after lexical rules. |

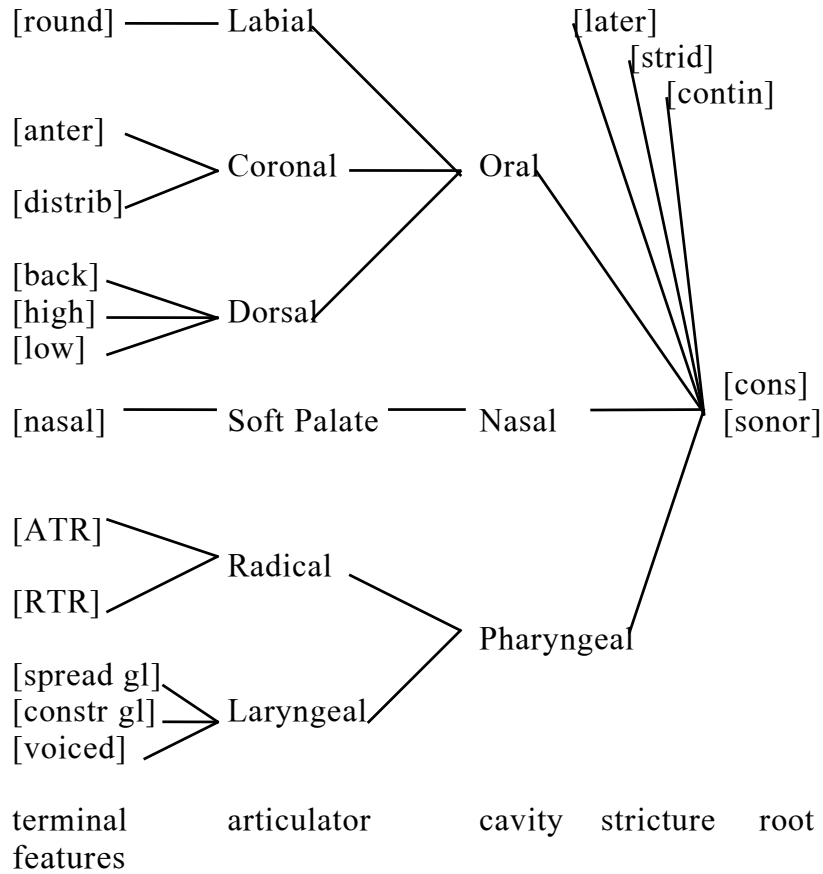
These properties are due to Pulleyblank (1986).

This framework will be used in this thesis to account for phonological processes that require morphological information for their application.

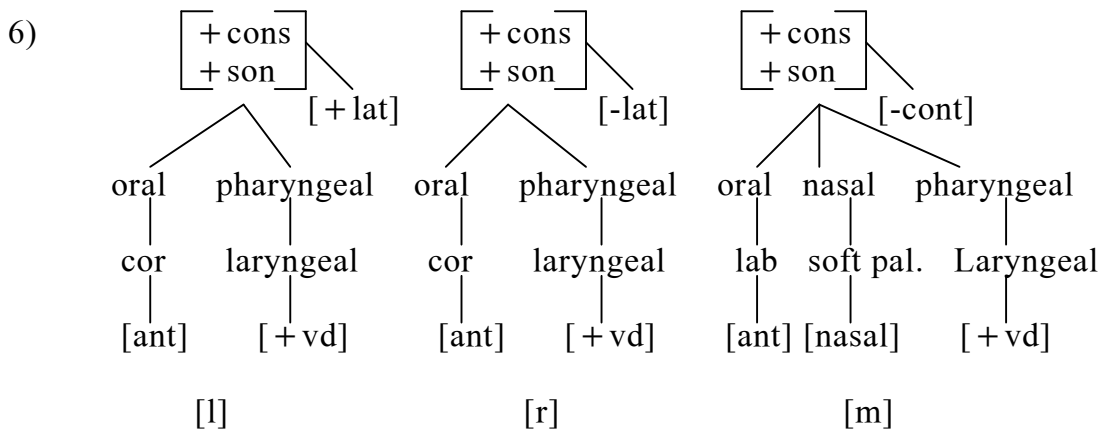
1.8.3 Feature Geometry

Feature Geometry (FG) (Clements 1985, Halle 1992, Kenstowicz 1994) is used to deal with the internal structure and composition of segmental (i.e., nontonal) material. The focus of feature geometry is the arrangement of distinctive features into a hierarchically structured tree. Such an arrangement that will be relevant in this work is based on proposals by Halle (1992), taken from Kenstowicz (1994: 146) and presented in (5).

5) Feature Geometry model



Following this model, sounds like [l], [r], and [m], for example, are represented as follows:



This system clearly shows insights into the featural organization of sounds. For instance, it tells us the difference between [l] and [r] that are articulatorily very close. The representations above specify that this difference is at the level of the stricture where [l] is [+lat] and [r] is [-lat].

Even though the model has been widely used to handle nontonal phenomena, many questions like “how many tiers exist, what tiers exist, and how the tiers relate to one another” continue to drive ongoing research in FG. It should also be mentioned that developments in FG have not largely been applied to tone. The RTT analysis presented in this thesis is an application of this model to tone. It demonstrates that what has been considered the “tonal tier” is a composition of many tiers that are arranged in a hierarchical geometric structure.

1.9 Methodology

The methodology used is the time honoured classical method used by descriptive linguistics for languages with no previous linguistic description. The analysis consists of (a) informant (native-speaker) assisted data elicitation, (b) data organization and classification (computer assisted), (c) data analysis, and (d) rule formulation based on one or more theoretical frameworks. In this respect, the data (word lists, phonological phrases) were collected with the aid of Njém speakers. The principal language helper was Rolex Koumato, a 28-year old University student.

Several trips were made to Ngoyla, Mbalam I and Etekessang not only to verify the faithfulness of the data but also to live the realities of the life of the people. While in the field most of the work was done with Anvamzoh Etienne who facilitated the verification process and augmentation of these data. It should be noted that Keith Beavon entrusted to me a lot of data that had been collected in what he calls “an unscientific manner” for over close to three decades while he was working on the related Koonzime. These data were classified in *Shoebox* (a data base management programme used by linguists in interlinearizing texts, developing lexicons, preserving field notes, and grammatical information) following word categories, noun classes, tone melodies, and syllable structures. The classification is motivated by the idea that tones will behave differently in various instances.

For an effective treatment (analysis) of these data, the internal structure of the words is studied in order to determine the prefixes, roots, and suffixes and how they combine. This helps to reveal the morphological processes (affixation, reduplication, etc.) that apply in Njém. Frames are further constituted in order to understand the behaviour of tones and segments in various contexts. This involves creating particular slots through which various sets of data are parsed. Most of the tonal phenomena are interpreted using *Speech Analyzer*. *Speech Analyzer*

is a computer application designed by SIL International to help linguists measure various elements of acoustic speech signals. This design is used to answer specific questions in which tonal phenomena can be compared.

Finally it should be noted that the analysis and rule formulation is carried out by an eclectic use of the linguistic theoretical frameworks presented above as deemed necessary. This is so because each of them handles specific issues in a more insightful manner than the others, permitting the work to explain phenomena that would otherwise be difficult to analyse. For instance, downstep has been observed, within autosegmental phonology, to be a situation in which the second of a sequence of two high tones is realized on a lower level than the first. It gives no further account for the lowering of this second high. The RTT model comes in to offer a convincing explanation by analysing the lowering to be the result of the spread of a preceding low register, followed by the delinking of the high register, allowing the high tone to be realized on that low register.

1.10 Overview

The phonology and tonology of Njém are presented in this thesis. In chapter 2, various aspects of the phonology are discussed. These include the consonant and vowel systems and the phonological processes

that these sounds undergo. Features that are used in the study are also presented in this chapter.

An overview of the morpho-syntax of this language is provided in chapter 3. The nominal and verbal morphology are outlined here. In this respect, the noun class system and agreement patterns, the stem and pre-stem morphology are discussed respectively. Finally, the syntactic structure is shown.

Chapter 4 concentrates on tone in nouns. The tonal melodies found on noun roots and the tonal effect of noun class prefixes are discussed in this chapter. It also handles tone in derived nouns as well as tone in noun phrases. The associative constructions are outlined as well.

In chapter 5, tone in verbs is presented. The tonal melodies found on verb roots are discussed. The behaviour of the infinitive, imperative, and habitual forms is outlined. Downstep and upstep are also discussed. Finally, the process of reduplication is handled in this chapter.

A general conclusion to this thesis is given in chapter 6. A summary of the rules that operate in Njém is presented here. The implication of this study to Register Tier Theory is discussed towards the end of this chapter.

CHAPTER 2

SEGMENTAL PHONOLOGY

2.0 Introduction

It is well known that tone languages consist of at least three kinds of phonological units, namely, consonants, vowels, and tones. This chapter is devoted to the phonetic characterization and phonological representation of Njém sounds. These segmental issues will be discussed since they have been known to influence the behaviour of pitch in languages that are tonal. A presentation of the consonant and vowel systems, including the phonological processes these sounds undergo, is found in this chapter. The tone system is mentioned only briefly here because it is treated in detail in chapters four and five. The features used in this work are also presented together with their defining feature matrices.

2.1 Consonants

Consonants are sounds that are produced with some constriction in the vocal tract that impedes the free flow of air through the organs of speech. They are usually numerous in human language and Njém is no exception. Beavon (2000: 1) says that there are nineteen consonant phonemes in this language. In what follows, the various phonetic consonants will be presented and analysed in order to determine which of them are contrastive.

2.1.1 Phonetic Consonant Inventory

The phonetic consonant sounds in table (1) are attested in Njém. Notice that the transcription of sounds in this study assumes the symbols of the International Phonetic Alphabet (IPA). The following correspondence can be made with the Cameroon Orthographic Symbols proposed by Tadadjeu and Sadembouo (1979), if the orthography of Njém, which is beyond the scope of this thesis, is being developed.

7)	IPA	Cameroon Alphabet	Examples
	ʃ	sh	lè-ʃim <i>'to run'</i>
	tʃ	c	tʃí'í <i>'neck'</i>
	dʒ	j	dʒŭn <i>'crocodile'</i>
	ɲ	ny	ɲòŋ <i>'mother'</i>
	j	y	lè-jé'lô <i>'to teach'</i>

These sounds will therefore be transcribed in this thesis using the IPA.

p		t		k	'	kp
b		d		g		gb
m		n	ɲ	ŋ		
	f	s	ʃ		h	
	v					
		ts	tʃ			
		dz	dʒ			
		l				
		r				
w			j			

Table 1: Phonetic Consonant Inventory

It should be noted that nasal-consonant clusters (labial, alveolar, and velar) do occur. They are however considered to be sequences of sounds that combine a homorganic nasal followed by a stop, a fricative, or an affricate as the following examples show:

- 8) òpwé ‘dog’
 òkànà ‘town’
 òfí’í ‘purse’
 lè-òvùs ‘grave’
 òdzà ‘intestine’

These data also show that the nasal-consonant clusters occur only in onset position and the nasals are syllabic, bearing a low tone.

The Structuralist Approach is used in order to determine the phonemes of Njém. This approach will help to better determine the orthography of the language which is, as stated above, beyond the scope of this study.

2.1.2 Contrastive Distribution

2.1.2.1 The Labials

The phonemes /p/ and /b/ contrast in onset position, as shown in the following data:

9)	lè-pílô	<i>'to roll'</i>
	lè-bílô	<i>'to become ill'</i>
	pjô	<i>'shed(N)'</i>
	bjô	<i>'yours'</i>
	pùm	<i>'dust'</i>
	bún	<i>'tilapia'</i>
	lè-pjèblò	<i>'to make a gesture'</i>
	lè-bjèblò	<i>'to drink'</i>
	lè-pû	<i>'to dig'</i>
	lè-bû	<i>'to break (firewood)'</i>

The phonemes /f/ and /v/ occur only in a few words. Both occur after /m/ as shown in (10).

- 10) le-m̀v̀ùs *'grave'*
 m̀fí'í *'purse'*

/f/ contrasts with /p/ and /b/ in onset position, as shown in the following data:

- 11) fǰô *'lawyer'*
 pǰô *'shed(N)'*
- lè-fê *'to shine'*
 lè-pê *'to cause resurrection'*
- fǰô *'lawyer'*
 bǰô *'yours'*
- lè-fí *'to spill'*
 lè-bí *'to beat'*

2.1.2.2 The Alveolars

The phonemes /t/ and /d/ contrast in onset position. Observe the data that follow:

- 12) dòm *'war'*
 tòm *'stomach'*
- lè-dè *'to eat'*
 lè-tê *'to create'*
- lè-dà *'to fetch (water)'*
 lè-tâ *'to be born ill'*

The phonemes /ts/ and /dz/ contrast in onset position as well.

- 13) lè-tsè' *'to be soft'*
 lè-dzè' *'to be tired'*

2.1.2.3 The Velars

/k/ and /g/ contrast in onset position.

14)	lè-kwèl	<i>'to love'</i>
	lè-gwèl	<i>'to raise'</i>
	lè-kê'	<i>'to walk'</i>
	lè-gê'	<i>'to arrest'</i>
	kwòn	<i>'skin'</i>
	gwôr	<i>'one'</i>
	kúbó	<i>'chicken'</i>
	gúmò	<i>'place'</i>

2.1.2.4 The Labial-velars

The phonemes /kp/ and /gb/ occur in just a few words. In the data of 2000+ words and phrases, /gb/ occurs only twice and /kp/ occurs four times. It has been observed that these doubly articulated sounds are very rare in languages of this area (Heath 2003: 336). Both occur before /i/ and /a/, as shown below.

15)	ngbìngbìm	<i>'lion'</i>
	kpí'ì	<i>'suddenly'</i>
	sàmgbá	<i>'seven'</i>
	kpán	<i>'cocoa'</i>

2.1.2.5 The Nasals

There are three nasal phonemes in Njém, /m/, /n/, and /ɲ/. /m/ and /n/ contrast in onset position as shown in (16a). They also contrast in intervocalic position, (16b), and in word-final position, (16c).

- 16a) lè-mòel *'to be engaged'*
 lè-nòel *'to inhume'*
- b) lè-tùmò *'to light'*
 lè-tùnò *'to shift backwards'*
- c) lè-sàm *'to violate'*
 lè-sân *'to sign'*

The phoneme /ɲ/ contrasts with /n/ in onset position.

- 17) lè-ɲìṅò *'to assume'*
 lè-nìṅò *'to coin'*
- lè-ɲîn *'to appear'*
 lè-nî *'to enter'*
- ɲòṅ *'mother'*
 nùn *'bird'*

2.1.2.6 The Semi-consonants

The semi-consonants /w/ and /j/ contrast in onset position as shown in (18).

- 18) lè-wàlà *'hour'*
 lè-jàlà *'response'*

They also contrast in intervocalic position.

- 19) bũjà *'length'*
 búwà *'fear(N)'*

It should be mentioned that certain phonetic sounds are allophones of some of the phonemes shown above. A presentation of complementary distribution follows.

2.1.3 Complementary Distribution

[d] and [r] are allophones of /d/. They occur in mutually exclusive environments with [r] occupying the root-medial and final positions and [d] the root-initial position. Table 2 shows these occurrences.

Sound	Root-initial	Root-medial	Root-final
D	lè-dèn <i>'to seize'</i> dínà <i>'reception'</i>	-	-
R	-	pàrà <i>'money'</i> ṅkúró <i>'buttock'</i>	lè-bîr <i>'to liberate'</i> kàr <i>'wasp'</i>

Table 2: d ~ r Distribution

The following rule captures the distribution:

- 20) Phonological rule (P-rule) 1: Sonorization

$$\begin{array}{|l} \hline + \text{ ant} \\ + \text{ cor} \\ - \text{ son} \\ - \text{ stri} \\ - \text{ nas} \\ \hline \end{array} \rightarrow [+ \text{ son}] / \left\{ \begin{array}{l} \text{V_V} \\ _ \# \end{array} \right\}$$

This rule says that [d] surfaces as [r] in final position or between two vowels. However, in some cases [d] occurs in intervocalic position. This always happens at the beginning of a root when [d] is preceded by an infinitive marker that has a CV structure. The occurrence of [d] in this manner seems to contradict this distribution. However the assumptions of the theory of Lexical Phonology make it possible to provide a natural explanation for this occurrence. This theory assumes that during the morphological construction of a word, the affixes do not attach simultaneously to the root. Word formation goes through levels and the output of each morphological operation is scanned by the phonological rules available at that level. Following this proposal it is claimed in this work that the verbal extensions and the noun class prefixes are attached to the root at separate levels. The Njém lexicon is divided into two levels. In the first level, the verbal extensions and nominal suffixes are added to the root. The nominal prefixes, tense markers, negation marker, and subject markers are attached to the stem in the second level. The following derivation therefore demonstrates that P-rule 1 applies prior to the prefixation of the infinitive marker.

21)	pára	kàr	dínà	lè-dèn
	UR/ pada	kad	dina	le-den/
	H L	L	H L	L L
Level 1 <i>UAC</i>	pada ⋮⋮ H L	kad ⋮ L	dina ⋮⋮ H L	den ⋮ L
<i>sonorization</i>	para H L	kar L	—	—
Level 2 <i>UAC</i>	—	—	—	le-den ⋮ L L
	PR[párà	kàr	dínà	lè-dèn]

Further evidence for this alternation is provided by the presence of [r] in the medial and final positions of some roots in other languages of zone A80. Observe, for example, the occurrences in the table below.

Màkàá	Bìkélé	Mpòmpó	Njém	Gloss
Mùdúm	mùrúm	mùrúm	mùrúm	'man'
ŋgwúd	wúrùk	ŋgwór	gwór	'one'

Table 3: d ~ r Distribution in some Zone A80 Languages

The examples show that these sounds alternate in these languages. [d] has been retained in Mākáa but has changed to [r] in most of the languages of the Makaa-Njem group when in root-medial or root-final position.

[ts] and [tʃ] are allophones of /ts/. Whereas [tʃ] occurs only before high vowels, [ts] occurs elsewhere, as shown below.

22)	lè-tʃìŋ	<i>'law'</i>
	tʃilà	<i>'writing'</i>
	tʃí'í	<i>'neck'</i>
	lè-tsàm	<i>'to destroy'</i>
	tʃwítsén	<i>'star'</i>
	tsél	<i>'liar'</i>

The following rule captures this distribution:

$$23) \quad [ts] \rightarrow [tʃ] \quad \begin{array}{l} _ V \\ +hi \end{array}$$

[tʃ] is therefore an allophone of /ts/.

[dz] and [dʒ] are also in complementary distribution. The phoneme [dz] is realized as [dʒ] before high vowels, but as [dz] elsewhere as shown in the data in (24).

- 24) lè-dʒilà *'replacement'*
 dzǔn *'crocodile'*
 lè-dʒìlò *'dignity'*
 dzórà *'firewood'*
 ñdzà *'intestine'*
 lè-dzè *'tooth'*

The following rule captures the distribution:

$$25) [dz] \rightarrow [dʒ] - \left[\begin{array}{c} V \\ +hi \end{array} \right]$$

[dʒ] is therefore an allophone of /dz/.

The rules in (23) and (25) can be collapsed as in (26).

- 26) P-rule 2: Palatalization

$$\left[\begin{array}{c} +ant \\ +cor \\ +stri \\ -del. rel. \end{array} \right] \rightarrow \left[\begin{array}{c} -ant \\ +hi \end{array} \right] / - \left[\begin{array}{c} V \\ +hi \end{array} \right]$$

According to this rule, [ts] and [dz] become [tʃ] and [dʒ] respectively when found before high vowels.

[ɲ] and [ŋ] are allophones of /ɲ/. [ŋ] occupies the root-medial and final positions whereas [ɲ] occurs in root-initial position. The table that follows shows their occurrence.

Sound	Root-initial	Root-medial	Root-final
ɲ	ɲâ 'claw' le-ɲà 'to tear'	-	-
ŋ	-	lè-ɲíŋô 'to suppose' lè-sìŋà 'to suit'	lè-sèŋ 'to collect' lè- tʃìŋ 'law'

Table 4: ɲ ~ ŋ Distribution

The following rule captures this distribution:

27) P-rule 3: Velarization

$$\begin{array}{|l} \text{-ant} \\ \text{+ cor} \\ \text{+ nas} \\ \text{+ hi} \end{array} \rightarrow [-\text{cor}] \left/ \begin{array}{l} \text{V_V} \\ \text{_ \#} \end{array} \right\}$$

This rule says that [ɲ] is realized as [ŋ] in final position or between two vowels, but as said above for [d] and [r], instances have been found where [ɲ] occurs between vowels. This is always at the beginning of a root when [ɲ] is preceded by an infinitive marker that has a CV structure. It confirms that the rule in (27) applies prior to the prefixation of the

infinitive marker to the root, in the same manner as shown in (21) above.

Consider this derivation.

28)	nâ	nɔŋ	lè-siŋà	lè-nà
	UR/ na	nɔŋ	le-siŋa	le-na /
	H L	L	L L	L L
Level 1 <i>UAC</i>	na ┆ ┆ H L	nɔŋ ┆ ┆ L	siŋa ┆ ┆ L	na ┆ ┆ L
<i>Tone Spread</i>	—	—	siŋa ┆ ┆ L	—
<i>velarization</i>	—	nɔŋ ┆ ┆ L	siŋa ┆ ┆ L	—
Level 2 <i>UAC</i>	—	—	le-siŋa ┆┆ ┆┆ L L	le-na ┆┆ ┆┆ L L
	PR[nâ	nɔŋ	lè-siŋà	lè-nà]

The Tone Spread rule applied in this derivation is discussed in section 3.2.2.2.

The glottal stop, [ʔ], and [k] are also in complementary distribution. While [k] occurs root-initially, [ʔ] occurs root-medially and finally. The table that follows demonstrates this distribution.

Sound	Root-initial	Root-medial	Root-final
K	lè-ké 'egg' kàlò 'root'	-	-
ʔ	-	lè-gwó'ó 'honey' lè-mú'ú 'jaw'	lè-só' 'to be intoxicated' là' 'horn'

Table 5: k ~ ʔ Distribution

The following rule captures this distribution:

29) P-rule 4: Glottalization

$$\begin{array}{|l}
 \text{-cont} \\
 \text{-son} \\
 \text{-ant} \\
 \text{-cor} \\
 \text{+hi} \\
 \text{-vd}
 \end{array}
 \rightarrow
 \begin{array}{|l}
 \text{+constri} \\
 \text{-hi}
 \end{array}
 / \left\{ \begin{array}{l} \text{v_v} \\ \text{_ \#} \end{array} \right\}$$

This rule says that [k] surfaces as [ʔ] in final position or between two vowels. The occurrence of [k] also mirrors that of [d] and [ɲ] as shown above.

More evidence that illustrate this alternation is gotten from other languages of Zone A80. Consider the imperative forms of the verb 'to come' in some of these languages.

Màkáa	Bìkélé	Mpòmpó	Njém	Gloss
Dzák	ntʃák	dzák	ntá'	'come'

Table 6: k ~ ' Distribution in some Zone A80 Languages

These data show that while [k] is maintained in some of these languages it has changed to ['] in Njém in the final position.

[h] and [s] are also considered to be allophones of the same phoneme. According to Beavon (2000: 2), [s] occurs root-initially while [h] occurs medially and finally. [h] is therefore an allophone of /s/. (Notice, though, that [s] has been found in the medial and final positions of two different roots (jèsè 'prow' and lè-mvùs 'grave' respectively). These two words seem to mitigate the analysis but they can be discarded, based upon the assumption that since words like these are not plentiful and no clear cut monomorphemic examples are known, they are borrowed words that have not completely undergone phonological adjustments to conform to the Njém structure.) Historical facts prove that during the migratory period, the Njém cohabited with the Bulu people for a very long time. In order to cover communication gaps the minority group, in this case the Njém, had to borrow words from the Bulu. A clear example is lè-mvùs from the Bulu word for grave, à-vùs.

The various cases of complementary distribution are summarized in the table that follows.

Phoneme	Allophone	Environment	Examples
d	r	root-medial position	/bùdúm/ [bùrúm] 'men'
		final position	/ḥgìd/ [ḥgìr] 'taboo'
	d	initial position	/dàlà/ [dàlà] 'pot'
		root-initial position	/lè-dì/ [lè-dì] 'to remain'
fs	tʃ	before [+hi] vowels	/tsíhó/ [tʃíhó] 'island'
	ts	elsewhere	/lè-tsénê/ [lè-tsénê] 'to change'
dz	dʒ	before [+hi] vowels	/lè-dzî/ [lè-dʒî] 'to request'
	dz	elsewhere	/lè-dzè/ [lè-dzè] 'tooth'
s	h	root-medial position	/lè-písô/ [lè-píhô] 'the last'
		final position	/lè-swòs/[lè-swòh] 'to greet'
	s	initial position	/sóm/ [sóm] 'worm'
		root-initial position	/lè-sòel/ [lè-sòel] 'to hide'
ɲ	ɲ	root-medial position	/sójɲó/ [sójɲó] 'well'
		final position	/sójɲ/ [sójɲ] 'father'
	ɲ	initial-position	/ɲâ/ [ɲâ] 'nail'
		root-initial position	/lè-ɲìɲò/ [lè-ɲìɲò] 'to assume'
k	ʔ	root-medial position	/lè-gwókó/ [lè-gwókʔ] 'honey'
		final position	/lè-sók/[lè-sókʔ] 'to be intoxicated'
	k	initial position	//kél/ [kél] 'sister'
		root-initial position	/lè-ké/ [lè-ké] 'egg'

Table 7: Complementary Distribution in Njém

2.1.4 Free Variation

[ʃ] and [s] are in free variation. This variation is observed from speaker to speaker as well as with the same speaker on different pronunciations of the same word. If the two sounds are used, speakers

often do not notice any change or they simply feel that a word is said in the two ways if they realize that the pronunciations are different. Some words in which any of the two sounds can occur are given in (30).

30)	séh	ʃéh	<i>'path'</i>
	ì-símsá	ì-ʃímsá	<i>'thought'</i>
	swòh	ʃwòh	<i>'lizard'</i>
	lè-sìm	lè-ʃìm	<i>'to run'</i>
	lè-síhlô	lè-ʃíhlô	<i>'to approach'</i>

More alternations that Njém sounds undergo are discussed later in section 2.6 (page 65).

2.1.5 Consonant Distribution

2.1.5.1 Root-Initial Consonants

A large number of the consonants occur in root-initial position. Table 8 shows root-initial consonants preceding some of the vowel phonemes (see section 2.2, page 46, for the vowels).

	i	ɪ	e	ɛ	a	æ	ɔ	o	U	u
p				lè-pèh to ressurrect	pàrà money				lè-pô to dig	
b	bí: quarter	lè-bɪl breast	lè-bè to see						búrú cap	búwà fear
t	tír animal				lè-tâ to be born ill			tòm stomach		
d	díbó stream		lè-dèn to seize		lè-dà to fetch		dòm war		dũ nose	
k			lè-ké egg	kél soeur	kán cloth	kèh parrot				kúbó chicken
g						lè-gæ' to arrest				gúmò place
kp	kpígí suddenly				kpán cocoa					
f	lè-fí to spill			lè-fè to shine						fúlú character
s	sílím scarf		sèb insect	sèhè story			són father			swo' lizard
ts	tʃí'í neck	tʃím cry								
dz	lè-dzílò dignity						dzórà firewood	dzó sleep	lè-dzũ to kill	
m						lè-mœl to be engaged				mùr person
n	lè-ní to enter			lè-nèr to paste		lè-nœl to inhume	nó such			nùm mouth
ɲ	lè-ɲíhò to suppose				ɲâ claw					
l	límà dream	lè-lî to warn			là' horn	lè-læ' to dirty				
w					lè-wàlà hour					wùnù peanut
j					jàná horse					

Table 8: Root-initial Consonants

2.1.5.2 Root-Medial Consonants

Several consonants occur in root-medial position. Table 9 shows root-medial consonants preceding some of the vowel phonemes.

	I	ɪ	e	ɛ	ɑ	æ	ɔ	o	U	u
b								díbo <i>stream</i>		
d					dzóra <i>firewood</i>				búró <i>cap</i>	mùrúm <i>man</i>
k	tʃí'í <i>neck</i>	mfí'í <i>purse</i>						lè-kó'ó <i>stone</i>		
g		kpígí <i>suddenly</i>			dúgá <i>cabinet</i>		mògò <i>group</i>	sígò <i>fire</i>		
s		dzìhí <i>bone</i>		sèhè <i>story</i>	mpáhá <i>parlour</i>		bóhó <i>seat</i>	tʃíhó <i>island</i>		
ts		tʃwítsén <i>star</i>								
m					límà <i>dream</i>			bùmò <i>fruit</i>		
n					kànà <i>story</i>			lè-minò <i>to absorb</i>		wùnù <i>peanut</i>
ɲ					jájá <i>horse</i>		sónó <i>well</i>	lè-ɲíḡò <i>to suppose</i>		
l				kpé'lé <i>sound</i>	lè-wàlà <i>hour</i>			lè-bílò <i>to become ill</i>		dzúlù <i>smoke</i>
w					lè-kùwà <i>spear</i>					
j					bùjà <i>length</i>					

Table 9: Root-medial Consonants

2.1.5.3 Root-Final Consonants

Only a few of the consonants occur in root-final position. The nasals, [m, n, and ŋ] occur in this position. Recall that [ŋ] is a realization of /ɲ/ in final position as shown above. The phonemes /d, k, and s/ also occur here but, as expected, are realized as [r, ' and h] respectively. The lateral, [l] can also occur here. These occurrences are common across languages. Nevertheless, the voiced bilabial stop, [b] also occurs here. Table 10 shows root-final consonants preceded by some of the vowel phonemes.

	i	ɪ	E	ɛ	a	u	U	o	ɔ	œ
b			sèb <i>insect</i>					dwôb <i>sky</i>		
d	tír <i>animal</i>			lè-nèr <i>to paste</i>		mùr <i>person</i>				
k					là' <i>horn</i>			swo' <i>lizard</i>		
s				lè-pèh <i>to resurrect</i>	lè-mwàh <i>to throw</i>	lè-ìnvùs <i>grave</i>				kèh <i>parrot</i>
m	sílim <i>scarf</i>	tʃím <i>cry</i>				nùm <i>mouth</i>	pùm <i>dust</i>			
n			le-dèn <i>to seize</i>		kán <i>cloth</i>					
ɲ			lè-ñtèŋ <i>to exaggerate</i>						sóŋ <i>father</i>	
l		lè-bíł <i>breast</i>		kél <i>soeur</i>						

Table 10: Root-final Consonants

These data demonstrate that only a few consonants can occupy the root-final position. As observed in many languages, there are heavy restrictions on which consonants may occur in syllable-final position, as opposed to those that occur in syllable-initial position. Given the proposal of syllable structure in terms of strong and weak positions, the argument Burquest (1998: 151) presents goes as follows: “Strong positions show themselves to be strong by allowing a large inventory of units to occur within them, while weak positions show themselves to be weak by having heavy restrictions on occurring segments.”

2.1.5.4 Consonant Clusters

The table that follows shows which consonants may occur in the onset position of a syllable when the preceding syllable ends in a coda (a hyphen in any gap means that a word cannot be found to complete it).

	b	D	g	s	l	r
b	-	-	-	-	lè-pjèblò <i>to make a gesture</i>	lè-bábrô <i>to bend</i>
d	ɲgwòrbà <i>bow</i>	-	mbòrgò <i>mud from animal skin</i>	-	-	-
k	lè-tʃí'bô <i>to go around</i>	-	-	sù'hò <i>shake (ideo.)</i>	lè-jé'lô <i>to teach</i>	gô'râ <i>tiredness</i>
s	lè-dwéhbâ <i>to be light</i>	-	-	-	lè-síhlô <i>to approach</i>	-
m	álòmbó <i>moon</i>	lè-pwòmdò <i>to caress</i>	-	lè-símʃâ <i>to remember</i>	lè-kàmlò <i>to prohibit</i>	lè-dzémrê <i>to oblige</i>
n	lè-gónbâ <i>to descend</i>	-	mbwèngè <i>swamp mud</i>	-	-	-
ɲ	-	-	-	-	lè-táɲlô <i>to recount</i>	-

Table 11: Root-medial Consonant Clusters (C.C)

From the phonemic consonants identified, the following phonemic chart can be established.

p		t		k	kp
b		d		g	gb
m		n	ɲ		
	f	s			
	v				
		ts			
		dz			
		l			
w			j		

Table 12: Phonemic Consonants

The section that follows deals with the vowels.

2.2 Vowels

Vowels are sounds produced with no obstruction to the airstream within the vocal tract. This permits the free flow of air through this tract. They are usually the most important parts of a syllable because they carry such intonational features as stress and pitch. Because of this they are known as the peak of the syllable. Njém has a five-height vowel

system, which is common in African languages (Casali 2001b: 5). While presenting vowel systems in African languages Casali (2001a: 3) mentions that five-height systems usually have “nine or ten vowels (in a few cases, more!).” Njém has 10 phonemic vowels, shown in the following table.

i			u
ɪ			ʊ
e			o
ɛ	œ		ɔ
		a	

Table 13: Phonemic Vowels

2.2.1 The Front Vowels

These vowels may occur in both open and closed syllables, as shown in the following data.

- 31) sí *‘ground’*
sín *‘jealousy’*
- dʒíhí *‘bone’*
tʃìr *‘noise’*
- lè-dè *‘to eat’*
lè-dèn *‘to seize’*
- lè-sê *‘to work’*
lè-sèŋ *‘to unit’*
- lè-lô: *‘to insult’*
lè-lè’ *‘to dirty’*

/i/ contrasts with /ɪ/, as shown in the following words.

- 32) lè-lî *'to relax'*
lè-lî *'to warn'*

/e/ contrasts with /i/, as in (33).

- 33) ìnpwê *'dog'*
ìnpwí *'white hair'*

/ɛ/ contrasts with /e/ as shown in the following minimal pairs.

- 34) lè-kjêl *'to reject'*
lè-kjèl *'to suspend'*
- lè-dzè *'tooth'*
lè-dzè' *'to be tired'*

/œ/ contrasts with /ɛ/ as demonstrated in (35).

- 35) lè-sœŋ *'to site'*
lè-sêŋ *'to unite'*
- lè-mœl *'to be engaged'*
lè-mêr *'to seize'*

2.2.2 The Back Vowels

They may also occur in both open and closed syllables. Notice that the central vowel, [a], is [+bk].

- 36) wùnù *'peanut'*
nùm *'mouth'*
- bùjà *'length'*
pùm *'dust'*

dzó	<i>'laugh'</i>
dzól	<i>'mucus'</i>
sónó	<i>'well'</i>
són	<i>'father'</i>
lè-sâ	<i>'to cause'</i>
lè-sàm	<i>'to spoil'</i>

/u/ contrasts with /U/ as shown in the following minimal pairs.

37)	lè-lû	<i>'to disturb'</i>
	lè-lû	<i>'to bite'</i>
	lè-dzû	<i>'to suck'</i>
	lè-dzû	<i>'to kill'</i>
	pùm	<i>'dust'</i>
	bún	<i>'tilapia'</i>

/u/ also contrasts with /i/ as shown below.

38)	lè-nû	<i>'to drink'</i>
	lè-nî	<i>'to enter'</i>
	lè-lû	<i>'to disturb'</i>
	lè-lî	<i>'to relax'</i>
	lè- dzû	<i>'to suck'</i>
	lè- dzî	<i>'to ask'</i>

/o/ contrasts with /u/ as shown in the minimal pair in (39).

39)	lè-dzò	<i>'to laugh'</i>
	lè-dzû	<i>'to suck'</i>

/o/ also contrasts with /U/.

- 40) lè-bò *'to rot'*
lè-bû *'to break (firewood)'*

/ɔ/ contrasts with /o/.

- 41) lè-lwôl *'to peel'*
lè-lwó' *'to fish'*
- lè-twô' *'to abandon'*
lè-twôb *'to leave unceremoniously'*

/a/ contrasts with /ɛ/, shown in (42) and with /o/, as shown in (43).

- 42) lè-pwâl *'to go out'*
lè-pwêl *'to chase'*
- 43) lè-tâ *'to inherit'*
lè-tô *'to go'*

2.2.3 Vowel Distribution

In this part, permitted vowel combinations are presented. Table 14 indicates which vowels may occur in a two-syllable root when the first syllable lacks a coda and the second has an onset.

	i	ɪ	e	ɛ	ɑ	u	U	o	ɔ	æ
i								tʃíhó <i>island</i>	ntímò <i>east</i>	
ɪ									-	
e								bè-ɲèmó <i>indulgence</i>	-	
ɛ					lè-sjèlà <i>to fade</i>			mè-kèbò <i>reason</i>	-	
ɑ					bàmà <i>prostitution</i>			dzáló <i>vanity</i>	-	
u					kùrà <i>blow</i>			lúmó <i>maggot</i>		
U					mpólá <i>indebtedness</i>		bì-kùḡṣ <i>deception</i>			
o					mpòmá <i>meeting</i>				-	
ɔ	-	mòní <i>money (borrow.)</i>	-	-	lè-lòmà <i>to rub</i>	-	bònṣ <i>air</i>	lè-tòndò <i>to slide</i>	wólò <i>cantin</i>	-
æ	-	-	-	-	bàerá <i>false accusation</i>	-	-	-	-	-

Table 14: Sequences of Vowels in Roots (V.CV)

Table 15 shows which vowels may occur in a two-syllable root when the first syllable lacks a coda and the second an onset.

	i	ɪ	e	ɛ	ɑ	u	U	o	ɔ	æ
i										
ɪ					lè-mbìà <i>good(n)</i>			lè-bíò <i>to be well cooked</i>	-	
e									-	
ɛ									-	
ɑ									-	
u										
U									ɲúò <i>serpent</i>	
o									-	
ɔ	-									-
æ	-	-	-	-		-	-	-	-	-

Table 15: Sequences of Vowels in Roots (V 1.V2)

2.2.4 Long Vowels

Vowel length is distinctive. The long vowels occur in open syllables. Contrast between the short and long vowels is shown in table 16.

	short	long
i	le-bî 'to beat'	bí: 'quarter'
ɪ	lè-lî 'to seize'	le-lî: 'to instruct'
e	lè-bè 'to plant'	lè-bè: 'to see'
ɛ	lè-dzè 'to give'	lè-dzè: 'to sing'
ɑ	lè-sâ 'to do'	le-sâ: 'to look for'
u	le-dû 'to follow'	dú: 'noise'
ʊ	dũ 'nose'	dũ: 'extra part'
o	dzó 'sleep'	dzó: 'bed'
ɔ	nó 'such'	nó: 'they'

Table 16: Short and Long Vowels

The section that follows presents the tonal system.

2.3 Tones

Tone refers to the abstract entities in terms of which the pitch pattern of utterances can be understood (Kenstowicz and Kisseberth 1979: 265). In tone languages, pitch has a lexical function, that is, the pitch on which the syllables of a word are said can bring about a difference in the meaning of words that are otherwise identical. Njém, being a tone language, manifests a direct correspondence to the two-tone system reconstructed for Proto-Bantu (PB) (Hyman and Byarushengo 1984: 53). Underlyingly, only the high and low tones exist in this language. What we observe on the surface (downstepped or upstepped high tones and upstepped low tones) is due to different phonological and/or tonological processes that are operational in the language. These are discussed in detail in chapters 4 and 5. Pairs of words, which show the contrast between high and low tones, are given in (44).

44)	dú	<i>'lap'</i>
	dù	<i>'nose'</i>
	dzó	<i>'sleep'</i>
	dzò	<i>'laugh'</i>
	bán	<i>'surety'</i>
	bàn	<i>'tilapia'</i>
	kár	<i>'car'</i>
	kàr	<i>'wasp'</i>

dʒwéhé	‘sun’
dʒwèhè	‘bone’

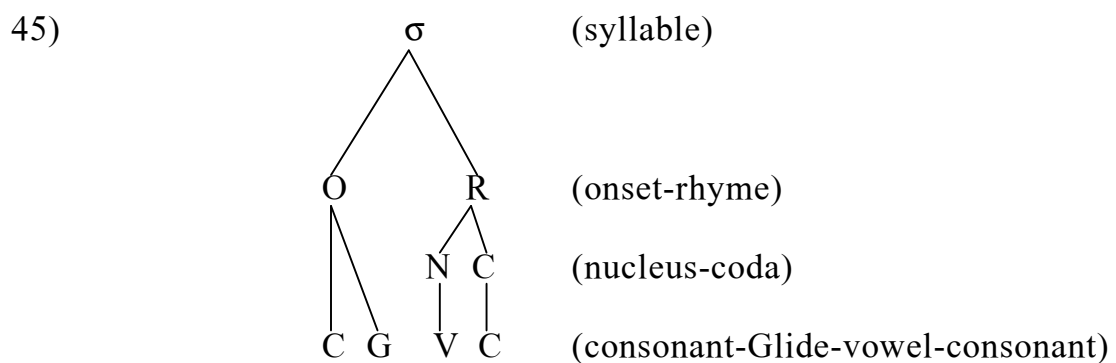
These data show that because tone has the same contrastive value as consonants and vowels, a change in the pitch of a syllable leads to a change in its meaning.

Contour tones also exist in Njém but are treated as sequences of level tones. The analysis that contour tones are separate level tones put together has been posited more generally for African languages. Yip (1989: 149-150) for example describes contour tones in African languages as “tone clusters” which result from associating two tonal root nodes. As stated by Yip (2002: 133), contour tones in Njém “are sequences of level tones, fairly rare and often limited to the ends of words or to heavy syllables”. Some languages with underlying level tones even seem to show a preference for contour tones over level tones in the output. From a theoretical perspective, this analysis is also favoured. This explains why Goldsmith (1990: 39-40) says “the possibility of many-to-one association between one tier and another opens up the possibility of treating rising and falling tones as sequences of level tones...associated with a single vowel.”

Even though tones are shown in this work to be associated directly to segments, it should be borne in mind that the tone-bearing unit in this language is the syllable because both light mono-moraic and heavy bi-moraic syllables can bear a similar number of tones. As mentioned above, a detailed analysis of the tone system is presented in chapter 4 and 5.

2.4 Canonical Syllable Structure

Burquest (1998: 147) says ‘the syllable level is the phonological level immediately above the level of the segment; it is a structural unit into which segmental phonemes are distributed.’ The syllable mirrors the notion of the rhythm wave (Pike 1967: 307), with an onset, peak, and coda. The structure of a syllable is shown in (45).



Njém sounds can combine in any of the following canonical syllable structures.

46)	N	ɲ-kwɔ̃l	'snail'
	V	í	'in'
	CV	nɛ	'with'
	CGV	pjô	'shed (N)'
	CVC	sóŋ	'father'
	CGVC	kwór	'village'

The morpheme structure of prefixes is either C-, V- or CV-, shown in (47a). Roots are either monosyllabic or disyllabic, as can be seen in (47b). Words also have a monosyllabic or disyllabic morpheme structure as shown in (47c).

47a)	d-ɔ̃m	'war'
	CL5-war	
	ì-símsá	'thought'
	CL11-thought	
	bì-bàn	'epics'
	CL8-epic	
b)	lè-kí	'egg'
	CL5-egg	
	m-ùrúm	'man'
	CL1-man	
	lè-jàlà	'response'
	CL5-response	

- c) lá ‘*glass*’
 búwà ‘*fear(N)*’
 kàlò ‘*root*’

After this presentation of the segmental and supra-segmental systems, the section that follows discusses the features used in representing the segments.

2.5 Features

Features allow for a systematic organization of phonological matrices. Through an understanding of these features, we are able to recognize that phonological segments occur in sets or classes. Segments which comprise one of these classes often function together as a set, either in modifying other sounds, or in being modified in some environments. They also serve in pointing out the phonetic plausibility of phonological patterns found in a language. They also help in distinguishing sounds very clearly, in that even if segments belong to the same natural class of sounds, no two of them can have the same value of features used in their description. Many different feature systems have been proposed by generative phonologists (Halle 1992, Kenstowicz 1994). Because of their widespread familiarity and use, standard

generative features currently constitute a useful framework for describing sounds. However, in order to avoid ambiguities, “it is perfectly acceptable to use essentially the same labels less formally, without the plus and minus signs” (Casali 2001b: 4). Sagey (1986) displays a similar view by positing both binary and unary features. Yip (2002: 61) thinks that “the question of whether features are binary or unary remains unsettled. In her view, if a feature is binary it can be the case that only one value is present underlyingly, and that the opposing value is inserted late, or not at all”. This matter can be settled by assuming that whatever feature system is chosen should be used consistently. The binary system is used in this study. This discussion on features is based on Kenstowicz (1994).

2.5.1 Features Used for Consonants

The following features have been used to describe the consonants of Njém in a distinct manner.

Consonantal: The feature *consonantal* has been used to classify all sounds that are produced with a drastic stricture in the supralaryngeal cavity. Sounds in this class have been described as [consonantal] and those excluded as [-consonantal]. This means that all Njém consonants are [+cons] and all vowels and glides are [-cons].

Syllabic: This feature is used to describe sounds that function as the nucleus or peak of a syllable. When nasals stand as the nucleus or peak of syllables, they are referred to as syllabic nasals. In Njém, syllabic nasals and vowels, are [+syll] whereas other consonants are [-syll].

Sonorant: This feature is used to describe sounds, which have only the degree of stricture that does not disrupt airflow enough to be able to inhibit voicing. If the closure is extreme enough, as with plosives, affricates and fricatives, the cavity behind the closure in the mouth quickly fills with the air involved in the production of the sound. Soon no more air can pass through the glottis and voicing cannot be maintained. In Njém, liquids, nasals, semivowels and vowels are [+son] whereas obstruents are [-son].

Nasal: This feature describes sounds produced with the velum lowered to allow the passage of air through the nasal cavity. All the Njém nasal consonants are [+nasal] and all other sounds are [-nasal].

Anterior: This feature groups all sounds produced from the palato-alveolar region up to the bilabials. Labial and alveolar consonants in Njém are described as [+ant] while the rest of the sounds are [-ant].

Coronal: This feature describes sounds produced with the blade of the tongue raised from its neutral position towards the hard palate. It has

therefore been used to distinguish alveolar, and palatal sounds in Njém that are [+cor] from other sounds that are said to be [-cor].

Continuant: Sounds that do not have a closure in the oral cavity sufficient to stop airflow through it are described as continuant. Njém fricatives and liquids are [+cont] while plosives, affricates and nasals are [-cont].

Strident: A considerable amount of noise is involved in the articulation of some fricatives and affricates. Labiodental, alveolar, alveopalatal and uvular fricatives and affricates in general are [+stri] while the rest of the sounds are [-stri]. It has been used to distinguish affricates from stops in Njém.

Lateral: Sounds that are [+lat] are made with air passing over the sides of the tongue. This is the case in Njém for [l]. It should be mentioned that this feature is generally relevant only for distinguishing among liquids. Thus *r*-like sounds are the important [-lat] segments.

Constricted glottis: This feature distinguishes sounds produced with a constriction at the level of the glottis from those produced without such a constriction. The glottal stop in Njém is described as [+constri] and all other sounds as [-constri].

Delayed Release: During the production of some sounds, the release of a total constriction is slowed so that a fricative is formed after the stop

portion. This feature has been used to distinguish affricates from fricatives in Njém.

Voice: This feature has been used to distinguish sounds produced with a vibration of the vocal folds from those produced without such a vibration.

All vowels, and voiced consonants are therefore [+vd] while the rest of the consonants are [-vd].

2.5.2 Features Used for Vowels

Syllabic: As said above, this feature describes sounds that can function as the peak of a syllable. Such sounds in Njém include all the vowels and the syllabic nasals. These are said to be [+syll] while the rest of the sounds are [-syll].

High: This feature has been used to differentiate sounds produced with the body of the tongue raised beyond the neutral position from those produced without such a raising. The high vowels are said to be [+high] whereas the rest of the sounds are [-high].

Back: This feature has been used to describe all sounds articulated by retracting the tongue body from the reference point. These include the central and back vowels that are considered [+back] while the front vowels are [-back].

Round: Njém sounds made with the lips rounded and/or protruded are [+round] whereas those produced with the lips in a neutral or spread position are [-round].

ATR: This feature has been used to describe vowels that are made by pushing forward the tongue root, expanding the resonating chamber of the pharynx and possibly pushing the tongue body upward. Such vowels are said to be [+ATR] whereas the others are [-ATR].

