

**A STUDY OF SYLLABLE WEIGHT
AND ITS EFFECTS IN DHOLUO PHONOLOGY**

By

ODUOR, JANE AKINYI NGALA

University of NAIROBI Library



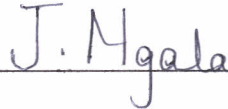
0451671 2

A Thesis Submitted in Fulfillment of the Requirements for the
Degree of Doctor of Philosophy in Linguistics in the University of
Nairobi

2002

DECLARATION

This thesis is my original work and has not been submitted for examination in any other university.

A handwritten signature in black ink, appearing to read 'J. Ngala', written over a horizontal line.

ODUOR, JANE AKINYI NGALA

This thesis has been submitted for examination with my approval as the university supervisor

A handwritten signature in blue ink, consisting of a large loop followed by a long horizontal stroke and a small flourish at the end, written over a horizontal line.

PROF. DUNCAN OKOTH OKOMBO

DEDICATION

TO

ALMIGHTY GOD,

AUSTIN, WERE AND DATE

Table of Contents

	Page
Declaration	II
Dedication	III
Acknowledgements	IX
List of Symbols and Abbreviations	XI
List of Tables	XIV
Abstract	XV
<i>Chapter 1</i>	1
Introduction	1
1.0 Background to the Language	1
1.1 Statement of the Problem	3
1.2 Rationale for the Study	5
1.3 Objectives of the Study	6
1.4 Hypothesis	7
1.5 Scope and Limitations	7
1.6 Theoretical Framework	8
1.7 Review of Literature	16
1.7.1 Review of Theoretical Literature	16
1.7.1.1 Background to the Theoretical Literature	16
1.7.1.2 Autosegmental Phonology	18
1.7.1.2.1 Introduction	18
1.7.1.2.2 Autosegmental Representation	19
1.7.1.2.3 Principles of Autosegmental Phonology	21

1.7.1.2.4	Some Rules of Autosegmental Phonology	23
1.7.1.2.5	Contour Tones	24
1.7.1.2.6	Floating Tones	25
1.7.1.2.7	Tone Stability	26
1.7.1.2.8	Extensions of Autosegmental Phonology to Non-Tonal Phenomena	26
1.7.1.2.9	The Skeletal Tier	27
1.7.1.3	CV Phonology Model	27
1.7.1.3.1	Introduction	27
1.7.1.3.2	CV Phonology and Syllable Representation	28
1.7.1.3.3	Syllable Division	30
1.7.1.4	Metrical Phonology	33
1.7.1.4.1	Introduction	33
1.7.1.4.2	Metrical Trees	35
1.7.1.4.3	Metrical Grids	43
1.7.1.5	The Nature of the Syllable	47
1.7.1.6	The Nature of Stress	54
1.7.1.7	The Nature of Tone	57
1.7.2	Review of Literature on Dholuo Phonology	60
1.7.2.1	The Dholuo Syllable Structure	60
1.7.2.2	Phonological Processes Involving Vowels	62
1.7.2.2.1	Glide-Formation	63
1.7.2.2.2	Vowel Deletion	64
1.7.2.2.3	Compensatory Lengthening	65
1.7.2.2.4	Root Lengthening	65

1.7.2.3	Stress and Vowel Lengthening	67
1.7.2.4	Tone in Dholuo	69
1.8	Methodology	70
1.8.1	Data Collection	70
1.8.2	Data Analysis	71
Chapter 2		73
A Phonemic Inventory of Dholuo sounds		73
2.0	Introduction	73
2.1	Consonants	73
2.2	Vowels	75
Chapter 3		80
The Dholuo Syllable Structure		80
3.0	Introduction	80
3.1	Open Syllables	81
3.2	Closed Syllables	90
3.3	Summary	96
Chapter 4		101
The Relationship Between Syllable Weight and Stress		101
4.0	Introduction	101
4.1	Stress in Bisyllabic Words	104
4.2	Stress in Trisyllabic Words	131
4.3	Stress in Polysyllabic Words	149
4.4	Vowel Doubling at Sentence Level	156
4.5	Summary	164

Chapter 5		175
The Relationship Between Syllable Weight and Tone		175
5.0	Introduction	175
5.1	Tone in Monosyllabic Words	177
5.2	Tone in Bisyllabic Words	182
5.3	Tone in Trisyllabic Words	194
5.4	Tone in Polysyllabic Words	205
5.5	Summary	213
Chapter 6		219
The Relationship Between Syllable Weight and Vowel		
Processes		219
6.0	Introduction	219
6.1	Vowel Deletion	223
6.1.1	Vowel Deletion in Monosyllabic Words	223
6.1.2	Vowel Deletion in Polysyllabic Words	236
6.2	Compensatory Doubling	245
6.2.1	Compensatory Doubling in Monosyllabic Words	246
6.2.2	Compensatory Doubling in Polysyllabic Words	251
6.3	Glide-Formation	253
6.3.1	/j/ Formation in Monosyllabic Words	258
6.3.2	/j/ Formation in Polysyllabic Words	262
6.3.3	/w/ Formation in Monosyllabic Words	265
6.3.4	/w/ Formation in Polysyllabic Words	266
6.4	Summary	268

<i>Chapter 7</i>		276
Conclusion and Recommendations		276
7.0	Summary and Conclusion	276
7.1	Recommendations	281
	Bibliography	285
	Appendix	291

Acknowledgements

This thesis has come to be through the financial assistance and support of the German Academic Exchange Programme -DAAD, Moi University and the University of Nairobi. I am very grateful to DAAD for the award of a research grant that enabled me to carry out my fieldwork and do all the other necessary work related to writing a thesis.

I am also deeply indebted to Prof. Duncan Okoth Okombo, my supervisor and mentor, for the keen supervision. He provided me with professional guidance and insights on certain aspects of my work. I am very grateful and may God bless him.

I must not forget to mention the support I received from Prof. Peter Amuka and Dr. E. Kembo Sure. I thank them very much for the encouragement they gave me to write a research proposal and undertake a Ph.D. degree. To Dr. Hukka Wario, the ambassador of Kenya to Zimbabwe, I am grateful. I thank him for the abundant reading materials that he provided me with. I am also grateful for the encouragement he gave me when I was writing my thesis.

I also convey my gratitude to my predecessors (Prof. D. O. Okombo and Dr. J. H. Oduol) in the field of Dholuo phonology. Their researches had a direct bearing on my work.

To Austin (my husband) and Louis (my son), I am grateful for the peaceful environment and time that they gave me during the writing of my very trying chapters. I especially thank my husband for all the support I received from him. To Kawera, who took over some of my household

responsibilities as a mother and gave me the peace of mind that I required to do a work of this nature, I am grateful and may God bless her. I also thank Washington for working with me as my research assistant.

I wish to acknowledge the help of Lucy, Sophie, Gladwell, Joyce and Austin. All of them assisted me in ensuring that my work acquired some permanent form through typing it. Lastly, I thank all those who contributed in various ways, but whose names I am not able to mention.