For more on features see Kenstowicz (1994) and Burquest (1998).

2.5.3 Consonant Feature Matrix

	syll	cons	ant	cor	nas	cont	son	stri	lat	constri	Del.rel	voice
p	-	+	+	-	-	-	-	-	-	-	-	-
b	-	+	+	-	-	-	-	-	-	-	-	+
t	-	+	+	+	-	-	-	-	-	-	-	-
d	-	+	+	+	-	-	-	-	-	-	-	+
k	-	+	-	-	-	-	-	-	-	-	-	-
g	-	+	-	-	-	-	-	-	-	-	-	+
'	-	+	-	-	-	-	-	-	-	+	-	-
kp	-	+	+	-	-	-	-	-	-	-	-	-
gb	-	+	+	-	-	-	-	-	-	-	-	+
m	-	+	+	-	+	-	+	-	-	-	-	+
n	-	+	+	+	+	-	+	-	-	-	-	+
ɲ	-	+	-	+	+	-	+	-	-	-	-	+
ŋ	-	+	-	-	+	-	+	-	-	-	-	+
Ñ	+	-	±	±	+	-	+	-	-	-	-	+
f	-	+	+	-	-	+	-	+	-	-	-	-
v	-	+	+	-	-	+	-	+	-	-	-	+
s	-	+	+	+	-	+	-	+	-	-	-	-
ʃ	-	+	-	+	-	+	-	+	-	-	-	-
h	-	+	-	-	-	+	-	+	-	-	-	-

ts	-	+	+	+	-	-	-	+	-	-	+	-
dz	-	+	+	+	-	-	-	+	-	-	+	+
tʃ	-	+	-	+	-	-	-	+	-	-	+	-
dʒ	-	+	-	+	-	-	-	+	-	-	+	+
l	-	+	+	+	-	-	+	-	+	-	-	+
r	-	+	+	+	-	-	+	-	-	-	-	+
w	-	-	+	-	-	+	+	-	-	-	-	+
j	-	-	-	+	-	+	+	-	-	-	-	+

Table 17: Consonant Feature Matrix

2.5.4 Vowel Feature Matrix

	syllabic	high	back	round	ATR
i	+	+	-	-	+
I	+	+	-	-	-
e	+	-	-	-	+
ɛ	+	-	-	-	-
œ	+	-	-	+	-
a	+	-	+	-	-
ɔ	+	-	+	+	-
o	+	-	+	+	+
U	+	+	+	+	-
u	+	+	+	+	+

Table 18: Vowel Feature Matrix

2.6 Phonological Processes

2.6.1 Consonants

The phonological processes that Njém consonant phonemes undergo are discussed in this part.

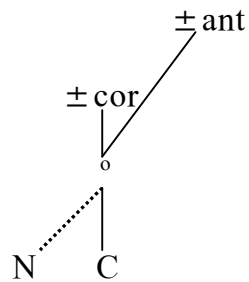
2.6.1.1 Nasal Assimilation

In an assimilation process, a sound is modified in order to make it more similar to some other sound in its neighbourhood (Katamba 1989). This often results in a smoother, more effortless, more economical transition from one sound to another. One type of assimilation is that in which a consonant takes up the features of another consonant. It is very common in languages to find a nasal being homorganic with the following consonant. This is ‘one of the most common processes found in the languages of the world’ (Burquest 1998: 4). The nasals in Njém assimilate to the place of articulation of the consonant they precede. The nasal is close enough to the stop for assimilation to occur. This follows the *locality* principle (Archangeli and Pulleyblank 1994) that depends on both a tier-internal notion of ‘adjacency’ and a cross-tier notion of ‘precedence’. The examples that follow demonstrate how nasal assimilation occurs.

48)	̀mp̄n	<i>'disciple'</i>
	̀mpáhá	<i>'parlour'</i>
	̀mbô	<i>'arm'</i>
	̀mbê	<i>'house'</i>
	̀nsù'	<i>'elephant'</i>
	̀nsà	<i>'hunger'</i>
	̀ndzà	<i>'intestine'</i>
	̀lè-̀ndámâ	<i>'to spoil'</i>
	̀̀kùrú	<i>'buttock'</i>
	̀̀kànà	<i>'town'</i>
	̀̀gìr	<i>'taboo'</i>
	̀̀kùl	<i>'force'</i>

These data demonstrate that the nasal takes the place of articulation of the consonant it precedes. The following rule can be formulated to capture this process.

49) P-rule 5: Nasal Assimilation



The following derivation illustrates the application of nasal assimilation.

50)	̀mpáhá	̀mbê	̀nsà	̀̀kúru
	UR/ N-paha	N-be	N-sa	N-kuru /
<i>Nasal Assimilation</i>	m-paha	m-be	n-sa	ŋ-kuru
<i>Tone rules</i>	̀̀mpáhá	̀̀mbê	̀̀nsà	̀̀̀kúru
	PR [̀̀mpáhá	̀̀mbê	̀̀nsà	̀̀̀kúru]

There is no attempt to account for tone in this section. This will be done in the subsequent chapters notably chapter 4 and 5.

2.6.1.2 Devoicing

The environment in which a consonant will occur often influences the behaviour of the glottis during its production. The articulatory effort is not only conditioned by the organs of production but also by the phonetic product itself. An interaction between voiced and voiceless consonants is common across languages (cf. Kenstowicz and Kisseberth 1979: 46). In Njém, the voiced bilabial and alveolar stops alternate with their voiceless counterparts. Consider the alternations shown in the data in (51).

51) Singulars	Plurals	Gloss
díbó	mèṅ-tíbó	'stream'
dò'ò	mèṅ-tò'ò	'room'
bùmò	mèṅ-pùmò	'fruit'
būrú	mèṅ-pūrú	'cap'
būhó	mèṅ-pūhó	'seat'

The singular forms of the nouns occur with the voiced stops while the plural forms occur with the voiceless stops. This distribution is, however, the reverse of the widespread process affecting NC, which is post-nasal voicing, summarised in Hyman (2003: 50). In order to account for this alternation it can be assumed that the voiceless stops change to their voiced counterparts when they occur in word-initial position. However, given that a typical environment for voicing to occur would be between two vowels, this counterintuitive alternation can be related to a historical process involving now lost vowels, which caused the change and left the voiced stops at word-initial position. Some neighbouring languages provide evidence that seems to support this claim. Consider the examples in the following table.

Màkáá	Mpòmó	Bikélé	Njém	Gloss
bùmá	bûm	bùmò	bùmò	'fruit'
ì-bùmá	ì-bûm	ìm-pùmò	mèm-pùmò	'fruits'
tùní	ì-tùn	dó'ó	dó'ó	'room'
ì-tùní	bì-tùn	mè-tó'ó	mèn-tó'ó	'rooms'

Table 19: Voicing in some Zone A80 Languages

This table demonstrates that in some of these languages the stops occur in between vowels. Being a typical environment for voicing it therefore occurred in Njém, as described above. The vowels were deleted later in a separate process, leaving the stop in initial position.

This explanation is problematic for some reasons. The first problem is that of having to account for a synchronic fact using historical evidence. This leads one to make claims that are not apparent enough. For example, in order to have the environment for voicing to occur a vowel has to be inserted and after voicing has occurred the vowel is deleted. The second reason is that historically these stops were voiced as in a word like *stream* shown in Proto-Bantu to occur with [d], and a synchronic explanation should therefore be able to reflect this.

Another assumption would then be to say that the voiced stops are devoiced when they occur after the nasals. This claim, which is not

phonetically plausible, is easily discarded by data that show that both the voiced and voiceless stops can occur after a nasal. Consider the following examples.

52) ñpún	<i>'disciple'</i>
ñbê	<i>'house'</i>
ñtámà	<i>'pepper'</i>
lè-ñdámâ	<i>'to spoil'</i>
ñkànà	<i>'town'</i>
ñgìr	<i>'taboo'</i>

Since both of them occur after the nasals it cannot be the case that devoicing takes place when the voiced stops are preceded by a nasal.

Another possibility suggested by Ngessimo Mutaka (personal communication) is to consider that mèn- is accented. It should be mentioned that accent is associated with high tone and/or voicelessness in languages with a residual accentual system. Since mèn- is accented, it therefore causes the voiced stops that follow it to become voiceless. The problem with this alternative is that prefixes are not usually accented. As demonstrated in section 3.1.3, mèn- is a class 6 prefix that marks the plural of class 9 nouns and so like other noun prefixes in Njém it cannot be accented.

The foregoing discussion suggests that the alternations cannot be clearly explained as either voicing or devoicing. A more plausible alternative would be to treat the words independently by setting up separate underlying forms for them. The voiced stops would be posited underlyingly for the singulars while the voiceless stops are posited for the plurals.

For an understanding of how this works, follow the derivation in (53).

53)	díbó	mèn-tíbó	bùmò	mèm-pùmò
	UR/ díbo	meN-tibo	bumo	meN-pumo/
<i>Nasal Ass.</i>	—	men-tibo	—	mem-pumo
<i>Tone rules</i>	díbó	mèn-tíbó	bùmò	mèm-pùmò
	PR[díbó	mèn-tíbó	bùmò	mèm-pùmò]

2.6.1.3 Irregular Prefixes

In a number of Bantu languages some irregular prefixes occur. In Njém they occur in class 5. This is shown in the data that follow.

54)	singular	Plural	Gloss
	dʒ-jô	m-jô	'name'
	dz-órà	mè-lórà	'firewood'
	dʒ-ínò	m-pínò	'finger'

It should be mentioned that these irregular prefixes occur in most of the languages in the Makaa-Njem group, as shown in the table below.

Màkàa	Bìkélé	Mpòmpó	Njém	Gloss
dz-ínò	d-ínò	díl	dʒ-jô	'name'
m-ínò	m-ínò	ì-díl	m-jô	'names'
ntsàgà	lé	dzórá	dz-órà	'firewood'
ì -ntsàgà	bì-lé	ì-dzóra	mè-lórà	'firewoods'
ɲ-ìnó	j-ìnó	dʒú	dʒ-ínò	'finger'
m-pìnó	m-pìnó	ì-dʒú	m-pínò	'fingers'

Table 20: Irregular Prefixes in some Zone A80 Languages

These irregular prefixes can be accounted for, in Njém, by the independently motivated rule of palatalization formulated above. The alternations in the roots can be explained by assuming that [l] and [p] are

deleted when the nouns occur in the singular form, as the following rules show:

55) P-rule 6: l-deletion

$$[+lat] \rightarrow [\emptyset] / \left[\begin{array}{c} +ant \\ +cor \\ +stri \\ -del. rel. \\ +vd \end{array} \right] _$$

This rule says that the lateral is deleted when it occurs after the voiced alveolar affricate.

56) P-rule 7: p-deletion

$$\left[\begin{array}{c} +ant \\ -cor \\ -cont \\ -son \\ -vd \end{array} \right] \rightarrow [\emptyset] / \left[\begin{array}{c} +cor \\ +stri \\ -del. rel. \\ +vd \end{array} \right] _$$

This rule states that the voiceless bilabial stop is deleted when it occurs after the voiced alveolar affricate. The data in (54) can therefore be derived as follows.

57)	dz-órà	mè-lórà	dʒ-ínò	m-pínò
	UR/ dz-lɔra	mə-lɔra	dz-pino	m-pino /
<i>l-deletion</i>	dz-ɔra	—	—	—
<i>p-deletion</i>	—	—	dz-ino	—
<i>palatalization</i>	—	—	dʒ-ino	—
<i>Tone rules</i>	dz-órà	mè-lórà	dʒ-ínò	m-pínò
	PR[dz-órà	mè-lórà	dʒ-ínò	m-pínò]

2.6.2 Vowels

In this part, the phonological processes that vowel phonemes undergo are discussed.

2.6.2.1 Devocalization

Generally, in languages, in at least some environments, the consonants and the vowels interact. In certain cases, the vowels are influenced by the consonants. In some others, vowels can influence the behaviour of other vowels. When vowels change to glides, they are said to have devocalized. This is a common phenomenon in Cameroonian Bantu languages (cf. Ngwa 1996, Akumbu 1999, Kenmogne 2000, etc.).

The high vowels of a sequence of two vowels (usually V1 in Njém) often devocalize. The back (+round) vowels usually labialize while the front (-back) vowels palatalize. It seems that devocalization occurs in order to maintain the canonical CV structure of this language that allows C(G)V(C) not C(V)V(C). Consider the following data.

58a)	kwò̀n	<i>'skin'</i>
	kwún	<i>'tail'</i>
	mwân	<i>'child'</i>
	̀mpwê	<i>'dog'</i>
b)	mjén	<i>'morning'</i>
	bè-bjéh	<i>'all'</i>
	pjô	<i>'shed (n)'</i>
	lè-bjèn	<i>'to refuse'</i>

The fact that some vowels occur with contour tones whereas others occur with level tones makes it possible to interpret the glides as being derived from vowels. Since the contour tones occur only in the vicinity of vowels preceded by the glides, it is logical to consider these glides as underlying vowels whose tones dock on vowels after devocalization. This can be seen in the following data.

59a) kwòṅ /kùṅ/ 'skin'
 kwún /kúún/ 'tail'
 mwân /múàn/ 'child'
 òpwê /òpùè/ 'dog'

b) mjén /míén/ 'morning'
 bè-bjéh /bè-bíés/ 'all'
 pjô /píò/ 'shed (n)'
 lè-bjèn /lè-bièn/ 'to refuse'

The following rule describes the process of devocalization:

60) P-rule 8: Devocalization (postlexical)

$$\begin{bmatrix} + \text{syll} \\ - \text{cons} \\ + \text{high} \end{bmatrix} \rightarrow [-\text{syll}] / _ \begin{bmatrix} + \text{syll} \\ - \text{cons} \end{bmatrix}$$

This rule says that high vowels are devocalized whenever they are immediately followed by other vowels, as shown in the following derivation.

61)	kwòn	mwân	mjén	pjô
	UR/ kuɔn	muan	miɛn	pio /
<i>Devocalization</i>	kwɔn	mwan	mjen	pjo
<i>Tone rules</i>	kwòn	mwân	mjén	pjô
	PR [kwòn	mwân	mjén	pjô]

2.6.2.2 Vowel Elision

Vowel elision or deletion of a vowel occurs when a word that begins with a vowel is added after another word that ends with a vowel. This often creates a sequence of two vowels which is not permissible across a word boundary. It has been found that when two vowels come together in hiatus in Njém, they produce such a sequence. In order to avoid it, one of the vowels is deleted. Consider the data that follow.

62)	nè kúmá with wealth	/nè # ì-kúmá/	'with wealth'
	mì-símsá c4-thought	/mì # ì-símsá/	'thoughts'
	nè kúrgá with ill-luck	/nè # ì-kúrgá/	'with ill-luck'

In these data the prefix vowel [i] of class 11 is deleted. It is considered that this happens because it occurs after another vowel. This means that because a sequence of two vowels across words is not permissible the second of these vowels is deleted. The following phonological rule can be formulated to capture this deletion process.

63) P-rule 9: Vowel Elision (postlexical)

$$\begin{bmatrix} + \text{syll} \\ - \text{cons} \end{bmatrix} \rightarrow [\emptyset] / \begin{bmatrix} + \text{syll} \\ - \text{cons} \end{bmatrix} \# _$$

This rule says that a vowel is deleted when it occurs after another vowel in the vicinity of a word boundary. The word boundary is crucial in this rule because in this environment, it is the second vowel that is deleted as opposed to the first in the vicinity of a morpheme boundary. Consider the following set of data that illustrates vowel elision in the context of a morpheme boundary.

- 64) $\text{n}\check{\text{a}} \text{ b}\check{\text{i}} \text{ s}\acute{\text{a}}:$ / $\text{n}\check{\text{e}} + \acute{\text{a}} + \text{b}\check{\text{i}} \# \text{s}\acute{\text{a}}:$ / ‘(s)he searched’
 3s.P2 PST search.FL
- $\text{g}\check{\text{a}} \text{ b}\grave{\text{a}} \text{ d}\text{z}\text{j}\acute{\text{e}}\text{b}$ / $\text{g}\check{\text{u}} + \acute{\text{a}} + \text{b}\grave{\text{a}} \# \text{d}\text{z}\acute{\text{i}}\text{e}\text{b}$ / ‘you did not call’
 2s.P2 NEG call.FL
- $\text{n}\grave{\text{e}} \text{ b}\grave{\text{a}}\text{'l}\grave{\text{o}}$ / $\text{n}\grave{\text{e}} + \grave{\text{e}} \# \text{b}\grave{\text{a}}\text{'l}\grave{\text{o}}$ / ‘let him double’
 3s.HOR double.FL

Vowel deletion also occurs in these data. Worth noticing though is the fact that in these data, it is V1 that is deleted rather than V2, as demonstrated above. A similar process occurs in neighbouring Makaa when the subject marker is followed by a vowel-initial tense marker (Heath 2003: 337). It is probably the case that in these phonological words the pronouns are clitics. Similarly a sequence of two vowels is not accepted across a morpheme boundary in Njém. To account for this deletion therefore it has been assumed that across morpheme boundaries, it is V1 that is deleted as opposed to the deletion of V2 across word boundaries. The rule that follows illustrates how this process works.

65) P-rule 10: Vowel Elision 2 (lexical)

$$\begin{bmatrix} +\text{syll} \\ -\text{cons} \end{bmatrix} \rightarrow [\emptyset] / _ + \begin{bmatrix} +\text{syll} \\ -\text{cons} \end{bmatrix}$$

According to this rule, in a sequence of two vowels across morpheme boundary the first is deleted. The following derivation illustrates how these rules work.

66)	mì-símsá	Gǎ bà dzjêb
	UR/ m ₁ # 1-simsa	g _U + a + ba # dzj ₁ eb /
	<i>Vowel Elision 2</i> _____	g + a + ba # dzj ₁ eb

<i>Vowel Elision</i>	m1 # s1msa	————
<i>Devocalization</i>	————	ga + ba #dzjeb
<i>Tone rules</i>	mì-símsá	Gǎ bà dzjêb
	PR[mì-símsá	Gǎ bà dzjêb]

2.6.2.3 Vowel Feature Spread

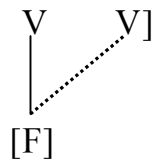
As is the case in some languages, a vowel may spread in a given environment to convey a certain meaning. In Njém, the root vowel spreads onto a featureless vowel in at least two contexts. Spreading occurs if the featureless vowel is the focus marker or if it is a marker of the imperative (for a fuller discussion of the phonology of the imperative, see section 5.4). The following data demonstrate vowel spread in the two contexts.

67a)	swô' ó	'lizard'
	lizard FOC	
	mpwê é	'dog'
	dog FOC	
	pùmà á	'get up'
	get up FOC	

	tóé'écé		'pick (IMP)'
	pé'écé		'verify (IMP)'
b)	bè-tír	í	'animal'
	c2-animal	FOC	
	ḡkùl	í	'force'
	force	FOC	
	ḡsũm	í	'hunt'
	hunt	FOC	
	tʃì'í		'live (IMP)'

The data in (a) can be accounted for in an uncomplicated manner. The root vowel spreads its features onto the V-slot that follows it as shown in (68).

68) P-rule 11: Vowel Feature Spread

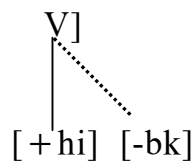


According to this rule, a vowel spreads its features onto the featureless vowel that occurs word-finally.

The data in (b) need further explanation. Whereas each non-high vowel in (a) spreads, spreading from the high vowels in (b) consistently yields the front-high vowel [i]. One could be tempted to think that the

focus marker or the marker of the imperative is underlyingly /i/ and that it surfaces as [i] after high vowels but assimilates to the phonetic qualities of each non-high vowel when it occurs after them. However, it is straightforward to assume that the underlying vowel of these markers is a featureless vowel and that it derives its features through spreading. When spreading originates from a high vowel, it is followed by the assignment of another (default) feature [-back], as stated in the following rule.

69) P-rule 12: [-back] Assignment



This rule assigns the feature [-bk] to a word-final [+hi] vowel.

In addition to the previously postulated rules of sonorization, glottalization, palatalization, nasal assimilation, and devocalisation, vowel feature spread, and [-back] assignment can be used to account for these data. Consider the following derivation:

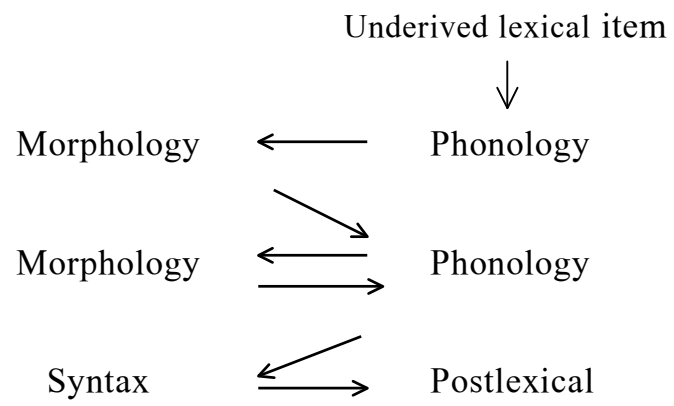
70)	bè-tírí	tʃì'í	gwà'á	pé'é	ɲkùlí
	UR/ be-tɪd + V	tsɪk + V	guak + V	pɛk + V	Nkul + V/
<i>Nasal Ass.</i>	—	—	—	—	ɲkul + V
<i>Sonorization</i>	be-tir + V	—	—	—	—
<i>Palatalization</i>	—	tʃɪk + V	—	—	—
<i>Glottalization</i>	—	tʃɪ' + V	gua' + V	pɛ' + V	—
<i>Devocalisation</i>	—	—	gwak + V	—	—
<i>V F Spread and [-bk] Assign.</i>	be-tir + i	tʃɪ' + i	gwa' + a	pɛ' + ε	ɲkul + i
<i>Tone rules</i>	bè-tírí	tʃì'í	gwà'á	pé'é	ɲkùlí
	PR [bè-tírí	tʃì'í	gwà'á	pé'é	ɲkùlí]

2.7 Conclusion

This chapter has focused on the phonetic characterization and phonological representation of Njém sounds. After presenting the contrastive phonemes, the features used in this work together with their defining feature matrices have been provided. The chapter ends up

discussing the phonological processes that the phonemes undergo. With the array of rules used to account for the alternations, the question of rule ordering naturally arises. However, evidence from the phonological processes presented above show that Sonorization, Palatalization, Velarization, Glottalization, Nasal assimilation, and Vowel Feature spread that apply at the root and/or stem are Level 1 rules since they apply prior to the affixation of level two formatives. Vowel elision 2, l-deletion, and p-deletion which require information from prefixation for their application, are Level 2 rules since the prestem material is added at level two. Finally Vowel elision and Devocalization are considered to be postlexical or phrasal rules because they apply across word boundaries. This ordering can be better understood by tracing the development of [nè kúmá], for example, through the paths indicated by the arrows in (71). It is composed of the root [kúmá], which passes through the lexical phonological rules of Level 1. The only relevant rule that applies to link the tones to the tone-bearing units is the UAC. Then the class prefix [ì-] is affixed to yield [ì-kúmá]. This form is submitted to Level 2 where the UAC alone applies. Finally, [nè] is added to form [nè ì-kúmá], which is then submitted to the postlexical component where Vowel elision applies to create the surface form [nè kúmá].

71)



CHAPTER 3

MORPHO-SYNTAX

3.0 Introduction

This chapter provides an overview of the morphology and syntax of Njém. The morphological properties of the nouns and verbs are presented here. The basic constituent order is also shown. Njém displays most of the morpho-syntactic properties that define a typical Bantu language. It has a noun class system as well as concord morphemes, and a rich verbal morphology that combines several verb modalities.

3.1 Noun Morphology

Nouns are prototypically words that encode concrete, time-stable entities (Boyd 1997: 62). They may be marked for plurality, and can take possession markings, demonstratives and various modifiers.

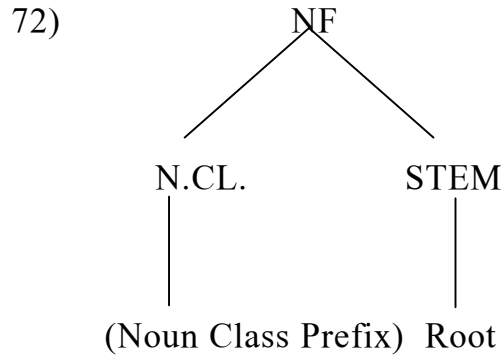
3.1.1 Morphological Structure of Nouns

According to Kisseberth and Odden (2003: 60) “Nominals in Bantu have the structure (pre-prefix +) class-prefix + stem.”

A typical Njém noun consists of a prefix followed by a stem. However, a certain number of nouns, especially in four of the ten noun classes, occur with a zero prefix. In class one, some nouns occur with prefixes while others do not.

The nominal structure assumed in this work can be presented,

following Kenmogne (2000: 33), as below.



This structure indicates that a Njém nominal form consists of an obligatory root that is preceded by an overt prefix or by a zero prefix.

The noun class prefix may be either a vowel or a consonant-vowel sequence. It could also be a single consonant. The noun roots are either monosyllabic or disyllabic. The following examples illustrate the morphological structure of the Njém noun.

73)	prefix-stem		prefix-stem	
	m-ùrúm	'man'	b-ùrúm	'men'
	CL1-man		CL2-man	
	ø-nùm	'mouth'	mì-nùm	'mouths'
	CL3-mouth		CL4-mouth	
	lè-bò	'foot'	mè-bò	'feet'
	CL5-foot		CL6-foot	

d-ù	<i>'nose'</i>	m-ù	<i>'noses'</i>
CL5-nose		CL6-nose	
ø-tʃím	<i>'cry'</i>	bì-tʃím	<i>'cries'</i>
CL7-cry		CL8-cry	

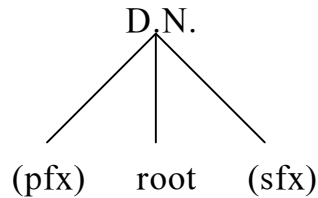
In these forms, [m-], [b-], [mì-], [lè-], [mè-], [bì-], [d-], and [m-] are all nominal prefixes grouped into singular and plural classes. Each prefix belongs to a specific class depending on its shape and the distinction in number it gives to the noun to which it belongs. Thus [m-] of [m-ùrúm] ‘man’ is singular class one (CL1) whereas [m-] of [m-ù] ‘noses’ is plural class six (CL6). Both singular and plural nominal markers are found in table 22 (page 93).

3.1.2 Morphological Structure of Derived Nouns

The derived nouns are called derived because they usually derive from verbs or other nouns. The pattern of productivity in Njém deverbatives is from verbal to nominal. This pattern is in line with the claim that “In Proto-Bantu, productivity must have been from nominal to verbal, although in the present day languages, the direction appears to be the reverse” (Meeussen 1967: 91).

The derived nouns in Njém have the following structure.

74)



This structure suggests that there is an obligatory root that takes either a prefix or a suffix. The prefix is always a nasal and the suffix the lateral. These affixes occur in mutually exclusive environments such that only one of the two occurs in a given context. /-l/ occurs with monosyllabic open roots whereas /Ñ-/ occurs elsewhere, as these examples indicate.

75a) Verb Root		Derived Noun	
-dùlù	'smoke'	ñ-dùlù	'smoker'
-bómá	'sell'	ñ-bómà	'seller'
-gómló	'sweep'	ñ-gómlò	'sweeper'
-kò'	'wander'	ñ-kò'	'wanderer'
b)			
tʃé-	'lie'	tʃé-l	'liar'
-sé	'work'	sé-l	'worker'
-lé	'play'	lé-l	'player'

The examples in (a) show that the derived noun is marked by a nasal. They also show that this nasal is homorganic and syllabic. In (b), instead of the homorganic nasal occurring, it is the lateral [-l] that is suffixed to the verb stem to form the derived noun. This lateral suffix occurs only when the root is an open monosyllable. The origin of [-l] may be traced to the verbal extensions. It is similar to the causative extension that has the meaning of ‘to cause somebody to do something’ or ‘to cause something to become different’. These derived nouns can therefore be said to have an implication in their meaning that there is a purpose that motivates the action.

3.1.3 Noun Class System

Several works on Bantu languages, such as Bleek (1862), Meinhof (1932), Meeussen (1967), Polomé (1967), Guthrie (1967), show that nouns are conveniently grouped into classes. Certain classes of nouns are intrinsically singular (for example 1, 3, 5, 7, 9, etc) while others are plural (2, 4, 6, 8, etc.). However, some classes contain both singular and plural nouns. The basic noun class prefixes of Proto-Bantu, grouped in genders i.e. according to the singular/plural pairing by Meinhof (1932), Guthrie (1967), Polomé (1967), taken from Kenmogne (2000: 35), are presented in the table below.

Semantic distribution	Guthrie	Polomé	Meinhof	
- Autonomous individualised beings, human nouns	mu-/ba-	me-/ba-	mu-/v-a-	(1/2)
- Non-autonomous individualised beings; animistic concepts, parts of the body, plants; natural phenomena	mu-/mi-	mu-/me-	mu-/mi-	(3/4)
- One of the pairs of objects that come in pairs	di-	de-	li-	(5)
- Mass nouns indicating a non-itemisable whole; pl. cl5.	ma-	ma-	ma-	(6)
- Inanimate objects	ki-/bi-	ke-/be-	ki-/bi-	(7/8)
- Objects or beings defined by their most characteristic features	ɲ-	ne-/di-/, ne-	ni-/li-, ni-	(9/10)
- Individualised objects numbering more than two	du-	do-	lu-	(11)
- Diminutives	ka-	ka-	tu-	(12)
- Diminutives	tu-	to-	tu-	(13)
- Abstracts	bu-	bo-	vu-	(14)
- Infinitives	ku-	ko-	ku-	(15)
- Definite location	pa-	pa-	pa-	(16)
- Indefinite location	ku-	ku-	ku-	(17)
- Location inside a place	mu-	mu-	mu-	(18)
	pi-		pi-	(19)
			u-	(20)
			i-	(21)

Table 21: Proto-Bantu Noun Class Prefixes

An illustration of the noun class prefixes of Njém is provided in the table that follows.

Class	Noun	Prefix	Stem	Gloss
1	mùmá	m-	-ùmá	'woman'
	pàrà	ø-	-pàrà	'priest'
2	bùmá	b-	-ùmá	'women'
	bèpàrà	bè-	-pàrà	'priests'
3	ndzà	ø-	-ndzà	'intestine'
4	mìndzà	mì-	-ndzà	'intestines'
	mìkúmá	mì-	-kúmá	'wealth'
5	lèpùlù	lè-	-pùlù	'sauce'
	dîh	d-	-îh	'eye'
	dzóra	dz-	-óra	'firewood'
	dzínò	dʒ-	-ínò	'finger'
6	mèpùlù	mè-	-pùlù	'sauce'
	mîh	m-	-îh	'eyes'
	mèmpîr	mèm-	-pîr	'chests'
7	nìnò	ø-	-nìnò	'louse'
8	bìnìnò	bì-	-nìnò	'lice'
9	bîr	ø-	-bîr	'chest'
11	ìkúmá	ì-	-kúmá	'wealth'

Table 22: Njém Noun Class Prefixes

Some Proto-Bantu single classes have been divided into two or three subclasses as a result of the phenomenon of class merger. The determination of class membership does not solely depend on the noun class prefixes because several classes could have a similar prefix. The pattern of agreement induced by the noun on the possessives, adjectives, relatives, etc, is very useful in determining how nouns are distributed into classes.

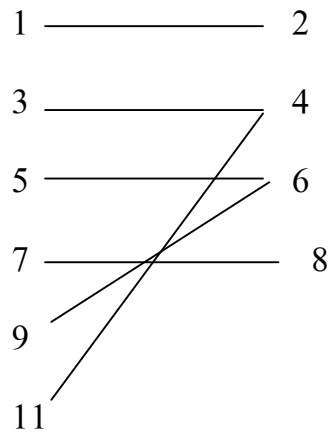
The table that follows provides clear evidence used to determine the belonging of nouns to a particular class. As said above, in most Bantu A languages such as Njém, noun classes cannot be identified from prefixes alone. Kenmogne (2000: 39) indicates that “other properties include the singular/plural pairing (e.g. 1-2, 3-4, etc). Patterns of agreement induced by the nouns are the most important criteria that should govern the noun class distribution.” In the table, therefore, concord markers of the nouns are included with various specifiers and complements when put together. Note also that the vowels of the various overt class-marker prefixes all bear a low tone underlyingly.

Class	Noun Prefix	Possessive (my)	Possessive (his)	Possessive (your)	Anaphoric adjective	Interrogative (which)	Demonstrative (this)	Relative pronoun	Associative markers	Subject markers
1	m- ø-	wàm	wé	wín	njò	wá:	nì	wà:	ø	njé
2	bè-	bâm	bé	bín	bâ	bá:	bínì	bá:	bé	bé
3	ø-	wâm	wé	wín	wî	wá:	nì	wá:	´	wé
4	mì-	mjâm	mjé	mín	mî	mjá:	mínì	mjá:	mí	mjé
5	lè- d- dz- dz-	lâm	lé	lín	lî	lá:	línì	lá:	lé	lé
6	mè- m- mèN-	mâm	mé	mín	mâ	má:	mínì	má:	mé	mé
7	ø-	jâm	jé	jín	jî	já:	nì	já:	´	jé
8	bì-	bjâm	bjé	bjín	bî	bjá:	bínì	bjá:	bí	bjé
9	ø-	wàm	njé	njín	njò	njá:	nì	njà:	ø	njé
11	i-	wâm	wé	wín	wî	wá:	wínì	wá:	mí	wé

Table 23: Concord Morphemes

The noun classes represented in table 22 can be grouped by pairs to constitute the genders in (76).

76)



3.1.3.1 Gender 1 / 2

Most of the nouns in this gender refer to humans. In class one which is the singular class, the nouns are prefixed by the bilabial nasal when the root begins with a vowel and a zero morpheme when the root begins with a consonant. In the plural class (CL2), the vowel of the class marker is deleted when the root begins with a vowel and its tone merges with the following low tone of the vowel that causes this deletion. See the following examples:

77)	Class 1		Class 2	
	m-ùr	'person'	b-ùr	'people'
	m-ùrúm	'man'	b-ùrúm	'men'
	m-ùmá	'woman'	b-ùbá	'women'
	ø-kél	'girl'	bè-kél	'girls'
	ø-sóŋ	'father'	bè-sóŋ	'fathers'
	ø-kũ'ũ	'uncle'	bè-kũ'ũ	'uncles'

The forms for 'girls' and 'fathers', for example, show that the CL2 marker is [bè-]. Those for 'people' and 'men' show that the vowel of this marker fails to surface. The deletion of this vowel is explained by the independently motivated rule of Vowel elision 2.

A further observation to be made from these data is that the root consonant for the form for 'women' assimilates the place features of the prefix consonant. This however happens only because both prefix and root consonants are bilabial. This assimilation can be considered to be phonetically motivated given that it is easier to repeat the same articulatory gesture for the two consonants.

3.1.3.2 Gender 3 / 4

The nouns in this gender are mostly inanimate things, as well as the names of trees and other plants. There is neither a segmental nor a tonal morpheme in class three to mark the singular whereas class four, which is marked by [mì-], clearly corresponds to the PB [mi-]. Examples include the following:

78)	Class 3		Class 4	
	ø-kàlò	'root'	mì-kàlò	'roots'
	ø-mò	'stomach'	mì-mò	'stomachs'
	ø-kán	'cloth'	mì-kán	'clothes'
	ø-ìbê	'house'	mì-ìbê	'houses'
	ø-tùhù	'difficulty'	mì-tùhù	'difficulties'
	ø-lû	'head'	mì-lû	'heads'

3.1.3.3 Gender 5 / 6

This gender, like in most Bantu languages, contains miscellaneous objects (Mutaka and Tamanji 2000: 151). The singular class (CL5) has two regular markers. When the root begins with a consonant, the prefix occurs as [lè-]. However, when the root begins with a vowel, it is marked by [d-]. Two irregular prefixes, [dz-] and [dʒ-], occur in this

class as shown in section 2.6.1.3, page 71. In the plural class, three separate forms occur, namely, [mè-] and [m-] that mark the plural of class five nouns and [mèN-] that marks the plural of class nine nouns. See section 3.1.3.5 for the class nine nouns. Examples are given in (79).

79)	Class 5		class 6	
	lè-bíl	'breast'	mè-bíl	'breasts'
	lè-kí	'egg'	mè-kí	'eggs'
	lè-tàŋlò	'story'	mè-tàŋlò	'stories'
	d-ù	'nose'	m-ù	'noses'
	d-òm	'war'	m-òm	'wars'
	d-ú'ú	'navel'	m-ú'ú	'navels'

These data show that when the root begins with a vowel the prefix vowel is deleted, in conformity with Vowel elision 2. Secondly, in the singular forms /l/ surfaces as [d]. A plausible synchronic explanation would be to assume that this happens because the lateral is followed by two vowels, as the following rule shows.

30) P-rule 13: Delateralization

$$[+lat] \rightarrow \begin{array}{|l} -son \\ -lat \\ -con \\ -stri \\ +vd \end{array} / \text{---}[V+V]$$

This rule specifies that the lateral changes to the voiced dental stop when it is followed by two vowels. The nouns in class five and six can be derived as follows.

81)	lè-kí	d-òṃ	mè-kí	m-òṃ
	UR / le-kí	le-ṃm	me-kí	me-ṃm /
<i>Delateralization</i>	---	de-ṃm	---	---
<i>Vowel elision 2</i>	---	d-ṃm	---	m-ṃm
<i>Tone rules</i>	lè-kí	d-òṃ	mè-kí	m-òṃ
	PR[lè-kí	d-òṃ	mè-kí	m-òṃ]

This derivation also shows that delateralization occurs before vowel elision.

3.1.3.4 Gender 7 / 8

Augmentatives, diminutives and other miscellaneous items are included in this gender. Just like gender 3/4, there is neither a segmental nor a tonal morpheme marking the singular class (CL7), whereas the plural class (CL8) is marked by [bì-]. This equally corresponds to the PB [bi-]. Consider the following examples:

82)	Class 7		Class 8	
	ø-dzúlù	'smoke'	bì-dzúlù	'smoke'
	ø-dzìhí	'bone'	bì-dzìhí	'bones'
	ø-bàn	'epic'	bì-bàn	'epics'
	ø-ɲâ	'claw'	bì-ɲâ	'claws'
	ø-dàlà	'pot'	bì-dàlà	'pots'
	ø-ɲkúru	'buttock'	bì-ɲkúru	'buttocks'

3.1.3.5 Gender 9 / 6

Class nine (CL9) contains a few personal nouns, animal names as well as some inanimate nouns. As stated above CL9, which is marked by a zero morpheme, forms its plural in class six. It should be noted that the

plural marker, /mènN-/, takes a syllable-final nasal, and that the root-initial consonant is voiceless. See the following examples:

83)	Class 9		Class 6
	ø-bvù'	'mortar'	mè̀m-pvù' 'mortars'
	ø-dí́bó	'stream'	mè̀n-tí́bó 'streams'
	ø-dḵ'ḵ	'room'	mè̀n-tḵ'ḵ 'rooms'
	ø-bîr	'chest'	mè̀m-pîr 'chests'
	ø-bùmò	'fruit'	mè̀m-pùmò 'fruit'

It can be observed that the PB gender 9/10 has collapsed into 9/6 in Njém. This gender also occurs in neighbouring Makaa (Heath 2003: 338) and behaves in a similar manner. For an account of the forms in this gender, see section 2.6.1.2, page 67.

3.1.3.6 Gender 11 / 4

This gender contains mostly abstract nouns. The singular class (CL11) is marked by [î-]. It takes its plural in class four that has been shown above to be marked by [mì-]. The following examples are illustrative:

84)	Class 11		Class 4	
	ì-símsá	' <i>thought</i> '	mì-símsá	' <i>thoughts</i> '
	ì-kúrgá	' <i>ill-luck</i> '	mì-kúrgá	' <i>ill-luck</i> '
	ì-kúmá	' <i>wealth</i> '	mì-kúmá	' <i>wealth</i> '

Many of the concordial markers for CL3 and CL11 are the same. One could think that the two are a single class, especially as both form their plural in CL4. However, the demonstrative pronoun (this) is different in the two, suggesting that they are separate classes. This can be seen in table 23 (page 95).

3.1.4 Agreement Patterns

As mentioned above, each noun conditions the form of the agreement affixes that occur with it in an utterance. The following data illustrate such an agreement observed between nouns and their concordial morphemes in Njém.

85)	ø-kél	wàm	njé	wá	' <i>My sister is here</i> '
	CL1-sister	my	CON	here	
	Bè-kél	bâm	bé	wá	' <i>My sisters are here</i> '
	CL2-sister	my	CON	here	
	ø-kán	wâm	wé	wá	' <i>My cloth is here</i> '
	CL3-cloth	my	CON	here	

Mì-kán CL4-cloth	mjâm my	mjé CON	wá here	<i>‘My clothes are here’</i>
Lè-bò CL5-foot	lâm my	lé CON	wá here	<i>‘My foot is here’</i>
Mè-bò CL6-foot	mâm my	mé CON	wá here	<i>‘My feet are here’</i>
ø-ñkúró CL7-buttock	jâm my	jé CON	wá here	<i>‘My buttock is here’</i>
Bì-ñkúró CL8-buttock	bjâm my	bjé CON	wá here	<i>‘My buttocks are here’</i>
ø-tʃwítsén CL9-star	wâm my	njé CON	wá here	<i>‘My star is here’</i>
I-kúrgá CL11-ill-luck	wâm my	wé CON	wá here	<i>‘My ill-luck is here’</i>

These data demonstrate that both the possessive marker and the concord morpheme change, depending on the class in which the noun they occur with belongs. For the rest of the concordial morphemes see table 23 above (page 95).

3.2 Verb Morphology

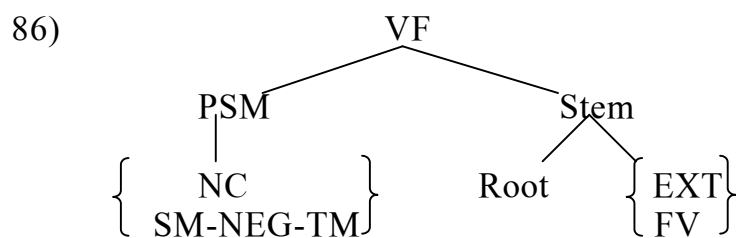
Verbs are prototypically words that code action, process or state (Boyd 1997: 71). In most Bantu languages, there are a series of inflections that are added to the verb root to generate a verbal form. In some Bantu A languages like Njém they are separate lexical items that

are combined with the verb root. The various aspects of the Njém verb morphology are presented here.

3.2.1 Morphological Structure of Verbs

In Bantu languages, the verb has a complex morphology. Myers (1998), following Meeussen (1967), shows that the verb in five Bantu languages has two main constituents. The Verb Stem consists of the root, its suffixes (extensions) marking things like causation, passive, reciprocal and so on, and a terminal vowel. An object marker immediately precedes it, and these join together in the Verbal Macrostem. The Inflectional Stem, which precedes the Macrostem, consists of the morphemes marking subject, tense, aspect, and/or modality.

Kenmogne (2000: 50) presents a tree diagram indicating the overall hierarchical structure of the verb as follows:



This diagram is interpreted as: a Verbal Form (VF) is made up of a Pre-Stem Material (PSM) plus a Stem. The PSM is either a noun class prefix when the verb is in the infinitive form or a sequence of SM - NEG - TM. The Stem comprises a Root (RT) plus an Extension (EXT) or a final vowel (FV).

The Njém verb, as rewritten below, mirrors the structure of a Bantu verb.

87) SM - TM – (NEG) - RT – (EXT)

Note that the negation and extension markers are optional in Njém.

This structure can be illustrated with the following examples.

88) nɛ bĩ túnô
 3s PST announce
 ‘You announced’

Gũ bâ lĩ
 2s PST.NEG liberate
 ‘You did not liberate’

nè bó bà dzè
 3s FUT NEG give
 ‘He will not give’

Bín bâ dzjêb-lá
 3P PST.NEG call-EXT
 ‘They did not call to each other’

These data show the structure of the verb in Njém. The verb begins by the subject marker, followed by the tense marker and then the negation marker. The verb root can be followed by one extension.

3.2.2 Stem Morphology

In most Bantu languages the stem consists of the verb root (RT) followed by one or more extensions (EXT) and/or the final vowel (FV). It can be rewritten as follows:

$$89) \text{ Stem} = \text{RT} + (\text{EXT}(\text{S})) + \text{FV}$$

While some languages may combine all of the above to form the stem, others, especially those that are less concatenative, can either choose between one or more extensions or the final vowel. In Njém, only an extension can occur. Its occurrence is optional because some verbs may occur without it. The Njém stem is therefore rewritten as follows:

$$90) \text{ Stem} = \text{RT} + (\text{EXT})$$

3.2.2.1 Extensions

Languages of the Bantu group have a number of verbal extensions. These are suffixes that are added to the root to result in a new verb stem.

Verbal extensions can either be productive or non-productive. The productive extensions usually affect verb valency whereas the non-productive ones may formally be isolated as suffixes but cannot be attributed any general meaning nor have any syntactic consequences. The extensions in Njém are optional, in the sense that some verbs occur without them. Notes on the various extensions follow.

3.2.2.1.1 The Reciprocal

This is one of the most productive extensions in Njém. It indicates that the action inherent in the verb is related to one element in two different ways; this element being at the same time the agent as well as the goal of the action. It is marked by a low tone extension [-là]. The examples that follow are illustrative.

91) lè-bjèn-là *'to refuse each other'*
 INF-refuse-REC

lè-tùmò-là *'to light for each other'*
 INF-light-REC

lè-ʃìm-là *'to run to each other'*
 INF-run-REC

lè-dʒjêb-là *'to call to each other'*
 INF-call-REC

lè-gîm-là *'to solicit each other'*
INF-solicit-REC

lè-ʃúgô-là *'to support each other'*
INF-support-REC

This suffix does not cause nor undergo any tonal changes when attached to the verb.

3.2.2.1.2 The Instrumental

The instrumental suffix generally modifies the meaning of the verb by specifying that the action is done with an instrument of some kind. In most instances the instrument is an inanimate object (Mutaka and Tamanji 2000: 178). In Njém, the instrumental suffix [-nè] expresses the meaning of 'with'. The examples presented in (92) illustrate this extension.

92) lè-bè-nè *'plant with'*
 INF-plant-INS

 lè-ʃîm-nè *'run with'*
 INF-run-INS

 lè-tîlò-nè *'write with'*
 INF-write-INS

lè-ká'-nè *'tie with'*
INF-tie-INS

lè-dzâm-nè *'prepare with'*
INF-prepare-INS

lè-túnô-nè *'announce with'*
INF-announce-INS

This suffix does not cause nor undergo any tonal changes when attached to the verb.

3.2.2.1.3 The Applicative

Generally, this extension indicates that the state or action described is for the benefit of somebody else. This extension, marked by [-í] which is high-toned is shown in the data that follow.

93) lè-dzè:-í *'sing for'*
 INF-sing-APP

 lè-tìlò-í *'write for'*
 INF-write-APP

 lè-ʃùmò-í *'construct for'*
 INF-construct-APP

 lè-dzô-í *'kill for'*
 INF-kill-APP

lè-dzâm-í *'prepare for'*
INF-prepare-APP

lè-sîl-í *'finish for'*
INF-finish-APP

Like the extensions above this one does not cause nor undergo any changes when added to the verb. Curiously, even though the structural description for vowel elision discussed above is met, it fails to apply here. It is simply considered that this process does not apply between the verb root and its extensions because these are strongly bound.

3.2.2.1.4 The Passive

This extension indicates that the action inherent in the verb is done to the subject. It occurs variably in Njém as either [-ð:] or [-ŋð:]. Both bear low tones. [-ð:] occurs after roots that end in consonants while [-ŋð:] occurs after roots that end in vowels. Examples that illustrate the occurrence of this suffix are presented in (94).

- 94) dzè-ŋð: *'given'*
give-PASS
- tùgò-ŋð: *'mixed'*
mix-PASS
- bjèn-ð *'refused'*
refuse-PASS

jé'lô-ŋð: *'taught'*
teach-PASS

dzjêb-ð: *'called'*
call-PASS

bwôm-ð: *'bought'*
buy-PASS

These data show that the passive suffix alternates between [ŋð] and [ð]. It could be claimed that the velar nasal is inserted but such a claim is easily discarded because the environment in which insertion occurs is not evident in these data. However, it can be argued that the velar nasal is deleted when it occurs after another consonant. This can be captured by the following rule:

95) P-rule 14: Velar Nasal Deletion

$$\begin{bmatrix} + \text{nas} \\ - \text{cor} \\ - \text{ant} \end{bmatrix} \rightarrow [\emptyset] / \begin{bmatrix} + \text{cons} \\ - \text{syll} \end{bmatrix} + _$$

According to this rule, the velar nasal is deleted when it occurs after another consonant, as shown in the following derivation:

96)	dzè-ŋò:	bwôm-ò:
	UR/ dzè-ŋò:	búòm-ŋò: /
<i>Velarization</i>	dze-ŋɔ:	buɔm-ŋɔ:
<i>Consonant deletion</i> —		buɔm-ɔ:
<i>Devocalisation</i> —		bwɔm-ɔ:
<i>Tone rules</i>	dzè-ŋò:	bwôm-ò:
	PR [dzè-ŋò:	bwôm-ò:]

3.2.2.1.5 The Reflexive

The reflexive suffix expresses the idea that the action described by the verb is for the benefit of the agent. It is marked in Njém by a low-toned morpheme [-wà], as shown in the data that follow.

97)	tìlò-wà write-REF	<i>'write for oneself'</i>
	lòmà-wà rub-REF	<i>'rub oneself'</i>
	dùbò-wà soak-REF	<i>'soak oneself'</i>

lû -wà *'bite oneself'*
bite-REF

má'-wà *'gather for oneself'*
gather-REF

ʃíhò-wà *'grind oneself'*
grind-REF

This suffix does not cause nor undergo any tonal changes.

3.2.2.1.6 The Causative

The causative in a large majority of languages has the meaning of 'to cause or to make somebody do something' or 'to cause something to become different'. It is marked in Njém by a lateral suffix [-l]. The following data show the occurrence of the causative suffix in Njém:

98) dè-l *'cause to eat'*
eat-CAUS

sò-l *'cause to hunt'*
hunt-CAUS

dʒù-l *'cause to climb'*
climb-CAUS

lû-l *'cause to bite'*
bite-CAUS

sâ-l *'cause to do'*
do-CAUS

jé'lô-l *'cause to teach'*
teach-CAUS

Similarly, this extension does not cause nor undergo any tonal or phonological changes when suffixed to the verb root.

3.2.2.2 The Root

The verb may either have a high tone or a low tone root. Each has a final low tone that docks onto the root. Examples include the following:

99a) -ɲà *'tear'*

-sàm *'spoil'*

-lòmà *'rub'*

b) -sû *'brush'*

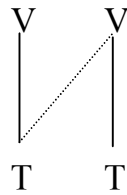
-mêr *'arrest'*

-búgô *'miss'*

While the data in (a) show that the final low tone merges with the low tone of the verb, those in (b) show that it creates a high-falling

contour when it meets a high tone on the verb. The following rules show how the verb root is derived.

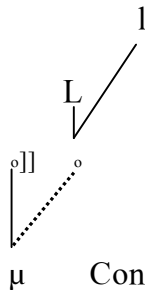
100) Tonological Rule (T-rule) 1: Tone Spread



Condition: It applies only on verb roots.

According to this rule a tone spreads to the following TBU in verb roots.

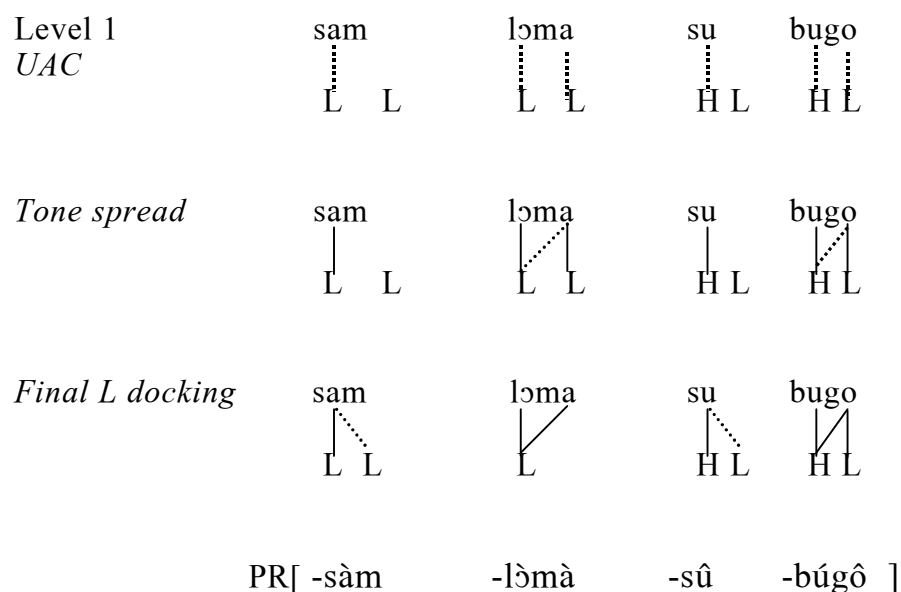
101) T-rule 2: Final Low Docking



Condition: It applies only on verb roots.

This rule allows a floating low tone to associate at the end of verb roots. The following derivation shows how verb roots are formed:

102)	-sàm	-lòmà	-sû	-búgô	
	UR/ sam	loma	su	bugo	/
	L L	L L	H L	H L	



3.2.3 Pre-Stem Morphology

As said above, the pre-stem material can include a sequence of subject markers, tense markers and negation. Each of these is presented in turn.

3.2.3.1 Negation

The negation marker occurs after the tense marker just before the verb root. It is marked by an overt morpheme, [bà], which changes to [à] when found after a consonant. It has a low tone underlyingly. Beavon (1991: 86) shows that in neighbouring Kɔ̀nzime “one common marker of negation is *a*.” Unlike the situation in Njém, he says that the negation marker in Kɔ̀nzime has several variants depending on the tense and

aspect of the construction. The following data illustrate the occurrence of the negation marker in Njém:

103a) mĩ bó bà dè
1s FUT NEG eat.FL
'I will not eat'

ɲè bó bà tìlò
3s FUT NEG write.FL
'He will not write'

bĩhĩ bó bà túnô
1p FUT NEG announce.FL
'We will not announce'

b) kàb-à nĩn mĩ
share-NEG keep 1s
'I have no share'

dzéŋ-à mĩ
give-NEG 1s
'Don't give me'

c) ɲǎ bà dzjèb / ɲε á bà dzìeb`/
3s.P2 NEG sharpen.FL
'He did not sharpen'

gǎ bà dzjêb / gu á bà dzíeb`/
2s.P2 NEG call.FL
'You did not call'

The negation marker surfaces in (a) as [bà]. The examples in (b) show that [b] is deleted because it occurs after another consonant. In (c) the vowel of the tense marker causes the deletion of the vowel of the subject marker, following Vowel Elision 2. The following rule captures the deletion of the voiced bilabial stop.

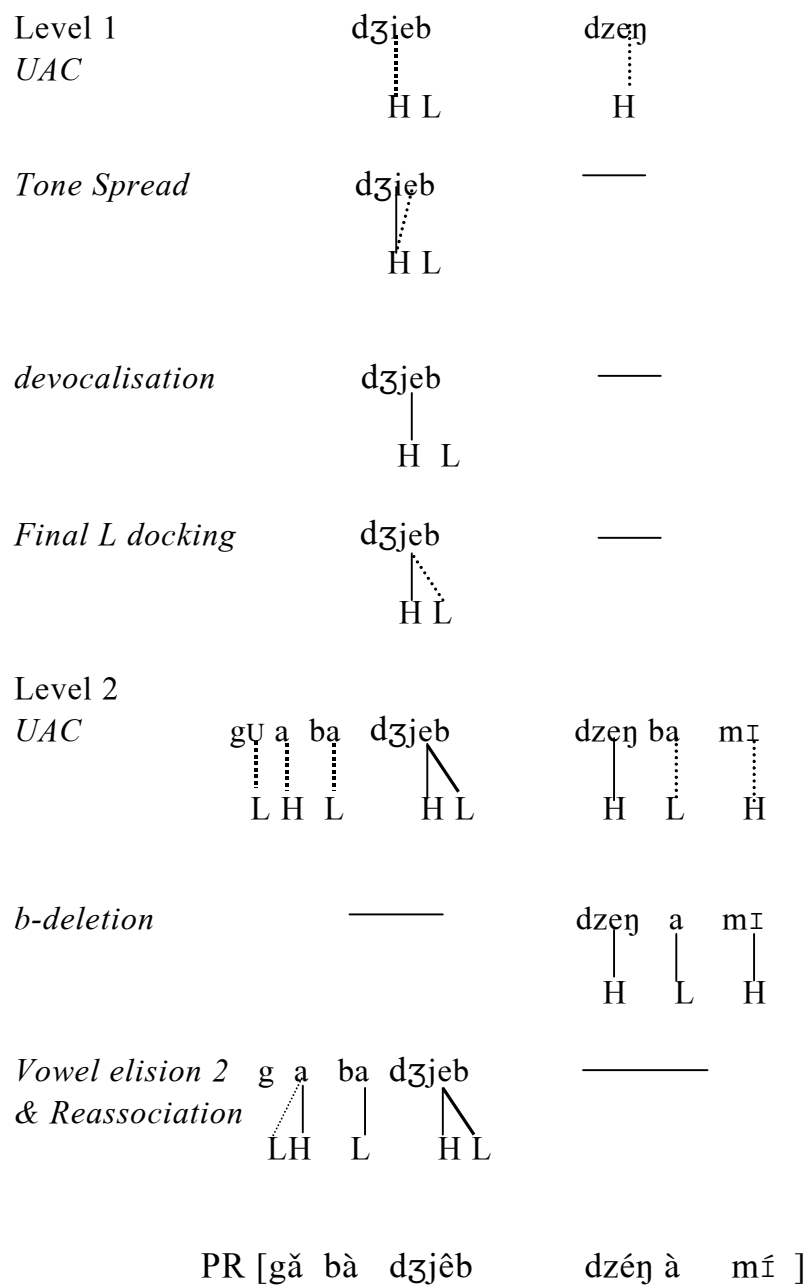
104) P-rule 15: b-deletion

$$\begin{bmatrix} \text{-son} \\ \text{-cont} \\ \text{-cor} \\ \text{+ ant} \\ \text{+ vd} \end{bmatrix} \rightarrow [\emptyset] / \begin{bmatrix} \text{+ cons} \\ \text{-syll} \end{bmatrix} _$$

According to this rule the voiced bilabial stop is deleted when it occurs after another consonant.

The assumptions of the theory of Lexical Phonology are relevant in accounting for these data. It is assumed that there is an interaction between word formation and rule application. The stem is derived in Level 1 whereas the prestem material is derived in Level 2. The derivation that follows illustrates how this works. Recall that the Njém verb is structured as follows: SM-TM-NEG-RT-EXT.

105) gǎ bà dʒjêb dzéŋ à mĩ
 UR/ gU- a - ba - dʒieb dzeŋ-ba - mI /
 H L H L H L



3.3.3.2 Tense Markers

Njém has a four-way temporal distinction with two past tenses (remote and general), a present tense and a future tense. These tenses are summarized in the table below.

Tense	Marker
Present Tense	lè-
Future Tense	bó
General Past	bǐ
Remote Past	bá

Table 24: Tense Markers

3.2.3.2.1 The Present Tense

The present tense is used in conversation to describe situations that are presently taking place or which will be taking place in the nearest future. The infinitive form of the verb is used in this tense in Njém. Examples include the following:

106) mǐ lè-dzìm
1s PRES-dream.FL
'I dream'

mǐ lè-tâ
1s PRES-inherit.FL
'I inherit'

né lè-tùgò
3s PRES-mix.FL
'(S)he mixes'

né lè-túnô
3s PRES-announce.FL
'(S)he announces'

These data show that the present tense is marked by the presence of the infinitive prefix. It does not undergo nor cause any tonal changes.

3.2.3.2.2 The Future Tense

The future tense (FUT) describes situations that will take place later than the moment of speech. This tense is marked by a high-toned morpheme [bó] and does not cause nor undergo any tonal changes as shown below.

107) mî bó bwòl
1s FUT dance.FL
'I will dance'

nè bó tìlò
3s FUT write.FL
'(S)he will write'

bíhí bó jé'lô
1p FUT teach.FL
'We will teach'

bín bó dè
2p FUT eat.FL
'You will eat'

bí bó lí
3p FUT advise.FL
'They will advise'

3.2.3.2.3 The General Past Tense

The general past (PST) is used to refer to situations that existed or took place before the moment of speech whether earlier on the day of speech or the previous day. It is marked by a rising-toned morpheme [bǐ]. Consider the following examples (the arrow ↓ represents downstep of a high tone):

108) mǐ bǐ dè
1s PST eat.FL
'I ate'

ǰé bǐ bè:
3s PST see.FL
'(S)he saw'

bǐhǐ ↓bí dzù
1p PST climb.FL
'We climbed'

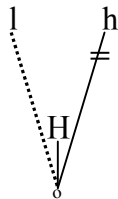
bín ↓bí sâ
2p PST search.FL
'You searched'

bín ↓bí dzâm
2p PST prepare.FL
'*You prepared*'

In the last three examples, the PST marker is realized as [↓bí] rather than [bí]. Two assumptions are necessary to account for this occurrence. First, the low part of the contour tone causes downstep of the high tone by spreading its low register feature to and delinking that tone's register feature. This follows the rule of l-spread and h-delink formulated in (109). Secondly, the high tone of the subject marker spreads onto [bí] and delinks the low part of the rising contour tone, following H-spread and L-delink formulated in (110). This spreading does not occur with the first two examples because the subject markers in them bear polar tones, which are assigned later in the derivation, as shown in section 3.2.3.3. The assumptions of Register Tier Theory are relevant in accounting for the tonal changes in Njém. The features *h* and *l* that occupy the Register tier specify the register of the present tone relative to that of the previous one. The Tonal features *H* and *L*, which occupy the Tonal tier, indicate the pitch of the tone-bearing unit relative to the current register. The two sets of features are linked to structural nodes on the Tonal root node tier. The nodes are, in turn, linked to moras

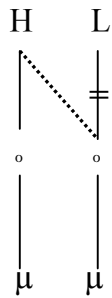
on the Tone-bearing unit tier. This RTT framework will be used in the rest of this work to account for tone.

109) T-rule 3: l-spread and h-delink



According to this rule, a low register feature spreads onto the following TRN, and, in a subsequent process, delinks the high register feature from that node.

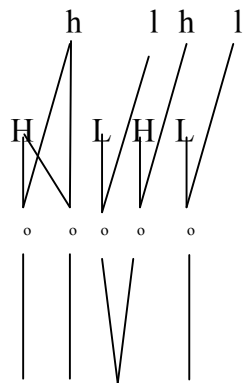
110) T-Rule 4: H-spread and L-delink



This rule says that a high tone spreads to the following low TRN, and, in a subsequent process, delinks that low tone. The data in (108) can therefore be derived as follows.

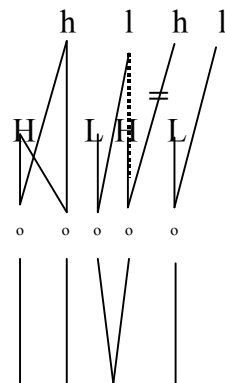
111)

Input



bI hI bi dzu

l-spread and h-delink

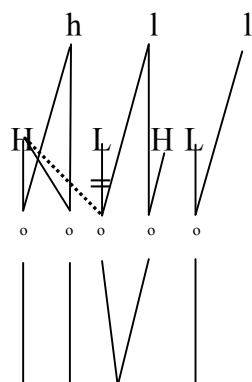


bI hI bi dzu

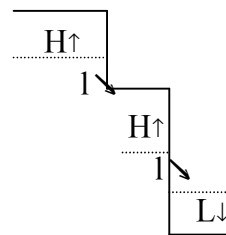
→

H-spread and L-delink, stray erasure

Phonetic Representation



bI hI bi dzu



bIhI bi dzu

This derivation also shows that in RTT, a composite contour tone (that which functions primarily as a phonological sequence of two or more level tones) is represented as follows: the features are dominated by two tonal root nodes associated to a single mora on the TBU tier. For the unitary contour tone (that which functions primarily as a phonological unit), the

features are dominated by a single tonal root node associated to a single TBU.

3.2.3.2.4 The Remote Past Tense

The remote past (P2) that describes situations which existed or took place earlier than yesterday morning is marked by [bá] which carries a high tone. In P2 constructions both the remote and general past markers occur. The PST marker indicates that the action, which is described by the verb, took place before the moment of speech and the P2 marker specifies that it happened a long time before that moment. The following examples are illustrative:

112) mĩ bá ↓bí dè /mĩ bá bĩ dè`/
 1s P2 PST eat.FL
 'I ate'

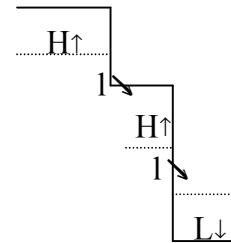
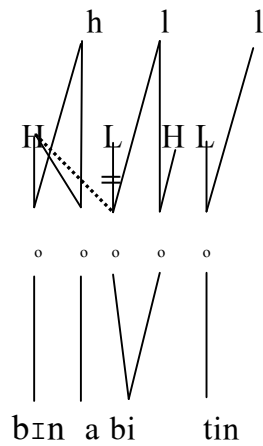
gũ bá ↓bí tìlò /gũ bá bĩ tìlò`/
 2s P2 PST write.FL
 'You wrote'

ɲè bá ↓bí sâ: /ɲè bá bĩ sâ:`/
 3s P2 PST search.FL
 '(S)he searched'

bĩhĩ bá ↓bí lôê: /bĩhĩ bá bĩ lôê:`/
 1p P2 PST insult.FL
 'We insulted'

H-spread and l-delink, Cons. Del., stray erasure

Phonetic Representation



3.2.3.3 Subject Markers

The subject markers occur before the tense markers. The first, second, and third person singular markers behave in an identical manner tonally whereas the plural markers behave differently. These markers are presented in the table below.

Subject	Marker
First Person Singular	mɪ
Second Person Singular	gU
Third Person Singular	ɲɛ
First Person Plural	bɪhɪ
Second Person Plural	bɪn
Third Person plural	bí

Table 25: Subject Markers

The first person singular is marked by [mɪ], the second person singular by [gʊ] and the third person singular by [ɲɛ]. It should be mentioned that all of these markers are inherently toneless and occur on the surface with polar tones (they bear the opposite of the tone that follows). The notion of *tonal polarity* refers to a usual morphemic segment whose tone is invariably opposite that of a preceding or following tone. Examples of surface polarity lend themselves to two different analyses: dissimilation and “true polarity” (Newman 1995: 771). In dissimilation, a particular specified tone is changed if certain conditions are met. In “true polarity” the tone of some element is always assigned as opposite to that of a neighbouring tone, but there is no compelling synchronic reason to presume that the tone started underlyingly as some specified tone or other. Polarity has been reported in other African languages. These include Margi (Pulleyblank 1986), Kɔnni (Cahill 1999), Yoruba (Akinlabi and Liberman 2000). Yip (2002: 159) says “polarity is a morphophonological effect. In some languages certain affixes have tones that are fully predictable from the tone of the root to which they attach”. Instead of receiving their tone by spreading in the usual way, they show a tone that is the opposite of the neighbouring tone. Newman (1995) offers a clearly convincing explanation which

shows that polarity is a normal tone process which is natural and its occurrence is expected because tone functions prosodically and works naturally with melodic patterns. In his view, “*whereas content words (especially nouns and verbs) have the body to carry distinctive tone, with short, unstressed grammatical morphemes, a specific tone, whether it be high or low, has very little saliency. What works well for short words, clitics, and affixes, is for the morpheme to join up with a substantive word to become part of a tonal melody whose preferred tune will in many cases be H-L or L-H*”. In some instances, these toneless grammatical morphemes will acquire surface tones by tone spreading or by the assignment of a default tone, but in others the principle underlying the tonal assignment will be to produce a tonal opposition, which surely must have natural advantages in terms of production, perception, memory, and/or other psychological factors. Njém polarity is *true polarity* with a *morphophonological effect*. Consider the data in (114):

114) mĩ lè-dè
 1s PRES-eat.FL
 ‘I eat’

mĩ bó dzù
 1s FUT climb.FL
 ‘I will climb’

gú lè-tùgò
 2s PRES-mix.FL
 ‘You mix’

gù bó gîm
 2s FUT solicit.FL
 ‘You will solicit’

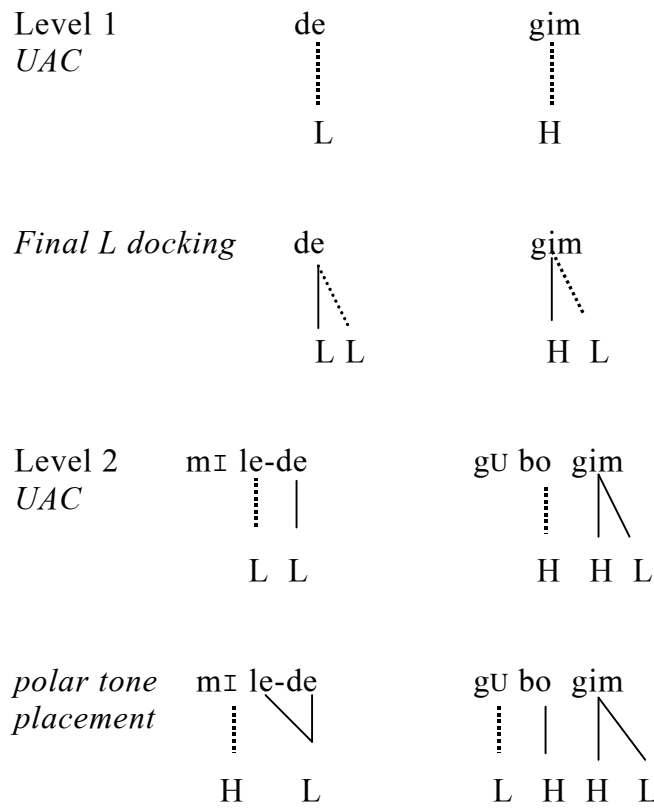
né lè-bè:
 3s PRES-see.FL
 ‘(S)He sees’

nè bó túnô
 3s FUT announce.FL
 ‘(S)He will announce’

These data demonstrate that the tone of the singular pronouns in these constructions is polar. It is assumed that at Level 2 of the derivation, the singular pronoun is added to the verb and given the opposite of the tone that follows it.

By assuming polarity, therefore, these forms are accounted for in a straightforward manner as shown in the following derivation.

115) mī lè-dè gù bó gîm
 UR/ mɪ le-de gU bo gim /
 L L L H H L



PR [mɪ̀ lè-dè gù bó gîm]

On the other hand, the plural markers all bear high tones. The first person plural is marked by [bɪ́hɪ́] while the second is marked by [bɪ́n]. These two plural pronouns will be shown together (excluding the third person plural) because both cause high tone spreading as shown below. The following data show the occurrence of these markers.

- 116) bɪ́hɪ́ ↓bí dzè:
 1p PST sing.FL
 'We sang'

bíhí ↓bí jé'lô
1p PST teach.FL
'We taught'

bíhí ↓bí sâ:
1p PST search.FL
'We searched'

bín ↓bí lô:
2p PST insult.FL
'You insulted'

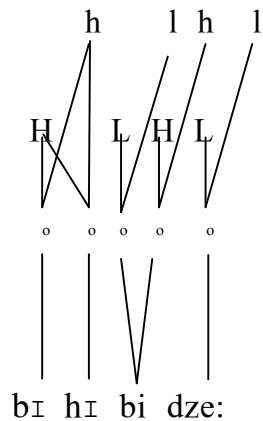
bín ↓bí tûgò
2p PST mix.FL
'You mixed'

bín ↓bí lí
2p PST advise.FL
'You advised'

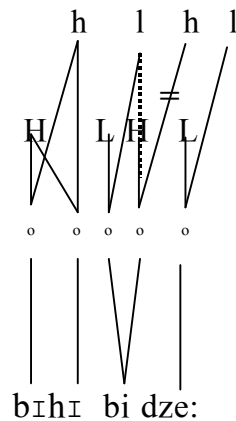
While these data demonstrate the occurrence of the first and second person plurals, they also show that the LH of the tense marker is realized as a downstepped H. This follows the rules of l-spread and h-delink, and H-spread and L-delink discussed in section 3.2.3.2.3. The following RTT derivation shows how downstep results:

117)

Input



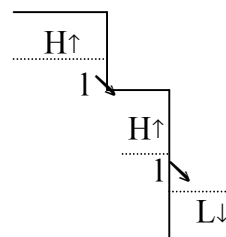
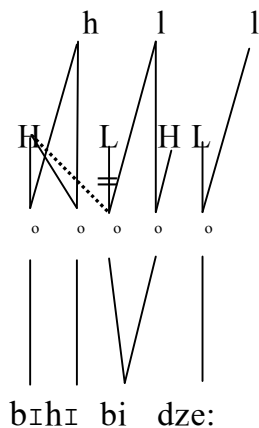
l-spread and h-delink



→

H-spread and l-delink, stray erasure

Phonetic Representation



bIhI bi dze:

The third person plural is marked by [bí]. It is always realized on a high tone, as the examples that follow show.

118) Bí dè
3p eat.FL
'They eat'

Bí tùgò
3p mix.FL
'They mix'

Bí b́ò d̀è
3p FUT eat.FL
'They will eat'

Bí b́ò l̃í
3p FUT advise.FL
'They will advise'

These data show that this marker does not cause nor undergo any tonal changes.

3.3 Syntactic Structure

The basic word order and the phrase internal structure of Njém are presented here briefly in order to introduce the syntactic structure of the language.

3.3.1 Basic Word Order

Baker (1989) sets a parameter of word order for natural languages, stating that languages belong in one of three groups, namely, SVO, SOV and VSO. The basic word order for Njém is SVO. Consider the following data.

[S V O]
119) B́íh́í b́ò t̃l̀ò g̀à ñk̀àrà 'We will write the book'
1p FUT write the book

[S V O]
Ḿí l̀è-d̀è m̀è-d̀è 'I eat food'
1s PRES-eat C6-food

	[S		V		O]	
Mùrúm	bá	gwìhò	lè-kó'ó	njó				<i>'The man threw the stone'</i>
man	P2	throw	C5-stone	CON				

	[S		V		O]	
Mwôn	bá	lê:	mùrúm	njó				<i>'The child insulted the man'</i>
child	P2	insult	man	CON				

3.3.2 Phrase-Internal Structure

Heads are initial within phrases. Within the noun phrase, for example, the noun occurs in the initial position. This is in line with the idea that a head-initial language will have prepositions instead of postpositions, the genitive or the adjective would follow the noun and a relative clause would follow the noun it modifies (Boyd 1997: 80). Even though Njém agrees with this prediction, certain instances seem to falsify it. It has been noticed, for example, that the interrogative pronoun always precedes, rather than follows the noun. The examples that follow show the position of the noun and also demonstrate that the modifiers agree with the head.

120a)	Bè-kél	bâm	bé	<i>'These my sisters'</i>
	CL2-sister	my	these	

	Mì-kán	mjâm	wé	<i>'These my clothes'</i>
	CL4-cloth	my	these	

	Lè-kùwà CL5-spear	lâm my	lé this	<i>'This my spear'</i>
	Bì-dzàṅà CL8-fiancé	bjâ my	bjé these	<i>'These my fiancés'</i>
	ø-bvù' CL9-mortar	wàm my	njé this	<i>'This my mortar'</i>
b)	wá: which	kán cloth		<i>'which cloth?'</i>
	mjá: which	mí- CL4-day	múhú	<i>'which days?'</i>
	lá: which	lé-bí1 CL5-breast		<i>'which breast?'</i>
	bjá: which	bí-bán CL8-surety		<i>'which sureties?'</i>
	já: which	nùn bird		<i>'which bird?'</i>

The data in (a) show that the noun precedes its modifiers in a phrase and that the modifiers always agree with the noun they follow. Those in (b) show that unlike the rest of the modifiers, the interrogative pronoun always precedes the noun in a noun phrase.

3.4 Conclusion

In this chapter, the nominal and verbal morphology of Njém have been presented. The noun class system has been elaborately discussed together with the agreement patterns found in nominal forms. Furthermore, the elements that make up the stem and the pre-stem material such as the extensions, the tense markers and the subject markers have been discussed in detail. Three new phonological rules: Delateralization, Velar Nasal deletion and b-deletion that apply in Level 2 have been discussed. Five tonological rules: Final low docking, Tone spread, l-spread and h-delink, H-spread and L-delink, and Polar tone placement have also been discussed. In order to show the syntactic structure of Njém, the basic word order and the phrase-internal structure have been presented towards the end of this chapter.

CHAPTER 4

TONE IN NOUNS

4.0 Introduction

This chapter discusses the tonology of the Njém noun. It begins by a presentation of the morpheme structure of noun roots. Considering that the surface tone is not always identical to the underlying tone in languages, it goes ahead to present the surface realizations of the noun roots and to argue for the underlying tonal melodies of each. The associative constructions are also included in this chapter.

4.1 Morpheme Structure of Noun Roots

The most common morpheme structures that occur on Njém noun roots are CV and CVC. The less common CVV morpheme type also occurs. This morpheme structure is shown in the data in table 26.

CV	CVC	CVV
lè-dzè 'tooth'	nùn 'bird'	bí: 'quarter'
bî 'residence'	lè-bíl 'breast'	dzó: 'bed'
lè-bò 'foot'	són 'father'	dú: 'noise'
só 'friend'	dùr 'robe'	dú: 'extra part'
lǐ 'tree'	lâm 'trap'	

Table 26: Morpheme Structure of Noun Roots

4.2 Contrastive Underlying Tonal Melodies for Noun Roots

As mentioned above, Njém nouns have mostly monosyllabic and disyllabic roots. It has also been said that the language is a two-tone language – High and Low (Akumbu 2000: 1). The noun roots have a four-way contrastive underlying tonal melody, namely, H, L, HL, and LH as shown in the following examples. The singular nouns presented in the following table are taken from C7, which takes neither a segmental noun class prefix nor a floating tone class prefix.

Underlying Form	CVCV	CVC	CV
H	tʃíhó ‘island’	bím ‘quantity’	lí ‘tree’
	sámá ‘group’	bán ‘pledge’	lá ‘glass’
L	sèhè ‘tale’	nùn ‘bird’	dzò ‘laugh’
	dzàṅà ‘fiance’	tòm ‘fight’	mò ‘stomach’
HL	límà ‘dream’	lâm ‘trap’	ṅâ ‘nail’
	kúrà ‘blow’	nôr ‘vagina’	bî ‘residence’
LH	tʃìlà ‘taboo’	kòb ‘fault’	gũ ‘madman’
	ṅàṅà ‘elegance’	bàm ‘material’	ṅtù ‘quarrel’

Table 27: Contrastive Underlying Tonal Melodies for Noun Roots

Table 27 shows that some of the surface tones are different from the underlying melodies. An example is the underlying LH melody that surfaces as L. Evidence for assuming these underlying melodies will be discussed later. In section 4.2.1, it will be shown that the OCP and Stray Erasure conspire to justify the underlying H melody. These principles, as well as l-spread and h-delink, and HL Simplification are used in section 4.2.3 to justify the underlying HL melody. Similarly, the OCP, l-spread and h-delink, and Low Tone Spread are exploited in section 4.2.4 to justify the underlying LH melody. Notes on each melody follow.

4.2.1 H Melody

As indicated in the table, the underlying high melody surfaces as High on all syllables in words in isolation. In most other environments as well, this melody still surfaces as High, spread over the entire domain of the melody (this implies that the phoneme of tone is the complete melody associated with a particular morpheme. In other words, “tone is the property of the morpheme, and not of any particular segment or syllable in that morpheme” (Yip 2002: 72). However, in exclamatory utterances the High behaves differently. Consider first the following examples:

121a)	$\begin{array}{ccc} \text{H} & \text{H} & \text{H} \\ \text{---} & \text{---} & \text{---} \\ \text{---} & \text{---} & \text{---} \\ \text{sama} & & \text{je} \\ \text{group} & & \text{his} \end{array}$	→	$\begin{array}{ccc} \text{H} & \text{H} & \text{H} \\ \text{---} & \text{---} & \text{---} \\ \text{---} & \text{---} & \text{---} \\ \text{[sama} & \text{je]} & \end{array}$	‘his group’
-------	---	---	--	-------------

b) $\begin{array}{ccc} \underline{\underline{H}} & \underline{\underline{H}} & \underline{\underline{H}} \\ \text{t}\check{\text{ɰ}}\text{iho} & \text{je} & \\ \text{island} & \text{his} & \end{array} \rightarrow [\text{t}\check{\text{ɰ}}\text{iho} \text{je}] \quad \text{'his island'}$

c) $\begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{H}} & \underline{\underline{L}} \\ \text{mpala} & \text{ja:} & & \\ \text{camp} & \text{that} & & \end{array} \rightarrow [\text{mpala} \text{ja:}] \quad \text{'that camp'}$

d) $\begin{array}{ccc} \underline{\underline{H}} & \underline{\underline{H}} & \\ \text{je} & \text{la} & \\ \text{his} & \text{glass} & \end{array} \rightarrow [\text{je} \text{la}] \quad \text{'his glass'}$

In these declarative phrases, the high melody is found before both high tone and low tone morphemes as well as after high tone and low tone morphemes. No surface changes occur in such cases, as the following figure shows.

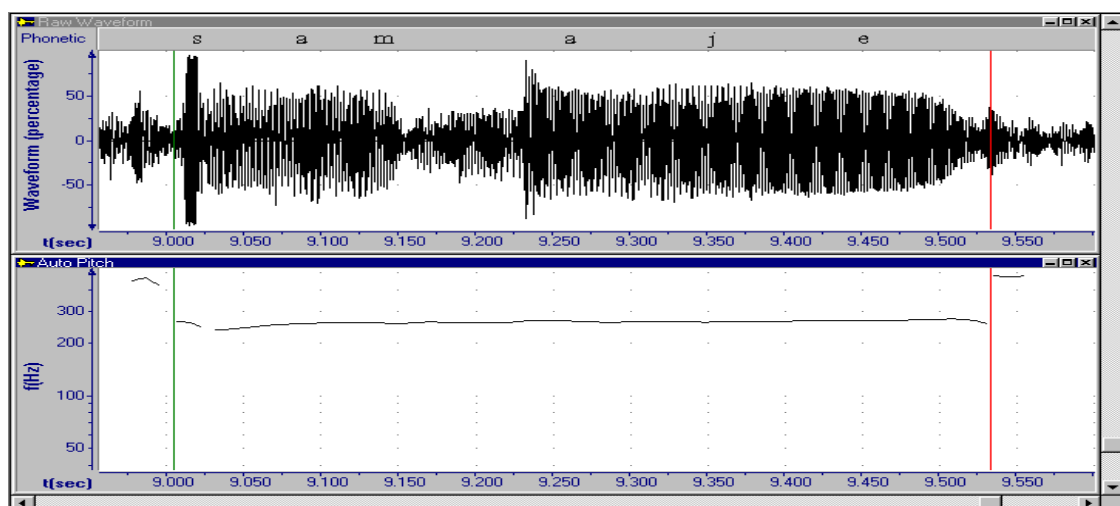


Figure 3: H Melody is realized as H

Figure 3 shows that the high tone is realized as High on both morphemes. Pitch traces of the data in (121) are shown in Appendix E: 1. It should be mentioned that the recordings used in this work occasionally show some interference due to the fact that a manual recorder instead of a digital recorder was used in the field to record the data. The pitch tracings however show up clearly and are demonstrative enough of the facts being presented.

Consider, subsequently the cases presented in (122) which show the occurrence of upstep when two high tones are contiguous.

- | | | | | | |
|-------|--|---|---|--|------------------------|
| 122a) | $\begin{array}{ccc} \underline{\underline{H}} & \underline{\underline{H}} & \underline{\underline{L}} & \underline{\underline{H}} \\ \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots \end{array}$ | → | $\begin{array}{ccc} \underline{\underline{H}} & \underline{\underline{H}} & \uparrow \underline{\underline{H}} \\ \dots & \dots & \dots \\ \dots & \dots & \dots \end{array}$ | | <i>'his group!'</i> |
| | sama je
group EXCL his | | [sama je] | | |
| | | | | | |
| b) | $\begin{array}{ccc} \underline{\underline{H}} & \underline{\underline{H}} & \underline{\underline{L}} & \underline{\underline{H}} \\ \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots \end{array}$ | → | $\begin{array}{ccc} \underline{\underline{H}} & \underline{\underline{H}} & \uparrow \underline{\underline{H}} \\ \dots & \dots & \dots \\ \dots & \dots & \dots \end{array}$ | | <i>'his island!'</i> |
| | tʃiho je
island EXCL his | | [tʃiho je] | | |
| | | | | | |
| c) | $\begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{H}} & \underline{\underline{L}} & \underline{\underline{H}} \\ \dots & \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots & \dots \end{array}$ | → | $\begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{H}} & \uparrow \underline{\underline{H}} \\ \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots \end{array}$ | | <i>'his camp!'</i> |
| | mpala je
camp EXCL his | | [mpala je] | | |
| | | | | | |
| d) | $\begin{array}{ccc} \underline{\underline{H}} & & \underline{\underline{L}} & & \underline{\underline{H}} \\ \dots & & \dots & & \dots \\ \dots & & \dots & & \dots \end{array}$ | → | $\begin{array}{ccc} \underline{\underline{H}} & & \uparrow \underline{\underline{H}} \\ \dots & & \dots \\ \dots & & \dots \end{array}$ | | <i>'his epilepsy!'</i> |
| | bu' je
epilepsy EXCL his | | [bu' je] | | |

e) $\begin{array}{ccc} \underline{\underline{H}} & \underline{\underline{L}} & \underline{\underline{H}} \\ \dots & \dots & \dots \\ \text{la} & & \text{je} \\ \text{glass} & \text{EXCL} & \text{his} \end{array} \rightarrow \begin{array}{cc} \underline{\underline{H}} & \uparrow \underline{\underline{H}} \\ \dots & \dots \\ [\text{la} & \text{je}] \\ & \text{'his glass!'} \end{array}$

These phrases reveal that when two high tone morphemes are combined in exclamatory phrases, the second is upstepped, as shown in figure 4.

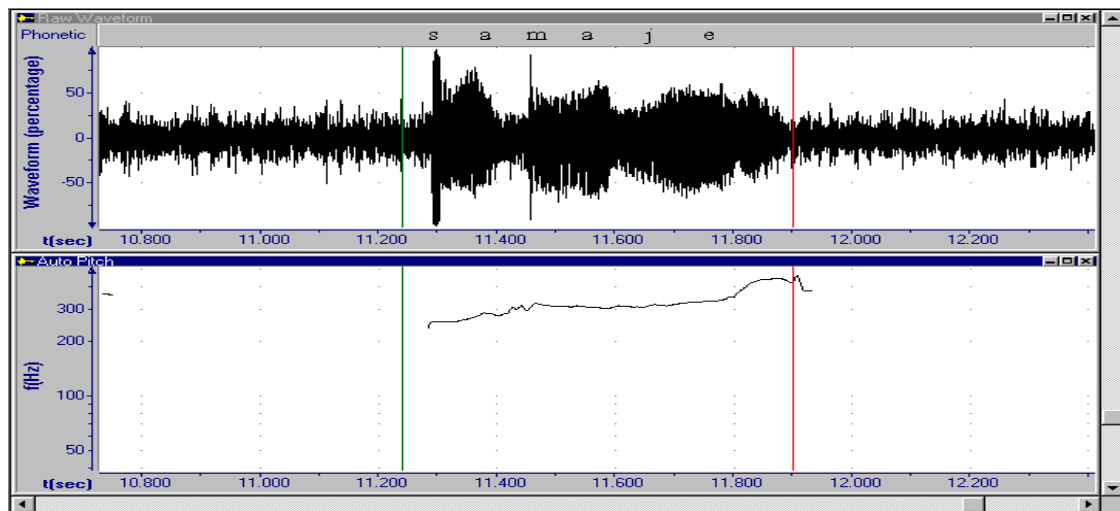
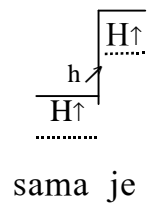


Figure 4: Upstep of H after another H

Figure 4 shows that the second high tone is higher than the first. Pitch traces of the data in (122) are given in Appendix E: 2. Upstep of the second high tone can be accounted for by assuming that there is a floating low tone expressing the exclamation, which occurs in between these two words. Notice that insertion (for example of this floating tone) may be caused in languages by the need for tones in prominent positions, by the OCP, or just by ‘specify’ (Yip 2002: 134). In Njém it is caused by

Phonetic representation



This derivation shows that in RTT a low tone that remains floating (and is eventually stray-erased) results in upstep of the following high tone whereas a floating tone whose low register feature spreads to and delinks the following high register causes downstep of that following high tone.

The treatment of upstep remains a particularly difficult problem. Clements (1996: 851-52) makes three claims to demonstrate that it is not symmetrical to downstep. The first is that upstep “is apparently restricted to H tones”. Secondly, upstep “is not known to be lexically distinctive”. Finally, “upstep is not known to apply recursively to create rising intonational staircases, at least in African languages”. However, Snider (1999:105-115) shows an upstep system that closely mirrors downstep systems. He illustrates that contrary to Clements’ assertions, upstep is lexically distinctive and does apply recursively to create rising intonational staircases. He also demonstrates, in line with Clements, that

upstep is restricted to H tones. He concludes that the counter-evidence provided against Clements' claims together with the facts put together by both of them call for a theoretical framework that treats upstep in a manner similar to downstep, with binary features and phonological rules. The upstep of high tones in Njém shown here and that of low tones shown in section 5.6 demonstrates that upstep is symmetrical to downstep. It illustrates that upstep is grammatical. It also demonstrates, contrary to Clements and Snider that both H and L tones participate in upstep. Finally, it shows that the binary features of RTT and phonological rules are relevant in the treatment of upstep.

4.2.2 L Melody

The underlying low melody surfaces as Low on all syllables. However, when this melody occurs at the end of an utterance, the tone is realized as a low fall (i.e., a low tone whose pitch falls even further). Consider the following data (notice that the down arrow, ↓, that occurs after the final low tone indicates the fall):

$\begin{array}{c} \underline{\underline{L}} \quad \underline{\underline{L}} \\ \dots \quad \dots \\ \underline{\underline{L}} \quad \underline{\underline{L}} \\ \dots \quad \dots \end{array}$	$\begin{array}{c} \underline{\underline{H}} \\ \dots \\ \underline{\underline{H}} \\ \dots \end{array}$	→	$\begin{array}{c} \underline{\underline{L}} \quad \underline{\underline{L}} \quad \underline{\underline{H}} \\ \dots \quad \dots \quad \dots \\ \underline{\underline{L}} \quad \underline{\underline{L}} \quad \underline{\underline{H}} \\ \dots \quad \dots \quad \dots \end{array}$
124a) bama	je		[bama je] <i>'his prostitution'</i>
prostitution	his		

- b) $\begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{L}} & \underline{\underline{H}} \\ \text{wunu} & \text{je} & \\ \text{peanut} & \text{his} & \end{array} \rightarrow \begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{L}} & \underline{\underline{H}} \\ [\text{wunu} & \text{je}] & \text{'his peanut'}$
- c) $\begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{H}} & \\ \text{nun} & \text{je} & \\ \text{bird} & \text{his} & \end{array} \rightarrow \begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{H}} & \\ [\text{nun} & \text{je}] & \text{'his bird'}$
- d) $\begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{L}} & \underline{\underline{L}} \\ \text{nə} & \text{wunu} & \\ \text{with} & \text{peanut} & \end{array} \rightarrow \begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{L}} & \underline{\underline{L}}_{\downarrow} \\ [\text{nə} & \text{wunu}] & \text{'with peanut'}$
- e) $\begin{array}{ccc} \underline{\underline{H}} & \underline{\underline{L}} & \\ \text{ja:} & \text{dur} & \\ \text{which} & \text{robe} & \end{array} \rightarrow \begin{array}{ccc} \underline{\underline{H}} & \underline{\underline{L}}_{\downarrow} & \\ [\text{ja:} & \text{dur}] & \text{'which robe'}$

In some African languages, the low tone falls or downglides utterance finally. It is pronounced at the lowest pitch level, as shown in figure 5.

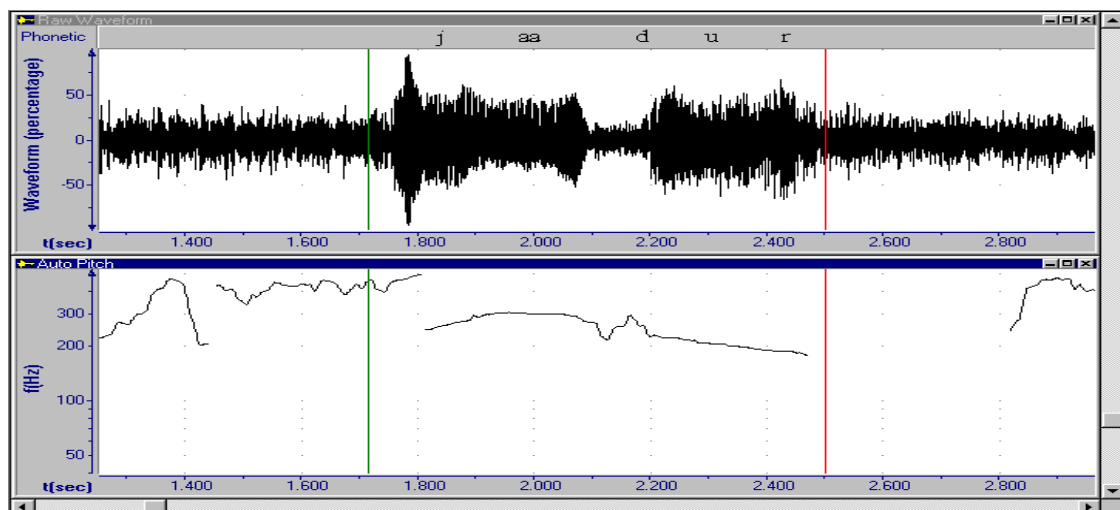
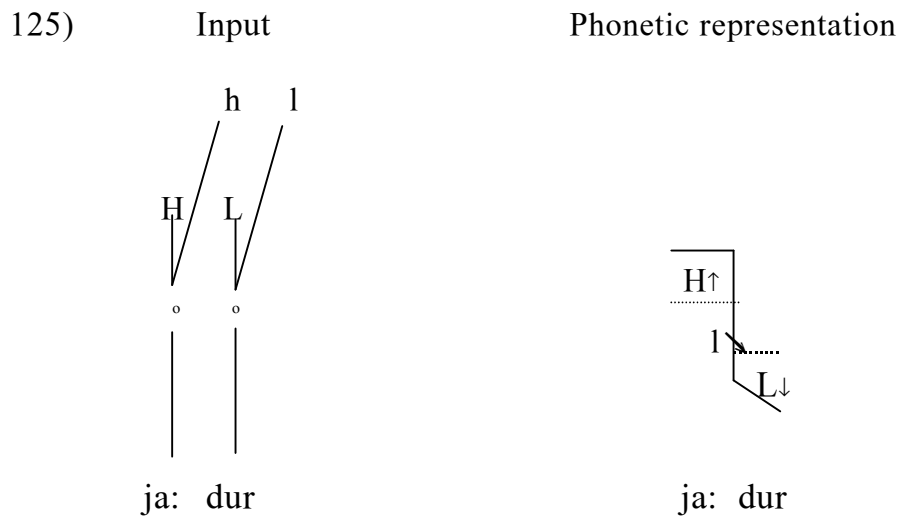


Figure 5: Downgliding of Final L

This figure shows that the final low tone falls. Appendix E: 3 shows the pitch traces of the data in (124). The downgliding of the final low tone is accounted for, in Njém, by assuming that it is the effect of *intonation* that causes any utterance-final associated low tone to be realized as a low-falling tone. The following representation shows this realization.