This thesis is my own investigation of the subject of the study. Accordingly, I take full responsibility for any loopholes that may feature in any aspect of it.

List of Symbols and abbreviations

\$	Syllable boundary
#	word boundary
μ	mora
σ /syll	syllable
=, z or x (on an association line)	deletion of an association line
∅	end result of deletion
α	a feature variable indicating a + or – with respect to a particular feature. The application of the rule gives the opposite value.
+	shows positive value when placed before a feature (e.g. [+ back])
+	shows that two words have come together when placed between words
-	negative value for a feature (e.g. [- back])
*	indicates that the linguistic form is wrong or does not exist
V*	more than one vowel
	main word stress or primary stress
	secondary stress
~	is also realised as (free variation)
AC	Association Conventions
AP	Autosegmental Phonology

[+ATR]	Advanced Tongue Root
[-ATR]	Retracted Tongue Root
B-U	Boro-Ukwala
C	consonant
ER	End Rule
F	Foot
G	germinate
h	heavy
H	high tone
IPA	International Phonetic Alphabet
KSN	Kisumu-South Nyanza
l	light
LCSR	Lexical Category Stress Rules
L	low tone
!H	downstepped high tone
NSSCs	negative syllable structure conditions
MP	Metrical Phonology
OCF	Obligatory Contour Principle
OR	Orthographic Representation
PSSCs	positive syllable structure conditions
QS	Quantity Sensitive
s	strong
TBU	Tone Bearing Unit
U	Utterance
V	vowel

VDR

Vowel Doubling Rule

w

weak

W

Word

WFC

Wellformedness Condition

List of Tables

	Page
(37) Consonantal Phonemes of Dholuo	73
(40) Dholuo Vowels	76

Abstract

This work is essentially a study of syllable weight and its effects in Dholuo phonology. It is assumed that a wide range of phonological processes are affected by syllable weight. The study therefore attempts to define syllable weight in Dholuo, showing how it is related to stress, tone and vowel processes (namely, deletion, compensatory lengthening and glide formation).

The data used in the study consists of monosyllabic, bisyllabic, trisyllabic and other polysyllabic words drawn from the speech of speakers of the KSN variety of Dholuo. The study is carried out within the frameworks of Autosegmental Phonology, Metrical Phonology and CV Phonology. The three theories are used in a complementary manner.

Using the CV phonology model in Chapter 3, the Dholuo syllable structure is first analysed to show or make clear the syllable types that exist in the language. This then paves way for a discussion of the relationship between syllable weight and stress.

In Chapter 4, it is then demonstrated within the framework of Metrical Phonology that stressed syllables are heavy and that stress has the effect of doubling vowels. In other words, some syllables are stressed because they are inherently heavy and they appear in positions where stress is also detected, while others have a doubled vowel because they occur as either the penultimate or the last syllable of a word. Syllable weight is also given a language specific definition. All the heavy syllables have been demonstrated to have a branching nucleus and all the light syllables a non-branching nucleus. It is also observed that almost all the heavy syllables are stressed and

almost all the light syllables are unstressed. It is concluded that syllable weight and stress have a mutual relationship and that Dholuo is a Quantity Sensitive language in stress assignment.

With the distinction between heavy and light syllables in mind, the relationship between syllable weight and tone is analysed in Chapter 5. The theory of Autosegmental Phonology is used in the analysis. The high-falling tone (a contour tone) is found on heavy syllables. All these heavy syllables are stressed. It is also noted that the high tone has the effect of making the weight of each syllable quite distinct, unlike the low tone. It is concluded that Dholuo is a Quantity Sensitive language in the assignment of the high-falling tone. The rest of the tones do not show any special relationship with syllable weight.

The relationship between syllable weight and vowel processes is also investigated in Chapter 6. It is observed that the vowel that undergoes deletion is normally a word-final vowel at word boundary. It is always in a light (CV) syllable and only undergoes deletion if it precedes a word beginning with another light (V) syllable at word boundary. The syllable that emerges is also a light (CV) syllable. Deletion often leads to compensatory lengthening. It is demonstrated that after deletion has taken place, the word initial vowel that is in a light syllable doubles to occupy the space left by the deleted vowel. The syllable that emerges is a heavy (CVV) syllable. The vowels that glide are all high vowels in light (CV) syllables. They glide when they precede word initial vowels that are in light (V) syllables or heavy (VV) syllables. The syllables that emerge as a result of glide formation are either light (CCV) syllables or heavy (CCVV) syllables. As far as vowel processes are concerned, Dholuo is a

Quantity Sensitive language. The three vowel processes directly affect vowels that are in a light (CV) syllable.

It is concluded in Chapter 7 that Dholuo is a Quantity Sensitive language in stress assignment, tone assignment, deletion, compensatory lengthening and glide-formation. It is also concluded that syllable weight in Dholuo has an effect on stress, tone, deletion, compensatory lengthening and glide-formation.

CHAPTER 1

INTRODUCTION

1.0 Background to the language

Dholuo belongs to the Nilo-Saharan family of languages. According to Encyclopaedia Britannica, Volume 22, the Chari-Nile is one of the six branches of the Nilo-Saharan family. The Eastern Sudanic branch, which is a branch of the Chari-Nile, consists of ten groups. The Nilotic group, being one of the groups of the Eastern Sudanic branch, is divided into the Western, Eastern and Southern branches. Dholuo belongs to the Western Nilotic branch. Some of the languages in this branch include Acholi, Lang'o, Alur, and Padhola (Stafford 1967). According to Stafford (1967), speakers of these languages by 1965 already numbered over one million. They all migrated from Sudan, their cradle land, and settled in Kenya and Uganda (Ochieng', 1985). In this group, only Dholuo speakers settled in Kenya and the Northern part of Tanzania.

The speakers of Dholuo live in Nyanza Province (Kenya), along the eastern shores of Lake Victoria. Cohen and Atieno-Odhiambo (1989:i) quote Evans-Pritchard (1949) in describing the region occupied by members of this ethnic group as follows:

The Luo of Kenya are a Nilotic people ...bordering Lake Victoria Nyanza to the North and South of Kavirondo Gulf. Some outlying sections also stretch into Tanganyika. The parts of Luoland which lie back from the lake, e.g. Alego and Ugenya, are undulating country.

The Kenya population census of 1989 revealed that the total number of

Luo people in Kenya was two million six hundred and fifty three thousand nine hundred and thirty two (2,653,932). The majority of the Luo people (2,030,278 people) live in Nyanza Province . The remaining few are scattered in the other provinces. This language has also been adopted by the Abasuba, an originally Bantu speaking community (Ayot, 1979).

Stafford (1967:vii) notes the existence of dialects in the Dholuo language :

There are dialects , but the differences between them are relatively small , and confined to matters of vocabulary and pronunciation rather than structure. Occasionally reference is made to dialect differences: the Trans-Yala dialect spoken in Ugenya , Alego, Imbo and parts of Gem locations is designated U.A.; while that spoken in South Nyanza is designated S.N.