Notice that this fall is attributed in the phonetic component to low tones that are utterance-final. The slanted nature of the final tone shows that the pitch falls even lower than that of a normal low tone.

4.2.3 HL Melody

On disyllabic nouns, the HL melody is realized as a high tone followed by a low tone on two separate syllables. On monosyllabic nouns, it is realized as a HL tone glide on a single syllable. However,

when a high-toned morpheme follows the HL melody, the following high tone is automatically downstepped, as shown in the data below. Notice that downstep and downdrift of high tones is triggered by a specific phonological tone, typically a low tone in many African languages. This tone may be realized on the surface, in which case “the lowering is properly called automatic downstep, or downdrift, or the trigger may be a floating tone, in which case it is called non-automatic downstep, or just downstep” (Yip 2002). Some linguists still think, however, that the floating tone analysis of downstep has the disadvantage that there is no segmental precedent for a floating, phonetically unrealized feature exerting ongoing phonological effects. Amongst them, Clark (1990), and Yip (2002) prefer to talk about *covert low tones* that fail to surface. Even though this issue remains unsettled, it is agreed that there is a low tone, either floating or covert, that is present in a downstep environment. Observe the data in (126):

126a)	$\begin{array}{cc} \underline{\underline{LH}} \underline{\underline{L}} & \underline{\underline{H}} \\ \underline{\underline{\quad}} \underline{\underline{\quad}} & \underline{\underline{\quad}} \\ \text{ntama} & \text{je} \\ \text{pepper} & \text{his} \end{array}$	→	$\begin{array}{cc} \underline{\underline{LH}} \underline{\underline{L}} & \downarrow \underline{\underline{H}} \\ \underline{\underline{\quad}} \underline{\underline{\quad}} & \underline{\underline{\quad}} \\ [\text{ntama} & \text{je}] \end{array}$	‘ <i>his pepper</i> ’
b)	$\begin{array}{cc} \underline{\underline{H}} \underline{\underline{L}} & \underline{\underline{H}} \\ \underline{\underline{\quad}} \underline{\underline{\quad}} & \underline{\underline{\quad}} \\ \text{dina} & \text{je} \\ \text{reception} & \text{his} \end{array}$	→	$\begin{array}{cc} \underline{\underline{H}} \underline{\underline{L}} & \downarrow \underline{\underline{H}} \\ \underline{\underline{\quad}} \underline{\underline{\quad}} & \underline{\underline{\quad}} \\ [\text{dina} & \text{je}] \end{array}$	‘ <i>his reception</i> ’

c) $\begin{array}{ccc} \underline{\underline{H}} & \underline{\underline{L}} & \underline{\underline{H}} \\ \text{kura} & \text{je} & \\ \text{blow} & \text{his} & \end{array} \rightarrow [\text{kura} \quad \text{je}] \quad \text{'his blow'}$

d) $\begin{array}{ccc} \underline{\underline{H}} & \underline{\underline{L}} & \underline{\underline{H}} \\ \text{tʃigo} & \text{win} & \\ \text{referee} & \text{your} & \end{array} \rightarrow [\text{tʃigo} \quad \text{win}] \quad \text{'your referee'}$

e) $\begin{array}{ccc} \underline{\underline{H}} & \underline{\underline{L}} & \underline{\underline{H}} \\ \text{lima} & \text{gwɔr} & \\ \text{dream} & \text{one} & \end{array} \rightarrow [\text{lima} \quad \text{gwɔr}] \quad \text{'one dream'}$

In these data, the Low of the HL spreads its register to and delinks the following high register, following the rule of l-spread and h-delink. The following high tone is therefore realized on the preceding low register, resulting to downstep, as can be seen in the following figure.

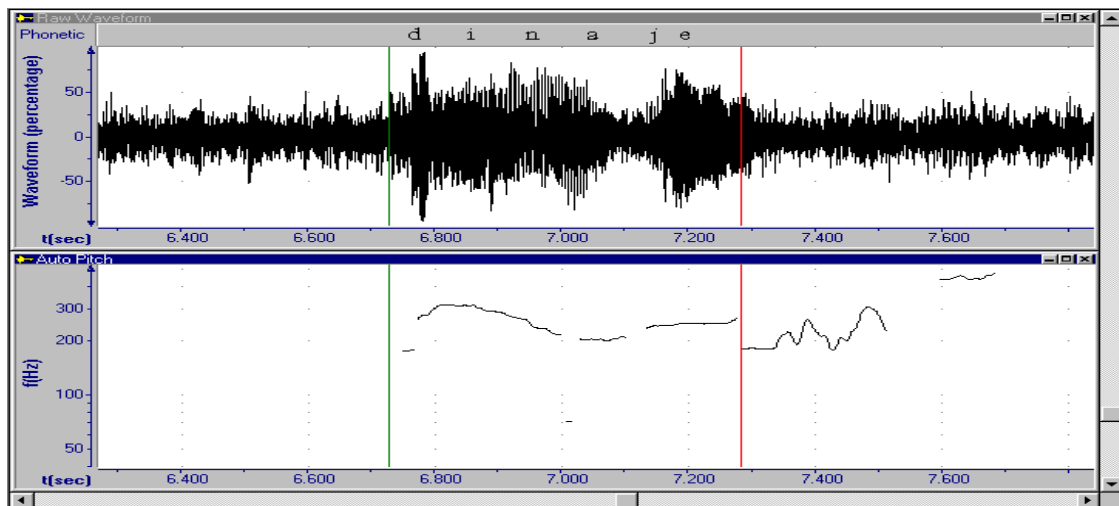
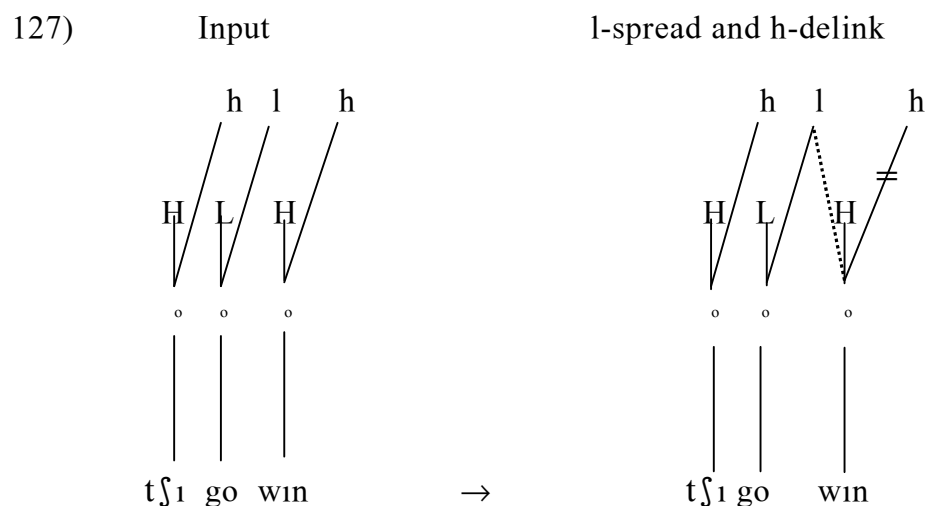


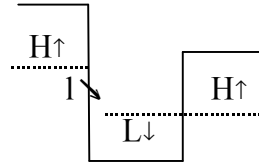
Figure 6: Downstep of second H in a H L H sequence

The figure shows that the second high tone is realized at a lower level than the first. Pitch traces of the data in (126) are shown in Appendix E: 4.

As said above, automatic downstep describes a situation where a high tone lowers after an overt low tone. It has been observed, for example in Chumburung, that “whenever a high tone follows a low tone within a phonological phrase, there is automatic downstep; i.e., the High is realized on the same (lower) register as the Low” (Snider 1999: 74). This assumption is also true for Njém, as shown in the data above. The spreading affects all of the TBUs that are linked to the TRN since the target of the spread is the TRN. The following derivation accounts for the above data:



Phonetic representation



tʃɪ go win

To handle this type of situation, it has also been observed “In a HLH sequence the low causes its own syllable to have a pitch at the low end of the pitch range. Second, it causes the whole pitch range to move down. This in turn means that the second high tone has a lower phonetic pitch than the first so that phonetically we get something like HLM” (Yip 2002: 11).

The monosyllabic nouns with the same HL melody behave differently when a high-toned morpheme is appended to them. Observe the examples below.

128a) $\begin{array}{cc} \text{HL} & \text{H} \\ \searrow & \underline{\quad} \\ \text{kul} & \text{je} \\ \text{race} & \text{his} \end{array} \quad \rightarrow \quad \begin{array}{cc} \underline{\text{H}} & \underline{\text{H}} \\ \underline{\quad} & \underline{\quad} \\ [\text{kul} & \text{je}] \end{array} \quad \text{'his race'}$

b) $\begin{array}{cc} \text{HL} & \text{H} \\ \searrow & \underline{\quad} \\ \text{lam} & \text{je} \\ \text{trap} & \text{his} \end{array} \quad \rightarrow \quad \begin{array}{cc} \underline{\text{H}} & \underline{\text{H}} \\ \underline{\quad} & \underline{\quad} \\ [\text{lam} & \text{je}] \end{array} \quad \text{'his trap'}$

c) $\begin{array}{cc} \text{HL} & \text{H} \\ \diagdown & \text{---} \\ \text{dzim} & \text{jin} \end{array} \rightarrow [\text{dzim} \text{jin}] \text{ 'your song'}$
 song your

d) $\begin{array}{cc} \text{HL} & \text{H} \\ \diagdown & \text{---} \\ \text{ʃeh} & \text{jin} \end{array} \rightarrow [\text{ʃeh} \text{jin}] \text{ 'your portion'}$
 portion your

e) $\begin{array}{cc} \text{HL} & \text{H} \\ \diagdown & \text{---} \\ \text{na} & \text{je} \end{array} \rightarrow [\text{na} \text{je}] \text{ 'her claw'}$
 claw her

In these data, the HL melody is realized as High yet its register is identical to that of the following high tone suffix that is attached after it, as can be seen in the figure below.

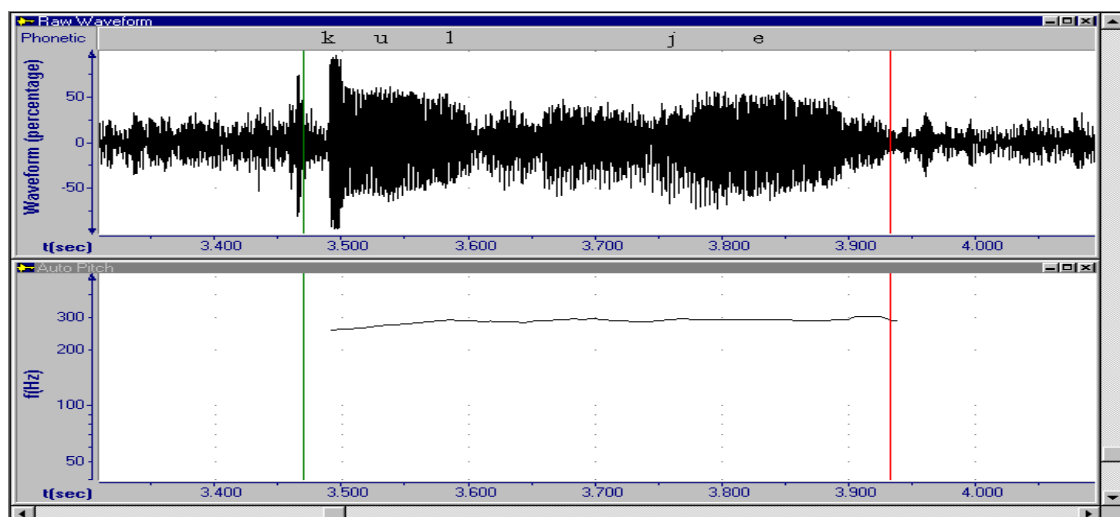
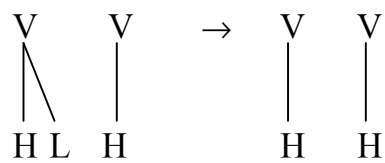


Figure 7: HL H surfaces as H

Figure 7 shows that both morphemes are realized on a high tone. Pitch traces of the data in (128) are shown in Appendix E: 5. To account for the fact that both morphemes are realized on a high tone, it is assumed that the HL contour tone is simplified to a high tone when it occurs before another high tone, as shown in the rule in (129). This is followed by the merging of the two high tones, allowing both to be realized on the same register.

129) T-rule 5: HL Simplification

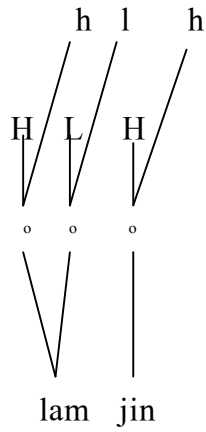


This rule says that a HL contour tone is simplified to a high tone when it is followed by a high tone.

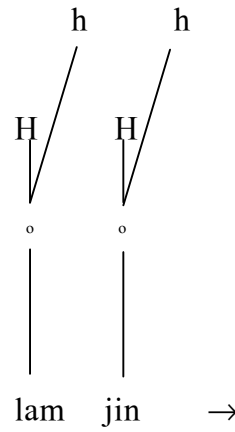
In order to understand how these processes work, follow the derivation below.

130)

Input



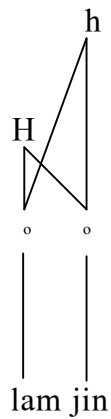
HL Simplification



→

→

Merger



Phonetic representation



lam jin

4.2.4 LH Melody

For its part, the LH melody surfaces as a non-falling Low on all syllable types, as reflected in the following words taken from table 27 (page 141).

- 131a) $\begin{array}{c} \text{LH} \\ \diagdown \\ \text{g}\bar{\text{u}} \end{array} \rightarrow \begin{array}{c} \text{L} \\ \text{[g}\bar{\text{u}}] \end{array} \quad \text{'madman'}$
- b) $\begin{array}{c} \text{L LH} \\ \text{ntu} \end{array} \rightarrow \begin{array}{c} \text{L L} \\ \text{[ntu]} \end{array} \quad \text{'quarrel'}$
- c) $\begin{array}{c} \text{LH} \\ \diagdown \\ \text{k}\bar{\text{o}}\text{b} \end{array} \rightarrow \begin{array}{c} \text{L} \\ \text{[k}\bar{\text{o}}\text{b}] \end{array} \quad \text{'fault'}$
- d) $\begin{array}{c} \text{L H} \\ \text{t}\bar{\text{ɕ}}\bar{\text{i}}\text{la} \end{array} \rightarrow \begin{array}{c} \text{L L} \\ \text{[t}\bar{\text{ɕ}}\bar{\text{i}}\text{la}] \end{array} \quad \text{'taboo'}$
- e) $\begin{array}{c} \text{L H} \\ \text{s}\bar{\text{o}}\bar{\text{g}}\bar{\text{o}} \end{array} \rightarrow \begin{array}{c} \text{L L} \\ \text{[s}\bar{\text{o}}\bar{\text{g}}\bar{\text{o}}] \end{array} \quad \text{'duck'}$

These data show that the underlying LH melody surfaces as low, as shown in figure 8.

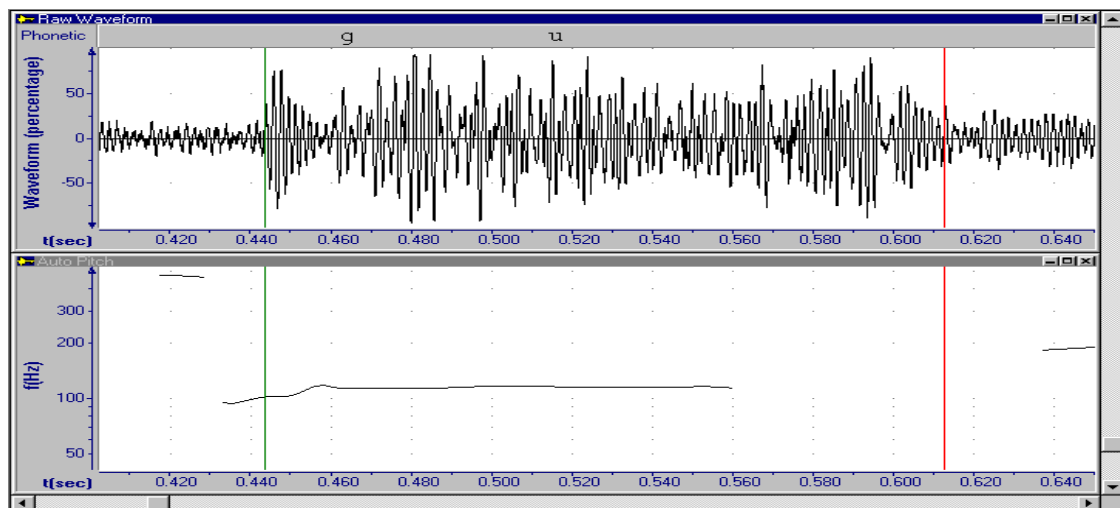
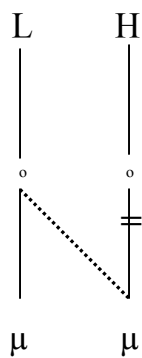


Figure 8: LH Melody surfaces as L

As can be seen in figure 8, the underlying LH melody surfaces as a non-falling Low. Appendix E: 6 shows the pitch traces of the data in 131.

The data in (131) can be analysed as follows: the low tone of the LH melody spreads its TRN to the high tone and delinks it completely. Notice that this happens within a given domain of tone, in this case a phonological word. This is captured by the following rule:

132) T-rule 6: Low Tone Spread (LTS)



This rule says that a low tone spreads from its TRN onto the following high TBU, and in a separate process, delinks that high tone.

It could be argued that the high tone is floating in this melody and remains as such in environments where this melody surfaces as Low and in environments where it surfaces as LH it docks leftwards. This assumption is discarded by the fact that the docking or failure to dock of

this floating high tone will not be constant. Consider, for example, what happens with the following sets of data.

133a) $\begin{array}{c} \text{LH} \\ \diagdown \\ \text{k}\bar{\text{o}}\text{b} \end{array} \rightarrow \begin{array}{c} \text{L} \\ \text{[k}\bar{\text{o}}\text{b]} \end{array} \quad \text{'fault'}$

$\begin{array}{c} \text{L H} \\ \text{t}\bar{\text{ʃ}}\text{ila} \end{array} \rightarrow \begin{array}{c} \text{L L} \\ \text{[t}\bar{\text{ʃ}}\text{ila]} \end{array} \quad \text{'taboo'}$

b) $\begin{array}{c} \text{LH} \quad \text{H} \\ \diagdown \quad \text{jin} \\ \text{k}\bar{\text{o}}\text{b} \quad \text{your} \\ \text{fault} \end{array} \rightarrow \begin{array}{c} \text{L} \quad \text{H} \\ \text{[k}\bar{\text{o}}\text{b} \quad \text{jin]} \end{array} \quad \text{'your fault'}$

$\begin{array}{c} \text{L H} \quad \text{H} \\ \text{t}\bar{\text{ʃ}}\text{ila} \quad \text{gw}\bar{\text{o}}\text{r} \\ \text{taboo} \quad \text{one} \end{array} \rightarrow \begin{array}{c} \text{L L} \quad \text{H} \\ \text{[t}\bar{\text{ʃ}}\text{ila} \quad \text{gw}\bar{\text{o}}\text{r]} \end{array} \quad \text{'one taboo'}$

c) $\begin{array}{c} \text{LH} \quad \text{L} \\ \diagdown \quad \text{ni} \\ \text{k}\bar{\text{o}}\text{b} \quad \text{this} \\ \text{fault} \end{array} \rightarrow \begin{array}{c} \text{LH} \quad \text{L}\downarrow \\ \diagdown \quad \text{ni} \\ \text{[k}\bar{\text{o}}\text{b} \quad \text{ni]} \end{array} \quad \text{'this fault'}$

$\begin{array}{c} \text{L H} \quad \text{L} \\ \text{t}\bar{\text{ʃ}}\text{ila} \quad \text{ni} \\ \text{taboo} \quad \text{this} \end{array} \rightarrow \begin{array}{c} \text{L H} \quad \text{L}\downarrow \\ \text{[t}\bar{\text{ʃ}}\text{ila} \quad \text{ja:]} \end{array} \quad \text{'that taboo'}$

In (a) nouns are given in isolation. High-toned morphemes are appended to the LH melody in (b), and low-toned morphemes follow those in (c). In (a) and (b), docking fails to occur but in (c), it does. If a claim is made that docking fails to apply because the floating tone is followed by a high-toned morpheme, it will still be required to say why it does not apply to the forms in (a). Again an explanation will still have to be given for the absence of the low tone on the second syllable of two-syllable nouns like [tʃìlá] that would be expected to surface as *[tʃìlǎ] if there were a floating high tone that docked. This renders the picture more complicated.

Even if it were possible to simplify the formulations and conclude that there is an underlying floating high tone, it still does not allow one to collapse the L and LH melodies into one because of the failure of low tones to downglide utterance-finally in the LH melody.

Notice that this nondowngliding Low, which in such environments does not fall contrasts with the gliding low tone shown in section 4.2.2. Since utterance-final low tones are phonetically realized as falling in many African languages (Snider 1999: 119), the fact that the Low of this LH melody is not utterance-final (due to the final floating High, that

- 135a) $\begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{H}} \\ \underline{\underline{}} & \underline{\underline{}} & \underline{\underline{}} \\ \underline{\underline{}} & \underline{\underline{}} & \underline{\underline{}} \end{array} \quad \rightarrow \quad \begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{L}} & \underline{\underline{H}} \\ \underline{\underline{}} & \underline{\underline{}} & \underline{\underline{}} \\ \underline{\underline{}} & \underline{\underline{}} & \underline{\underline{}} \end{array}$
 ɕula jin 'your sermon'
 sermon your
- b) $\begin{array}{ccc} \underline{\underline{LH}} & & \underline{\underline{H}} \\ \underline{\underline{}} & & \underline{\underline{}} \\ \underline{\underline{}} & & \underline{\underline{}} \end{array} \quad \rightarrow \quad \begin{array}{cc} \underline{\underline{L}} & \underline{\underline{H}} \\ \underline{\underline{}} & \underline{\underline{}} \\ \underline{\underline{}} & \underline{\underline{}} \end{array}$
 di gwɔr 'one residence'
 residence one
- c) $\begin{array}{ccc} \underline{\underline{LH}} & \underline{\underline{H}} & \\ \underline{\underline{}} & \underline{\underline{}} & \\ \underline{\underline{}} & \underline{\underline{}} & \end{array} \quad \rightarrow \quad \begin{array}{cc} \underline{\underline{L}} & \underline{\underline{H}} \\ \underline{\underline{}} & \underline{\underline{}} \\ \underline{\underline{}} & \underline{\underline{}} \end{array}$
 kɔb jin 'your fault'
 fault your
- d) $\begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{H}} \\ \underline{\underline{}} & \underline{\underline{}} & \underline{\underline{}} \\ \underline{\underline{}} & \underline{\underline{}} & \underline{\underline{}} \end{array} \quad \rightarrow \quad \begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{L}} & \underline{\underline{H}} \\ \underline{\underline{}} & \underline{\underline{}} & \underline{\underline{}} \\ \underline{\underline{}} & \underline{\underline{}} & \underline{\underline{}} \end{array}$
 tɕila je 'his taboo'
 taboo his
- e) $\begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{H}} \\ \underline{\underline{}} & \underline{\underline{}} & \underline{\underline{}} \\ \underline{\underline{}} & \underline{\underline{}} & \underline{\underline{}} \end{array} \quad \rightarrow \quad \begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{L}} & \underline{\underline{H}} \\ \underline{\underline{}} & \underline{\underline{}} & \underline{\underline{}} \\ \underline{\underline{}} & \underline{\underline{}} & \underline{\underline{}} \end{array}$
 sɔgɔ jin 'your duck'
 duck your

These data show that the underlying LH melody is realised as L when found before a high-toned morpheme, as can be seen in the following figure.

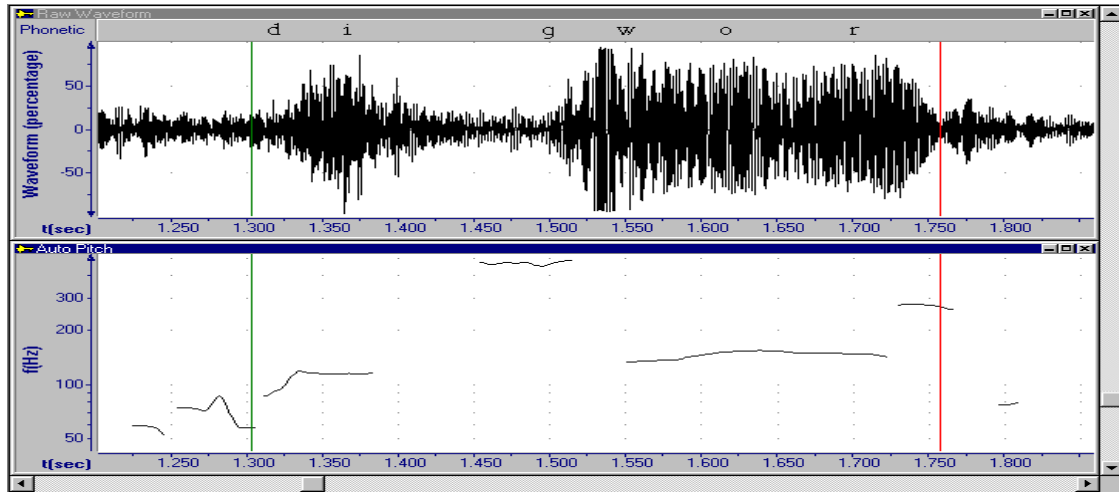
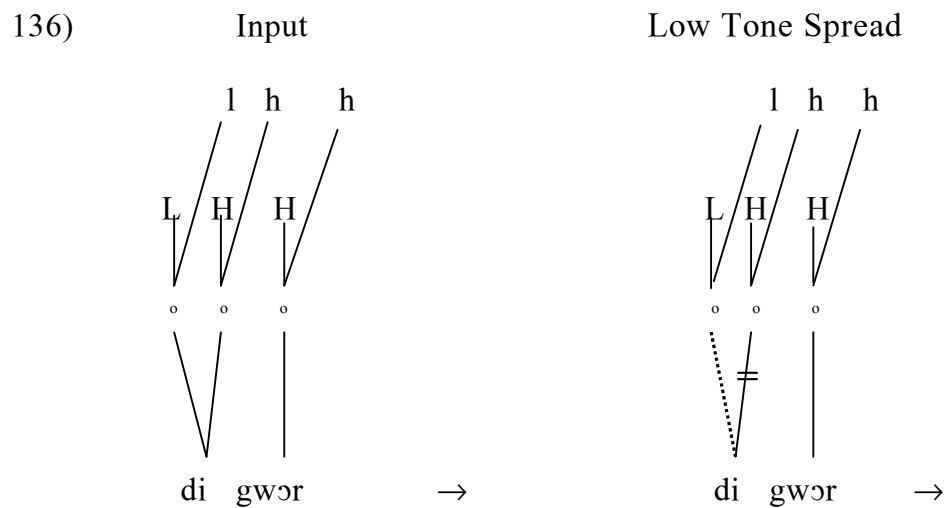


Figure 9: LH Melody is realized as L before H

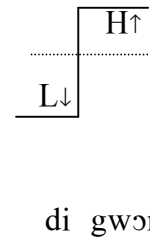
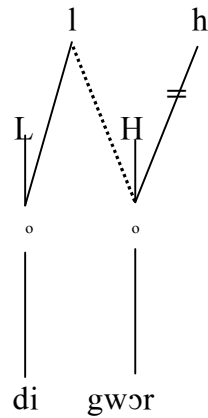
Figure 9 shows that the underlying LH melody surfaces as Low when found before high-toned morphemes. Pitch traces of the data in (135) are shown in Appendix E: 7.

The data in (135) can therefore be derived as follows.



l-spread and h-delink

Phonetic representation



However, as said briefly above, when a low-toned suffix is added after the LH melody, this LH melody surfaces as the underlying LH. Examples are presented in (137).

137a) $\begin{matrix} \text{LH} & \text{L} \\ \diagup & \text{---} \\ \text{ntu} & \text{ni} \\ \text{quarrel} & \text{this} \end{matrix} \rightarrow \begin{matrix} \text{LH} & \text{L}\downarrow \\ \diagup & \text{---} \\ [\text{ntu} & \text{ni}] \\ & \text{'this quarrel'} \end{matrix}$

b) $\begin{matrix} \text{LH} & \text{L} \\ \diagup & \text{---} \\ \text{kɔb} & \text{ja:} \\ \text{fault} & \text{that} \end{matrix} \rightarrow \begin{matrix} \text{LH} & \text{L}\downarrow \\ \diagup & \text{---} \\ [\text{kɔb} & \text{ja:}] \\ & \text{'that fault'} \end{matrix}$

c) $\begin{matrix} \text{LH} & \text{L} \\ \diagup & \text{---} \\ \text{di} & \text{ja:} \\ \text{residence} & \text{that} \end{matrix} \rightarrow \begin{matrix} \text{LH} & \text{L}\downarrow \\ \diagup & \text{---} \\ [\text{di} & \text{ja:}] \\ & \text{'that residence'} \end{matrix}$

d) $\begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{L}} \\ \underline{\underline{\text{ɕ}}\underline{\underline{ù}}\underline{\underline{l}}\underline{\underline{á}} & & \underline{\underline{n}}\underline{\underline{i}} \\ \text{sermon} & & \text{this} \end{array} \rightarrow \begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{L}}\downarrow \\ \underline{\underline{\text{ɕ}}\underline{\underline{ù}}\underline{\underline{l}}\underline{\underline{á}} & & \underline{\underline{n}}\underline{\underline{i}} \\ [\text{ɕ}ula & & ni] \text{ 'this sermon'} \end{array}$

e) $\begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{L}} \\ \underline{\underline{\text{t}}}\underline{\underline{\text{ɕ}}}\underline{\underline{ì}}\underline{\underline{l}}\underline{\underline{á}} & & \underline{\underline{j}}\underline{\underline{à}}\underline{\underline{:}} \\ \text{taboo} & & \text{that} \end{array} \rightarrow \begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{L}}\downarrow \\ \underline{\underline{\text{t}}}\underline{\underline{\text{ɕ}}}\underline{\underline{ì}}\underline{\underline{l}}\underline{\underline{á}} & & \underline{\underline{j}}\underline{\underline{à}}\underline{\underline{:}} \\ [\text{t}ɕila & & ja:] \text{ 'that taboo'} \end{array}$

The fact that this LH melody occurs as such on the surface suggests that the low tone morpheme appended to these roots blocks Low Tone Spread from occurring, allowing the surface forms to be similar to the underlying LH melody, as shown in the following figure.

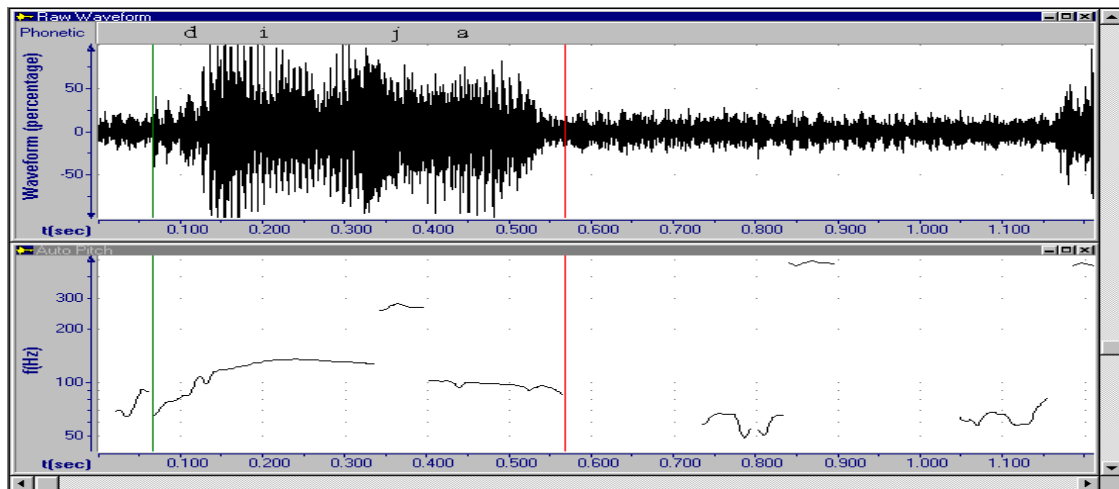
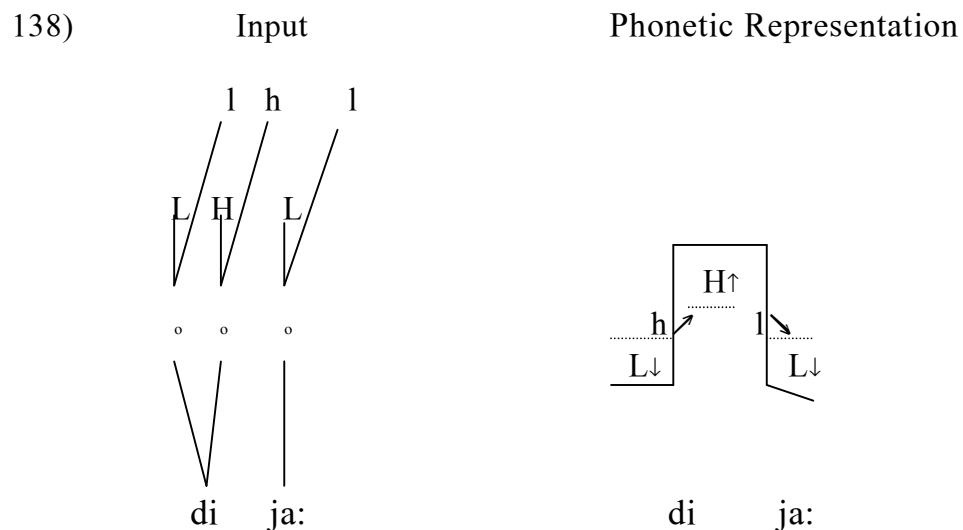


Figure 10: LH melody surfaces as LH before L

This could also be viewed as an OCP constraint, involving low tones. As said earlier, the OCP is a cover term for a set of principles that conspire in many languages to prohibit the occurrence of adjacent

identical features on nonskeletal tiers (cf. McCarthy 1986, Odden 1986, 1988, Myers 1997, Snider 1999). In Njém this principle prohibits adjacent identical tones within a single morpheme, across morpheme boundaries, as well as across word boundaries. Pitch traces of the data in (137) are shown in Appendix E: 8. The representation that follows shows that if Low Tone Spread occurs, the OCP will be violated.



4.3 Tonal Effect of Noun Class Prefixes

As mentioned earlier, a typical Njém noun consists of a prefix and a stem, with some nouns occurring with zero prefixes. In presenting the noun class system, it was clearly shown which classes take which prefixes, and which do not take any prefix at all. Generally, the prefixes, when they occur, bear low tones. However, in some situations, when a

high-toned morpheme occurs before a word that comprises a prefix and a stem, the prefix surfaces with a high tone. The following data illustrate this:

- 139a) nè lè-píhò *'with behind'*
 with CL5-behind
- nè lè-bú'ú *'with anger'*
 with CL5-anger
- nè lè-bí1 *'with breast'*
 with CL5-breast
- nè lè-pùlù *'with soup'*
 with CL5-soup
- nè mì-nùm *'with mouths'*
 with CL4-mouth
- nè bì-bán *'with sureties'*
 with CL8-surety
- b) lé lé-píhò *'his behind'*
 his CL5-behind
- lé lé-bú'ú *'his anger'*
 his CL5-anger
- lé lé-bí1 *'his breast'*
 his CL5-breast

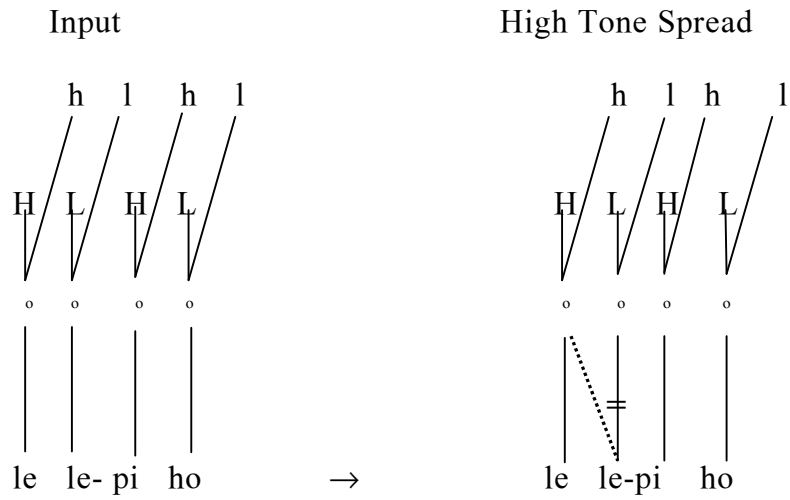
lé lé-pùlù *'his soup'*
his CL5-soup

mjé mí-nùm *'his mouths'*
his CL4-mouth

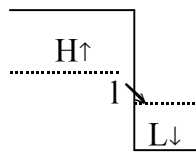
bjé bí-bán *'his sureties'*
his CL8-surety

The examples in (a) show that the prefixation of a low-toned morpheme does not cause any change in the tone of the following TBU. In (b) the noun class prefix surfaces with a high tone when a high-toned morpheme precedes the word. Here, the high tone spreads from the preceding high tone morpheme onto the noun class prefix. Notice that even though the structural description for the application of downstep in Njém is met, it fails to apply. A plausible explanation is that the tone that spreads is replacive and as such neutralizes the presence of the prelinked low tone after it is delinked. This claim is demonstrated in section 4.5.2 where it is shown that *High Tone Spread* occurs only when the noun takes a prefix. When it so happens, the tone that spreads replaces the tone of the target entirely. The data in (139b) can therefore be derived as follows:

140)



Phonetic representation



le lepiho

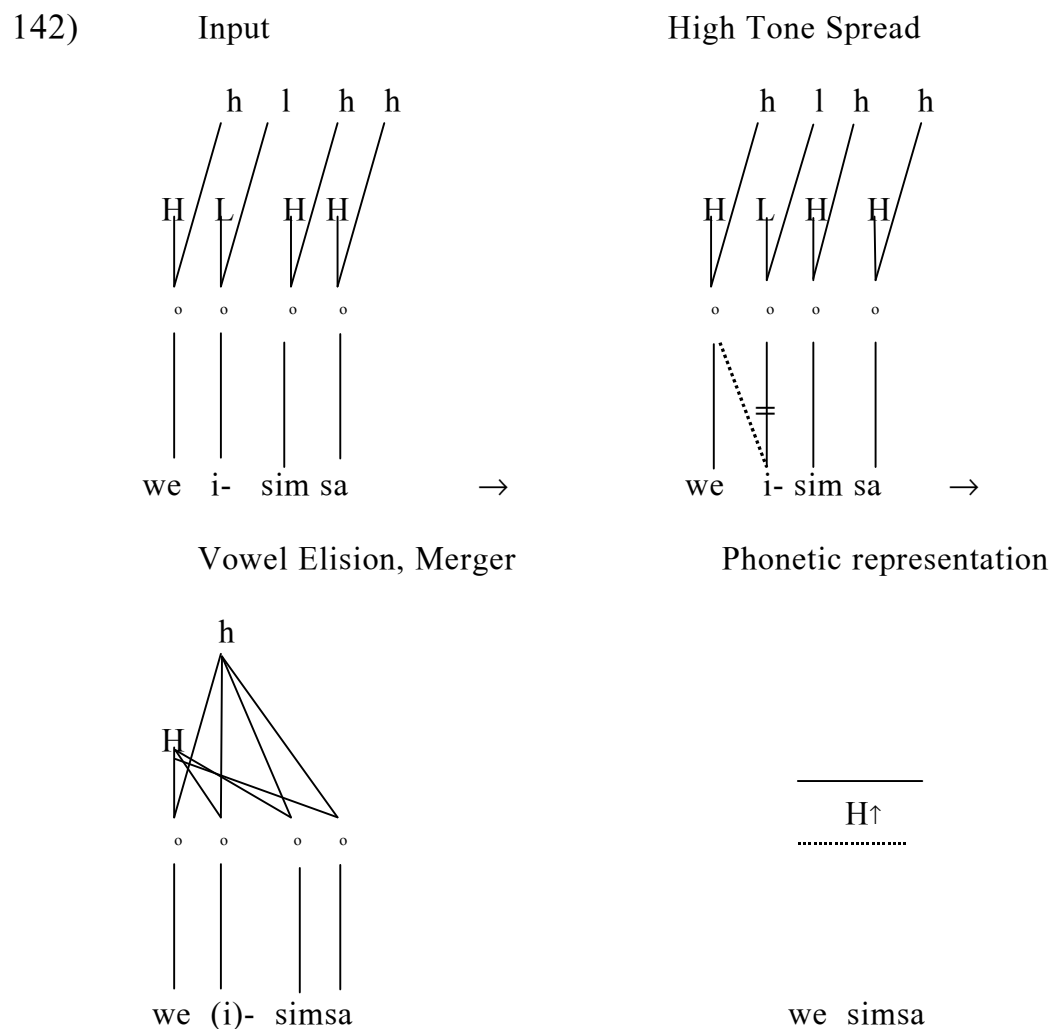
In yet other instances, the addition of the same high-toned prefix causes the deletion of the class prefix but downstep does not occur as well. The following data are illustrative:

141) wé símsá *'his thought'* cf. ì-símsá
 his thought

wé kúrgá *'his ill-luck'* cf. ì-kúrgá
 his ill-luck

wé kúmá *'his wealth'* cf. ì-kúmá
his wealth

In these data, it is assumed that the vowel of the class prefix is deleted because it occurs after another vowel since a sequence of such vowels is not accepted in Njém (see section 2.6.2.2). The derivation in (142) shows how the data in (141) are derived.



4.4 Tone in Derived Nouns

Mention has been made that two categories of derived nouns exist, namely, those that take a homorganic nasal prefix, and those that take a lateral suffix. During these derivations, no tonological or phonological changes occur. When nouns are derived from low tone verbs, they surface with low tones. Examples are given in (143).

- 143) ì-bjà *'fighter'*
 ì-bî: *'seer'*
 n-dùlù *'smoker'*
 n-dzìmà *'dreamer'*

When the nouns are derived from high tone verbs, they also surface with high tones. The examples in (144) show nouns derived from high tone verbs.

- 144) tsé-l *'liar'*
 n-kó' *'wanderer'*
 lé-l *'player'*
 n-gómló *'sweeper'*
 n-dzíbó *'thief'*

An observation that can be made is that neither the nasal prefix nor the lateral suffix occurs with the plural of the derived nouns. Observe the plurals given in the following data.

145a)	bè-bjà	<i>'fighters'</i>
	bè-bî:	<i>'seers'</i>
	bè-dùlù	<i>'smokers'</i>
	bè-dzìmà	<i>'dreamers'</i>
b)	bè-tsé	<i>'liars'</i>
	bè-kó'	<i>'wanderers'</i>
	bè-lé	<i>'players'</i>
	bè-gómló	<i>'sweepers'</i>

It can be seen that in both sets of data, only the CL2 marker that indicates plurality, as discussed in section 3.1.3.1, occurs with these plural forms. The absence of the derived noun affixes can be attributed to deletion. The problem with this assumption is the difficulty to account for such a deletion. A possible explanation would be to say that the nasal prefix is deleted when it occurs between a vowel and a consonant and that the lateral suffix on its part is deleted when it occurs in word-final position. These assumptions are rejected by data like the following:

146a)	mè̀m-pî̀r	<i>'chests'</i>
	mì-̀ndzà	<i>'intestines'</i>
	bì-̀ṅkúru	<i>'buttocks'</i>
b)	tsé-l	<i>'liar'</i>
	sé-l	<i>'worker'</i>
	lé-l	<i>'player'</i>

These data demonstrate that the affixes are not deleted in such environments. This implies that the markers are not affixed at all when the derived noun is in the plural.

4.5 Tone in Noun Phrases

4.5.1 Morphosyntactic Structure of the Noun Phrase

A noun phrase is a noun in combination with other nominal modifiers. It can as well include a noun pronounced in isolation. In a Njém noun phrase, the head noun can occupy the initial position and be followed by modifying elements where they occur. However, in question formation, the interrogative adjective obligatorily occupies the initial position. The possessive pronoun “his/her”, on its part behaves in a flexible manner, occurring either before or after the head noun in a noun phrase. Whether this freedom is determined by functions in discourse

structure remains an open question. These patterns are shown in the following examples.

- 147a) nùm wá: 'that mouth' *wá: nùm 'that mouth'
 mouth that
- kél wàm 'my sister' *wàm kél 'my sister'
 sister my
- tʃwítsén gwór 'one star' *gwór tʃwítsén 'one star'
 star one
- mì-múhú mín 'your days' *mín mì-múhú 'your days'
 CL4-day your
- mém tʃí tʃíjǎ 'young aunt' *tʃí tʃíjǎ mém 'young aunts'
 aunt small
- b) wá: kán 'which cloth?' *kán wá: 'which cloth?'
 which cloth
- mjá: mí- múhú 'which days?' *mì-múhú mjá: 'which days?'
 which CL4-day
- lá: lé-bíl 'which breast?' *lè-bíl lá: 'which breast?'
 which CL5-breast
- bjá: bí-bán 'which sureties?' *bì-bán bjá: 'which sureties?'
 which CL8-surety

	já: nùn which bird	<i>'which bird?'</i>	*nùn já: <i>'which bird?'</i>
c)	wé ñkúró her buttock	<i>'her buttock'</i>	
	ñkúró wé buttock her	<i>'her buttock'</i>	
	wé kòh his parrot	<i>'his parrot'</i>	
	kòh wé parrot his	<i>'his parrot'</i>	
	wé límà his dream	<i>'his dream'</i>	
	límà wé dream his	<i>'his dream'</i>	
	wé ɲòŋ his mother	<i>'his mother'</i>	
	ɲòŋ wé mother his	<i>'his mother'</i>	

The examples in (a) show that the noun occurs in the initial position in noun phrases. Those in (b) show that the interrogative

adjective occupies the initial position whereas those in (c) demonstrate that the third person singular possessive pronoun alone occurs variably before or after the noun in noun phrases. Notes on the tonal process that occurs within the noun phrase follow below.

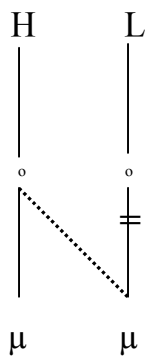
4.5.2 High Tone Spread

Tone spreading in African languages is one of the ways that show the mobility of tone, which is characteristic of these languages. Either the high or low tones can spread but generally the high tone participates in spreading more than the low tone. Spreading in itself can be bi-directional. However, spreading to the right is very common, but to the left is much rarer (Yip 2002: 10). It should be mentioned that movement and tone spreading may be motivated by attraction to particular positions such as domain heads or domain edges, by OCP or simply by the need to provide each syllable with its own tone. It may be unbounded or constrained by a locality requirement as in Njém. The data in (148b) demonstrate a situation of high tone spreading in which a high tone spreads to the following noun prefix. The data also emphasize that in Njém, spreading across words occurs only when a noun has a prefix. Compare the forms in (a) with those in (b).

- 148a) wá: òdùlù *'which smoker'*
 which smoker
- já: nùn *'which bird'*
 which bird
- wá: là' *'which horn'*
 which horn
- já: bán *'which surety'*
 which surety
- wá: kél *'which girl'*
 which girl
- b) bá: bé-dùlù *'which smokers'*
 which CL2-smoker
- bjá: bí-nùn *'which birds'*
 which CL8-bird
- mjá: mí-là' *'which horns'*
 which CL4-horn
- bjá: bí-bán *'which sureties'*
 which CL8-surety
- bá: bé-kél *'which girls'*
 which CL2-girl

The examples in (b) show that the high tone of the interrogative pronoun spreads onto the class prefix of the noun that follows it. As mentioned in section 4.3, the high tone that spreads is replacive. This claim also finds support in the failure of downstep to occur in high tone roots. The following rule shows how high tone spread occurs.

149) T-rule 7: High Tone Spread (HTS)

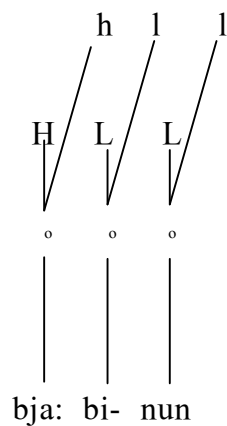


HTS spreads a high tone from its TRN onto the following low-toned TBU, delinking the low tone.

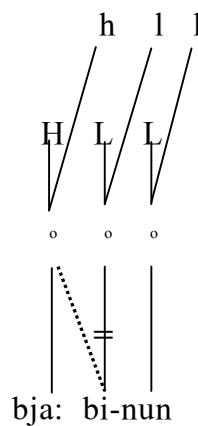
For an understanding of how the data in (148b) are derived, see the following derivation.

150)

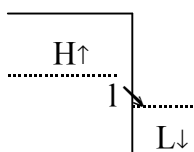
Input



High Tone Spread



Phonetic representation



bja: binun

This derivation also shows that in RTT, a long vowel can be dominated by a single TRN. This is so because when the tonal specifications for adjacent tonal root nodes are identical, they are allowed to merge into one. Because of the fact that the merged and non-merged representations are considered to be equivalent it is irrelevant whether they are represented as merged or not. When one needs access to an individual TBU then they must be represented separately. The fact that

the two low tones are not merged confirms that High Tone Spread causes the target low tone to be replaced completely.

4.6 Associative Constructions

The associative constructions in Njém can be grouped into three sets depending on the type of associative marker they take. The marker can either be null, an overt high-toned morpheme or a floating high tone. In the following table the various noun classes are grouped following the associative marker that occurs with them.

Class	Association Marker
CL1, and 9	zero morpheme (\emptyset)
CL2, 4, 5, 6, 8, and 11	overt high-toned morpheme (bé, mí, lé, mé, bí, and mǐ)
CL3, and 7	floating high tone (´)

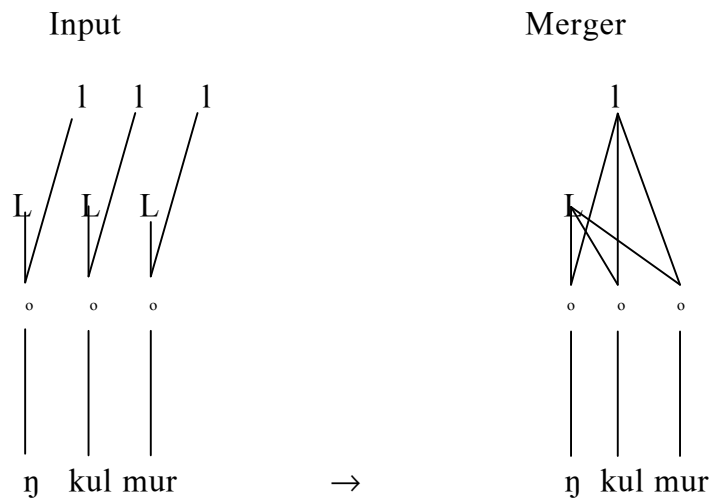
Table 28: Associative Markers

The first set of examples that follows contains class one and class nine nouns in initial position (N1 position). In this set, there is neither an overt morpheme nor a tone that marks *association*. The data that follow are illustrative.

151)	m-ùr	ḡkàḡ	<i>'city dweller'</i>
	CL1-person	town	
	m-ùr	kél	<i>'owner of sister'</i>
	CL1-person	sister	
	m-ùmá	sóḡ	<i>'father of woman'</i>
	CL1-woman	father	
	ø-ḡkùl	mùr	<i>'strength of man'</i>
	CL9-force	person	
	ø-ḡpwé	dzûm	<i>'dog of husband'</i>
	CL9-dog	husband	
	ø-ḡkàḡ	mùr	<i>'city dweller'</i>
	CL9-town	person	

In these data, the class one and class nine nouns do not undergo nor cause any tonal changes in the associative construction when they occur as the initial nouns. Similarly, the fact that downstep does not occur with the H H examples shows that there is no intervening low tone which typically marks agreement in CL1 and CL9 in Bantu. This therefore confirms that there is no intervening tone that represents the associative marker in these cases. The following representation shows

152)



Phonetic representation

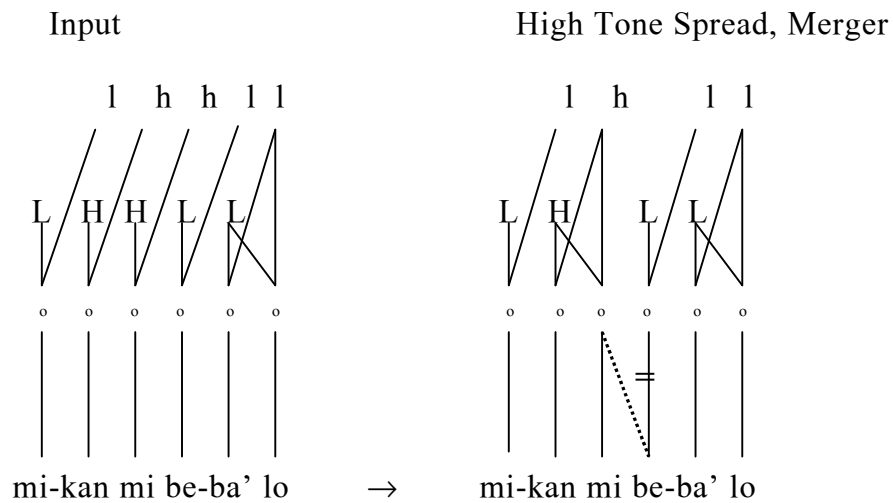
$$\begin{array}{c}
 \dots\dots\dots \\
 L \downarrow \\
 \hline
 \end{array}$$

ŋkul mur

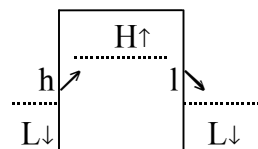
This derivation shows that the three low tones are coalesced by *merger*. Notice that merger is the coalescence of identical adjacent features and is one of the most common repair strategies languages use in order to satisfy OCP constraints. It assures that adjacent identical features, whether associated or not, are merged into one.

The next set of associative constructions contains classes 2, 4, 5, 6, 8, and 11 nouns. The associative marker in this set is an overt morpheme.

154)



Phonetic representation

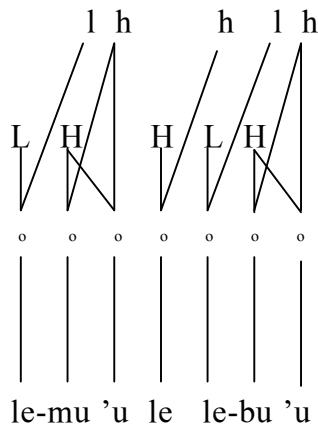


mikan mi beba'lo

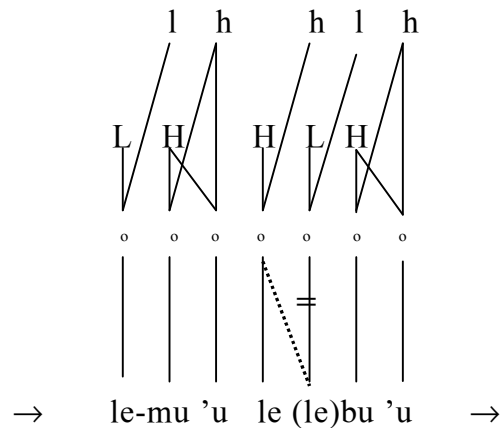
However, in (b) where the associative marker is similar to the following noun class prefix, only one of them occurs. It is assumed that the prefix is deleted in order to avoid redundancy. The fact that downstep does not apply in this environment actually confirms the assumption that the high tone that spreads onto a word that takes a prefix is replacive. See the derivation in (155).

155)

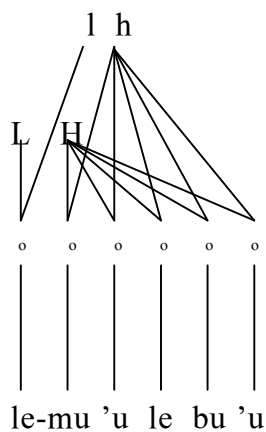
Input



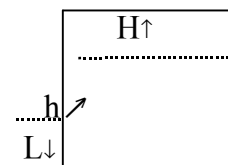
High Tone Spread, Deletion



Merger



Phonetic Representation



lemu 'u le bu 'u

The last set of associative constructions involves class 3 and class 7 nouns. Here, the associative marker is a floating high tone that occurs between the nouns. In many African languages, the associative construction is conveyed by means of a tonal morpheme (Williamson 1986, Chumbow and Nguendjio 1991). This docks onto the noun on the

right to form a falling contour tone if it meets a low tone. The data that follow show such constructions.

156) ø-kàr mûr /kàd ´ mùd/ ‘man’s wasp’
 CL7-wasp AM.person

ø-ndîm nâṅà /ndîm ´ nâṅá/ ‘ghost’s elegance’
 CL3-ghost AM.elegance

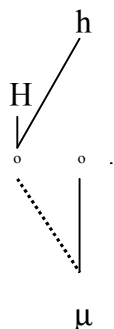
ø-dàlà kél /dàlà ´ kél/ ‘man’s pot’
 CL7-pot AM.girl

ø-kwún mûr /kúún ´ mùd/ ‘tail’s camp’
 CL3-tail AM.person

ø-sámá tʃím /sámá ´ tsím/ ‘group’s cry’
 CL7-group AM.cry

These examples show that the floating high tone that marks *association* docks onto the following noun. The rule that follows shows how this occurs.

157) T-rule 8: Rightwards High Docking



Condition: It must be the high tone of the associative marker.

realization on the surface of each melody discussed. Where the analysis is not transparent, supporting examples have been given to amplify the arguments. The morpho-syntactic structure of the noun phrase has also been discussed, with an account of the tonological process that noun phrases undergo given. This chapter has ended up by a presentation of the associative construction. The three sets, distinguished by the type of associative marker they take have been discussed. Still in this chapter, l-spread and h-delink that accounts for downstep of high tones, HL Simplification that allows a HL contour tone to be simplified to a high tone when followed by a high tone, Low Tone Spread that prevents some utterance-final low tones from downgliding, High Tone Spread that permits some underlying low tone morphemes to be realized as surface high tones, and Rightwards High Docking that shows that some associative constructions take a floating high tone have been discussed. Derivations showing how these rules work have also been given. These derivations also show that merger applies as soon as the structural description for its application is met, in order to satisfy the OCP constraint. Stray erasure also applies at the end of postlexical component to delete all unassociated tonal features. The other tone rules apply whenever the structural description for their application is met.

CHAPTER 5

TONE IN VERBS

5.0 Introduction

This chapter discusses the tonology of the Njém verb. It begins by a presentation of the morpheme structure of verb roots. Considering that the surface tone is not always identical to the underlying tone in Njém, it goes ahead to present the surface realization of the verb roots and to argue for the underlying tonal melodies of each. The process of reduplication is also outlined here.

5.1 Morpheme Structure of Verb Roots

The most common morpheme types that occur on Njém verb roots are CV, CVC and CVCV. The less common CVV type also occurs. This morpheme structure is shown in the data in table 29.

CV	CVC	CVCV	CVV
lè-dè 'to drink'	lè-tìn 'to wipe'	lè-lòmà 'to rub'	lè-bè: 'to see'
lè-sò 'to hunt'	lè-nèr 'to paste'	lè-sùmò 'to plant'	lè-dzè: 'to sing'
lè-ɲà 'to tear'	lè-kèn 'to send'	lè-nìgò 'to fold'	lè-sâ: 'to look for'
lè-tô 'to go'	lè-bâ 'to abuse'	lè-lúlô 'to forge'	lè-lcê: 'to insult'
lè-sû 'to brush'	lè-sîl 'to end'	lè-búgô 'to miss'	
lè-lî 'to instruct'	lè-sân 'to sign'	lè-búlâ 'to return'	

Table 29: Morpheme Structure of Verb Roots

5.2 Contrastive Underlying Tonal Melodies for Verb Roots

Verbs have only monosyllabic and disyllabic roots (except when reduplicated). As mentioned earlier, this language is a two-tone language – High and Low. The verb roots have a two-way contrastive underlying tonal melody, namely, High and Low. These are presented in the table that follows.

Underlying form	CV	CVC	CVCV
H	lè-tâ ‘to inherit’	lè-mêr ‘to arrest’	lè-búgô ‘to miss’
	lè-sû ‘to brush’	lè-sîl ‘to finish’	lè-búlâ ‘to return’
L	lè-ɲà ‘to tear’	lè-sàm ‘to spoil’	lè-lòmà ‘to rub’
	lè-sò ‘to hunt’	lè-tìn ‘to wipe’	lè-sùmò ‘to plant’

Table 30: Contrastive Underlying Tonal Melodies for Verb Roots

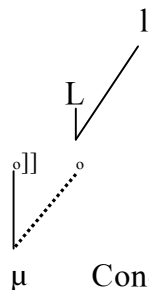
The interpretation that follows from the table is that whereas the underlying H melody surfaces as HL on the root, the underlying L melody surfaces as Low. For an account of how the H and L underlying melodies are realized on the surface, see the phonology of the infinitive that follows.

5.3 Phonology of the Infinitive

The infinitive form of the verb in Njém is marked by the class five noun prefix [lè-] (which has a low tone underlyingly), and a floating low tone suffix that appends to the verb root. Apart from the prefixation therefore, the floating low tone merges with the root tone if it is low and surfaces as the falling part of a HL contour when the root bears a high tone underlyingly. Notice that both the infinitive low tone and the final low tone (which occurs on all verb roots) occur in infinitive forms and are merged in order to avoid redundancy. The association of this tone to the edge provides evidence for the assertion that contours are fairly rare and limited to the ends of words. This kind of tone has also been found in some languages. Snider (1999: 120), for example, demonstrates that “the stem in Bamileke Dschang (Yemba) consists of a verb root and a floating Lo tone infinitive suffix.” This tone however associates following language specific rules. In some languages such as Yemba it remains floating and causes downstep.

The following rule can be formed to account for the docking of this infinitive low tone that occurs at the end of Njém verb roots.

159) T-rule 9: Infinitive Low Association



Condition: It must be when a verb occurs in the infinitive.

This rule allows a floating low tone to associate at the end of infinitive forms of verbs.

However, this tone does not associate in some instances. This happens when the glottal stop occurs in the coda position of a -cvc- root. It is possible that the glottal stop, which precedes this tone, obstructs its association. It is nonetheless unclear why this consonant influences the behaviour of the tone. However, since this glottal stop is also derived (from underlying k) it is possible to assume an operating constraint that renders derived sounds opaque. Thus, opaque ['] obstructs the association of the infinitive tone to the preceding TBU. This same consonant has been known to influence vowels in some languages, e.g. Chumburung (Snider 1999: 76).

Even though the above analysis seems to work, a more plausible explanation suggested by Ngessimo Mutaka (personal communication) would be to assume that the glottal stop is one of the *depressor*

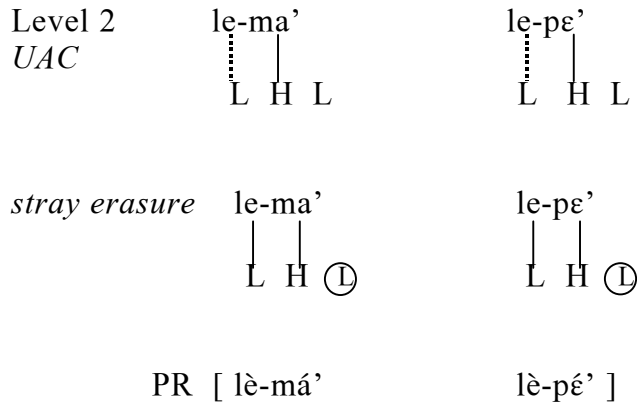
consonants in Njém. In languages that manifest an interaction between consonants and tones, *depressors* often cause voiceless consonants to be associated with the high tone. In this situation therefore, the glottal stop, which is associated with the high tone, prevents the association of the low tone. Consider the following data that demonstrate the failure of the low tone to associate.

160)	lè-gwà'	'to destroy'
	lè-tè'	'to boil'
	lè-pé'	'to verify'
	lè-má'	'to gather'
	lè-sá'	'to tremble'

The derivation that follows shows how these forms are derived.

161)	lè-má'	lè-pé'
	UR/ le-mak	le-pɛk /
	L H L	L H L
Level 1	mak	pɛk
<i>UAC</i>	⋮	⋮
	H L	H L
<i>glottalization</i>	ma'	pɛ'
	H L	H L

Infinitive low association



Note that though applied at this level, stray erasure ‘or pruning, empirically well-motivated for nontonal phenomena (cf. Itô 1986), applies at the end of the postlexical component to delete all unassociated tonal features prior to the application of any phonetic, i.e., gradient feature component, rules’ (Snider 1999: 37).

5.4 Phonology of the Imperative

Generally, the “imperative” is used to give orders or commands. Such structures concern “verbal acts through which the speaker attempts to manipulate the non-verbal behaviour of the hearer” (Givón 1990: 806). Such verbal manipulations are affected by various social and personal factors and are altered accordingly. These factors include the social status of the participants, their authority, and ability to act. The

imperative marker in Njém, unlike in many languages, has several variants depending on the shape of the verb root to which it attaches. Six segmental markers have been identified and each combines with a high tone, which is always present, to indicate the imperative. These markers are presented below.

5.4.1 [k] + High Tone

When the verb root is one open syllable, and the vowel is [-hi], the voiceless velar stop together with a high tone are added to it in order to obtain the imperative. Examples include the following:

162)	dé' eat.IMP	/-dè-k´/	'eat (IMP)'
	só' hunt.IMP	/-sò-k´/	'hunt (IMP)'
	dzé' give.IMP	/-dzè-k´/	'give (IMP)'
	sá' do.IMP	/-sá-k´/	'do (IMP)'
	tó' go.IMP	/-tó-k´/	'go (IMP)'

These data show that the voiceless velar stop, which surfaces as the glottal stop, is added to the verb root, and the high tone replaces the tone of the root to result in imperative forms.

5.4.2 [go] + High Tone

When the verb root is one open syllable, and the vowel is [+hi], the morpheme [go] together with the high tone are added to form the imperative. See the following examples:

163)	dʒùgó	/-dzù-gó/	'climb (IMP)'
	climb.IMP		
	súgó	/-sú-gó/	'brush (IMP)'
	brush.IMP		
	lǐgó	/-lǐ-gó/	'advise (IMP)'
	advise.IMP		
	nígó	/-ní-gó/	'enter (IMP)'
	enter.IMP		
	lǐ́gó	/-lǐ́-gó/	'bite (IMP)'
	bite.IMP		

The observation to be made from these data is that a [-CV] structure is suffixed to the root and that the [V] bears the high tone that is present in all imperative forms.

5.4.3 [ŋ] + High Tone

When the verb root is one open syllable with a long vowel, the palatal nasal and a high tone are added to form the imperative. Consider the following examples:

- | | | | |
|------|-------------|------------|-----------------|
| 164) | béŋ | /-bè:-ŋ´/ | 'see (IMP)' |
| | see.IMP | | |
| | ʃwón | /-ʃuò:-ŋ´/ | 'dispute (IMP)' |
| | dispute.IMP | | |
| | bján | /-biá:-ŋ´/ | 'fight (IMP)' |
| | fight.IMP | | |
| | sán | /-sá:-ŋ´/ | 'search (IMP)' |
| | search.IMP | | |
| | lóŋ | /-lóé:-ŋ´/ | 'insult (IMP)' |
| | insult.IMP | | |

Here, it can be observed that the palatal nasal that surfaces as the velar nasal following *glottalization* and the high tone are added to the

verb root (note that the high tone replaces the tone of the root vowel). In addition, the long root vowel becomes short in the imperative forms. The fact that the long vowels become short in closed syllables confirms the assertion that long vowels occur in open syllables.

5.4.4 [V] + High Tone

When the glottal stop occupies the coda position of a root, following the rule of *glottalization*, the root vowel spreads and bears the imperative high tone, as discussed in section 2.6.2.3. Examples are given in (165).

- 165) gwà'á /-guàk-Ŵ/ 'destroy (IMP)'
 destroy.IMP
- tʃì'í /-tsìk-Ŵ/ 'give birth (IMP)'
 give birth.IMP
- tée'ée /-téek-Ŵ/ 'pick (IMP)'
 pick.IMP
- pé'é /-pék-Ŵ/ 'verify (IMP)'
 verify.IMP
- bómsá'á /-bómsák-Ŵ/ 'sell (IMP)'
 sell.IMP

In these data each root vowel spreads and bears the high tone of the imperative.

5.4.5 [i:] + High Tone

When other consonants (apart from the glottal stop) occupy the coda position and the root vowel is [-bk], [i:] is suffixed to bear the imperative high tone. The following examples are illustrative:

166) bjèní: /-bièn-í :/
 exaggerate.IMP ‘*refuse (IMP)*’

nèrí: /-nèd-í :/
 paste.IMP ‘*paste (IMP)*’

tìní: /-tìn-í :/
 wipe.IMP ‘*wipe (IMP)*’

tjélí: /-tiél-í :/
 establish.IMP ‘*establish (IMP)*’

sílí: /-síl-í :/
 finish.IMP ‘*finish (IMP)*’

These data show that the front high vowel [i:] is consistently attached to the root and it bears the high tone.

5.4.6 [a:] + High Tone

This marker occurs in two instances. First, when consonants other than the glottal stop occupy the coda position and the root vowel is [+bk], as shown in the examples that follow.

167) bwòlá: /-buòl-á :/ ‘*dance (IMP)*’
dance.IMP

dzàná: /-dzàn-á:/ ‘*put out (IMP)*’
put out.IMP

mwàhá: /-muàs-á:/ ‘*throw (IMP)*’
throw.IMP

bámá: /-bám-á:/ ‘*insult (IMP)*’
insult.IMP

swóhá: /-suós-á:/ ‘*respire (IMP)*’
respire.IMP

Here, [a] is suffixed to all the roots and it bears the imperative high tone.

Secondly, this same marker occurs when the root has two syllables (which happen to always be open). Examples include the following:

168) lòmá: /-lòmà-á:/ ‘*rub (IMP)*’
rub.IMP

dùbá: /-dùbò-á:/ 'soak (IMP)'
soak.IMP

tìlá: /-tìlò-á:/ 'write (IMP)'
write.IMP

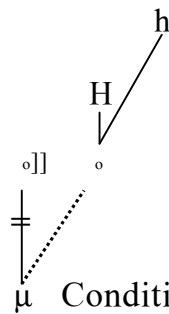
búlá: /-búlá-á:/ 'return (IMP)'
return.IMP

ṣúgá: /-ṣúgó-á :/ 'support (IMP)'
support.IMP

These data indicate that [a:], which bears the imperative high tone causes the vowel of the second syllable of the root to delete.

A general observation to be made from the markers presented above is the presence of the high tone on all. Because it is the sole tonal marker of the imperative it replaces the prelinked tones so that contour tones fail to surface even when it attaches to a low tone root. The rule that follows shows how the tone of the imperative associates.

169) T-rule 10: Imperative High Association (IHA)



According to this rule the high tone of the imperative docks leftwards to and delinks the tone of the TBU of the root that precedes it. The following derivation demonstrates how the imperative forms are derived.

170)	só'	súgó	lœŋ	pé'ε	tìní:	bámá:	tìlá:
UR/	so	su	lœ:	pεk	tin	bam	tilo/
	L	H	H	H	L	H	L
Level 1	so	su	lœ:	pεk	tin	bam	tilo/
<i>UAC</i>	⋮ L	⋮ H	⋮ H	⋮ H	⋮ L	⋮ H	⋮ L
<i>Tone Spread</i>	—	—	—	—	—	—	tilo ⋮ L
<i>suffix- ation</i>	so-k L H	su-go H H	lœ:-ŋ H H	pεk-V H H	tin-i: L H	bam-a: H H	tilo-a: ∨ L H
<i>IHA & low delink</i>	so-k L H	su-go H H	lœ:-ŋ H H	pεk-V H H	tin-i: L H	bam-a: H H	tilo-a: ∨ L H
<i>other rules</i>	so' H	—	lœŋ H	pé'ε ∨ H	—	—	til a: L H
PR	[só'	súgó	lœŋ	pé'ε	tìní:	bámá:	tìlá:]

5.5 Phonology of the Habitual

The habitual is of interest because of its phonological composition. It is used in conversation in Njém to describe situations that happen regularly or as a habit. It is marked by a discontinuous morpheme. Its structure is as follows: after the subject marker comes the first part of the habitual marker. It is followed by the root of the verb involved, and lastly, the second part of the habitual marker. The examples that follow are illustrative:

171) nɛ̀ kɪ̀ kɛ̀n kɛ̀ní:
3s HAB send HAB
'He often sends (always)'

nɛ̀ tʃì tʃì' tʃì'í:
3s HAB deliver HAB
'He often delivers (always)'

Mí nì nìgò nìgá:
1s HAB fold HAB
'I often fold (always)'

Mí sɪ̀ sɛ̀rgà sɛ̀rgá:
1s HAB slide HAB
'I often slide (always)'

Mî lí lɛ̀: lɛ̀ŋ
1s HAB insult HAB
'I often insult (always)'

ɲè tí tǵèl tǵélí:
3s HAB establish HAB
'She often establishes (always)'

Mĩ ʃí ʃíhò ʃíhá:
1s HAB grind HAB
'I often grind (always)'

ɲè pí pílô pílá:
3s HAB roll HAB
'She often rolls (always)'

Mĩ pì pwòm̀̀ndò pwòm̀̀dá:
1s HAB distinguish HAB
'I often distinguish (always)'

ɲè lí lwónǵlô lwónǵlá:
3s HAB fill HAB
'She often fills (always)'

These data show that a series of operations culminate in what is considered a habitual utterance. As can be seen, the verb root occurs normally, either as a low tone or a high tone verb root. Furthermore, the discontinuous habitual marker flanks the verb root. The second morpheme of the habitual marker follows the verb root. It should be noted that this morpheme is copied from the verb root and that there is a high tone that occurs on its final syllable. The first morpheme of the

habitual marker precedes the verb root. This morpheme is always a CV sequence and the V is always [i]. Of interest here are the tone of the vowel and the nature of the consonant.


As can be observed, this vowel is underlyingly toneless and receives its tone by ‘Tone Anticipation’ from the tone of the root vowel. This explains why it occurs with a low tone when followed by low-tone verbs and with a high tone when followed by high-tone verbs.

One further observation to be made from these data is that the root consonant reduplicates and occurs as the consonant in the first marker of the habitual. This consonant has no features underlyingly and copies all the features of the root consonant following ‘Consonant Assimilation’. This explains why the consonants are the same as each root-initial consonant. The derivation that follows shows how the habitual marker is derived. The earlier stages of this derivation are ignored here.


172) Mí sì sèrgà sèrgá: Mî lí lœ: lœŋ

Level 2

Tone Anticipation mI Ci serga serga: mI Ci lœ: lœŋ



Consonant assimilation mI si serga serga: mI li lœ: lœŋ



<i>polar tone placement</i>	mɪ	si	serga	serga:	mɪ	li	lœ:	lœŋ
	⋮	/			⋮	/	/	
	H		L	L	L	L	H	H
	PR [mɪ̃ si sèrgà sèrgá				Mɪ̃ lí lœ̃: lœŋ]			

5.6 Downstep and Upstep

In at least two contexts, the tone of the verb root is either downstepped or upstepped. The contexts involved are the present habitual negative, and the present (subject focalised). In these constructions the high tones on high tone verbs are downstepped while the low tones on low tone verbs are upstepped. Beavon (2000: 4) observes this phenomenon but refers to it as polar tones. He however makes the following remark that discards that status: “Tandis que le ton bas devient ton haut le ton haut ne devient pas ton bas. Au contraire, il devient un ton moyen.” Because of the fact that the low tone becomes high but the high tone becomes mid, not low, they cannot be polar tones.

The data that follow illustrate that the processes involved here are actually downstep and upstep. In (173) the high tone verbs are presented in the two contexts to show how downstep takes place. In (177) low tone verbs are given in the same contexts to illustrate upstep.

173a) $\begin{array}{cccc} \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{L}} & \underline{\underline{H}} \underline{\underline{HL}} \\ \dots & \dots & \dots & \dots \searrow \\ \underline{\underline{p}}\underline{\underline{\varepsilon}} & \underline{\underline{a}} & & \underline{\underline{ba}}'\underline{\underline{lo}} \end{array} \rightarrow \begin{array}{cc} \underline{\underline{LH}} & \downarrow \underline{\underline{H}} \underline{\underline{HL}} \\ \swarrow & \dots \searrow \\ [\underline{\underline{p}}\underline{\underline{a}} & \underline{\underline{ba}}'\underline{\underline{lo}}] \end{array}$
 3s NEG CER double 'He never doubles'

$\begin{array}{cccc} \underline{\underline{H}} & \underline{\underline{H}} & \underline{\underline{L}} & \underline{\underline{H}} \\ \dots & \dots & \dots & \dots \\ \underline{\underline{Bi}} & \underline{\underline{a}} & & \underline{\underline{ba}}' \end{array} \rightarrow \begin{array}{cc} \underline{\underline{H}} & \downarrow \underline{\underline{H}} \\ \dots & \dots \\ [\underline{\underline{Ba}} & \underline{\underline{ba}}'] \end{array}$
 3p NEG CER give respect 'They never give respect'

b) $\begin{array}{cccc} \underline{\underline{L}} \underline{\underline{H}} & \underline{\underline{L}} & \underline{\underline{H}} \underline{\underline{HL}} \\ \dots & \dots & \dots \searrow \\ \underline{\underline{p}}\underline{\underline{\varepsilon}} & \underline{\underline{e}} & & \underline{\underline{ba}}'\underline{\underline{lo}} \end{array} \rightarrow \begin{array}{cc} \underline{\underline{LH}} & \downarrow \underline{\underline{H}} \underline{\underline{HL}} \\ \swarrow & \dots \searrow \\ [\underline{\underline{p}}\underline{\underline{\varepsilon}} & \underline{\underline{ba}}'\underline{\underline{lo}}] \end{array}$
 3s PSF CER double 'It's him who doubles'

$\begin{array}{cccc} \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{L}} & \underline{\underline{H}} \\ \dots & \dots & \dots & \dots \\ \underline{\underline{p}}\underline{\underline{\varepsilon}} & \underline{\underline{e}} & & \underline{\underline{ba}}' \end{array} \rightarrow \begin{array}{cc} \underline{\underline{LH}} & \downarrow \underline{\underline{H}} \\ \swarrow & \dots \\ [\underline{\underline{p}}\underline{\underline{\varepsilon}} & \underline{\underline{ba}}'] \end{array}$
 3s PSF CER give respect 'It's him who gives respect'

While the data in (a) are in the present habitual negative, those in (b) are in the present, with the subject focalised. In all the sets, the high tone of the verb root is downstepped, as can be seen in the following figure.

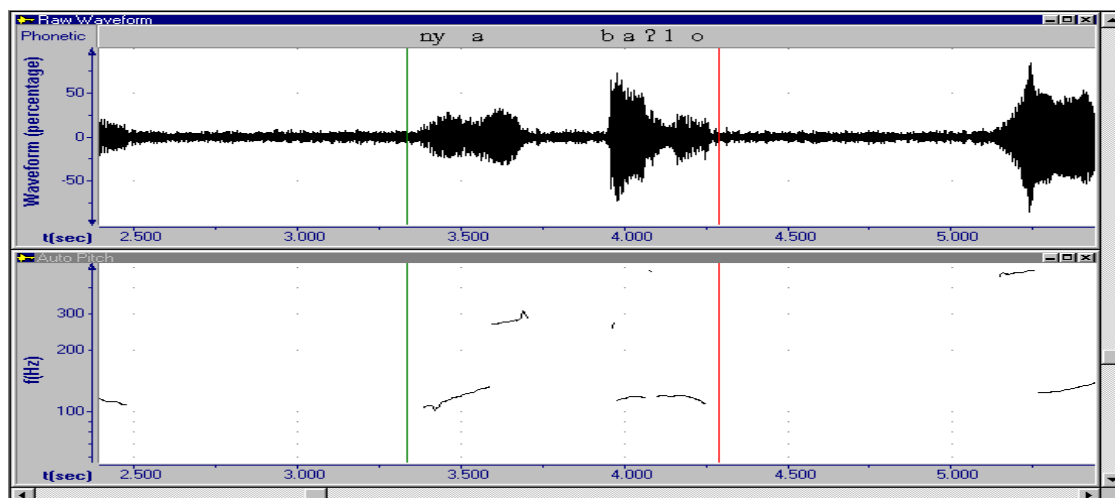
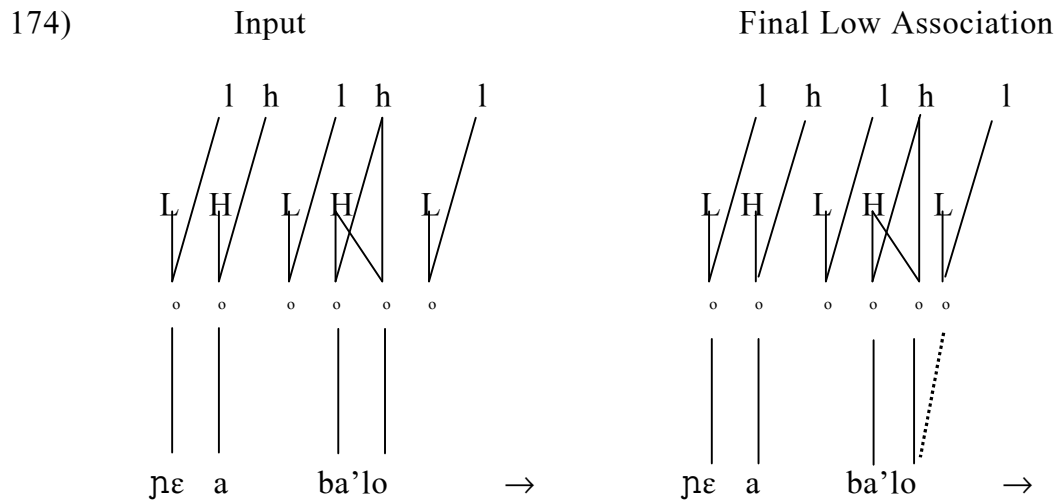


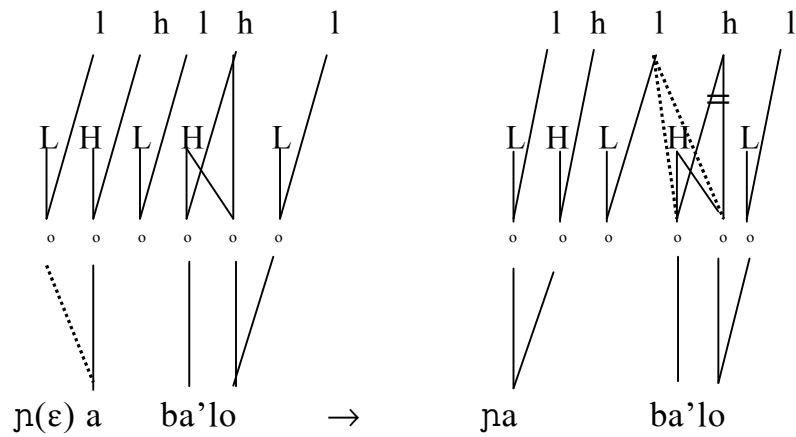
Figure 11: Downstep of H

Figure 11 shows that the high tone of the verb root has been lowered. See Appendix E: 9 that shows that the high tone is realized, in isolation, at about 280Hz and Appendix E: 10 that reveals that the high tone has been lowered to about 120Hz. In order to account for this downstep, it is assumed that there is a floating low tone, marking *certainty*, that occurs just before the high-toned verb roots. This floating tone is low because it occurs with high tone roots. This tone spreads its low register feature to the following high tone. This spreading is followed by the delinking of the high register of that high tone (following l-spread and h-delink) allowing it to be realized on a lower register, and resulting to downstep. Notice that the tone that is produced is lower than a high tone. This tone is referred to as Mid_1 (Snider 1999: 24) since it is

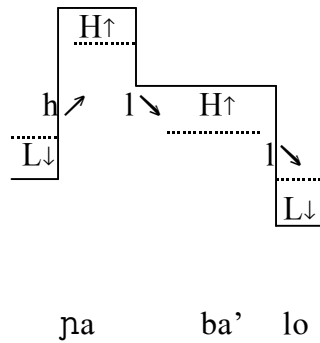
a high tone that is realized on a low register. The derivation that follows shows how this occurs.



Vowel Deletion and Reassociation l-spread and h-delink, and stray erasure

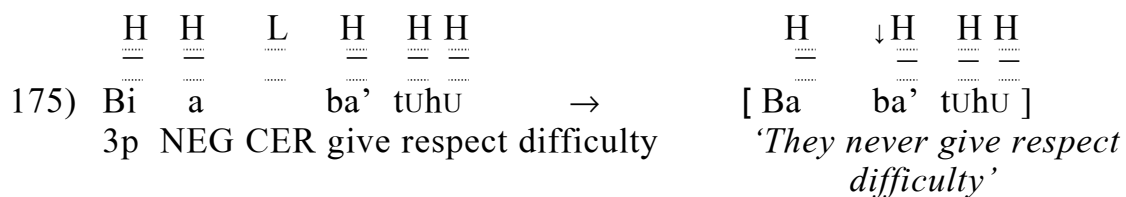


Phonetic representation

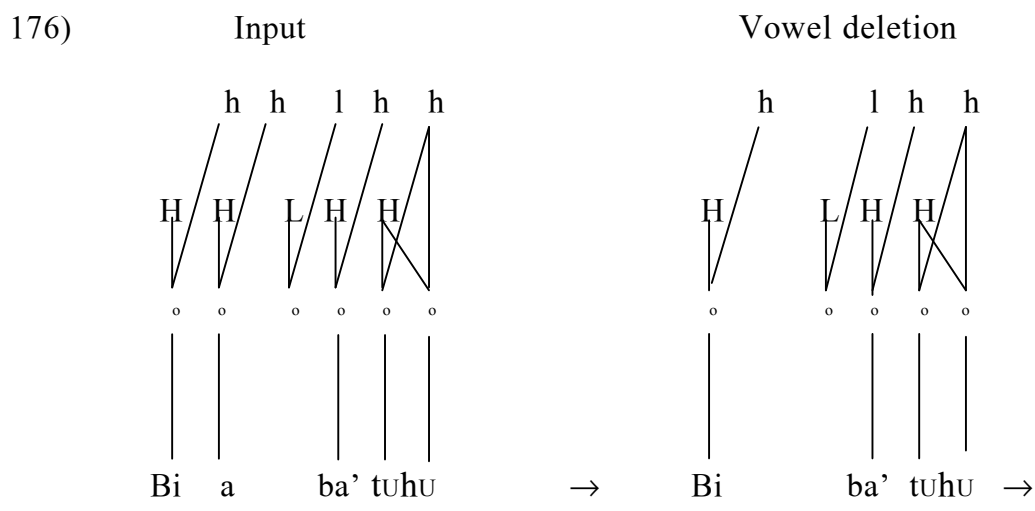


This derivation demonstrates that the vowel of the subject marker deletes as discussed earlier (see Vowel Elision 2) and its tone docks onto the negation marker that causes its deletion. It also shows that the floating low tone spreads its register to and delinks the following high register. The floating low tone itself is deleted following stray erasure at the end of the derivation.

It could be argued that this lowering is local and is due to the L spreading rather than the l. In such a situation, the register of any tone following the downstepped high will be reset to a higher level. This means, for example, that the surface tone of any high tone that follows the lowered high will be Mid_2 (a low tone on a high register) rather than Mid_1 (a high tone on a low register). However, the set of data in (175) shows that it is indeed register lowering that occurs.

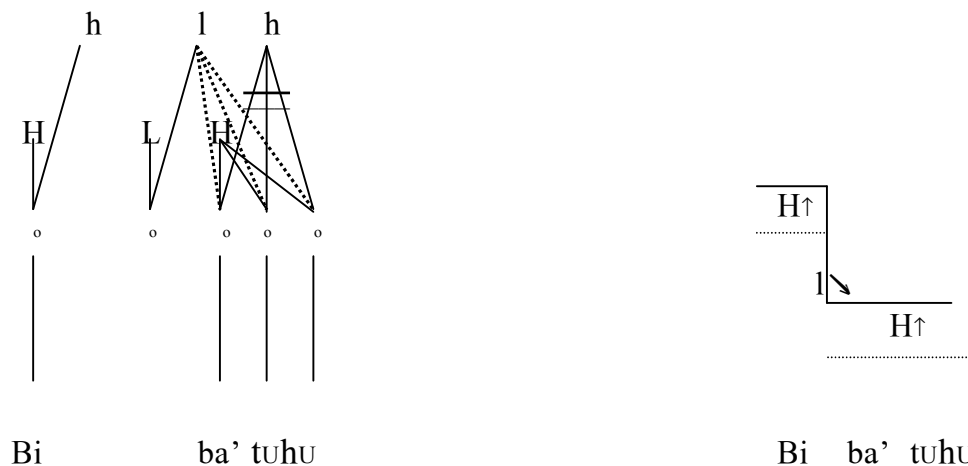


This example shows that the high tone following the downstepped high is also lowered to Mid₁, as shown in the derivation that follows.



l-spread and h-delink, Merger and Stray Erasure

Phonetic representation



The fact that Beavon (2000: 4) considers this tone to be Mid suggests that because he does not use the RTT framework to analyse the data, he misses significant insights, such as register phenomena, which this model provides. Because it assumes that the register and tonal features occupy different independent tiers, the RTT is able to better account for the phenomenon of downstep which without such theoretical machinery can only be perceived as mid tones.

Consider the next sets of data that illustrate upstep of low tones.

$\begin{array}{cccc} \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{H}} & \underline{\underline{L}} \ \underline{\underline{L}} \\ \dots & \dots & \dots & \dots \ \dots \\ \dots & \dots & \dots & \dots \ \dots \\ \dots & \dots & \dots & \dots \ \dots \end{array}$	→	$\begin{array}{cc} \underline{\underline{LH}} & \uparrow \underline{\underline{L}} \ \underline{\underline{L}} \\ \diagdown & \dots \ \dots \\ \dots & \dots \ \dots \\ \dots & \dots \ \dots \end{array}$
177a) $\eta\epsilon$ a ba'lo		[η a ba'lo]
3s NEG CER guard		<i>'He never guards'</i>

$\begin{array}{cccc} \underline{\underline{H}} & \underline{\underline{H}} & \underline{\underline{H}} & \underline{\underline{L}} \\ \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots \end{array}$	→	$\begin{array}{cc} \underline{\underline{H}} & \uparrow \underline{\underline{L}} \\ \dots & \dots \\ \dots & \dots \\ \dots & \dots \end{array}$
Bi a ba'		[Ba ba']
3p NEG CER careful		<i>'They are never careful'</i>

$\begin{array}{cccc} \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{H}} & \underline{\underline{L}} \ \underline{\underline{L}} \\ \dots & \dots & \dots & \dots \ \dots \\ \dots & \dots & \dots & \dots \ \dots \\ \dots & \dots & \dots & \dots \ \dots \end{array}$	→	$\begin{array}{cc} \underline{\underline{LH}} & \uparrow \underline{\underline{L}} \ \underline{\underline{L}} \\ \diagdown & \dots \ \dots \\ \dots & \dots \ \dots \\ \dots & \dots \ \dots \end{array}$
b) $\eta\epsilon$ e ba'lo		[$\eta\epsilon$ ba'lo]
3s PSF CER guard		<i>'It's him who guards'</i>

$\begin{array}{ccc} \underline{\underline{L}} & \underline{\underline{H}} \ \underline{\underline{H}} & \underline{\underline{L}} \\ \dots & \dots & \dots \\ \dots & \dots & \dots \\ \dots & \dots & \dots \end{array}$	→	$\begin{array}{cc} \underline{\underline{LH}} & \uparrow \underline{\underline{L}} \\ \diagdown & \dots \\ \dots & \dots \\ \dots & \dots \end{array}$
$\eta\epsilon$ e ba'		[$\eta\epsilon$ ba']
3s PSF CER careful		<i>'It's him who is careful'</i>

In all the sets, as well, the low tone of the verb root is upstepped, as can be seen in figure 12.

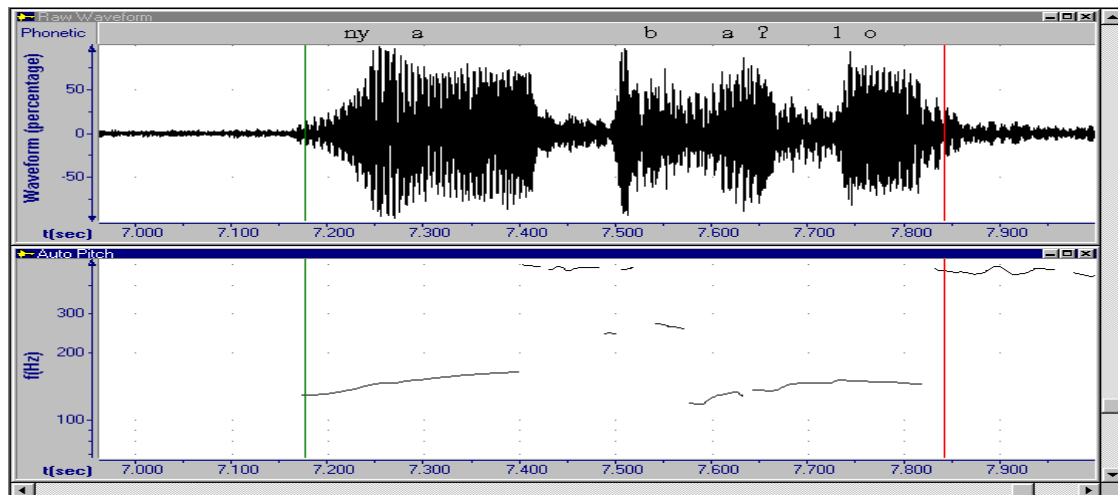
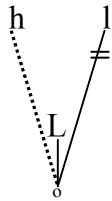


Figure 12: Upstep of L

The figure shows that the low tone of the verb root is realized at a higher level. Appendix E: 11 shows that in isolation, the low tones are realized between 100Hz and 110Hz, and Appendix E: 12 shows that the low tones have been raised to between 160Hz and 180Hz. In order to account for this upstep, it is assumed that there is a floating high tone, marking *certainty*, that occurs just before the low-toned verb roots. This floating tone is high because it occurs with low tone roots. This tone spreads its high register feature to the following low register feature, and, in a subsequently process, delinks the low register feature. This process follows the prediction made in Snider (1999: 54-55) that upstep of a low tone is caused by a *floating high register feature* that spreads as opposed

to downstep of a low tone caused by a *floating high register feature* that remains floating. The following rule shows how the process occurs:

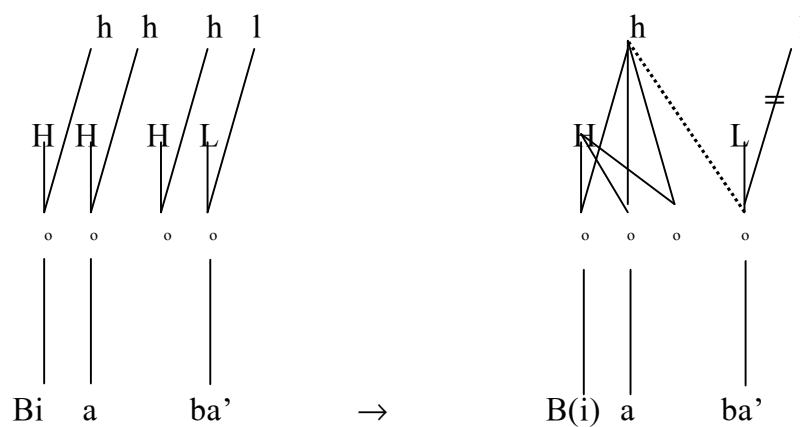
178) T-rule 11: h-spread and l-delink



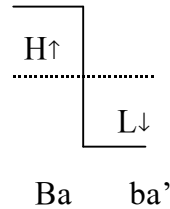
According to this rule, a high register feature spreads onto the TRN to its right, and, in a subsequent process, delinks the low register feature from that node.