A more recent study on Dholuo dialects by Oduol (1990) reveals that there are two dialects. According to her findings , there is dialect 1, also known as Kisumu-South Nyanza (KSN) which is spoken in a wider geographical area. It is spoken in Bondo division excluding Yimbo locations , Yala, Maseno, Kisumu, Winam, Muhoroni, Central, Mbita, Ndhiwa, Migori, Macalder, Oyugis and Kendu divisions. Oduol(1990) also states that this dialect functions as the standard form because it is used in print and as a medium of instruction. It is also dominant and socially prestigious. Dialect 2, the Boro-Ukwala (B-U) dialect, is spoken in a smaller region and is considered less prestigious. It is spoken in Yimbo location of Bondo division, Boro and Ukwala divisions. She notes that speakers of B-U use KSN features depending on their degree of exposure to it and/ or their willingness to accommodate. She also notes that most speakers command a wide range of the dialect continuum and slide up and down it.

The regions where Stafford (1967) claims SN variety is spoken do not differ much from Oduol's (1990) KSN variety. In this study, it is KSN variety that is used, for the simple reason that it is the one the researcher is most familiar with.

1.1 Statement of the Problem

Goldsmith (1990:178) states that there are languages that are quantity-sensitive and those that are not. The former allow the internal structure of the syllable to interfere with the construction of the foot- level prosodic structure of a word. In such languages, the treatment of quantity-sensitive foot involves a direct linking of the structure of rhymes to the stress pattern of the word (see section 1.7.1.6 for a general discussion of stress).

The concept of quantity sensitivity raises questions for the Dholuo language that deserve a systematic investigation. It is fairly obvious as has been demonstrated in this study that Dholuo has both heavy and light syllables(see section 1.6 for a definition); and that there are words with only light syllables and others with both heavy and light syllables. What is not so readily observable is the effect of this syllable weight on the relevant aspects of Dholuo phonology. In other words, there is need to investigate whether, for example, stress and tone in Dholuo are sensitive to syllable weight. To put it differently: do heavy syllables carry the main stress of a word or utterance or do they bear a particular kind of tone?

Moreover certain lengthened vowels (and therefore possible heavy syllables) in Dholuo are a product of phonological processes such as vowel

root lengthening and compensatory lengthening (Odhiambo, 1981). There is need to investigate whether the main stress in the relevant words is on the syllable with a vowel that has been lengthened.

Deletion and glide-formation are other vowel processes that could be closely related to syllable weight. There is need to investigate whether syllable weight has a role to play in these phonological phenomena. In other words, there is need to investigate the types of syllables that provide an environment for deletion and glide formation.

The issues that need to be investigated can be summarised in one broad question as follows:

What is the effect of syllable weight on the relevant aspects of Dholuo phonology?

This broad question can be split further into the following specific questions:

- (i) What is syllable weight in Dholuo? What is a heavy or light syllable in Dholuo?
- (ii) What is the relationship between syllable weight and stress in Dholuo? (Is Dholuo a quantity sensitive language?)
- (iii) What is the relationship between syllable weight and tone in Dholuo?
- (iv) What is the relationship between syllable weight and vowel processes such as root lengthening, deletion, compensatory lengthening and glide formation?

1.2 Rationale for the study

This study is important in terms of its contribution to theoretical linguistics in general as well as Dholuo linguistics in particular. The study hopes to reveal the strengths of Autosegmental Phonology, Metrical Phonology and CV - Phonology. The theory of Autosegmental Phonology was designed to deal with tonal phenomena (Katamba, 1989). The theory of Metrical Phonology was developed to deal with stress in various languages (Goldsmith, 1990). CV - Phonology deals with representation of the syllable (Clements and keyser, 1983).

In the theory of Metrical Phonology, various rules have been suggested for placement of stress in various languages. A study of the nature of stress as a phonological entity in Dholuo helps to test the validity of some of these rules, show which ones are applicable to Dholuo and possibly develop rules within this theory that uniquely apply to stress in Dholuo.

Tone (the pitch aspect of a syllable (Hornby, 1992)), which has traditionally been treated as a suprasegmental feature (Hockett, 1947), is an important feature in Dholuo phonology. Goldsmith (1990:185) states that:

In most languages, what is called primary, or word-level, stress is the assignment of a special tonal (or intonational) melody to the syllable in question, in addition to the stress effects perceived on the other secondarily stressed syllables.

This shows that in some languages the realisation of one phonological feature could be a reflection of another. This study is therefore important because it shows the behaviour of tone in relation to stress and syllable weight in Dholuo. It also shows the rules of Autosegmental Phonology that are

applicable to Dholuo.

The importance of the CV-tier and syllable tier of the CV-Phonology model is seen in the study. The study shows that the syllable tier and the CV-tier are very important in any analysis involving syllable weight.

The study can also be justified in terms of its relevance to applied linguistics. First and foremost, pronunciation errors may be related to the way in which higher level units, such as stress and tone are organized in different languages. This study therefore encourages applied linguists (who relate theory to teaching methods and materials for teaching) and teachers of English to develop suitable teaching/ learning materials based on adequate understanding of the differences between English and Dholuo, among other factors.

1.3 Objectives of the Study

In relation to the research problem and the rationale stated above, the objectives of the study are:

- (i) to investigate the nature of syllable weight and give it a language-specific definition in relation to Dholuo;
- (ii) to investigate the metrical patterns of Dholuo and establish their relation to syllable weight;
- (iii) to investigate the relationship between syllable weight and tone in Dholuo; and
- (iv) to investigate the role of syllable weight in other phonological processes (namely, root-lengthening, deletion, compensatory lengthening and glide- formation).

1.4 Hypothesis

In view of the statement of the problem, the rationale and the objectives, the hypothesis of the study is:

A wide range of phonological processes in Dholuo involving especially stress, tone and vowels are influenced by syllable weight.

The hypothesis, just like the objectives in the preceding section, shows that the phenomena under investigation are syllable weight, stress patterns, tone patterns and some vowel processes in Dholuo. It is the relationship between syllable weight and each of the last three that is investigated and established in this study.

1.5 Scope and Limitation

This is a synchronic study of Dholuo. It sets out to investigate the effects of syllable weight in Dholuo phonology.

In Dholuo, stress and tone use the syllable as their domain. The syllable in turn is composed of sound segments. The research therefore encompasses establishing a phonemic inventory of the sound segments that exist in Dholuo. The phonemic inventory shows the sounds that are found in Dholuo words.

In investigating the nature of stress, tone and the vowel processes, words (monosyllabic, bisyllabic, trisyllabic and other polysyllabic words) as well as utterances consisting of two or more words are used. The levels involved in the analysis are:

- (i) the individual segments;
- (ii) the syllable;
- (iii) the foot;
- (iv) the word;
- (v) utterances with more than one word; and
- (vi) the tonal tier.

The study also includes vowel processes that are investigated in terms of whether they influence or are influenced by syllable weight.

The data used in the study was collected from native speakers of the KSN variety of Dholuo, which is the one conventionally regarded as the standard dialect (Oduol, 1990).

1.6 Theoretical Framework

In this section, the principles and descriptive strategies of the three theories are stated briefly. The theories of Autosegmental Phonology (AP) (Goldsmith, 1990), Metrical Phonology (MP) (Hogg and McCully, 1987 and Goldsmith, 1990) and CV Phonology of Clements and Keyser (1983) are used in a complementary manner. The dominant theory is AP because it appears to be capable of handling most of the issues under investigation.

There are several tiers of phonological segments in autosegmental representation (see section 1.7.1.2.2 for meaning of segment). Segments with a particular phonological role in a language appear on exactly one tier. No tier is subordinate to the other, each is just a different location for the display of information (c.f. Kenstowicz, 1994). Segments on different tiers are

synchronized by the use of association lines. As seen in all the charts in this work, association lines are lines that join or relate segments in different tiers. In other words, they are lines drawn to show the relationship between the segments in the various tiers (see Chart 3).

The two most important principles of Autosegmental Phonology are the Obligatory Contour Principle (OCP), which states that adjacent identical autosegments should not have the same value, and left-to-right Mapping Principle, where association lines are introduced to link autosegments in different tiers in a one-to-one fashion from Left-to-right (Hulst and Smith, 1985). More detail on these principles is given in section 1.7.1.2.3 below. These two principles are used to link tones and vowels, as seen in Chapter 5.

Contour and floating tones (segments) are accommodated in this theory. Contour tones are treated as sequences of level tones. A floating tone is treated as a morpheme that is underlyingly tonal or a tonal segment that is not linked to a vowel at a particular point in the derivation (Goldsmith, 1990). Since segments on different tiers are independent of each other, when a segment on one tier is deleted the one it was previously linked to remains stable, hence the stability effect. The segment that resists deletion is reassociated with another on the level of the deleted one.

The idea of contour and floating tones is used in the analysis of tone in Chapter 5. Floating segments are also seen in the analysis of deletion, compensatory doubling and glide formation in Chapter 6.

The CV-tier of Clements and Keyser (1983) is also introduced in the theory of Autosegmental Phonology to serve as anchor points for segments on

different tiers (Durand, 1990). The CV-tier, in this theory, helps to show the weight of each syllable.

CV Phonology is one of the other two theories in this study. It assumes that the syllable has a three- tiered structure consisting of the syllable node, the CV-tier and the segmental tier (Clements and Keyser, 1983). The CV-tier is important in phonological representation because it defines functional positions (peaks and non-peaks) within the syllable (Clements and Keyser, 1983). CV Phonology, through its inclusion of the category nucleus, clearly defines the structure of a heavy/light syllable. A light syllable is defined as one with a simple or non- branching nucleus, while a heavy syllable is defined as a syllable with a complex or branching nucleus (see section 1.7.1.3.2 for further explanations and diagrammatic illustrations).

CV Phonology has the Onset First Principle which is used in creating well-formed syllables in languages. In this principle, it is assumed that the V- elements are already pre-linked to the syllable node. Syllable-initial consonants take precedence over syllable-final ones. This means that consonants to the left of a vowel are first joined to the syllable node as long as they result in well-formed syllables for Dholuo words as seen in Chapter 3 (see section 1.7.1.3.3 for more details on the Principle).

The theory of CV Phonology has been treated briefly because it is only used to define the Dholuo syllable structure in Chapter 3. It seems to have been incorporated in the two other theories that are used in this study because all its three tiers (σ -tier, CV-tier and phonemic (segmental) tier) are included in the analysis in Chapter 4 and Chapter 6 where Metrical Phonology and

Autosegmental Phonology are used, respectively.

Metrical Phonology tries to show that in some languages, there is a distinct relationship between stress placement and syllable weight. I have chosen to use it in this study because there is evidence that Dholuo is one of those languages (see Chapter 4). The theory makes use of trees and grids (see section 1.7.1.4.1).

When organizing rhythmic constituents, syllable rhymes are first arranged into constituents called feet, which are then organized into the phonological word. A stressed rhyme is in the head -position of a metrical foot. There are parameters for the construction of a foot. The first parameter states that when constructing feet, it must be stated whether they are left-headed or right-headed. The second parameter states that foot structures can be constructed rightwards or leftwards, that is, from the beginning or end of a word, respectively.

In Quantity - sensitive systems, that is, systems where primary stress must fall or be on a heavy syllable, principles of stress assignment must have access to syllable weight because heavy syllables demand to be stressed. Accordingly, the third parameter states that in Quantity-sensitive systems heavy syllables must be stressed, while in Quantity insensitive ones they do not have to be stressed.

The fourth parameter states that a foot node may or may not dominate another foot node. This means that some languages have a foot structure that is binary while others have an unbounded foot structure (see section 1.7.1.4.2 for more illustrations on the four parameters).

Primary or word -level stress is picked from a syllable that has already been given secondary stress on other grounds. In establishing word -level structure, only the first parameter matters. Word-level primary stress is picked from the first (left-headed) or last (right-headed) foot of the word, in systems where the establishment of the foot structure precedes that of word-level structure.

Metrical grids refer to three or more layers of X's (see the first quotation in section 1.7.1.4.3) running parallel to syllables. The lowest layer after individual segments is known as *mora row*, syllable row or Row 0. The next layer indicating head of feet and representing secondary stress is known as *foot row* or Row 1. The third layer has an X only above the syllable that receives the main word stress. It is the *word row* or Row 2.

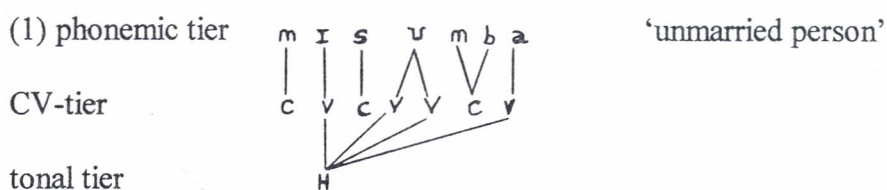
End Rule (ER), which places a grid mark on the extreme left or right of the domain it is specified for, is the first rule of grid construction. A complete statement of ER includes two specifications, namely: whether ER applies in initial or final position and the grid level (word or foot level). Extrametricality (see section 1.7.1.4.3 for explanation) interacts with ER. The last or first syllable of Row 0 is put in brackets to make it invisible to the application of any rule.

Perfect Grid is yet another rule which corresponds to the process of establishing bounded feet across the word in Metrical Trees. A grid mark is assigned after every other grid mark on Row 1 from left-to-right or right-to-left. Its function is to create sequences of stressed-unstressed units (refer to section 1.7.1.4.3 for illustrations and further details).