Observe that the tone that is produced is higher than a low tone. This tone is referred to as Mid_2 (Snider 1999: 24) since it is a low tone that is realized on a high register. Observe the following derivation that illustrates how this works:

179) Input h-spread and l-delink, Merger, Vowel Deletion



Phonetic representation



This derivation demonstrates that the vowel of the subject marker deletes as well (following Vowel Elision 2). It also shows that the floating high register spreads to and delinks the following low register. This allows the low tone to be realized on a higher register, causing upstep.

As argued above it could be said that the raising is local and is due to the H spreading rather than the h, so that the register of any tone that follows the raised low will be reset to a lower level. This equally signifies, for example, that the surface tone of any low tone that follows the raised low will be Mid_1 rather than Mid_2 . Nevertheless, data like the following demonstrate clearly that it is indeed register raising that has taken place.

180a) $\begin{array}{ccccccc} \underline{\underline{L}} & \underline{\underline{H}} & & \underline{\underline{H}} & \underline{\underline{L}} & \underline{\underline{L}} & & \underline{\underline{L}} & \underline{\underline{L}} & \underline{\underline{L}} \\ \underline{\underline{=}} & \underline{\underline{=}} & & \underline{\underline{=}} & \underline{\underline{=}} & \underline{\underline{=}} & & \underline{\underline{=}} & \underline{\underline{=}} & \underline{\underline{=}} \end{array}$ \rightarrow $\begin{array}{ccccccc} \underline{\underline{LH}} & & \uparrow \underline{\underline{L}} & \underline{\underline{L}} & & \underline{\underline{L}} & \underline{\underline{L}} & \underline{\underline{L}} \\ \underline{\underline{=}} & & \underline{\underline{=}} & \underline{\underline{=}} & & \underline{\underline{=}} & \underline{\underline{=}} & \underline{\underline{=}} \end{array}$
 3s NEG CER guard C2-defender *'He never guards the defenders'*

$\begin{array}{ccccccc} \underline{\underline{H}} & \underline{\underline{H}} & & \underline{\underline{H}} & & \underline{\underline{L}} & & \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{H}} & & \underline{\underline{H}} & & \uparrow \underline{\underline{L}} & & \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{H}} \\ \dots & \dots & & \dots & & \dots & & \dots & \dots & \dots & & \dots & & \dots & & \dots & \dots & \dots \\ \text{Bi} & \text{a} & & \text{ba}' & & \text{be-kuma} & \rightarrow & [\text{Ba} & \text{ba}' & \text{be-kuma}] \\ \text{3p} & \text{NEG} & \text{CER} & \text{careful} & & \text{C2-assessor} & & \text{'They are never careful with} \\ & & & & & & & \text{the assessors'} \end{array}$

b) $\begin{array}{ccccccc} \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{H}} & & \underline{\underline{L}} & \underline{\underline{L}} & \underline{\underline{L}} & \underline{\underline{L}} & \underline{\underline{L}} & & & & & \underline{\underline{LH}} & & \uparrow \underline{\underline{L}} & \underline{\underline{L}} & \underline{\underline{L}} & \underline{\underline{L}} & \underline{\underline{L}} \\ \dots & \dots & \dots & & \dots & \dots & \dots & \dots & \dots & & & & & \dots & & \dots & \dots & \dots & \dots & \dots \\ \text{ɲɛ} & \text{e} & & \text{ba}'\text{lo} & & \text{be-kamlo} & \rightarrow & [\text{ɲɛ} & \text{ba}'\text{lo} & \text{be-kamlo}] \\ \text{3s} & \text{PSF} & \text{CER} & \text{guard} & & \text{C2-defender} & & \text{'It's him who guards} \\ & & & & & & & \text{the defenders'} \end{array}$

$\begin{array}{ccccccc} \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{H}} & & \underline{\underline{L}} & & \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{H}} & & & & & \underline{\underline{LH}} & & \uparrow \underline{\underline{L}} & & \underline{\underline{L}} & \underline{\underline{H}} & \underline{\underline{H}} \\ \dots & \dots & \dots & & \dots & & \dots & \dots & \dots & & & & & \dots & & \dots & & \dots & \dots & \dots \\ \text{ɲɛ} & \text{e} & & \text{ba}' & & \text{be-kuma} & \rightarrow & [\text{ɲɛ} & \text{ba}' & \text{be-kuma}] \\ \text{3s} & \text{PSF} & \text{CER} & \text{careful} & & \text{C2-assessor} & & \text{'It's him who is careful} \\ & & & & & & & \text{with the assessors'} \end{array}$

In these data, both high and low tone nouns are added after the upstepped low. The High and Low tone roots have an underlying low-toned prefix that immediately follows the upstepped low. This shows that the register has indeed gone up since all the tones that follow are realized at the previously raised level. This actually confirms that the high register has spread and that the surface tone of the second raised low tone is indeed Mid₂.

Downstep and upstep in Njém lend support to Snider's (1999: 23-24) prediction that the features and geometry of tone allow for the

specification of up to four level tone phonemes in Language: High, Mid₁, Mid₂, and Low. The application of downstep and upstep also suggests that the constraint that a high tone that follows a floating low tone, which spreads, is downstepped and a low tone that follows a floating high tone, which spreads, is upstepped operates in Njém. As has been shown, the floating tone spreads its register feature to and delinks the following register feature.

5.7 Tone in Verb Phrases

5.7.1 Morphosyntactic Structure of the Verb Phrase

A verb phrase in general comprises a verb in combination with its adjuncts and complements (Snider and Roberts 2000: 5). It can also be just a verb pronounced in isolation. Generally, in Njém, the verb occurs before any of the modifiers added to it. The modifiers that have been found to occur together with a verb include adjuncts (such as adverbs and prepositions) and complements (such as direct and indirect objects). Examples are given in the following sets of data:

181a) Lè-dè ìbínìmbjà
 INF-eat well
 '*Eat well*'

Lè-nû tʃí tʃòhò
INF-drink slowly
'Drink slowly'

Lè-bwôm kwé'kwé'
INF-buy rapidly
'Buy rapidly'

Lè-tìlò kwé'kwé'
INF-write quickly
'Write quickly'

Lè- jé'lô òbínòbjà
INF-teach well
'Teach well'

Mí lè-dè òbínòbjà
1s INF-eat well
'I am eating well'

Bíhí lè-nû tʃí tʃòhò
2p INF-drink slowly
'We are drinking slowly'

b) Dé' mé-dè
eat.IPF C6-food
'Eat(ing) food'

Nùgó mé-díbó
drink.IPF C6-water
'Drink(ing) water'

Bwómá: mé-dè
buy.IPF C6-food
'Buy(ing) food'

Jé'lá: mwôn
teach.IPF child
'Teach(ing) child'

Tilá: kárlár
write.IPF book
'Write(ing) book'

The data in (a) show verb-adverb constructions that do not undergo nor cause any tonal changes. Those in (b) are verb-object constructions. It is evident that whether these constructions are in the perfective or imperfective, there are no phonological nor tonological differences in their shapes. Also worth noting is the fact that the tonal process of high tone spreading applies here in the manner described in section 4.5.2.

5.7.2 Reduplication

Mutaka and Tamanji (2000: 63) have observed that in certain languages, some parts of a word – a vowel, a syllable, two syllables, a stem, or a whole word – may be repeated to provide some particular meaning to the word. The reduplicated string may thereby have a meaning peculiar to it. The complete reduplication found in Njém verbs

has also been reported in some Bantu languages. An example can be found in Duala (Mutaka 1994). Consider the phrases from Njém that are provided in (182).

182) Lè-dè-è lè-dè-è lè-dè
INF-eat-RED INF-eat-RED INF-eat
'Only eating'

Lè-tìlò-è lè-tìlò-è lè-tìlò
INF-write-RED INF-write-RED INF-write
'Only writing'

Lè-má'-è lè-má'-è lè-má'
INF-gather-RED INF-gather-RED INF-gather
'Only gathering'

Lè-sân-è lè-sân-è lè-sân
INF-sign-RED INF-sign-RED INF-sign
'Only signing'

Lè-bwôm-è lè-bwôm-è lè-bwôm
INF-buy-RED INF-buy-RED INF-buy
'Only buying'

Lè-túnô-è lè-túnô-è lè-túnô
INF-announce-RED INF-announce-RED INF-announce
'Only announcing'

Reduplication surfaces in isolation in a different manner than in actual usage in discourse. The reduplicated forms in (182) show that a

verb can be reduplicated entirely up to three times to lay emphasis on the action inherent in it. Worth noting, however, is the fact that the first two forms usually take a reduplicative suffix [è] that does not occur with the third. Whatever the syllable structure or the phonological shape of the verb, this vowel always occurs as described above. Inherent in this reduplicative suffix seems to be the idea of continuation or repetition of the action described by the verb. Notice that tone is copied entirely in this reduplication. In discourse though, the reduplication (no maximal length) does not take this vowel suffix, as demonstrated in the phonological phrases that follow.

183) Dʒû dʒû dʒû dʒû
 kill kill kill kill
'Killing intensely'

ŋkàb ŋkàb ŋkàb ŋkàb
 share share share share
'Sharing'

Dʒjêb dʒjêb dʒjêb dʒjêb
 call call call call
'Calling'

Tùgò tùgò tùgò tùgò
 mix mix mix mix
'Mixing'

5.8 Conclusion

In this chapter, the morpheme structure of verb roots has been presented. The contrastive underlying tonal melodies for verb roots have been given in order to account for the surface melodies found on these roots. Supporting examples that render the analysis transparent have been provided in instances where the arguments are not straightforward. The morphosyntactic structure of the verb phrase has been discussed. The reduplication process that takes place in verb phrases has equally been presented. Also in this chapter, such tonological processes as Infinitive Low Association, Imperative High Association, Downstep and Upstep have been discussed. In each case, derivations have been given to show how the processes operate.

CHAPTER 6

GENERAL CONCLUSION

6.0 Summary

This study focused on the treatment of the phonology of Njém, with attention directed to the behaviour of tones. To realize this objective, phonetic sounds identified in the Njém sound inventory were presented. From their distribution, it was realized that some of the sounds are complementary with some basic phonemes having allophones. This is how it came to be said for example that /d/ is realized as [r] in root-medial and root-final positions and as [d] in root-initial position. Having presented such cases of complementary distribution, this part of the analysis presented phonemic consonant and vowel charts as well as defined feature matrices of standard generative phonology. This led to a discussion and motivation of phonological processes that the sounds of this language undergo.

The study then proceeded to analyse and present the morphology and syntax of the language. After revealing the nominal morphology (principally the noun class system and the agreement patterns), the verbal morphology (including the elements that make up the stem and pre-stem material) were presented. In order to reveal the syntactic structure of Njém, the basic word order and phrase-internal structure were also presented.

The work then went on to discuss the tonology of the Njém noun. It accounted for the melodies found on noun roots by presenting their underlying representations and arguing for their surface realizations. The associative construction, a major nominal construction in Njém, was also discussed.

The research then concentrated on the tonology of the verb. It also accounted for the melodies found on verb roots by presenting their underlying representations and arguing for the surface realizations. Reduplication, a major verbal process in this language, was discussed as well.

Phonological and tonological rules (summarized below) were formulated to account for the processes found in the language. Derivations were also given to demonstrate how the rules postulated relate the underlying representations to the phonetic realizations.

6.1 Summary of Rules

6.1.1 Phonological Rules

184) P-rule 1: Sonorization

$$\begin{array}{|l} \hline + \text{ant} \\ + \text{cor} \\ - \text{son} \\ - \text{stri} \\ - \text{nas} \\ \hline \end{array} \rightarrow [+ \text{son}] / \left\{ \begin{array}{l} \text{V_V} \\ _ \# \end{array} \right\}$$

This rule says that [d] surfaces as [r] in final position or between two vowels.

185) P-rule 2: Palatalization

$$\begin{bmatrix} + \text{ant} \\ + \text{cor} \\ + \text{stri} \\ - \text{del. rel.} \end{bmatrix} \rightarrow \begin{bmatrix} - \text{ant} \\ + \text{hi} \end{bmatrix} / - \begin{bmatrix} \text{V} \\ + \text{hi} \end{bmatrix}$$

According to this rule, [ts] and [dz] become [tʃ] and [dʒ] respectively when found before high vowels.

186) P-rule 3: Velarization

$$\begin{bmatrix} - \text{ant} \\ + \text{cor} \\ + \text{nas} \\ + \text{hi} \end{bmatrix} \rightarrow [- \text{cor}] / \left\{ \begin{array}{l} \text{V}_- \text{V} \\ _ \# \end{array} \right\}$$

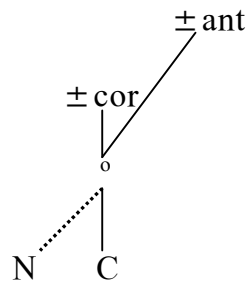
This rule says that [ŋ] is realized as [ŋ̠] in final position or between two vowels.

187) P-rule 4: Glottalization

$$\begin{bmatrix} - \text{cont} \\ - \text{son} \\ - \text{ant} \\ - \text{cor} \\ + \text{hi} \\ - \text{vd} \end{bmatrix} \rightarrow \begin{bmatrix} + \text{constri} \\ - \text{hi} \end{bmatrix} / \left\{ \begin{array}{l} \text{V}_- \text{V} \\ _ \# \end{array} \right\}$$

This rule says that [k] surfaces as ['] in final position or between two vowels.

188) P-rule 5: Nasal Assimilation



This rule states that a nasal adopts the features or place of articulation of the following consonant.

189) P-rule 6: l-deletion

$$[+lat] \rightarrow [\emptyset] / \left[\begin{array}{c} +ant \\ +cor \\ +stri \\ -del. rel. \\ +vd \end{array} \right] _$$

This rule says that the lateral is deleted when it occurs after the voiced alveolar affricate and has been used to explain the occurrence of some irregular prefixes.

190) P-rule 7: p-deletion

$$\left[\begin{array}{c} +ant \\ -cor \\ -cont \\ -son \\ -vd \end{array} \right] \rightarrow [\emptyset] / \left[\begin{array}{c} +cor \\ +stri \\ -del. rel. \\ +vd \end{array} \right] _$$

This rule states that the voiceless bilabial stop is deleted when it occurs after the voiced alveolar affricate. It has also been used to explain the occurrence of some irregular prefixes.

191) P-rule 8: Devocalization

$$\begin{bmatrix} +\text{syll} \\ -\text{cons} \\ +\text{high} \end{bmatrix} \rightarrow [-\text{syll}] / _ \begin{bmatrix} +\text{syll} \\ -\text{cons} \end{bmatrix}$$

This rule says that high vowels are devocalized whenever they are immediately followed by other vowels.

192) P-rule 9: Vowel Elision

$$\begin{bmatrix} +\text{syll} \\ -\text{cons} \end{bmatrix} \rightarrow [\emptyset] / \begin{bmatrix} +\text{syll} \\ -\text{cons} \end{bmatrix} \# _$$

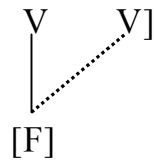
This rule states that a vowel is deleted when it occurs after another vowel in the vicinity of a word boundary.

193) P-rule 10: Vowel Elision 2

$$\begin{bmatrix} +\text{syll} \\ -\text{cons} \end{bmatrix} \rightarrow [\emptyset] / _ + \begin{bmatrix} +\text{syll} \\ -\text{cons} \end{bmatrix}$$

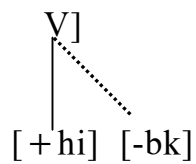
According to this rule, in a sequence of two vowels across morpheme boundary the first is deleted.

194) P-rule 11: Vowel Feature Spread



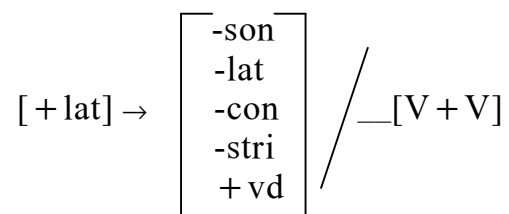
This rule says that a vowel spreads its features onto the featureless vowel that occurs word-finally.

195) P-rule 12: [-back] Assignment



This rule assigns the feature [-bk] to a word-final [+hi] vowel.

196) P-rule 13: Delateralization



This rule specifies that the lateral changes to the voiced dental stop when it is followed by two vowels.

197) P-rule 14: Velar Nasal Deletion

$$\begin{bmatrix} +\text{nas} \\ -\text{cor} \\ -\text{ant} \end{bmatrix} \rightarrow [\emptyset] / \begin{bmatrix} +\text{cons} \\ -\text{syll} \end{bmatrix} + _$$

According to this rule, the velar nasal is deleted when it occurs after another consonant.

198) P-rule 15: b-deletion

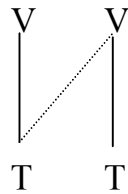
$$\begin{bmatrix} -\text{son} \\ -\text{cont} \\ -\text{cor} \\ +\text{ant} \\ +\text{vd} \end{bmatrix} \rightarrow [\emptyset] / \begin{bmatrix} +\text{cons} \\ -\text{syll} \end{bmatrix} _$$

This rule states that the voiced bilabial stop is deleted when it occurs after another consonant.

6.1.2 Tonological Rules

The tonological rules that have helped to account for the complexities of Njém tone are summarized below.

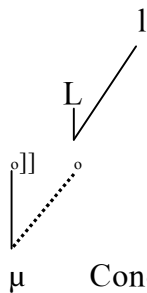
199) T-rule 1: Tone Spread



Condition: It applies only on verb roots.

According to this rule a tone spreads to the following TBU in verb roots.

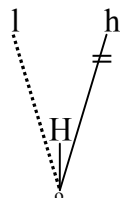
200) T-rule 2: Final Low Docking



Condition: It applies only on verb roots.

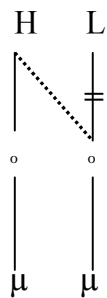
This rule allows a floating low tone to associate at the end of verb roots. It has been used to explain the occurrence of a low tone at the end of all verb roots.

201) T-rule 3: l-spread and h-delink



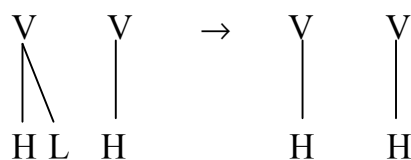
According to this rule, a low register feature spreads onto the following TRN, and, in a subsequent process, delinks the high register feature from that node. It has been useful in accounting for the occurrence of downstep of high tones that regularly happens whenever a high tone follows a low tone.

202) T-Rule 4: H-spread and L-delink



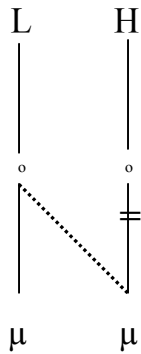
This rule says that a high tone spreads to the following low TRN, and, in a subsequent process, delinks that low tone. It has been used to account for the simplification of a LH contour tone to a H tone.

203) T-rule 5: HL Simplification



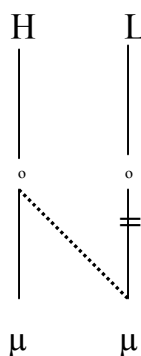
This rule says that a HL contour tone is simplified to a high tone when it is followed by a high tone.

204) T-rule 6: Low Tone Spread



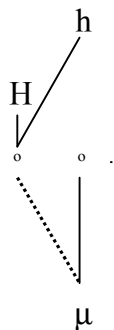
This rule says that a low tone spreads from its TRN onto the following high TBU, and, in a separate process, delinks that high tone. This rule has been used to explain mostly why the underlying LH melody surfaces as L in several environments.

205) T-rule 7: High Tone Spread



This rule spreads a high tone from its TRN onto the following low-toned TBU, delinking the low tone. It has been used to explain why a low tone following a high tone is realized as a high tone in environments where the structural description for the application of the rule is met.

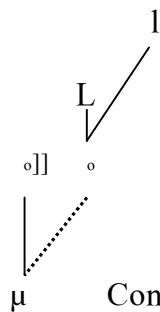
206) T-rule 8: Rightwards High Docking



Condition: It must be the high tone of the associative marker.

According to this rule, a floating high tone docks to the TBU to its right. This rule has been used to explain why in some associative constructions the noun in N2 position occurs with a falling tone.

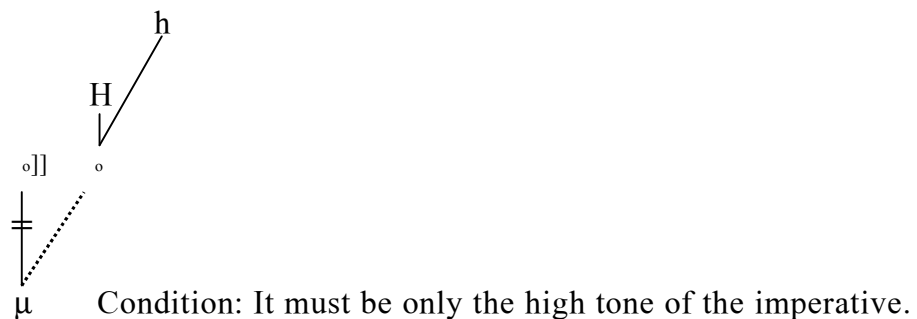
207) T-rule 9: Infinitive Low Association



Condition: It must be when a verb occurs in the infinitive.

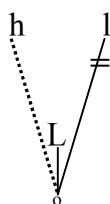
This rule says that the floating low tone suffix of the infinitive docks leftwards to the preceding TBU, in this case the last root vowel. This explains why the high-tone verbs always surface as HL while in the infinitive.

208) T-rule 10: Imperative High Association



This rule says that the final high tone that marks the imperative docks onto the preceding TBU and delinks the pre-linked low tone. This rule has been formulated to explain why only a high tone occurs on the last TBU in imperative forms.

209) T-rule 11: h-spread and l-delink



According to this rule, a high register feature spreads onto the TRN to its right, and, in a subsequent process, delinks the low register

feature from that node. This rule has been used to explain why low tones are upstepped in the environment where there is a preceding floating high tone.

It has been shown in this thesis that the Lexical Phonology of Njém is made up of two non-cyclic levels (see section 2.7 page 83-85). The roots and stems are derived at level one while the pre-stem material is derived at level two. The underived lexical item or root is scanned by the rules of the phonology prior to the affixation of level one formatives, in support of the proposal made by Halle and Mohanan (1985).

The Obligatory Contour Principle has been found to be productive in Njém. It is active as a constraint on underlying representations and even in the course of the derivation. In most cases, identical adjacent tones are coalesced by *merger*, a repair strategy employed in order to satisfy the OCP constraint.

6.2 Register Tier Theory Model

The RTT model presented in Snider (1999) has been used in this work to account mainly for tonological processes. The relevance of register features *h* and *l* on a REGISTER TIER, tonal features *H* and *L* on a TONAL TIER, a TRN tier and a TBU tier, arranged geometrically

has been demonstrated. Following this model, this study has been able to represent each tone in a unique manner. The model has been completely relevant in accounting for the different types of tonal alternations such as assimilations, downstep and upstep that occur in Njém. It has permitted to characterize in an adequate fashion the different types of contour tones found in this language.

As said in Snider (1999: 39) “not all that the model can do is yet attested.” A glaring case in point is the *upstep* of low tones described in this work. The prediction Snider made about upstep can be summarized as follows: “upstep of *any* tone can be triggered by any floating tone, provided the register of the floating tone is opposite in value to the tone that undergoes the upstep.” To illustrate his point he cites descriptions of Mids that undergo downstep and of Mids that cause Highs to be downstepped (Snider 1999: 53 fn 23).

The failure to cite low tones that undergo upstep suggests that such cases were not available at the time. The illustration of this phenomenon in Njém therefore provides further evidence that confirm the prediction made about upstep in Snider (1999).

A theory of language can only be properly evaluated with fully worked-out grammars that make use of it in handling a complex body of

interacting phenomena. African languages have significantly contributed to the establishment of phonological and especially tonological theories. To this end, this study has accumulated evidence for the claim that Register Tier Theory aptly handles the tonology of languages that are tonal.

Considering that all human beings and their works are imperfect, and that this thesis is no exception, some shortcomings may be found in it. Despite these flaws, it is wished that it will serve as a guide to students and/or researchers who may want to venture into studying tone in languages. It is also highly hoped that the observations and explanations assembled here will serve as a basis to the establishing of the orthography of the Njém language and subsequently to its standardization.

REFERENCES

- Akinlabi, A. and M. Liberman. 2000. The tonal phonology of Yoruba clitics. In B. Gerlach and J. Grizenhout (eds.), *Clitics in Phonology, morphology and Syntax*. Amsterdam/Philadelphia: John Benjamins Publishing Company.
- Akumbu, P. 1999. Nominal Phonological Processes in Babanki. Masters dissertation. The University of Yaounde I.
- . 2000. Tone in Njém nouns (ms). The University of Yaounde I.
- Archangeli, D. and D. Pulleyblank. 1994. *Grounded Phonology*. Cambridge, Mass: MIT Press.
- Baker, M. 1989. Object Sharing and Projection Principle in Serial Verb Constructions. *NLLT*.
- Beavon, K. 1991. Koozime Verbal System. In S. Anderson and B. Comrie (eds.), *Tense and Aspect in Eight languages of Cameroon*. Dallas: The Summer Institute of Linguistics and The University of Texas at Arlington. 47-104.
- . 1996. Quelques observations sur le système tonal du Njyém. (ms). SIL, Yaounde.
- . 2000. Une esquisse de grammaire et de phonologie Njyém. (ms). SIL International, Yaounde.

- Bleek, W. 1862. *A Comparative Grammar of South African Languages*.
(Republished in 1971 by Gregg International, Westmead, England).
- Boyd, V. 1997. *A Phonology and Grammar of Mbodomo*. MA Thesis.
The University of Texas at Arlington.
- Breton, R. and B. Fohtung. 1991. *Atlas Administratif des Langues Nationales du Cameroun*. Paris: ACCT; Yaounde: CERDOTOLA.
- Burquest, D. 1998. *Phonological Analysis: A Functional Approach*.
Dallas: SIL.
- Cahill, M. 1999. *Aspects of the Morphology and Phonology of Konni*.
Ph.D. dissertation. Ohio State University.
- Casali, R. 2001a. *Vowel systems of African languages*. Paper presented
at the Central African Linguistics Consultants Seminar, Yaounde.
- . 2001b. *Optimality theory and ([ATR]) vowel harmony*. Paper
presented at the Central African Linguistics Consultants Seminar,
Yaounde.
- Chumbow, B. S. and E. G. Nguendjio. 1991. *Floating Tones in Bangwa*.
Journal of West African Languages Vol. 21 N° 1: 3-14.
- Clark, M. 1990. *The Tonal System of Igbo*. Dordrecht: Foris.
- . 1993. *Representation of downstep in Dschang Bamileke*. In
Harry Van der Hulst and Keith Snider (eds.), 27-73.

- Clements, G. N. 1985. The geometry of phonological features. *Phonology Yearbook* 2: 223-52.
- . 1996. “Review of the phonology of tone: The representation of tonal register, edited by Harry Van der Hulst and Keith Snider.” *Language* 72 (4): 847-52.
- Dieu, Michel and Patrick Renaud. 1983. Atlas de L’Afrique Centrale (ALAC), Atlas Linguistique du Cameroun (ALCAM). Situation linguistique en Afrique Centrale, inventaire préliminaire: le Cameroun. Paris: ACCT; Yaoundé: CERDOTOLA et DGRST.
- Givón, T. 1990. *Syntax: A Functional-Typological Introduction*, Vol. 2 Philadelphia: John Benjamins Publishing Co.
- Goldsmith, J. 1990. *Autosegmental and Metrical Phonology*. Oxford: Basil Blackwell.
- Grimes, B. 2000. *Ethnologue: Languages of the World*, 14th edition. Dallas, Texas: SIL.
- Guthrie, M. 1967/1971. *Comparative Bantu* (4 Volumes). Farnborough: Gregg Press.
- Halle, M. 1992. Phonological Features. In W. Bright (ed.), *International Encyclopedia of Linguistics*, vol. 3, 207-12. Oxford: Oxford University Press.

- and K. P. Mohanan 1985. Segmental Phonology of English. *Linguistic Inquiry* 16: 57-115.
- Heath, T. 2003. Makaa (A83). In D. Nurse and G. Philippson (eds.), *The Bantu Languages*. New York: Routledge, 335-48.
- Hyman, L. 2003. Segmental Phonology. In D. Nurse and G. Philippson (eds.), *The Bantu Languages*. New York: Routledge, 42-58.
- and E. Byarushengo 1984. In G. N. Clements and J. Goldsmith (eds.), *Autosegmental Studies in Bantu Tone*. Dordrecht: Foris Publications, 53-103.
- Inkelas, S. 1987. Tone feature geometry. In J. Blevins and J. Carter (eds.), *Proceedings of North Eastern Linguistics Society* 18, 223-37. Amherst, Mass: GLSA.
- , W. Leben, and M. Cobler. 1987. The phonology of intonation in Hausa. In J. Blevins and J. Carter (eds.), *Proceedings of North Eastern Linguistics Society* 17, 327-42. Amherst, Mass: GLSA.
- Itô, J. 1986. Syllable Theory in Prosodic Phonology. Ph.D. dissertation. MIT, Cambridge.
- Katamba, F. 1989. *An Introduction to Phonology*. London: Longman.
- Kenmogne, M. 2000. *The Lexical Phonology of Bakoko*. Ph.D. dissertation. University of Buea.

- Kenstowicz, M. 1994. *Phonology in Generative Grammar*. Oxford: Blackwell.
- and C. Kisserbeth. 1979. *Generative Phonology*. New York: Academic Press.
- Kiparsky, P. 1982. Lexical phonology and morphology. In I.S Yang (ed.), *Linguistics in the morning calm*, 3-91. Seoul: Hanshin.
- . 1985. Some consequences of lexical phonology. *Phonology Yearbook 2*: 83-138.
- Kisseberth, C. and D. Odden. 2003. Tone. In D. Nurse and G. Philippson (eds.), *The Bantu Languages*. New York: Routledge, 59-70.
- Maho, J. 2003. A classification of the Bantu languages: an update of Guthrie's referential system. In D. Nurse and G. Philippson (eds.), *The Bantu Languages*. New York: Routledge, 639-51.
- McCarthy, J. 1986. OCP Effects: gemination and antigemination. *Linguistic Inquiry 17*: 207-63.
- Meeussen, A. E. 1967. Bantu grammatical reconstructions. *Africana Linguistica 3, Annalen*. Van het Koninklijk Musee Voor Midden-Afrika 61: 79-121. Tervuren.

- Meinhof, C. 1932. Introduction to the Phonology of the Bantu Languages. Translated and revised by N. J. Van Warmelo. Berlin: D. Reimer.
- Mohanan, K. P. 1986. The Theory of Lexical Phonology. Dordrecht: D. Reidel.
- Mutaka, N. M. 1994. Tone assignment in Duala noun reduplication. *Journal of West African Languages* 24: 2.
- _____ and P. Tamanji. 2000. An Introduction to African Linguistics. Munchen: Lincom Europa.
- Myers, S. 1997. OCP Effects in Optimality Theory. *Natural Language and Linguistic Theory*. 15. 4: 847-92.
- _____. 1998. Aux in Bantu Morphology and Phonology. In L. Hyman and C. Kisseberth (eds.), *Theoretical Aspects of Bantu Tone*. Stanford, CA: CSLI, 231-64.
- Newman, P. 1995. Hausa Tonology: Complexities in an 'easy' tone language. In J. Goldsmith (ed.), *The Handbook of Phonological Theory*. Cambridge: Blackwell 762-81.
- Ngwa, G. 1996. The Phonology of Bafut: A Generative Approach. Masters Dissertation. The University of Yaounde I.

- Odden, D. 1986. On the Obligatory Contour Principle. *Language* 62 (2): 353-83.
- _____. 1988. Anti-antigemination and the OCP. *Linguistic Inquiry* 19: 451-75.
- Pike, K. 1967. Language in Relation to a Unified Theory of the Structure of Human Behaviour. The Hague: Mouton.
- Polomé, E. 1967. Lubumbashi Swahili. *Journal of African Languages* Vol. 7 N° 1.
- Pulleyblank, D. 1986. Tone in Lexical Phonology. Ph.D. Dordrecht: Reidel.
- Sagey, E. 1986. The Representation of Features and Relations in Non-Linear Phonology. Doctoral dissertation. MIT, Cambridge.
- Snider, K. L. 1990. Tonal upstep in Krachi: Evidence for a register tier. *Language* 66 (3): 453-74.
- _____. 1999. The Geometry and Features of Tone. Dallas: The Summer Institute of Linguistics and The University of Texas at Arlington.
- _____ and J. Roberts. 2000. Suggested outline for the description of tone (ms). SIL International.

- Tadadjeu, M. and E. Sadembouo. (1979) 1984. *Alphabet Général des Langues Camerounaises*. Yaoundé: Collection PROPELCA no. 1.
- Williamson, K. 1986. Igbo associative and specific constructions. In K. Bogers, H. Van der Hulst and M. Mous (eds.), *The Phonological Representation of Suprasegmentals*. Dordrecht: Foris. 195-208.
- Yip, M. 1989. Contour tones. *Phonology* 6 (1): 149-74.
- . 1993. Tonal Register in East Asian Languages. In Harry Van der Hulst and Keith Snider (eds.), 245-68.
- . 2002. *Tone*. Cambridge: Cambridge University Press.

APPENDICES

Appendix A: List of Nouns

	<i>H-Melody Roots</i>	<i>L-Melody Roots</i>	
Monosyllables	sóŋ <i>father</i>	lè-bò <i>foot</i>	
	sí <i>ground</i>	bvù' <i>mortar</i>	
	tsél <i>liar</i>	dòm <i>war</i>	
	lè-bíl <i>breast</i>	lè-sà <i>feather</i>	
	bím <i>quantity</i>	lè-dzè <i>tooth</i>	
	bán <i>pledge</i>	ndzà <i>intestine</i>	
	lí <i>tree</i>	kũ <i>leg</i>	
	lá <i>glass</i>	mùr <i>person</i>	
	bí: <i>quarter</i>	ngìr <i>taboo</i>	
	só <i>friend</i>	lè-tʃìŋ <i>law</i>	
	lè-kéh <i>hand</i>	lè-kàn <i>lime</i>	
	bú' <i>epilepsy</i>	nùn <i>bird</i>	
	kél <i>sister</i>	kòh <i>parrot</i>	
	mpwé <i>dog</i>	tòm <i>stomach</i>	
	tír <i>animal</i>	dùr <i>robe</i>	
Disyllables	núnwá <i>snake</i>	lè-pùlù <i>soup</i>	
	fúlú <i>character</i>	bùmò <i>fruit</i>	
	tʃwítsén <i>star</i>	wùnù <i>peanut</i>	

tʃíhó *island*
 ñkúró *buttock*
 sámá *group*
 òpálá *camp*
 lè-ñkómá *circle*
 ì-kúrgá *ill-luck*
 ì-símsá *thought*
 ì-kúmá *wealth*
 lè-bú'ú *anger*
 kú'ú *uncle*
 mŭhŭ *day*
 búhó *seat*

HL-Melody Roots

Monosyllables

dwôb *sky*
 díh *eye*
 lâm *trap*
 nôr *vagina*
 ñâ *nail*
 bí *residence*
 dzîm *song*

lè-wàlà *hour*
 lè-tànglò *story*
 dàlà *pot*
 kàlò *root*
 sèhè *tale*
 dzàṅà *fiancé*
 bàrà *prostitution*
 mè-lŭ'ŭ *dew*
 ñkànà *town*
 ñkùl *force*
 lè-kùwà *spear*
 bàhà *bamboo*

LH-Melody Roots

kób *fault*
 bãm *material*
 gũ *madman*
 ñtũ *quarrel*
 dí *residence*
 kãr *wasp*
 ñǒṅ *mother*

	ndîm	<i>ghost</i>	ɸjěm	<i>field</i>
	mwân	<i>child</i>	ndzũm	<i>old man</i>
	bvûm	<i>mat</i>	dzũn	<i>crocodile</i>
	ʃêh	<i>path</i>	djěn	<i>mud</i>
	ɸâ	<i>claw</i>	těŋ	<i>cupboard</i>
	mbô	<i>arm</i>	să	<i>reconciliation</i>
	mbê	<i>house</i>	nsěl	<i>pangolin</i>
	dʒjô	<i>name</i>	dʒim	<i>misfortune</i>
Disyllables	púbò	<i>wind</i>	tʃìlá	<i>taboo</i>
	dzórà	<i>firewood</i>	ɸàŋá	<i>elegance</i>
	kúrà	<i>blow</i>	m-ùrúm	<i>man</i>
	ʃígò	<i>fire</i>	m-ùmá	<i>woman</i>
	ntámà	<i>pepper</i>	ʃùlá	<i>sermon</i>
	dínà	<i>reception</i>	sàmgbá	<i>seven</i>
	tʃígò	<i>referee</i>	ɸèhá	<i>complaint</i>
	límà	<i>dream</i>	mpòmá	<i>meeting</i>
	lè-píhò	<i>behind</i>	kòlá	<i>same-name</i>
	síjà	<i>chair</i>	kwò'ó	<i>tree trunk</i>

dʒínò	<i>finger</i>	lè-bèṅé	<i>bell</i>
bè-ʃíhò	<i>sand</i>	sògó	<i>duck</i>
méra	<i>arrest</i>	ʃihó	<i>vein</i>
líḡù	<i>insolence</i>	ʃè'é	<i>mandrill</i>
dʒúlù	<i>smoke</i>	pīhá	<i>accident</i>

Appendix B: List of Verbs

Monosyllables	<i>H-Melody Roots</i>	<i>L-Melody Roots</i>
	lè-nî <i>to enter</i>	lè-sò <i>to hunt</i>
	lè-bwôm <i>to buy</i>	lè-ṅà <i>to tear</i>
	lè-nû <i>to drink</i>	lè-sàm <i>to spoil</i>
	lè-dʒû <i>to kill</i>	lè-tìn <i>to wipe</i>
	lè-dʒjêb <i>to call</i>	lè-nèr <i>to paste</i>
	lè-tâ <i>to inherit</i>	lè-kèn <i>to send</i>
	lè-sû <i>to brush</i>	lè-bè: <i>to see</i>
	lè-mêr <i>to arrest</i>	lè-dzè: <i>to sing</i>
	lè-sîl <i>to finish</i>	lè-ʃìm <i>to run</i>
	lè-tô <i>to go</i>	lè-kwèl <i>to estimate</i>
	lè-lî <i>to instruct</i>	lè-ṅkàb <i>to share</i>
	lè-bâm <i>to abuse</i>	lè-kò' <i>to wander</i>

	lè-sân	<i>to sign</i>	lè-ntèn	<i>to exaggerate</i>
	lè-sâ:	<i>to look for</i>	lè-bjèn	<i>to refuse</i>
	lè-lœ:	<i>to insult</i>	lè-kwàr	<i>to be cut</i>
	lè-tsê	<i>to lie</i>	lè-dzjèb	<i>to sharpen</i>
	lè-sê	<i>to work</i>	lè-dzù	<i>to climb</i>
	lè-lê	<i>to play</i>	lè-mwàn	<i>to plant</i>
	lè-dzâm	<i>to prepare</i>	lè-sèn	<i>to collect</i>
	lè-dzô	<i>to eliminate</i>	lè-tsàm	<i>to destroy</i>
	lè-lî	<i>to bite</i>	lè-dzàn	<i>to put off</i>
	lè-sâ	<i>to cause</i>	lè-dzò	<i>to laugh</i>
	lè-gîm	<i>to solicit</i>	lè-bwòl	<i>to dance</i>
	lè-bîr	<i>to liberate</i>	lè-sàm	<i>to violate</i>
	lè-dzî	<i>to cry</i>	lè-sèn	<i>to unite</i>
Disyllables	lè-búgô	<i>to miss</i>	lè-dùbò	<i>to soak</i>
	lè-tíbô	<i>to smash</i>	lè-sùmò	<i>to plant</i>
	lè-sú'lâ	<i>to become</i>	lè-sèrgà	<i>to slide</i>
	lè-ndámâ	<i>to spoil</i>	lè-bà'lò	<i>to guide</i>
	lè-bá'lô	<i>to double</i>	lè-tilò	<i>to write</i>
	lè-jé'lô	<i>to teach</i>	lè-tùgò	<i>to mix</i>
	lè-bómâ	<i>to sell</i>	lè-dùlù	<i>to smoke</i>

lè-mwó'lô	<i>to harvest</i>	lè-jàlà	<i>to respond</i>
lè-túnô	<i>to announce</i>	lè-tùmò	<i>to light</i>
lè-ʃúgô	<i>to support</i>	lè-ʃùmò	<i>to construct</i>
lè-ʃíhò	<i>to grind</i>	lè-lòmà	<i>to rub</i>
lè-bwóplô	<i>to taste</i>	lè-pùmà	<i>to stand up</i>
lè-tómndô	<i>to excite</i>	lè-minò	<i>to absorb</i>
lè-lígô	<i>to abandon</i>	lè-tàṅlò	<i>to recount</i>
lè-túblô	<i>to pronounce</i>	lè-bùbò	<i>to fry</i>
lè-bwó'lô	<i>to replace</i>	lè-pwòmndò	<i>to distinguish</i>
lè-síhlô	<i>to approach</i>	lè-sìṅà	<i>to suit</i>
lè-lwómlô	<i>to send</i>	lè-ʃùlò	<i>to descend</i>
lè-lúlô	<i>to forge</i>	lè-nìgò	<i>to fold</i>
lè-pínâ	<i>to surprise</i>	lè-ṅkàṅà	<i>to log</i>
lè-búlâ	<i>to return</i>	lè-ṅkàṅlò	<i>to inflate</i>
lè-ʃú'lâ	<i>to become</i>	lè-dzòṅlâ	<i>to transmit</i>
lè-lóbrâ	<i>to babble</i>	lè-tàlò	<i>to start</i>
lè-míhâ	<i>to urinate</i>	lè-pùmà	<i>to quit</i>
lè-sú'lâ	<i>to activate</i>	lè-bàṅà	<i>to imitate</i>

Appendix C: Noun Phrase Paradigms

H-Melody Roots + Specifiers

NC	CV STRUCTURE	POSSESSIVE (MY)	POSSESSIVE (HIS)	POSSESSIVE (YOUR)	INTERROGATIVE (WHICH)	DEMONSTRATIVE (THIS)	ANAPHORIC ADJECTIVE	GLOSS
1	CVC	kél wàm	kél wé	kél wín	wá: kél	kél nì	kél njò	<i>sister</i>
	CVCV	kú'ú wàm	kú'ú wé	kú'ú wín	wá: kú'ú	kú'ú nì	kú'ú njò	<i>uncle</i>
2	CVC	bè-mém bâm	bè-mém bé	bè-mém bín	bá: bé-mém	bè-mém bínì	bè-mém bâ	<i>aunts</i>
	CVCV	bè-kúmá bâm	bè-kúmá bé	bè-kúmá bín	bá: bé-kúmá	bè-kúmá bínì	bè-kúmá bâ	<i>rich ones</i>
3	CVC	kán wâm	kán wé	kán wín	wá: kán	kán ní	kán wî	<i>cloth</i>
	CVCV	múhú wâm	múhú wé	múhú wín	wá: múhú	múhú ní	múhú wî	<i>day</i>
4	CVC	mì-kán mjâm	mì-kán mjé	mì-kán mín	mjá: mí-kán	mì-kán mínì	mì-kán mî	<i>cloths</i>
	CVCV	mì-múhú mjâm	mì-múhú mjé	mì-múhú mín	mjá: mí-múhú	mì-múhú mínì	mì-múhú mî	<i>days</i>
5	CVC	lè-bíl lâ	lè-bíl lé	lè-bíl lín	lá: lé-bíl	lè-bíl línì	lè-bíl lí	<i>breast</i>
	CVCV	lè-bú'ú lâ	lè-bú'ú lé	lè-bú'ú lín	lá: lé-bú'ú	lè-bú'ú línì	lè-bú'ú lí	<i>anger</i>
6	CVC	mè-bíl mâm	mè-bíl mé	mè-bíl mín	má: mé-bíl	mè-bíl mínì	mè-bíl má	<i>breasts</i>
	CVCV	mè-bú'ú mâm	mè-bú'ú mé	mè-bú'ú mín	má: mé-bú'ú	mè-bú'ú mínì	mè-bú'ú má	<i>anger</i>
7	CVC	bán jâm	bán jé	bán jín	já: bán	bán ní	bán jî	<i>surety</i>
	CVCV	ñkúú jâm	ñkúú jé	ñkúú jín	já: ñkúú	ñkúú ní	ñkúú jî	<i>buttock</i>
8	CVC	bì-bán bjâm	bì-bán bjé	bì-bán bjín	bjá: bí-bán	bì-bán bínì	bì-bán bì	<i>sureties</i>
	CVCV	bì-ñkúú bjâm	bì-ñkúú bjé	bì-ñkúú bjín	bjá: bí-ñkúú	bì-ñkúú bínì	bì-ñkúú bì	<i>buttocks</i>
9	CSVCV	tʃ wítsén wàm	tʃ wítsén njé	tʃ wítsén njín	njá: tʃ wítsén	tʃ wítsén nì	tʃ wítsén njò	<i>star</i>
11	CVCCV	ì-kúrgá wâm	ì-kúrgá wé	ì-kúrgá wín	wá: í-kúrgá	ì-kúrgá wínì	ì-kúrgá wî	<i>ill-luck</i>

L-Melody Roots + Specifiers

<i>NC</i>	<i>CV STRUCTURE</i>	<i>POSSESSIVE (MY)</i>	<i>POSSESSIVE (HIS)</i>	<i>POSSESSIVE (YOUR)</i>	<i>INTERROGATIVE (WHICH)</i>	<i>DEMONSTRATIVE (THIS)</i>	<i>ANAPHORIC ADJECTIVE</i>	<i>GLOSS</i>
1	CVCV	dùlù wàm	dùlù wé	dùlù wín	wá: dùlù	dùlǔ nì	dùlù njò	<i>smoker</i>
2	CVCV	bè-dùlù bàm	bè-dùlù bé	bè-dùlù bín	bá: bé-dùlù	bè-dùlù bínì	bè-dùlù bâ	<i>smokers</i>
3	CVC	là' wàm	là' wé	là' wín	wá: là'	là' ní	là' wí	<i>horn</i>
4	CVC	mì-là' mjâm	mì-là' mjé	mì-là' mín	mjá: mí-là'	mì-là' mǐnì	mì-là' mî	<i>horns</i>
5	CVCV	lè-wàlà lâ	lè-wàlà lé	lè-wàlà lín	lá: lé-wàlà	lè-wàlà lǐnì	lè-bú'ú lí	<i>hour</i>
6	CVCV	mè-wàlà màm	mè-wàlà mé	mè-wàlà mín	má: mé-wàlà	mè-wàlà mǐnì	mè-wàlà mâ	<i>hours</i>
7	CVC	nùn jâm	nùn jé	nùn jín	já: nùn	nǔn ní	nùn jî	<i>bird</i>
	CVCV	sèhè jâm	sèhè jé	sèhè jín	já: sèhè	sèhě ní	sèhè jî	<i>story</i>
8	CVC	bì-nùn bjâm	bì-nùn bjé	bì-nùn bjín	bjá: bí-nùn	bì-nùn bínì	bì-nùn bì	<i>birds</i>
	CVCV	bì-sèhè bjâm	bì-sèhè bjé	bì-sèhè bjín	bjá: bí-sèhè	bì-sèhé bínì	bì-sèhè bì	<i>stories</i>
9	CVC	kèh wàm	kèh njé	kèh njín	njá: kèh	kěh nì	kèh njò	<i>star</i>

HL-Melody Roots + Specifiers

<i>NC</i>	<i>CV STRUCTURE</i>	<i>POSSESSIVE (MY)</i>	<i>POSSESSIVE (HIS)</i>	<i>POSSESSIVE (YOUR)</i>	<i>INTERROGATIVE (WHICH)</i>	<i>DEMONSTRATIVE (THIS)</i>	<i>ANAPHORIC ADJECTIVE</i>	<i>GLOSS</i>
1	CVCV	tʃígò wàm	tʃígò wé	tʃígò wín	wá: tʃígò	tʃígó nì	tʃígò njò	<i>referee</i>
2	CVCV	bè-tʃígò bâm	bè-tʃígò bé	bè-tʃígò bín	bá: bé-tʃígò	bè-tʃígó bínì	bè-tʃígò bâ	<i>referees</i>
3	CVC	ndím wàm	ndím wé	ndím wín	wá: ndím	ndím ní	ndím wî	<i>ghost</i>
4	CVC	mì-ndím mjâm	mì-ndím mjé	mì-ndím mín	mjá: mí-ndím	mì-ndím mǐnì	mì-ndím mî	<i>ghosts</i>
5	CVCV	lè-pǔlà lám	lè-pǔlà lé	lè-pǔlà lín	lá: lé-pǔlà	lè-pǔlá lǐnì	lè-pǔlà lí	<i>free time</i>
6	CVCV	mè-pǔlà màm	mè-pǔlà mé	mè-pǔlà mín	má: mé-pǔlà	mè-pǔlá mǐnì	mè-pǔlà má	<i>free times</i>
7	CVC	dʒím jâm	dʒím jé	dʒím jín	já: dʒím	jím ní	dʒím jî	<i>bird</i>
	CVCV	límà jâm	límà jé	límà jín	já: límà	límá ní	límà jî	<i>dream</i>
8	CVC	bì-dʒím bjâm	bì-dʒím bjé	bì-dʒím bjín	bjá: bí-dʒím	bì-jím bínì	bì-dʒím bì	<i>birds</i>
	CVCV	bì-límà bjâm	bì-límà bjé	bì-límà bjín	bjá: bí-límà	bì-límá bínì	bì-límà bì	<i>dreams</i>
9	CVC	kúl wàm	kúl njé	kúl njín	njá: kúl	kúl nì	kúl njò	<i>tortoise</i>

LH-Melody Roots + Specifiers

<i>NC</i>	<i>CV STRUCTURE</i>	<i>POSSESSIVE (MY)</i>	<i>POSSESSIVE (HIS)</i>	<i>POSSESSIVE (YOUR)</i>	<i>INTERROGATIVE (WHICH)</i>	<i>DEMONSTRATIVE (THIS)</i>	<i>ANAPHORIC ADJECTIVE</i>	<i>GLOSS</i>
1	CVC	ɲǒŋ wàm	ɲǒŋ wé	ɲǒŋ wín	wá: ɲǒŋ	ɲǒŋ ní	ɲǒŋ njò	<i>mother</i>
	CVCV	m-ùmá wàm	m-ùmà wé	m-ùmà wín	wá: m-úmà	m-ùmá ní	m-ùmà njò	<i>woman</i>
2	CVC	bè-ɲǒŋ bâm	bè-ɲǒŋ bé	bè-ɲǒŋ bín	bá: bé-ɲǒŋ	bè-ɲǒŋ bíní	bè-ɲǒŋ bâ	<i>mothers</i>
	CVCV	b-ùbà bâm	b-ùbà bé	b-ùbà bín	Bá: b-úbà	b-ùbà bíní	b-ùbà bâ	<i>women</i>
3	CVC	kùl wâm	kùl wé	kùl wín	wá: kùl	kùl ní	kùl wî	<i>rope</i>
	CVCV	kàlò wâm	kàlò wé	kàlò wín	wá: kàlò	kàlò ní	kàlò wî	<i>root</i>
4	CVC	mì-kùl mjâm	mì-kùl mjé	mì-kùl mín	mjá: mí-kùl	mì-kùl mǐní	mì-kùl mî	<i>ropes</i>
	CVCV	mì-kàlò mjâm	mì-kàlò mjé	mì-kàlò mín	mjá: mí-kàlò	mì-kàlò mǐní	mì-kàlò mî	<i>roots</i>
7	CVC	kàr jâm	kàr jé	kàr jín	já: kàr	kàr ní	kàr jî	<i>wasps</i>
	CVCV	ʃùlà jâm	ʃùlà jé	ʃùlà jín	já: ʃùlà	ʃùlà ní	ʃùlà jî	<i>sermon</i>
8	CVC	bì-kàr bjâm	bì-kàr bjé	bì-kàr bjín	bjá: bí-kàr	bì-kàr bíní	bì-kàr bî	<i>wasps</i>
	CVCV	bì-ʃùlà bjâm	bì-ʃùlà bjé	bì-ʃùlà bjín	bjá: bí-ʃùlà	bì-ʃùlà bíní	bì-ʃùlà bî	<i>sermons</i>
9	CVC	pùm wàm	pùm njé	pùm njín	njá: pùm	pùm ní	pùm njò	<i>dust</i>

Appendix D: Verb Phrase Paradigms

Subject + Tense Markers

TM \ SM	P2	GENERAL PAST	PRESENT	FUTURE	GLOSS
1s	mă bí dè mă bí njà	mí bí dè mí bí njà	mí lè-dè mí lè-njà	mî bó dè mî bó njà	<i>eat</i> <i>tear</i>
	mă bí gîm mă bí sîl	mí bí gîm mí bí sîl	mí lè-gîm mí lè-sîl	mî bó gîm mî bó sîl	<i>solicit</i> <i>finish</i>
2s	gă bí dzù gă bí sò	gû bí dzù gû bí sò	gû lè-dzù gû lè-sò	gû bó dzù gû bó sò	<i>climb</i> <i>hunt</i>
	gă bí túnô gă bí pínâ	gû bí túnô gû bí pínâ	gû lè-túnô gû lè-pínâ	gû bó túnô gû bó pínâ	<i>announce</i> <i>surprise</i>
3s	njä bí bè: njä bí dzè:	njé bí bè: njé bí dzè:	njé lè-bè: njé lè-dzè:	njè bó bè: njè bó dzè:	<i>see</i> <i>sing</i>
	njä bí bîr njä bí bâm	njé bí bîr njé bí bâm	njé lè-bîr njé lè-bâm	njè bó bîr njè bó bâm	<i>liberate</i> <i>abuse</i>
1p	bíhí bâ bí dzìm bíhí bâ bí kò'	bíhí bí dzìm bíhí bí kò'	bíhí lè-dzìm bíhí lè-kò'	bíhí bí bó dzìm bíhí bí bó kò'	<i>dream</i> <i>wander</i>
	bíhí bâ bí sâ: bíhí bâ bí lô:	bíhí bí sâ: bíhí bí lô:	bíhí lè-sâ: bíhí lè-lô:	bíhí bí bó sâ: bíhí bí bó lô:	<i>look for</i> <i>insult</i>
2p	bín bâ bí tìn bín bâ bí kèn	bín bí tìn bín bí kèn	bín lè-tìn bín lè-kèn	bín bí bó tìn bín bí bó kèn	<i>wipe</i> <i>send</i>
	bín bâ bí jé'lô bín bâ bí míhâ	bín bí jé'lô bín bí míhâ	bín lè-jé'lô bín lè-míhâ	bín bí bó jé'lô bín bí bó míhâ	<i>teach</i> <i>urinate</i>
3p	bí bâ bí tùgò bí bâ bí bàṅà	bí tùgò bí bàṅà	bí lè-tùgò bí lè-bàṅà	bí bó tùgò bí bó bàṅà	<i>mix</i> <i>imitate</i>
	bí bâ bí lí bí bâ bí lê	bí lí bí lê	bí lè-lí bí lè-lê	bí bó lí bí bó lê	<i>advise</i> <i>play</i>

Root + Extensions

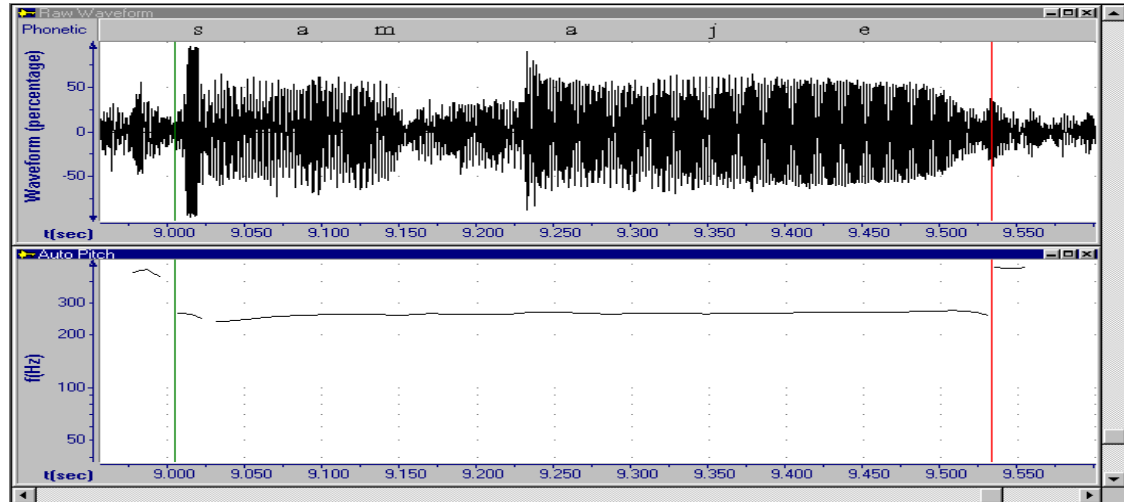
<i>ROOT</i>	<i>RECIPROCAL</i>	<i>INSTRUMENTAL</i>	<i>APPLICATIVE</i>	<i>PASSIVE</i>	<i>REFLEXIVE</i>	<i>CAUSATIVE</i>	<i>GLOSS</i>
-dè-	dè-là	dè-nè	dè-í	dè-ηò	dè-wà	dè-l	<i>eat</i>
-dʒù-	dʒù-là	dʒù-nè	dʒù-í	dʒù-ηò	dʒù-wà	dʒù-l	<i>climb</i>
-bè:-	bè:-là	bè:-nè	bè:-í	bè:-ηò	bè:-wà	bè:-l	<i>see</i>
-dzè:-	dzè:-là	dzè:-nè	dzè:-í	dzè:-ηò	dzè:-wà	dzè-l	<i>sing</i>
-nèr-	nèr-là	nèr-nè	nèr-í	nèr-ò	nèr-wà	nèr-l	<i>arrest</i>
-tìn-	tìn-là	tìn-nè	tìn-í	tìn-ò	tìn-wà	tìn-l	<i>wipe</i>
-tùgò-	tùgò-là	tùgò-nè	tùgò-í	tùgò-ηò	tùgò-wà	tùgò-l	<i>mix</i>
-tìlò-	tìlò-là	tìlò-nè	tìlò-í	tìlò-ηò	tìlò-wà	tìlò-l	<i>write</i>
-tâ-	tâ-là	tâ-nè	tâ-í	tâ-ηò	tâ-wà	tâ-l	<i>inherit</i>
-lí-	lí-là	lí-nè	lí-í	lí-ηò	lí-wà	lí-l	<i>advise</i>
-lôê:-	lôê:-là	lôê:-nè	lôê:-í	lôê:-ηò	lôê:-wà	lôê:-l	<i>insult</i>
-sâ:-	sâ:-là	sâ:-nè	sâ:-í	sâ:-ηò	sâ:-wà	sâ:-l	<i>look for</i>

-sîl-	sîl-là	sîl-nè	sîl-í	sîl-ò	sîl-wà	sîl-l	<i>finish</i>
-gîm-	gîm-là	gîm-nè	gîm-í	gîm-ò	gîm-wà	gîm-l	<i>solicit</i>
-túnô-	túnô-là	túnô-nè	túnô-í	túnô-ηò	túnô-wà	túnô-l	<i>announce</i>
-jé'lô-	jé'lô-là	jé'lô-nè	jé'lô-í	jé'lô-ηò	jé'lô-wà	jé'lô-l	<i>teach</i>

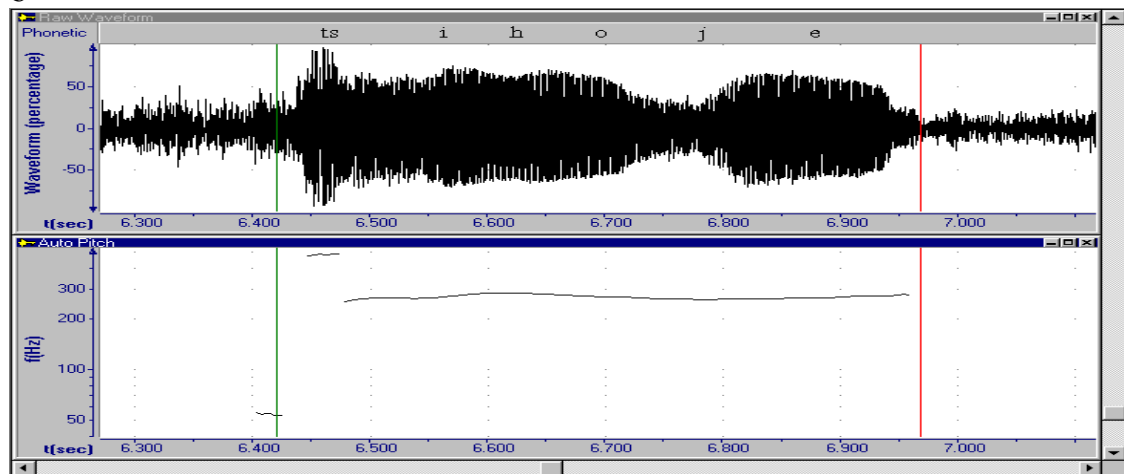
Appendix E: Pitch Traces

1) H melody is realized as H (female speakers)

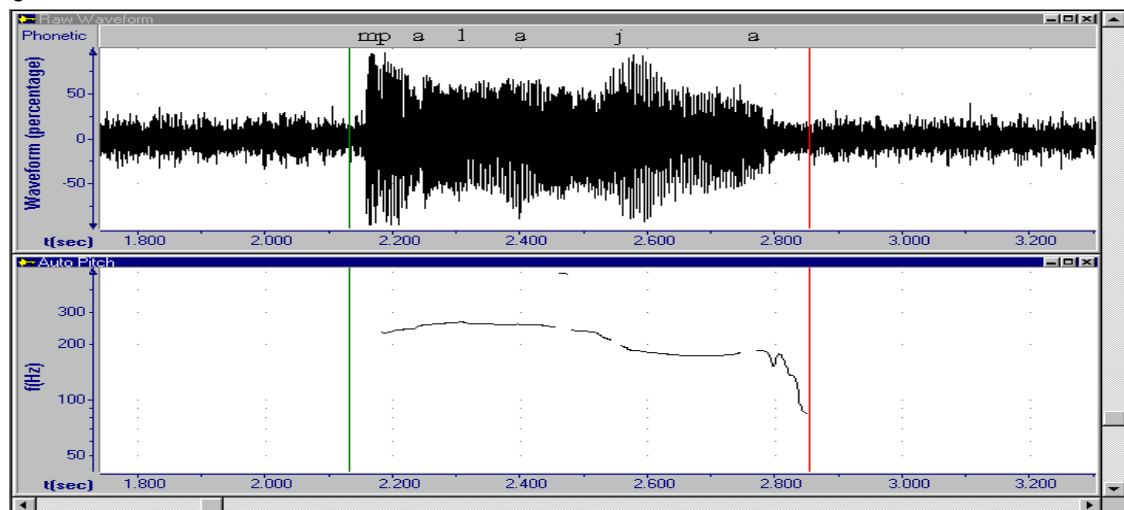
a



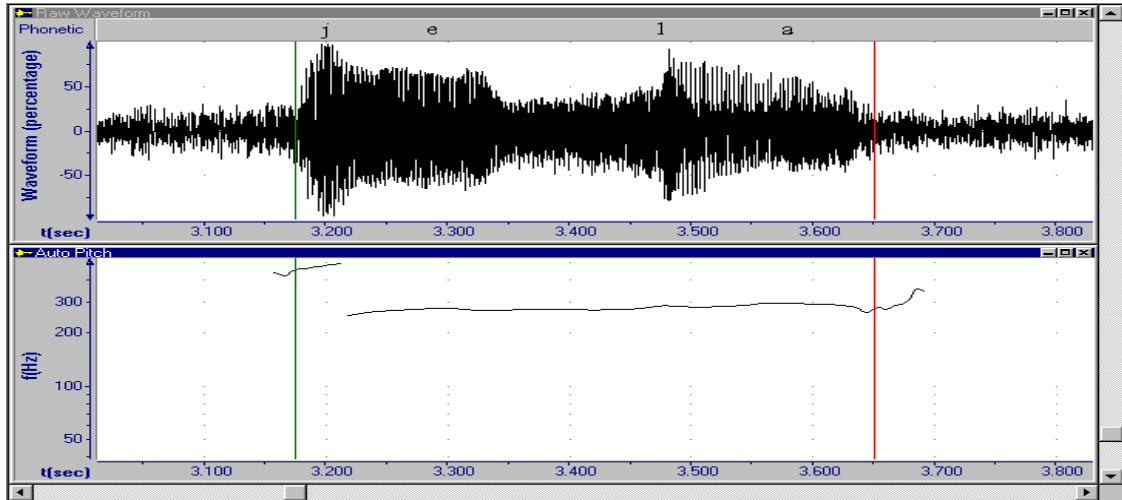
b



c

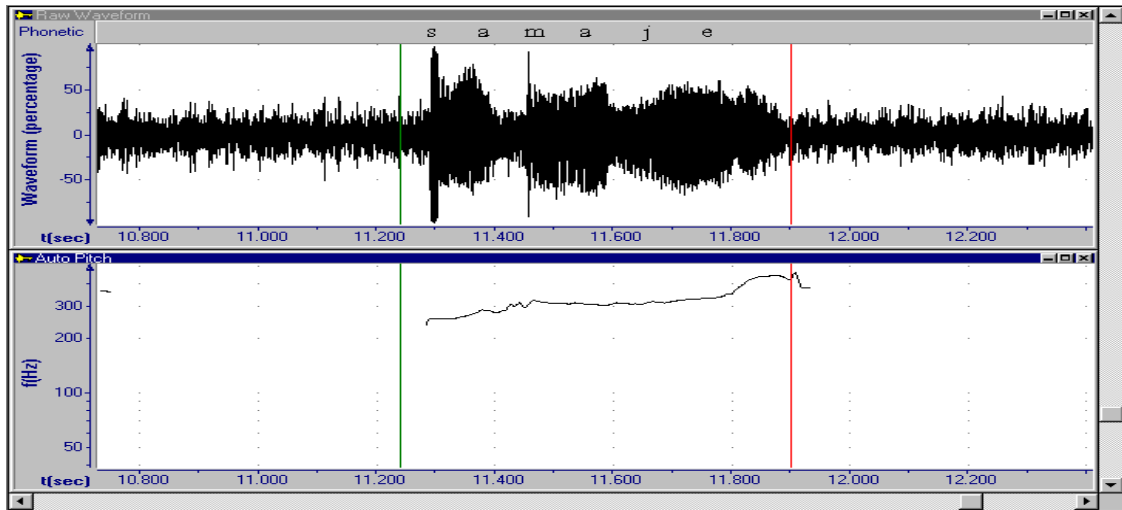


d

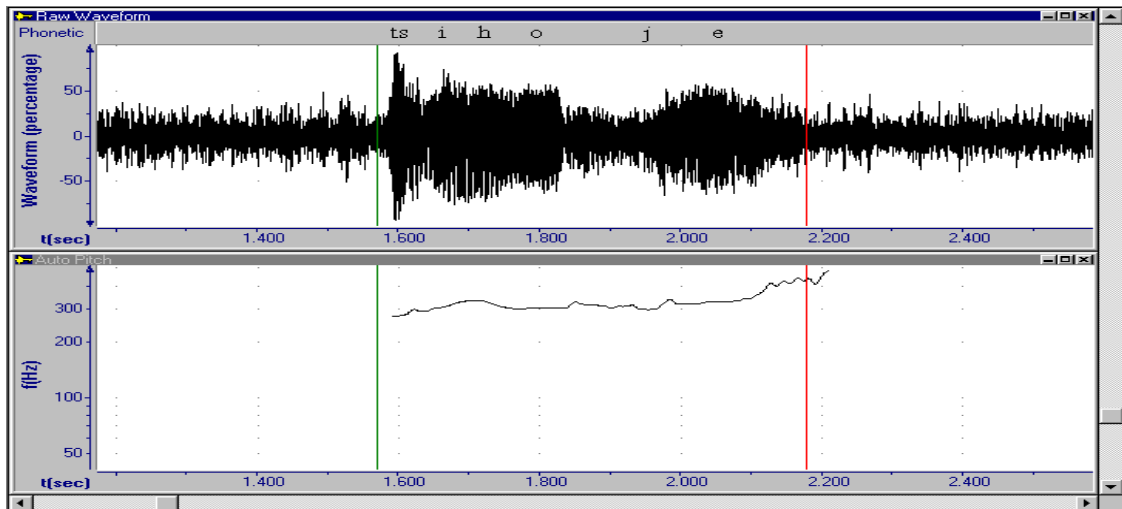


2) Upstep of H after another H (female speakers)

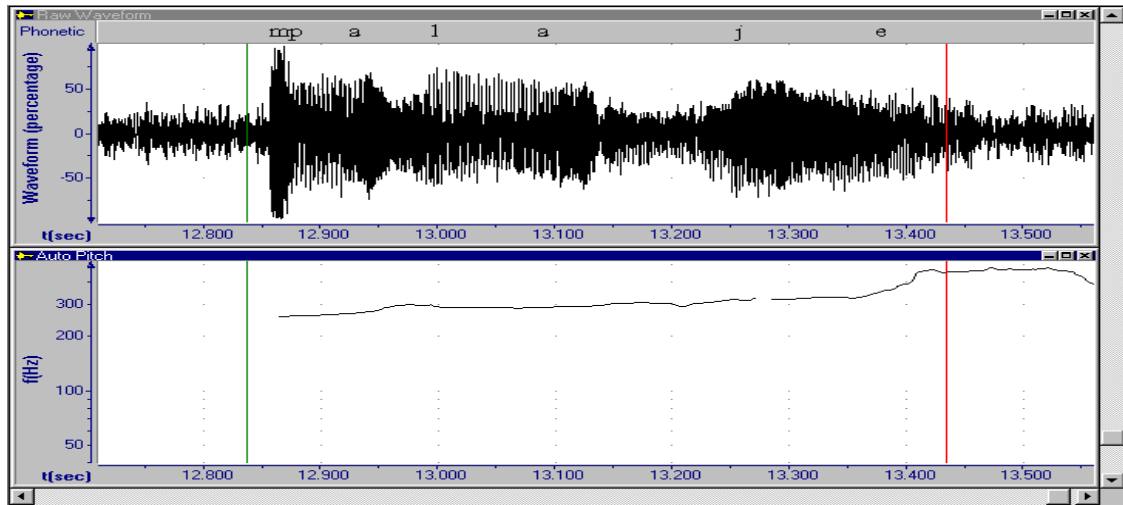
a



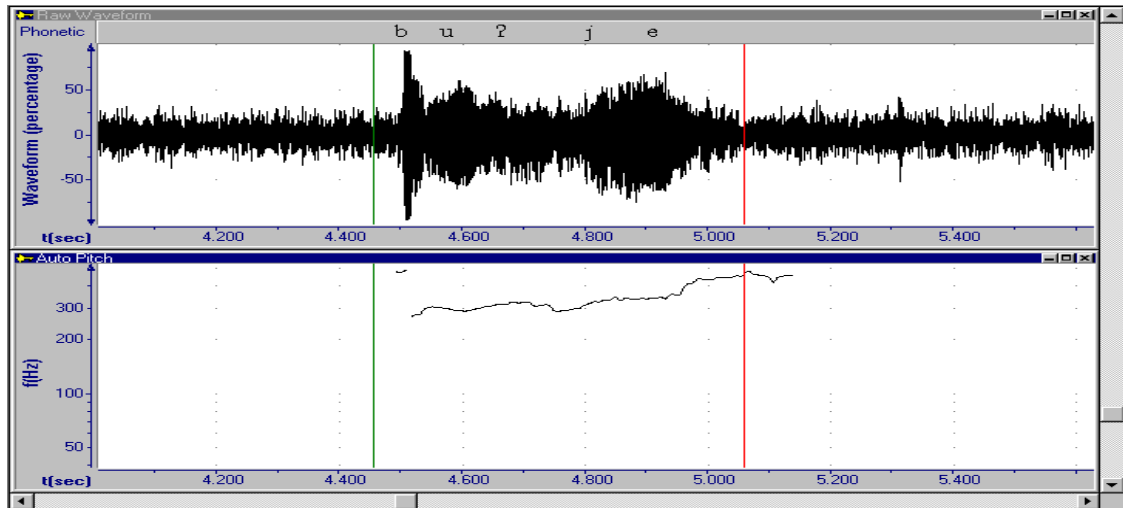
b



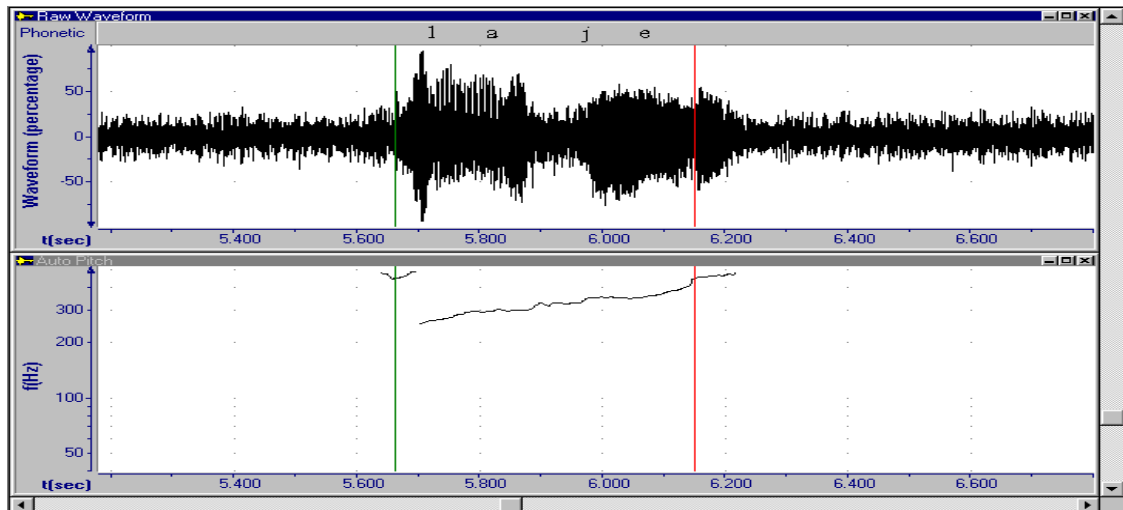
c



d

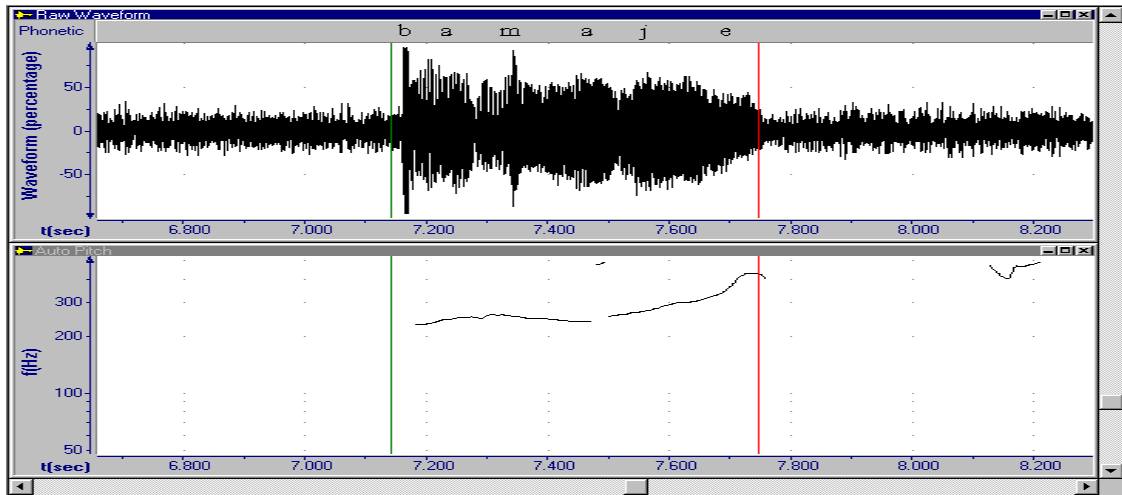


e

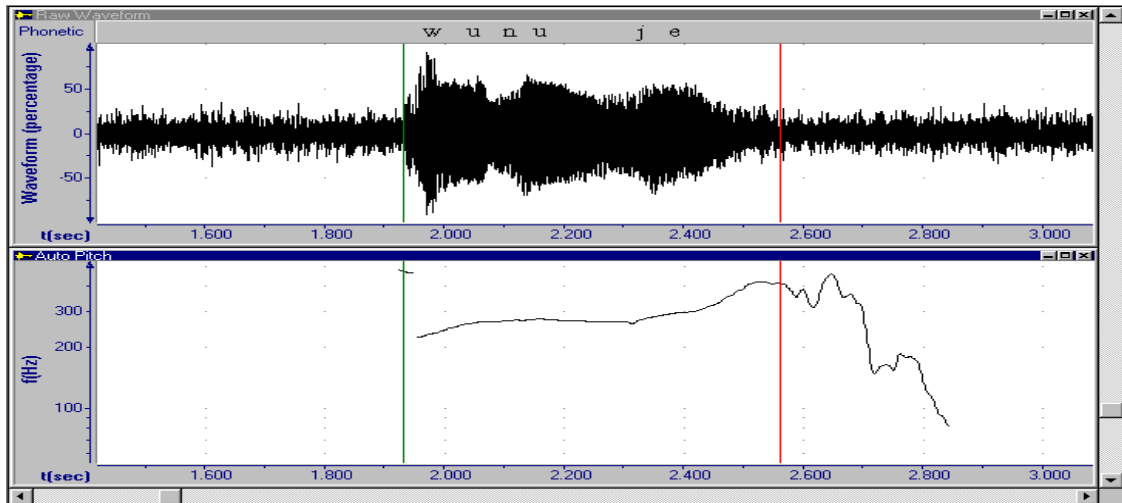


3) Final low tone downglides (female speakers)

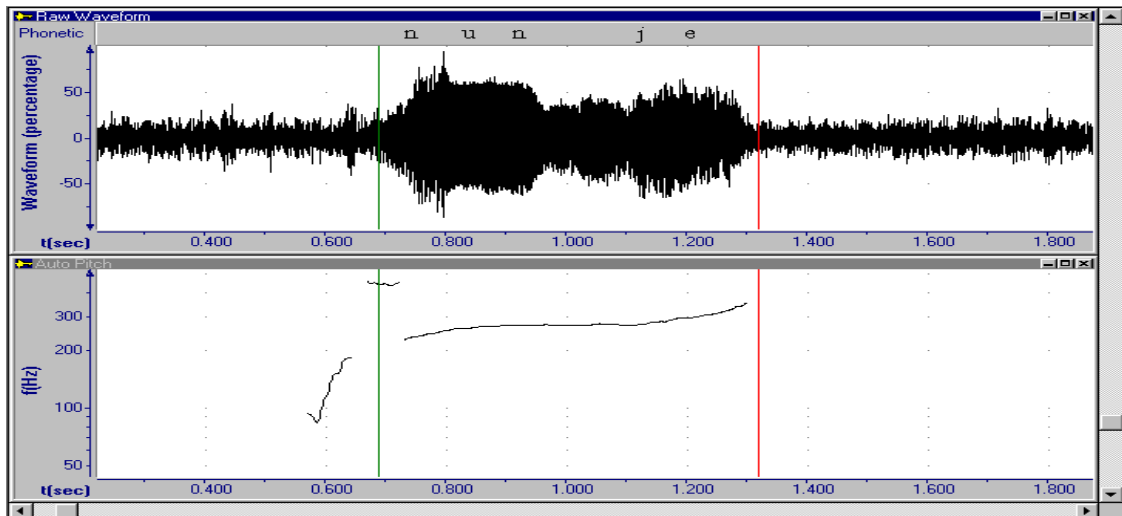
a



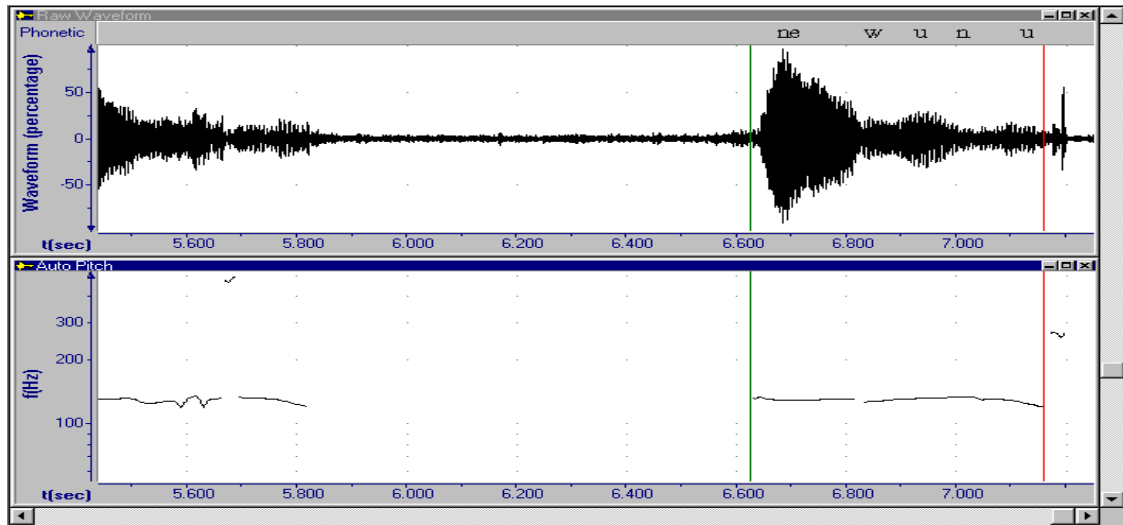
b



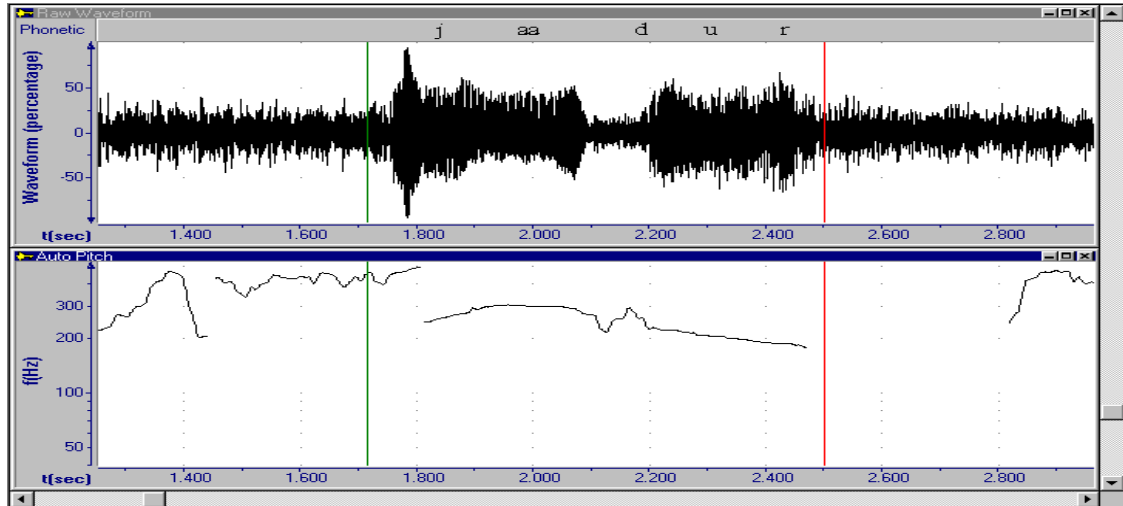
c



d

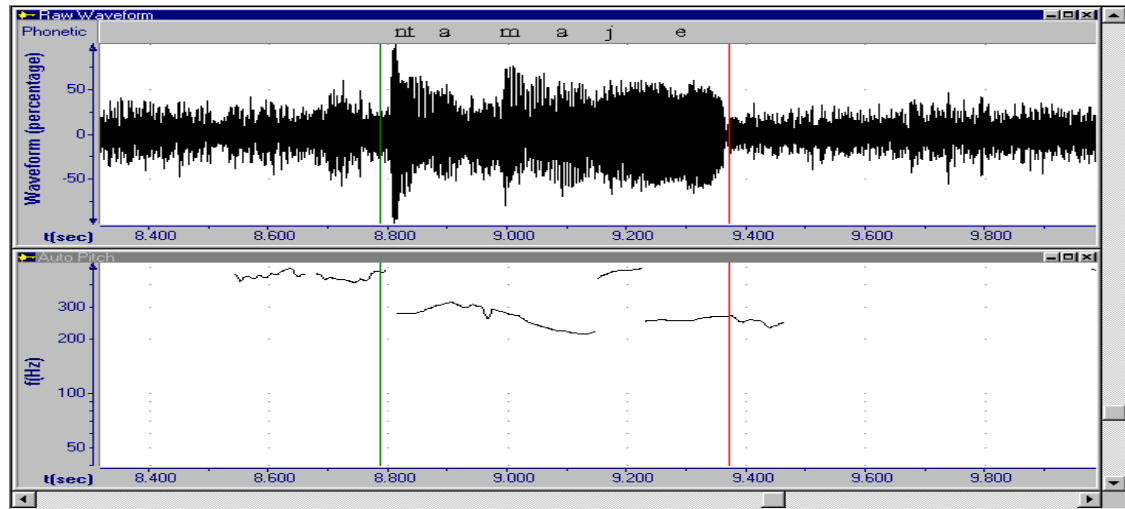


e

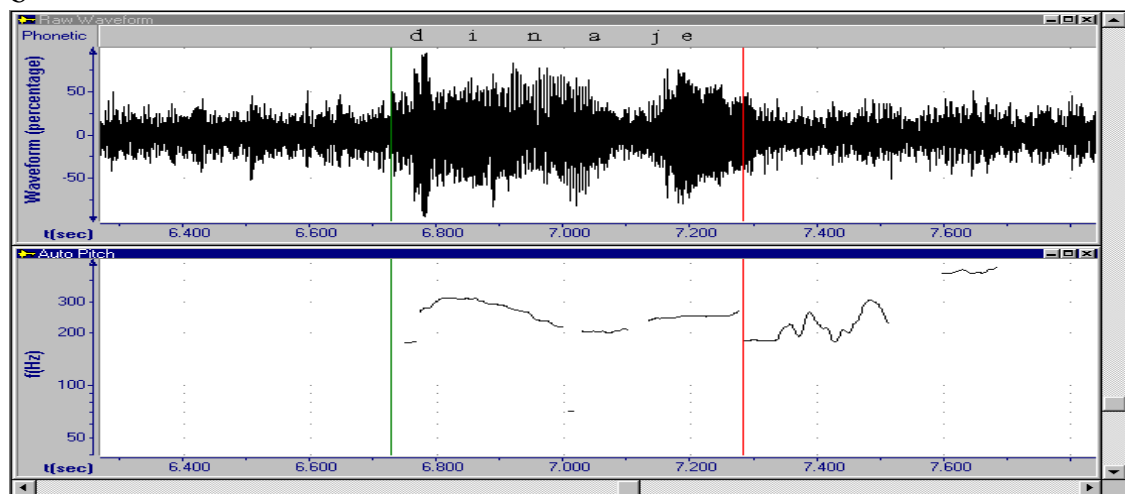


4) Downstep of second H in a H L H sequence (female speakers)

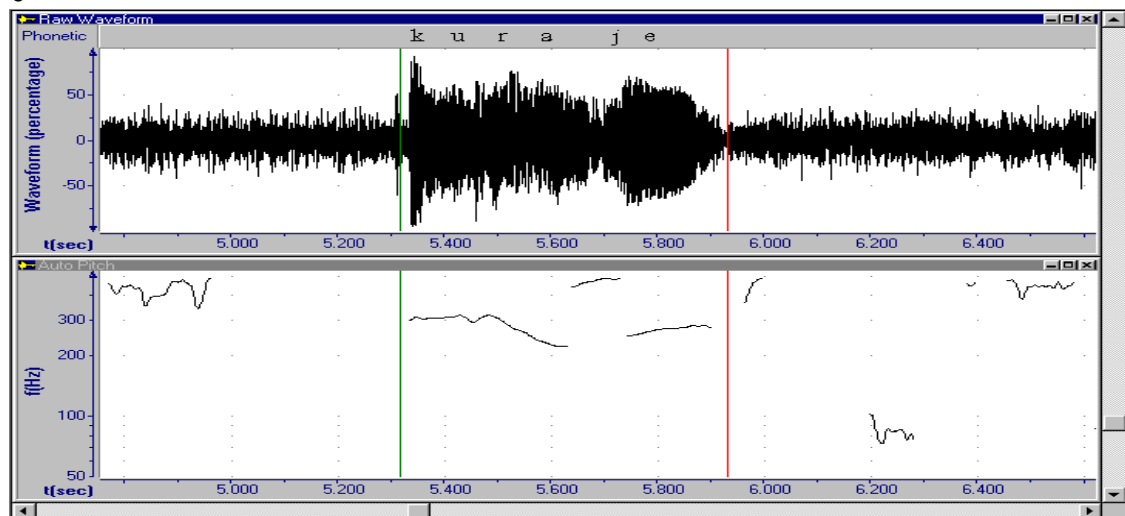
a



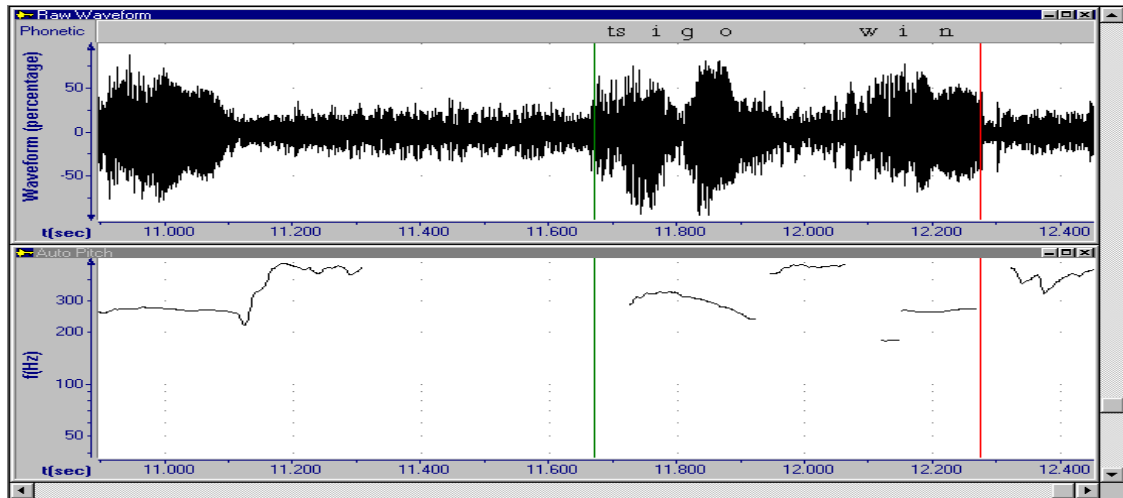
b



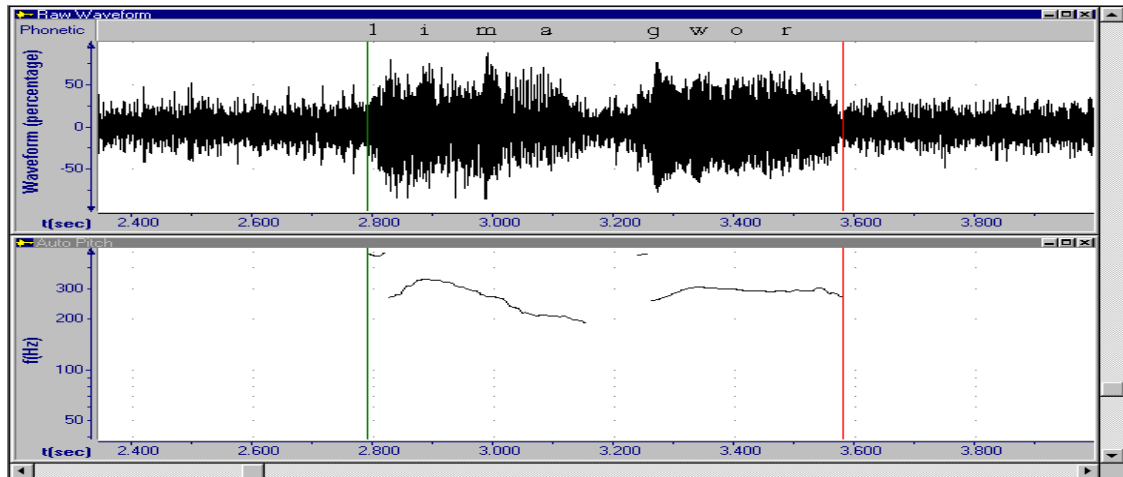
c



d

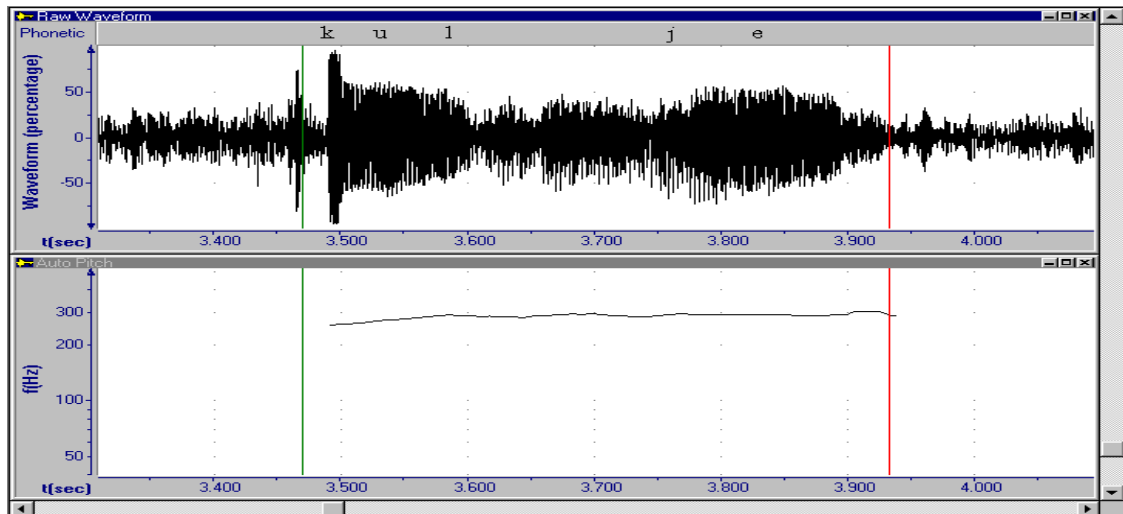


e

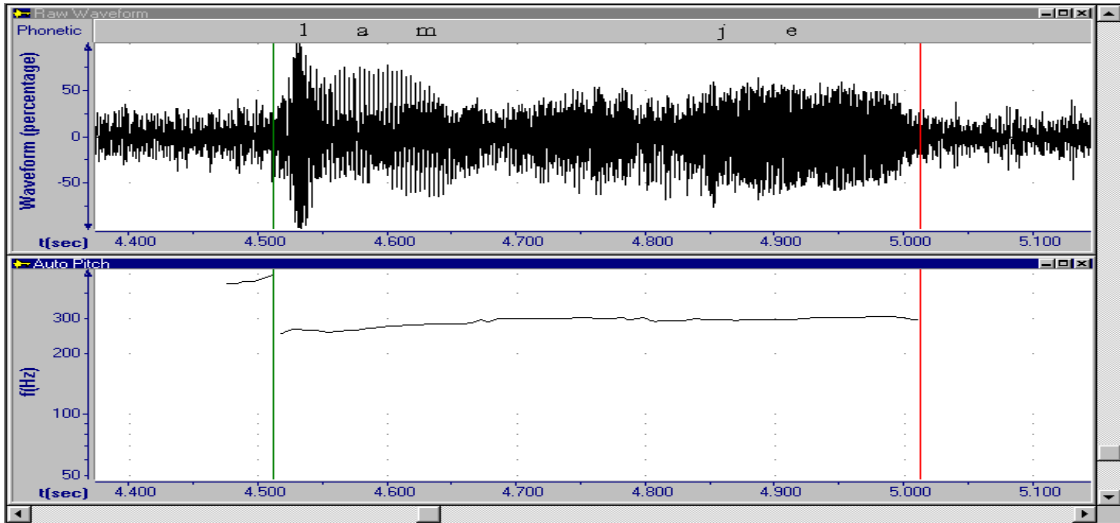


5) HL H surfaces as H (female speakers)