Another rule of grid construction is known as Quantity-Sensitivity (QS). It creates a grid-mark or a series of grid marks, on Row 1 over any heavy syllables. This rule applies to languages without an alternating stress pattern or the rule of Perfect Grid. Metrical Phonology is used in this study to help me describe the pattern of stress in Dholuo and to show how it is related to syllable weight.

Before showing how the three theories will work, it is worth stating that the main aim of the study is to investigate the relationship between syllable weight and phonological processes involving tone, stress and vowels.

CV-Phonology is used to define the Dholuo syllable structure at the level of vowels and consonants. It is used to show the maximum number of vowels found in the peak. Autosegmental phonology is used to separate tones from vowels. This enables one to show more easily the behaviour of tone in relation to phonemic segments associated with them. The theory is also useful for describing and explaining the existence of contour and floating tones. Such explanations are used to account for the existence of contour tones in Dholuo. In representing tones appropriately in diagrams or charts, the OCP and Mapping Principle are used. Under the umbrella of the OCP, identical autosegments in Dholuo have been collapsed. For example, in a situation where a three syllable word has a high-high-high tone sequence, it is one high tone that is spread over three syllables. A Dholuo word is used for illustration.

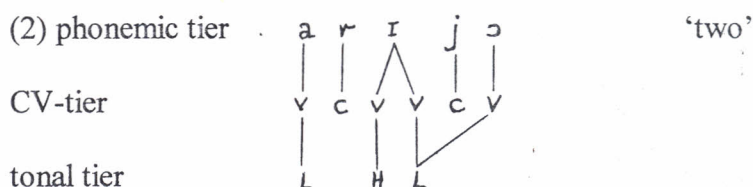


Kenstowicz (1994:324), in his discussion of Autosegmental Phonology, states the following about mapping:

If a language restricts its contour tones to the initial or the final positions of a domain, this can be a clue to the directionality of tonal assignment.

Since contour tones do not seem to appear in the first syllable in words with more than one syllable in Dholuo, it is reasonable to assume that mapping tones and vowels should be from left-to-right.

Generally, the theory of Autosegmental Phonology is used to explain the relationship between syllable weight and tone. In other words, through Autosegmental representation, the weight of a syllable is shown on one tier and the tone assigned to it on another, as in the example below.



The CV-tier shows the weight of each of the three syllables, whereas the tonal tier shows the tone associated with each of them. The Middle syllable is heavy and the contour tone is found in this same syllable.

Autosegmental Phonology is used to explain vowel processes such as deletion, compensatory lengthening and glide-formation. The rules of deletion and ressociation within the theory of Autosegmental Phonology help to account for the process of compensatory lengthening in Dholuo. Therefore, apart from using the charts of Autosegmental Phonology in my data analysis and presentation throughout the study, the theory's principles and descriptive

strategies are used in detail in the analysis of tone and vowel processes.

Autosegmental phonology does not seem to have explicit principles and rules governing stress placement. Such rules are provided by the theory of Metrical Phonology. By combining the rules of metrical trees and grids (c.f. Halle and Vergnaud, 1987), many generalizations about stress placement are captured.

The four parameters of metrical trees are used to determine the location of stress in Dholuo words, and to show the Dholuo foot structure. The third parameter (see section 1.7.1.4.2 and 4.1) is used to show that Dholuo is a quantity sensitive language as far as stress placement is concerned. Metrical Phonology is used to discuss syllable weight in relation to stress.

In summary, Autosegmental Phonology seems to cover the bulk of my research objectives. In the few areas where it is not very useful, two other theories (Metrical Phonology and CV Phonology) have been used to cater for the relevant research objectives. The three theories are used in a complementary manner. It is not difficult to use them in a complementary manner because they have a significant degree of overlap. In some areas, the overlap is based on borrowing from one another. For example, both Autosegmental Phonology and Metrical Phonology adopt the idea of the CV-tier from Clements and Keyser's (1983) CV-Phonology Model. All the three theories seem to organise their features in terms of different tiers or levels of representation. The idea of tiers or levels is rooted in Autosegmental Phonology. Any other information on the three theories is explained at the relevant place in the study.

Autosegmental Phonology is the dominant theory in this study because apart from being able to handle most of the issues under investigation, the idea of each autosegment being placed on its own level of representation runs through the entire data analysis and presentation. The study is shaped into an organised whole by the three theories.

1.7 Review of Literature

The literature review below is divided into two parts. The first part gives a background to the current theories of phonology (such as Autosegmental Phonology, Metrical Phonology and CV Phonology). It also gives in detail the descriptive strategies, rules and representations that exist in each of the three theories used in this study. An insight into the nature of the syllable, stress, tone and vowel processes is also given in this part. Vowel processes are also discussed in section 1.7.2.2. The second part consists of a review of literature on Dholuo phonology.

1.7.1 Review of Theoretical Literature

1.7.1.1 Background to the Theoretical Literature

The Background to the theoretical literature as reviewed in this section is to a large extent drawn from Durand (1990). He gives a short but well detailed summary of the proceedings in generative phonology that led eventually to the emergence of current theories of phonology.

Goldsmith (1990) observes that Autosegmental and Metrical Phonology are direct continuations of traditional work of generative

phonology that was codified in Chomsky and Halle(1968). The work of the latter is referred to as ‘standard’ or ‘classical generative phonology’ (Durand, 1990). Durand (1990:1) then gives an outline of what is entailed in Chomsky and Halle (1968) as follows:

Since SPE offered... a theory of the internal structure of sounds, a theory of levels and derivation, a theory of the linking up between syntax and phonology, much work since 1968 has been devoted to upholding or rejecting some fundamental thesis or other of this work.

The abbreviation SPE refers to The Sound Pattern of English, the title of the book by Chomsky and Halle (1968). Durand (1990) observes that the assumptions made by Chomsky and Halle (1968) remained fairly stable at first because most researchers were content.

With time works by William’s (1976), Goldsmith (1976), Liberman (1975) and others in different areas of phonology led to the formulation of models in which certain properties of utterances were represented in terms of features drawn from the linear string of phonemes and then placed on their own level of representation (Clements and Keyser, 1983). In the recent past therefore SPE thesis has been questioned within several frameworks. Some of these frameworks include Autosegmental Phonology, Metrical Phonology, CV Phonology, Dependency Phonology, Three-dimensional Phonology and Grid-only Phonology (Durand, 1990). The latter then explains how these theories differ from standard generative phonology as follows:

...these models can be described as non-linear by opposition to standard generative phonology where ... a phonological representation is simply depicted as a linear arrangement of sound-segments (even though each segment is composed of simultaneously occurring features) and where phonological rules operate on such strings (they delete, insert or permute segments, or change their feature values) (Durand 1990:1).

All these current theories have some common ideas. One of their main points of agreement is that a number of phenomena such as tone and stress (these two are also part of our concern in this study) cannot be appropriately studied in phonological representations that are limited to string-like arrangements of segments and boundaries (Durand, 1990). They can be studied effectively if they are considered as autosegments with their own level of representation.

Durand (1990) concludes by asserting that the name ‘generative phonology’ should remain for several reasons. The first reason is that the non-linear frameworks mentioned here stem from the practice of generative phonologists such as Goldsmith. They were confronted with issues which could not be handled within the SPE notation. The second reason given is that portions of the standard theory are retained in ‘non-linear’ frameworks. The third reason is that the ‘non-linear’ models have not exhausted the set of new proposals concerning phonological structure (for more reasons, see Durand 1990).

This theoretical review is important because it gives a background to some of the current theories used to guide the study. The theories that are used are Autosegmental Phonology, Metrical Phonology and CV Phonology. The main postulates of the three theories are explained in the sections that follow.

1.7.1.2 Autosegmental Phonology

1.7.1.2.1 Introduction

Goldsmith (1990) is one of the main proponents of Autosegmental

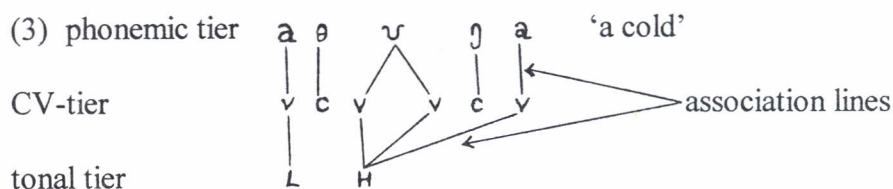
Phonology as already stated in section 1.6. This theory claims that the view of segments as unordered sets of specified feature must be done away with (Hulst and Smith, 1985). The main claim of Autosegmental Phonology is that features, such as tone, should be allowed to spread over domains of varying sizes. Features should span portions of syllables, whole syllables, feet etc (Durand, 1990). Each feature is also placed on its own level of representation. Therefore, the scope of a specified feature need not be a single segment. This theory was designed to deal with tonal phenomena (Katamba, 1989).

1.7.1.2.2 Autosegmental Representation

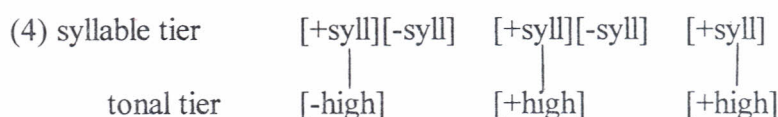
The main difference between autosegmental representation on the one hand and generative and traditional phonemic representation on the other is that the former posits two or more parallel tiers of phonological segments (Goldsmith, 1990). The meaning of segment is explained later in this section. According to Hornby (1992), a ***tier*** generally refers to any of the parts of a structure placed one above the other. In phonology, a tier refers to a level of one phonological feature of which sound segments are composed. It consists of a string of segments (Goldsmith, 1990). For example, in Dholuo, a tier can consist of tones only. These tones could be high, low, falling or rising (see example (3) below for a diagrammatic illustration).

In classical generative phonology, phonological representations consist of a string of segments. In autosegmental representation, each tier has a string of segments, but the segments on each tier differ with regard to what

features are specified in them. For example, on a tonal tier each segment is specified for a tone and for nothing else (Goldsmith,1990). To illustrate this, an example is drawn from Dholuo, the language under investigation.



Features could also be used to illustrate the same thing as shown in example (4) below. (The analysis in Chapter 3 shows that in Dholuo only vowel sounds are syllabic).



Example (4) above shows that any feature that plays a phonological role in a language will appear on exactly one tier (Goldsmith,1990).

In the past, the term segment was taken to refer to units in time with a finite and identifiable length. In Autosegmental Phonology, it is used as a term for an indivisible unit (Goldsmith,1990). The high tone, for example, is an indivisible unit. Therefore, it is a segment. Hulst and Smith (1985:6) support this stand by arguing that:

The idea is that features are also segments, segments on their own, hence autosegments. (Hulst and Smith, 1985:6)

Features on different tiers, such as the ones in (4) above are segments. Segments on separate tiers are joined by association lines. The term *chart* refers to a pair of tiers, along with the set of association lines that relates them (Goldsmith, 1990). Viewed phonetically, association lines represent simultaneity in time or coregistration. For example, in Chart 3 above, the very

first sound of the word *athvɲa* has a low tone. The articulation of the vowel /a/ is accompanied with a low tone. In other words, the vowel /a/ is articulated simultaneously with a low tone. Therefore, association lines link the vowel /a/ with L to show that the two are articulated at the same time, i.e., coregistered. In a chart consisting of the tonal tier and a tier of vowels and consonants, the segments on each of these tiers are known as the Freely Associating Segments. The Freely Associating Segments on the non-tonal tier are known as the Tone-Bearing Units (TBU's) (Goldsmith,1990).

1.7.1.2.3 Principles of Autosegmental Phonology

Hulst and Smith (1985) quote two principles of Autosegmental Phonology from Goldsmith (1976). These two principles are the Obligatory Contour Principle (OCP) and Left-to-right Mapping-Principle.

They state that according to the OCP adjacent identical autosegments should not have the same value unless they are separated by word boundary. This means that sequences of similar tones are not allowed to exist. It is therefore a principle that allows one to collapse identical autosegments if there is no reason to leave them separate (Hulst and Smith, 1985). Collapsing identical autosegments reduces the complexity of the representation. Dholuo appears to have words with a sequence of identical tones. The OCP therefore allows me to collapse these tones.

Goldsmith (1976) then proposes leaving tones and segments on separate tiers in order to deal with the issue of short vowels with contour tones adequately. He suggests that this can be done by having the Mapping Principle

introduce association lines. To ensure that there is a wellformed relation between the tonal tier and TBU's, Goldsmith (1976) formulates the wellformedness Condition (WFC) which is as follows:

- (a) association lines do not cross (no X-ing);
 - (b) all TBU's are associated to at least one tone;
 - (c) all tones are associated to at least one TBU.
- (Hulst and Smith, 1985:17)

To explain how the relationship between the tonal tier and TBU's comes into being, Goldsmith (1976) proposes three Association Conventions (AC's), which are also referred to as Principles of Association by Durand (1990). First, there is *Mapping*, where association lines are inserted between tones and TBU's in one to one fashion from left to right. Secondly, there is *Dumping*, where all left over tones are linked to the last vowel to the right. Lastly, there is *Spreading*, where all left over vowels are linked to the last tone to the right.

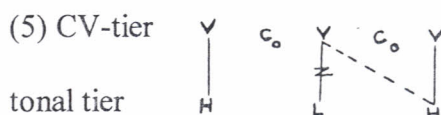
Halle and Vergnaud (1982) argue that left over tones after one-to-one mapping may either be left floating or be associated by a language specific rule. They also add that spreading could be a language particular matter. Goldsmith (1990) claims that there are systems where no further language specific rules associate TBU's or tones left unassociated by the AC. Goldsmith seems to be indicating that in some languages there is only mapping, there is no dumping and spreading. Therefore, tones may be left vowelless and viceversa. A TBU that is not associated with a tone is realised on a low pitch (Goldsmith,1990). Goldsmith then says that all the material included in the formulation of a rule forms the structural description of the

rule.

1.7.1.2.4 Some Rules of Autosegmental Phonology

For the purpose of showing how rules operate within this theory, two rules are discussed in this section. The two rules are plateauing and sandhi lowering. The rest of the rules are identified where they are found necessary in the course of the study.

Plateauing is said to operate at phrase level. It changes a sequence of high-low-high tones to high-high-high tones (Goldsmith,1990). The rule is represented in example (5) below.



Adopted from Goldsmith (1990:36)

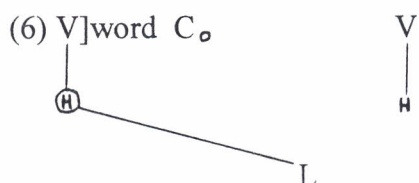
In this rule and in other rules of Autosegmental Phonology, a broken or dashed association line indicates part of the structural change. Unbroken association lines show associations that already exist. A pair of short lines '=', an 'x' or 'z' across an association line indicates that the line is to be deleted by the rule (Goldsmith 1990).

Plateauing may also apply within a word. Being a late post-lexical rule, its effect is to create sequences of surface high tones (Goldsmith,1990). Goldsmith (1990) further claims that it is possible to rewrite this rule in order to change the features of the low tone, rather than to reassociate the high tone on the right or left of the affected vowel. He then states that:

However the theory of autosegmental phonology proposes that, when a phonological effect can be expressed by either feature changing

mechanisms or reassociative mechanisms, the latter are to be preferred (Goldsmith,1990:37).

Sandhi lowering is yet another rule that operates at phrase level. It has the effect of decreasing the number of consecutive high tones. It lowers a word final high tone if the next vowel bears a high tone (Goldsmith1990). The rule is given below.

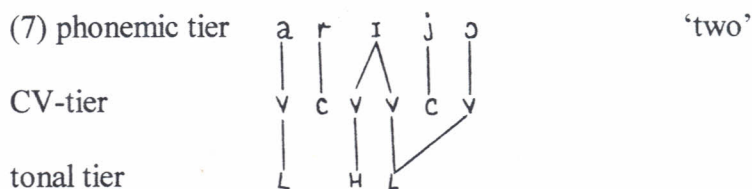


In (6) above and in rules of Autosegmental Phonology generally, a circle around a segment indicates that it is not associated to any other segment on the facing tier (Goldsmith, 1990).

These two rules do not apply to my data, nevertheless, they show how a broken association line, a 'z' across an association lines or a circle around a segment should be used. Broken association lines and a 'z' across association lines are used extensively in Chapter 6.

1.7.1.2.5 Contour Tones

The terms '*contour tones*' or '*dynamic tones*' are used to refer to rising and falling tones (Goldsmith, 1990). In languages with both low and High tones, it is common to find falling and rising tones. Therefore the possibility of many-to-one associations in the theory of Autosegmental Phonology allows us to treat rising and falling tones as sequences of level tones associated with one vowel (Goldsmith, 1990). The second syllable of the word in example (7) has a contour tone.



The theory allows me to express the notion of contour tones in Dholuo simply and directly. The theory therefore portrays the internal make up of contour tones. Other complex segments such as diphthongs and prenasalized consonants are also represented in this manner.

1.7.1.2.6 Floating Tones

It is predicted, in the theory, that certain morphemes exist on just one tier. This is a possibility that cannot be included in other theories of phonological representation (Goldsmith, 1990). Floating tones are an example of this possibility. A floating tone could either mean a morpheme that is underlyingly only tonal or a segment which, at a given moment in the derivation, is not associated with any vowel (Goldsmith, 1990).

Hulst and Smith (1985:14) who refer to floating tones as defective morphemes, state that:

...one will encounter morphemes that consist exclusively of tone and also morphemes that (although they contain a vowel or, a tone-bearing unit; TBU) have no tone. In a strict segmental framework such entities are problematic, especially the 'segmentless' tones. Within the autosegmental model defective morphemes are not in any sense anomalous. If morphemes consist of two independent tiers then there is no reason why one could not be lacking.

The idea of floating segments is used in the analysis of the downstepped high tone in Chapter 5 and floating skeletal positions in Chapter 6. The downstepped high tone is analysed as a sequence of LH tone (see

sections 5.2 where words in Group 7 are discussed).

1.7.1.2.7 Tone Stability

In autosegmental representation autonomy is granted to segments on each tier (Goldsmith, 1990). Therefore, when a rule whose effect is to delete a segment occurring in one autosegmental tier applies, it does not necessarily affect an autosegment with which it was previously associated. That a segment may resist deletion is what is known as stability effect (Goldsmith, 1990). Tone stability is discussed in section 5.5.

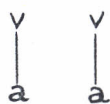
1.7.1.2.8 Extensions of Autosegmental Phonology to

Non-Tonal Phenomena

In the discussion of Autosegmental Phonology so far, I have only shown how it applies to tone. The theory can also be applied to other phenomena, which are traditionally grouped under 'suprasegmentals' (Hulst and Smith, 1985). It can be used in the analysis of vowel length, intonation and vowel harmony, just to mention a few.

Vowel length, for example, would be represented as shown below, within the framework of Autosegmental phonology.

(8)(a) CV-tier or skeletal tier
(see section 1.7.1.2.9)
phonemic tier



(b) CV-tier
phonemic tier



Since the theory has the OCP, (8b) is preferred to (8a) (Hulst and

Smith, 1985). In this study, the theory is also used in the analysis of deletion, compensatory lengthening and glide formation.

1.7.1.2.9 The Skeletal Tier

The skeletal tier, which is also known as the CV-tier or the timing tier is composed of units that are represented as C's and V's and more neutrally as undifferentiated X's (Goldsmith,1990). The elements on this tier are called slots (V-slots and C-slots) because they are segments to which vowels and consonants must associate if they are to be realized (Goldsmith, 1990). Goldsmith (1990:48) then states the importance of this tier as quoted below:

This tier will play a central role in the organization of the entire phonological structure, serving as the anchor points for elements on the various other tiers. Tone, for example, which we assumed... to associate directly to vowels, will rather be seen to associate to elements on the skeletal tier to which the vowels also associate.

In my entire data analysis, the CV-tier is included.

In this study, as already stated in section 1.6 Autosegmental Phonology is used in the analysis of tone, deletion, compensatory lengthening and glide-formation. All the charts used in the work are also adopted from Autosegmental Phonology.

1.7.1.3 CV Phonology Model

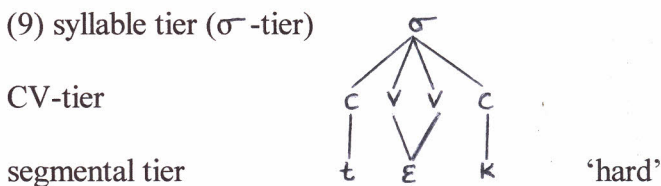
1.7.1.3.1 Introduction

The CV Phonology Model is a theory of phonology whose main proponents are Clements and Keyser (1983), as already stated in section 1.6. This theory is one of the theories guiding the study because it shows how the

syllable is represented and gives proposals on how syllable weight should be handled in languages. Syllable weight is at the centre of our study. CV Phonology Model is one of my minor theories.

1.7.1.3.2 CV Phonology and Syllable Representation

Clements and Keyser (1983) designed the theory to specifically deal with the syllable. They support their theory by saying that it accomplishes the task of stating universal principles governing syllable structure. The task is accomplished by the assumption that the syllable has a three-tiered structure which consists of the syllable node, the CV-tier and the segmental tier. Consequently, the theory is also referred to as the Three-tiered Theory of the syllable. In this model, the syllable is represented as follows:



The terms ‘**segmental tier**’ used in CV Phonology are synonymous with ‘**phonemic tier**’ used in Autosegmental phonology and ‘**segmental level**’ used in Mentrical Phonology.

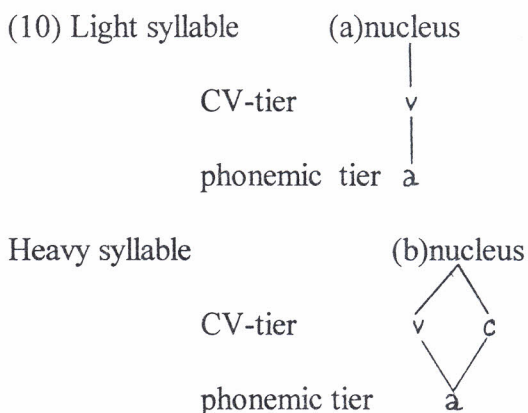
The inclusion of the CV-tier in phonological representation of the syllable is very important since it defines fuctional positions within the syllable. Syllable peaks and non-peaks are differentiated by elements of the CV-tier (Clements and Keyser, 1983). In other words, a syllable peak is dominated by a V while a non-peak is dominated by a C (Clements and Keyser, 1983).

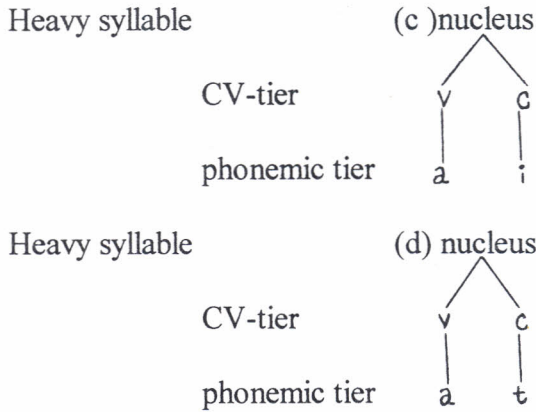
Writers such as Halle and Vergnaud (1980) have proposed a set of constituents smaller than the syllable (Clements and Keyser, 1983). These constituents are the onset, nucleus and coda. Clements and Keyser (1983) indicate that of the three, only the category nucleus plays an important role in phonological organization. They go on to say that the evidence of its importance is in its role in defining the distinction between heavy and light syllables. They define the distinction between the two as follows:

The notions light syllable and heavy syllable may be formally defined in terms of the category 'nucleus,' where we take the nucleus to be a prosodic category consisting of any and all tautosyllabic sequences of the form V(X) where X ranges over single occurrences of C and V. Light syllables are those containing a simple (non-branching) nucleus, that is V, while heavy syllables are those containing a Complex (branching) nucleus, that is VV or VC (Clements and Keyser, 1983:12).

They then emphasise that the nucleus in all languages consists of all sequences of the form VV or VC. This may mean that to them, the consonant immediately following a vowel in a syllable is part of the nucleus. The subsequent consonants form the coda of the syllable.

Light and heavy syllables are represented as shown below:





(10a) represents a short vowel, (10b) a long vowel, (10c) a diphthong and (10d) a sequence of a vowel followed by a consonant. The study shows whether light and heavy syllables in Dholuo fit the analysis and the representation given by Clements and Keyser (1983) in (10) above.

Clements and Keyser observe that in rules that are sensitive to syllable weight, what is relevant is the internal structure of the nucleus but not the internal structure of the onset and coda. They propose that the nucleus is a category of prosodic organization dependent on, but formally distinct from the syllable.

The concept '*mora*' is also defined in this theory. They characterize it in terms of the distinction between light and heavy syllables as follows:

A mora is any element of the CV-tier dominated by the node "Nucleus" in the Nucleus display (Clements and Keyser, 1983:80).

In relation to tone, they define a mora as any element of the CV tier dominated by the Nucleus, which function as a tone bearing unit.

1.7.1.3.3 Syllable Division

In CV Phonology, there is a principle that is used in organising words into syllables. The principle is known as the Onset First Principle. According

to Clements and Keyser (1983:37) the Onset First Principle states that:

- a. Syllable-initial consonants are maximized to the extent consistent with the syllable structure conditions of the language in question.
- b. Subsequently, syllable-final consonants are maximized to the extent consistent with the syllable structure conditions of the language in question.

This principle is also quoted by Ngala (1994) from Clements and Keyser (1983). They state that this principle stems from the rules formulated for the English syllable by Kahn (1976).

In the Onset First Principle specified above, ‘a’ applies before ‘b’. In a word with a VCV structure, the syllable division is V \$ CV even if VC and CV are well-formed syllables. In a word with a VCCV structure, the syllable division is V\$CCV even if CCV, VCC,VC and CV are all well-formed syllables. For Dholuo, a word with a VCV structure is syllabified as V\$CV even though VC and CV are both well-formed syllables. A Dholuo word with VCCV structure is syllabified as VC\$CV because CCV is not a well-formed syllable but VC and CV are well-formed syllables. CCV syllable occurs only as a result of glide formation as seen in section 6.3. In stating that a VC\$CV syllable division is preferred to a V\$CCV division in Dholuo, the basic assumption of the phonological approaches to the syllable is used. The assumption is that there is a close relationship between word structure and syllable structure (Hyman, 1975). Sounds that are found at the beginning of a word can also be found at the beginning or end of a syllable. In other words, what can start or end a word can also start or end a syllable. This assumption is also supported by Haugen (1956) in his study of the Kutenai language. His study shows that a word medial cluster of consonants is a possible word (or

syllable) final cluster followed immediately by a possible word (or syllable) initial cluster. Haugen (1956) argues that his analysis could be extended to other languages.

The Onset First Principle seems to suggest that languages select syllable divisions which maximize syllable initial consonants. It is similar to