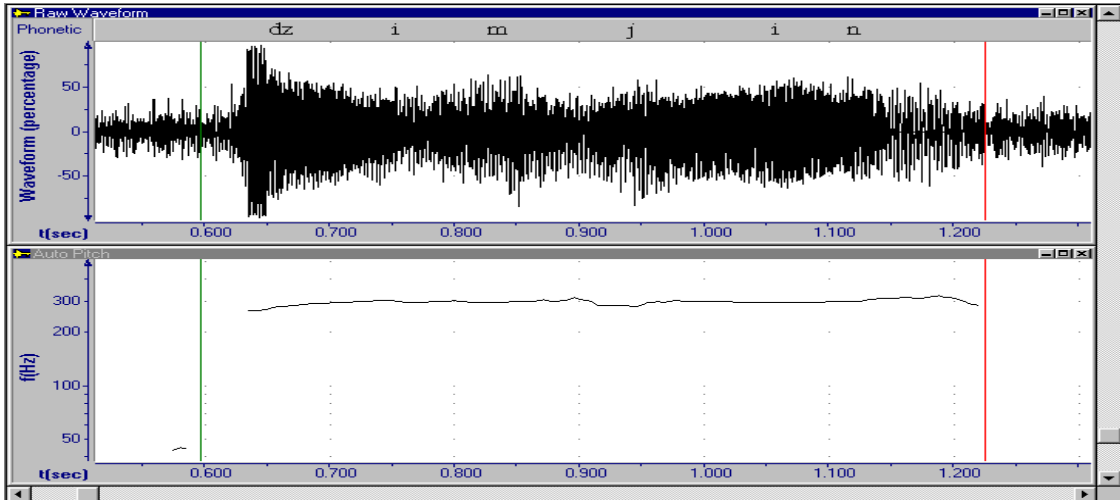
a



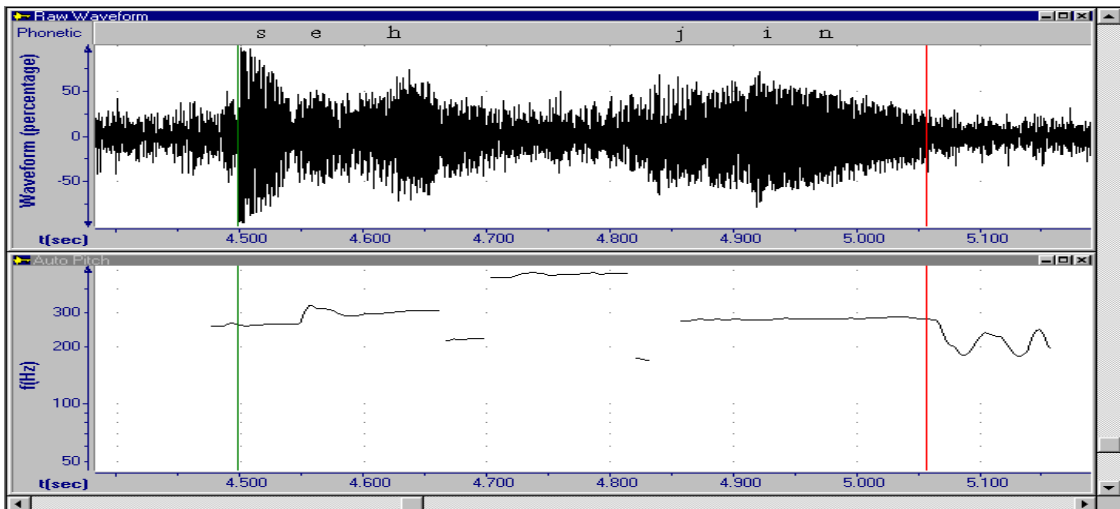
b



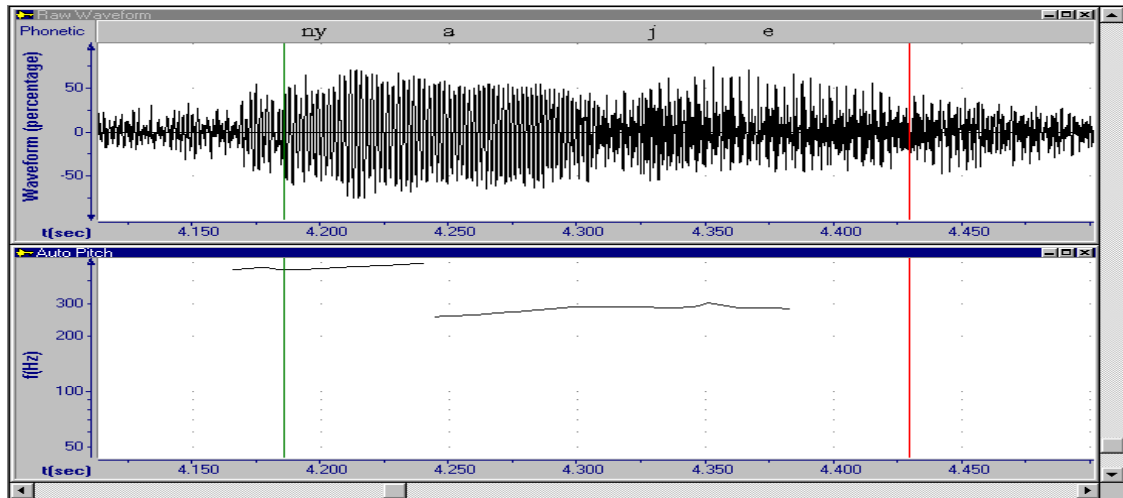
c



d

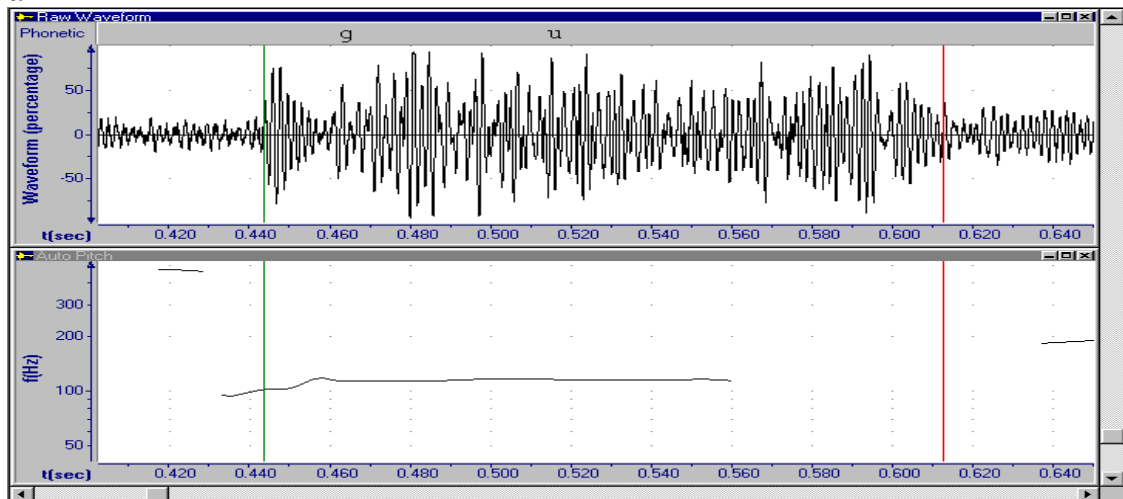


c

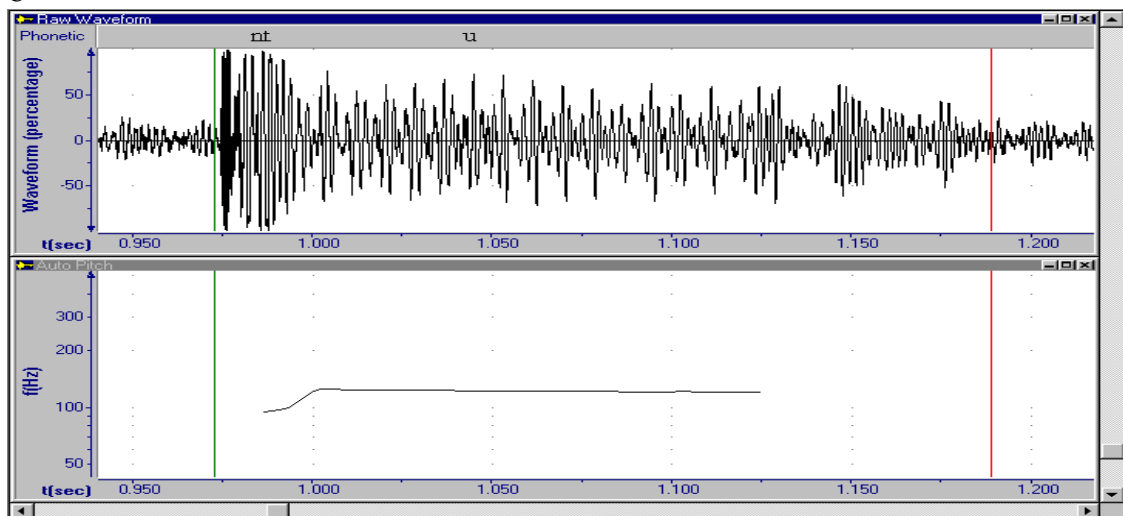


6) LH Melody surfaces as L(male speakers)

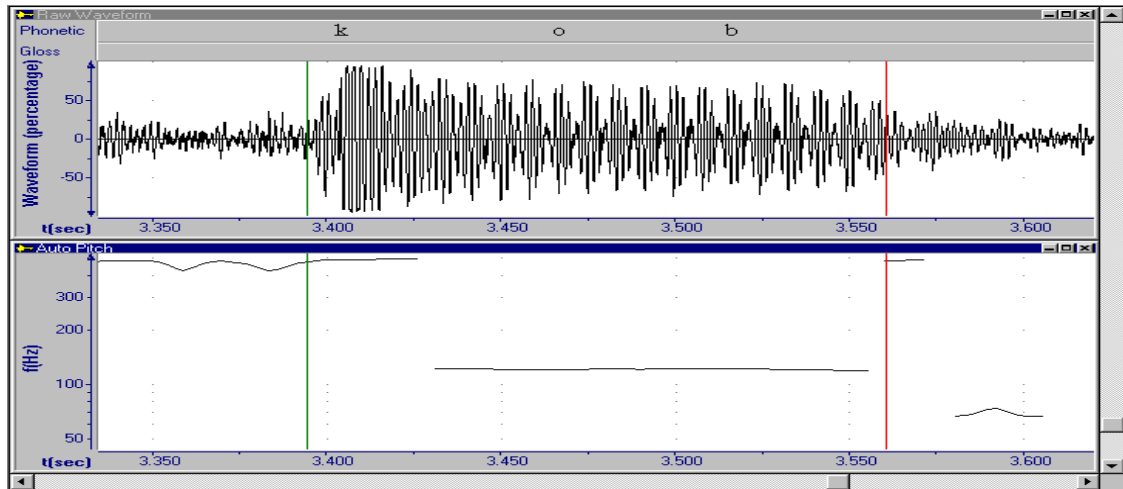
a



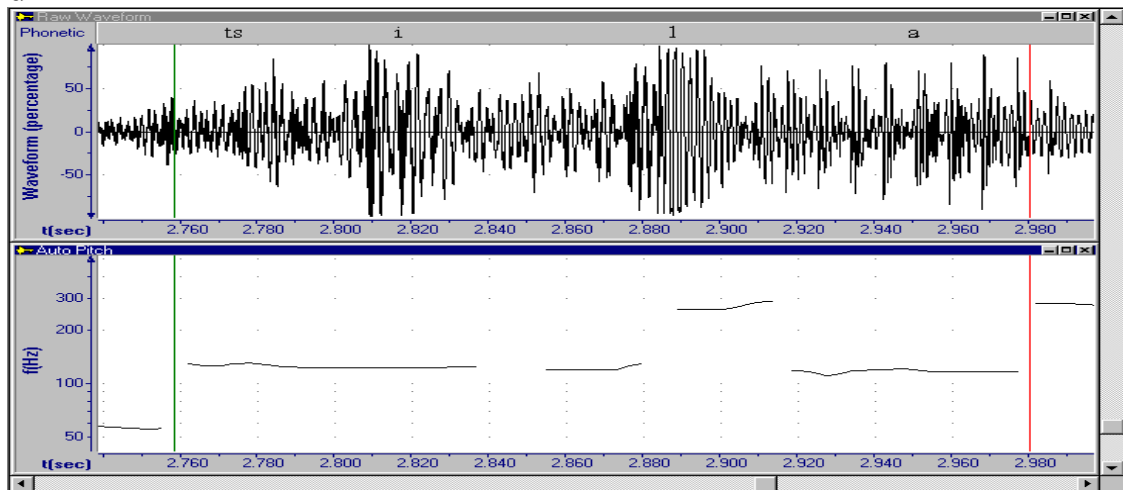
b



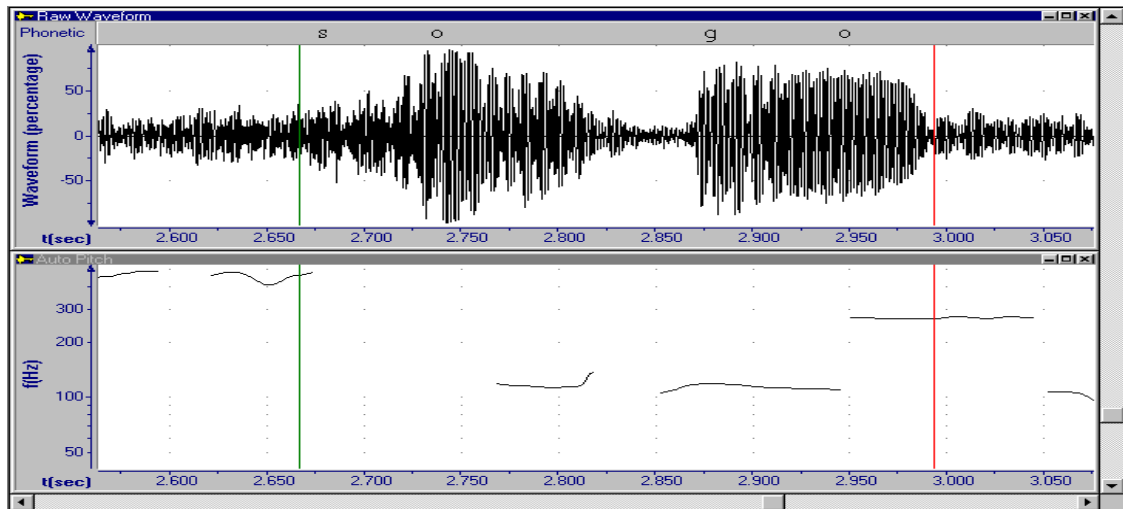
c



d

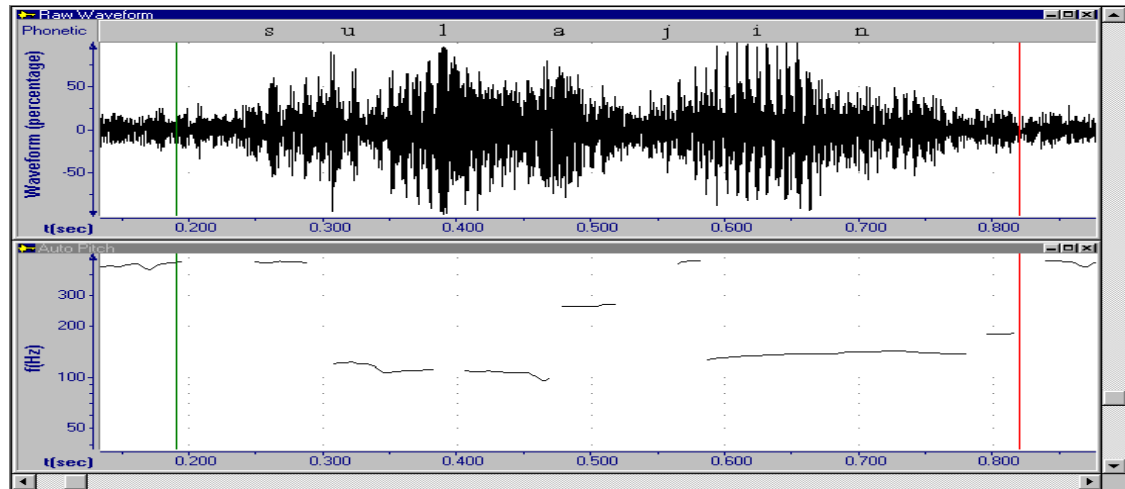


e

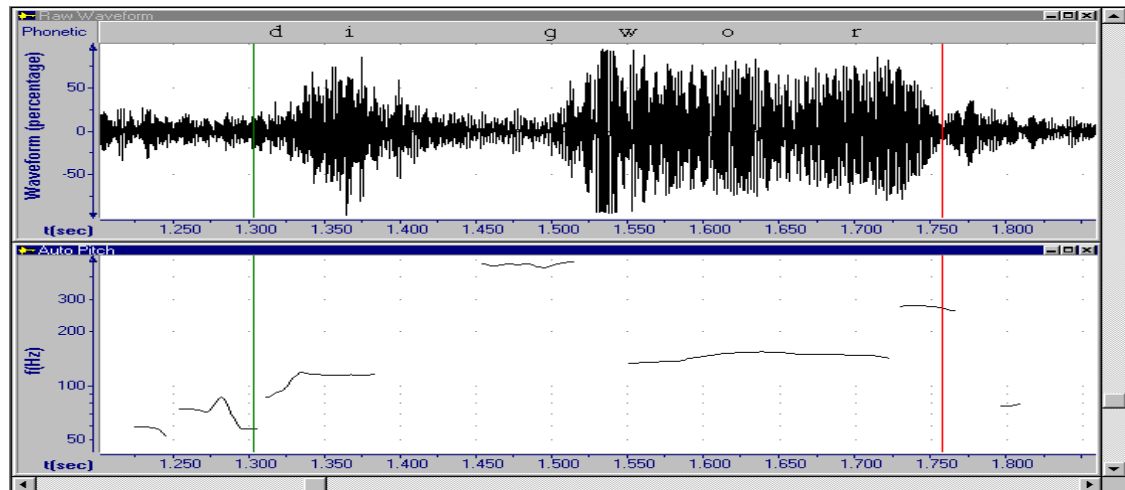


7) LH Melody is realized as L before H (male speakers)

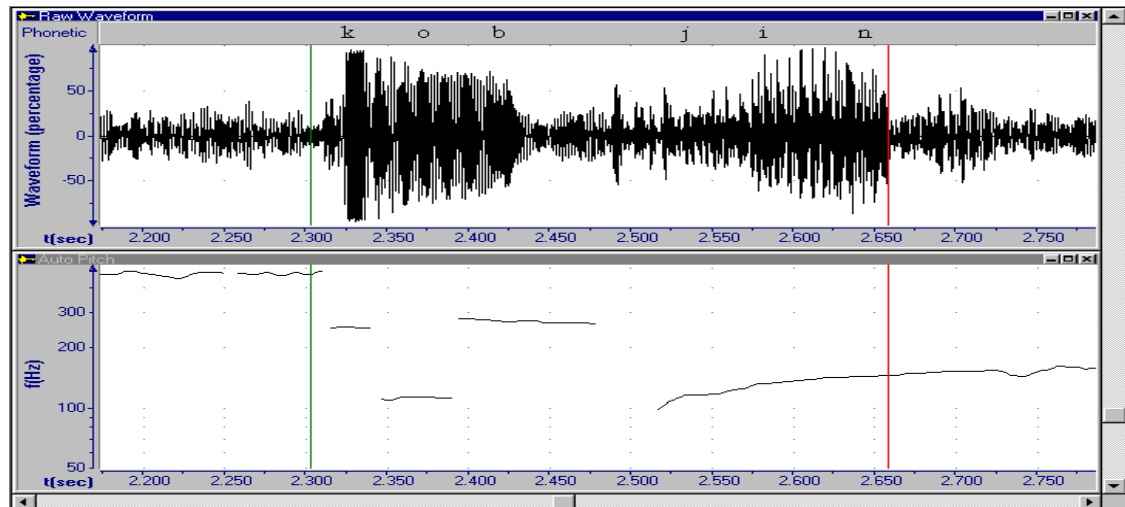
a



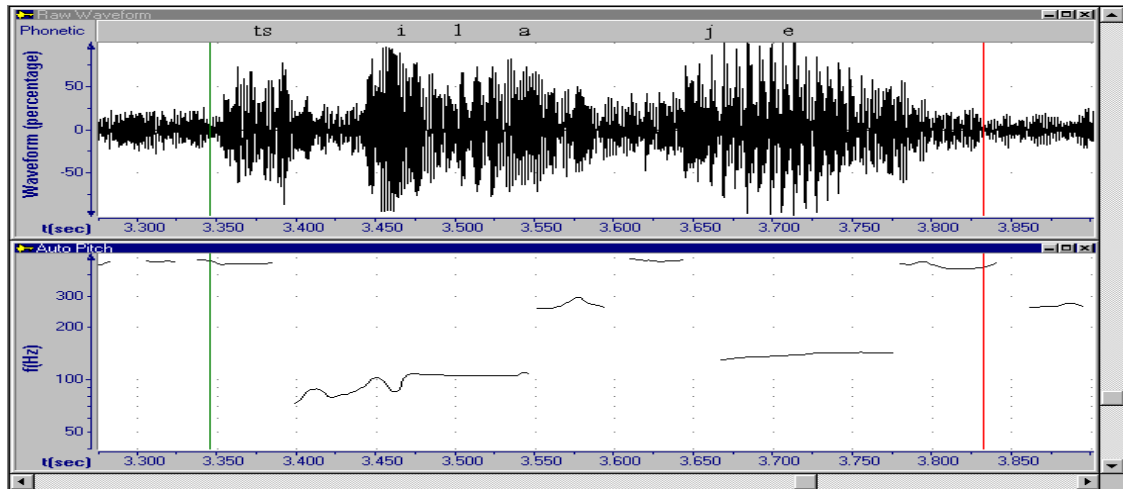
b



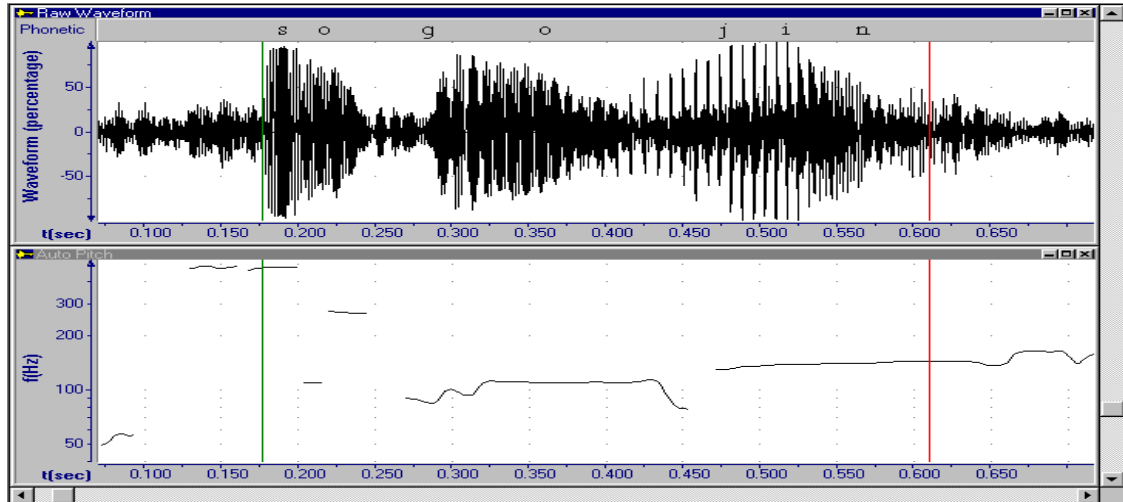
c



d

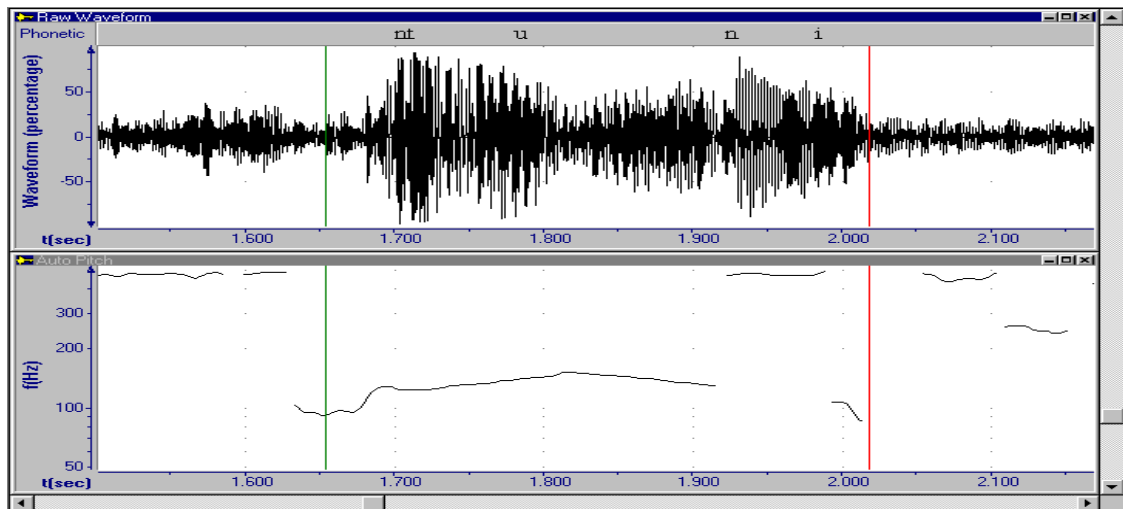


c

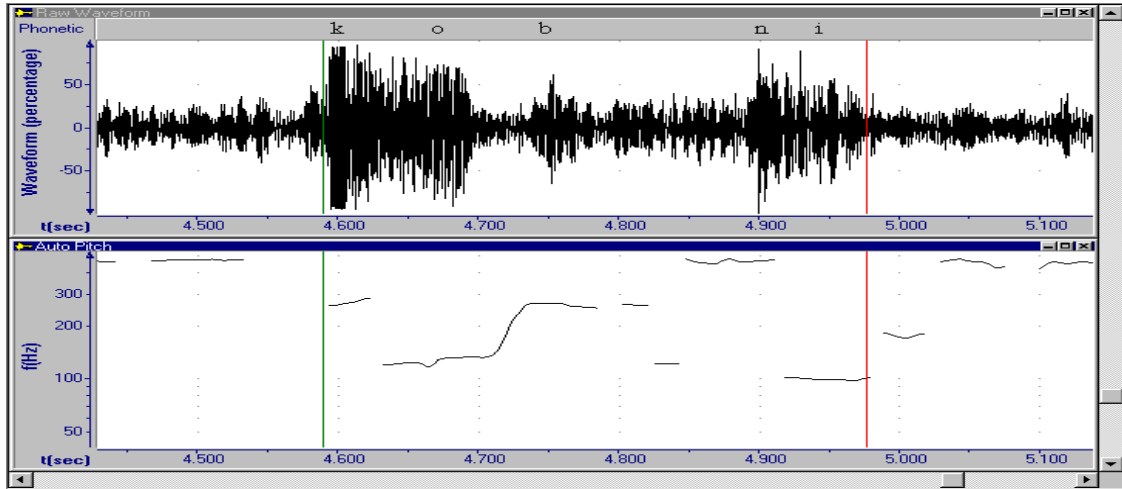


8) LH melody surfaces as LH before L (male speakers)

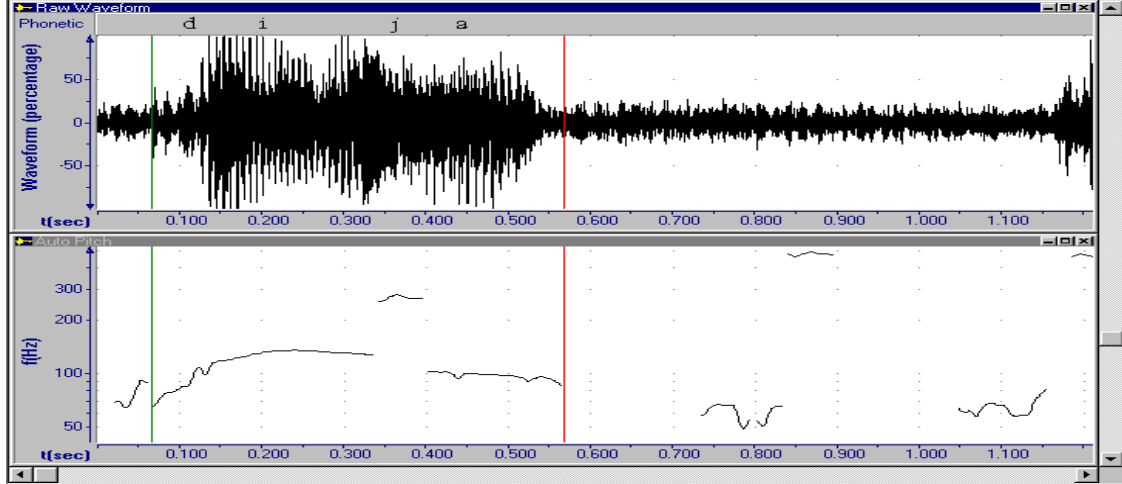
a



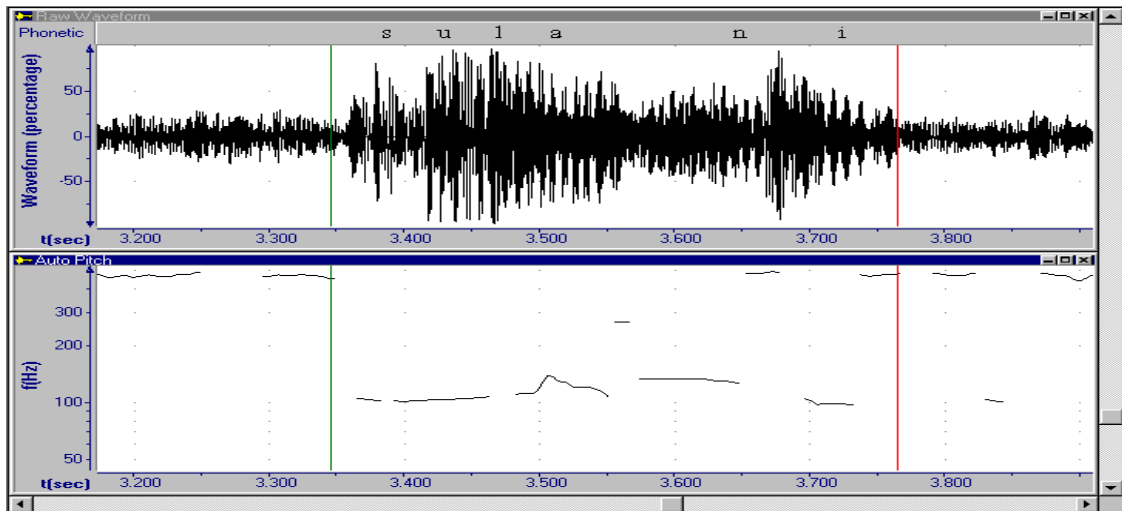
b



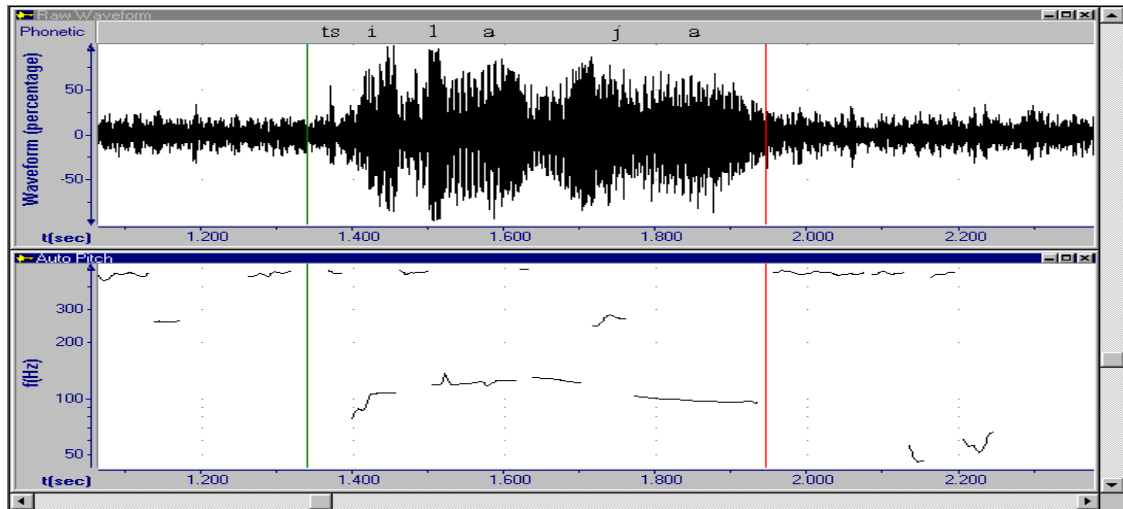
c



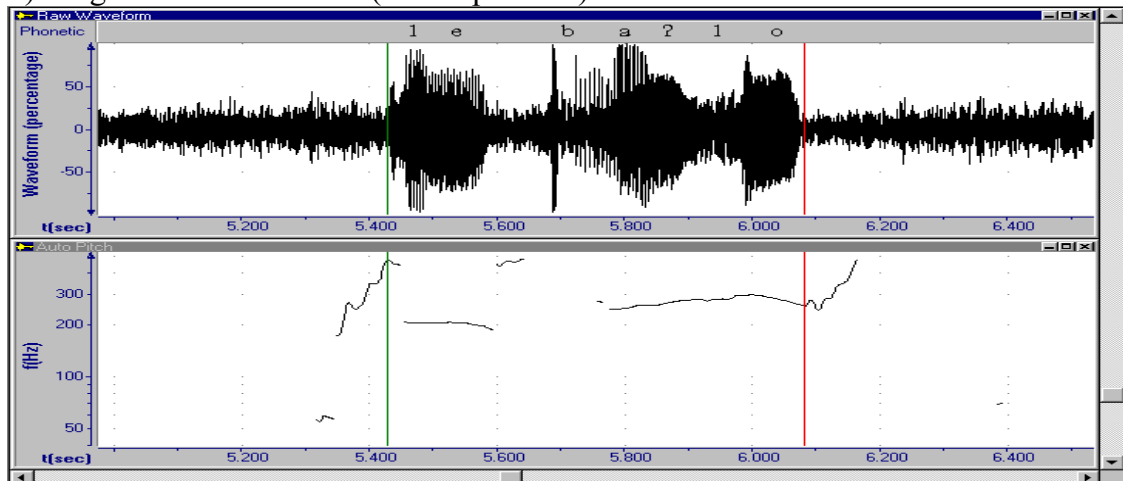
d

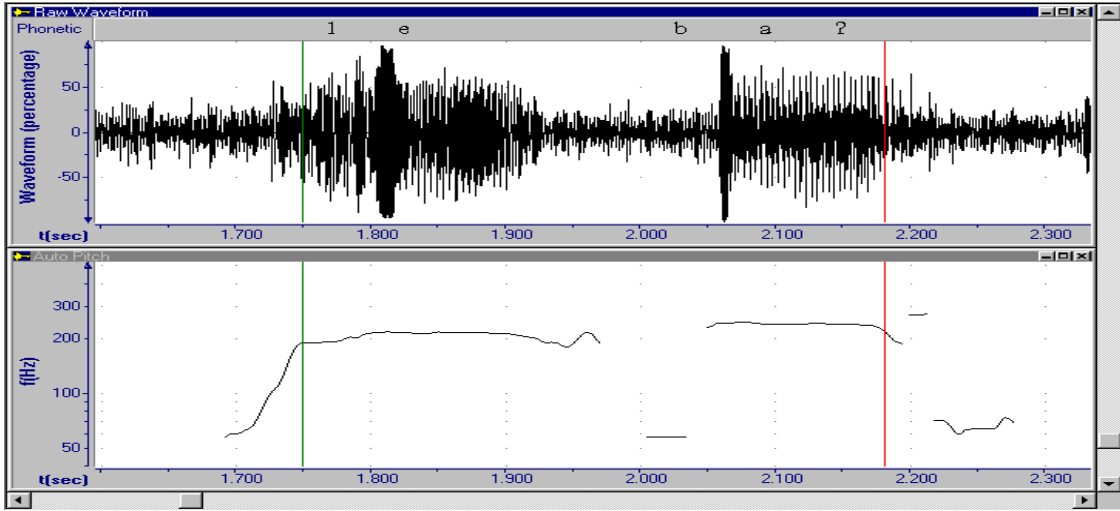


c

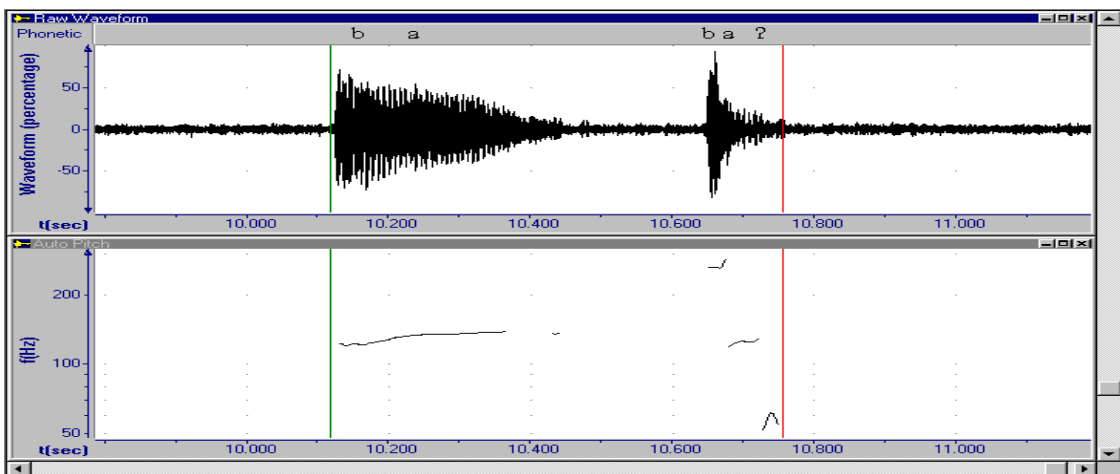
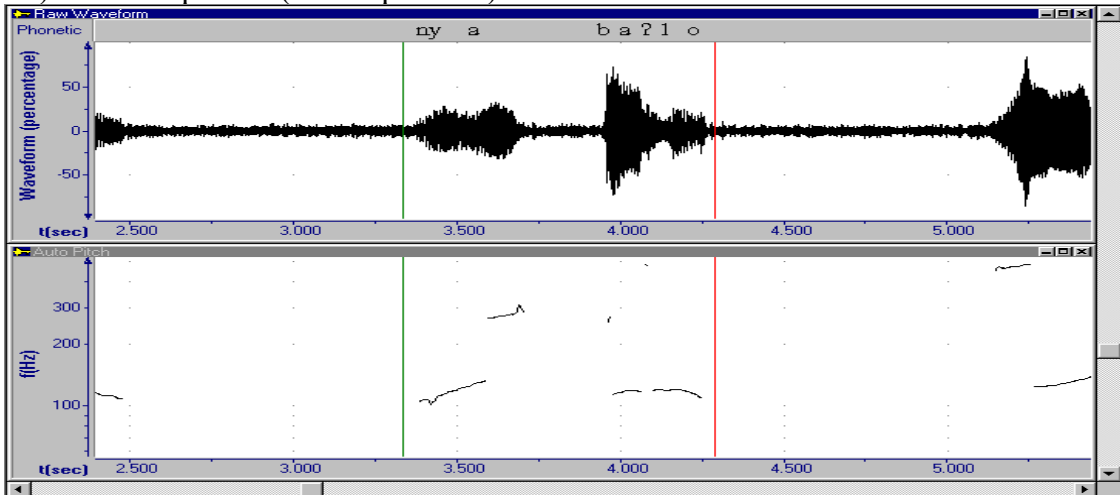


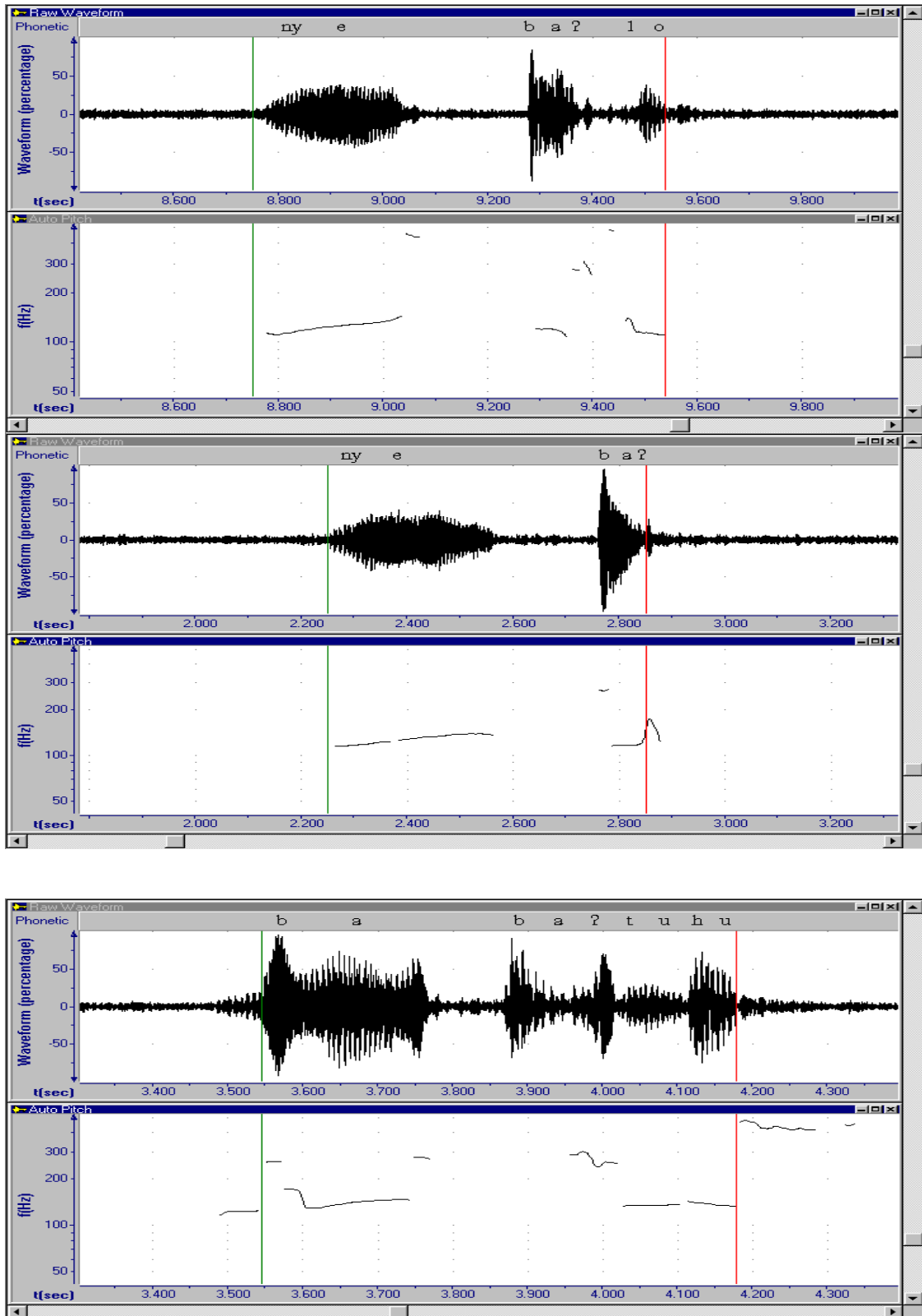
9) High-toned verb roots (male speakers)



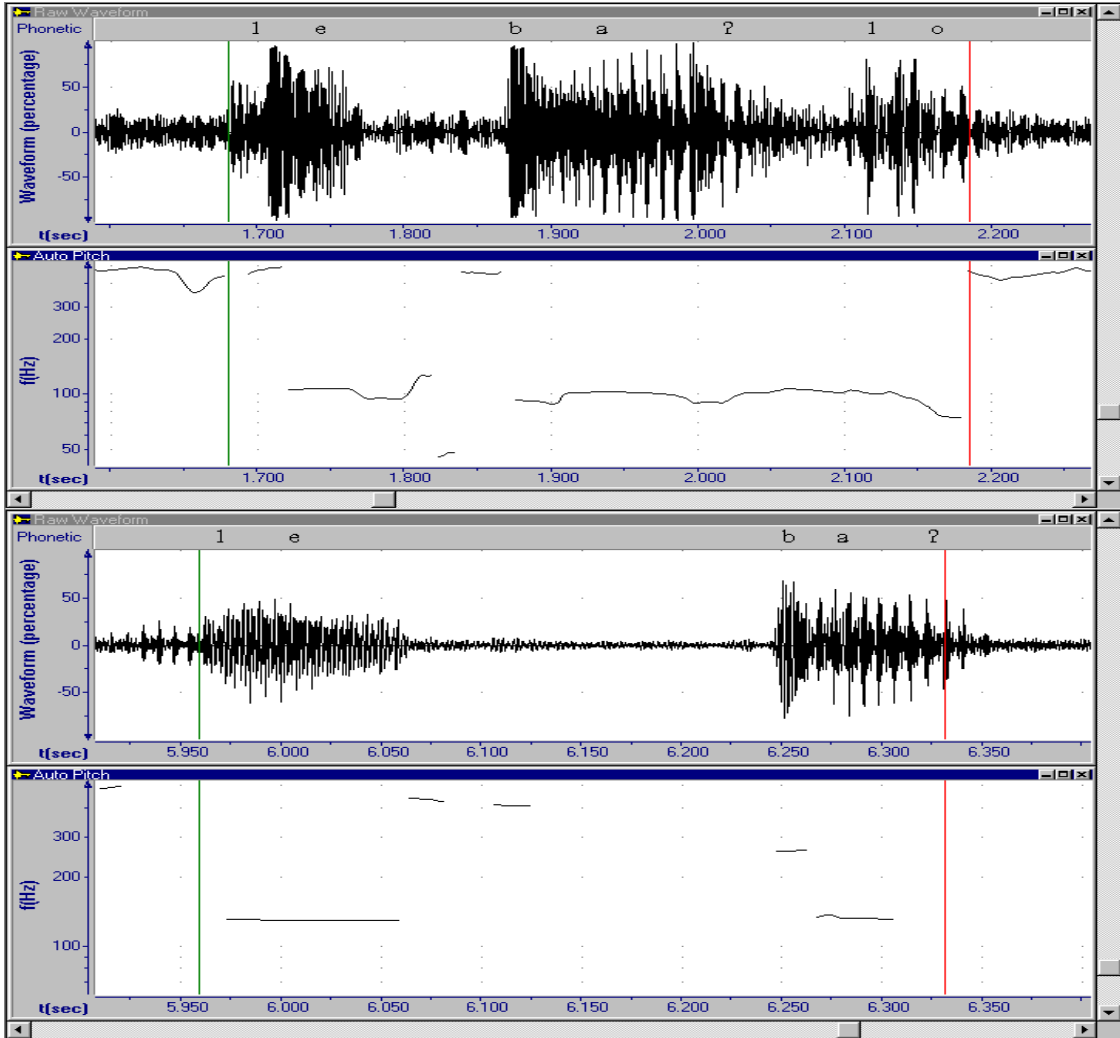


10) Downstep of H (male speakers)





11) Low-toned verb roots (male speakers)



12) Upstep of L (male speakers)

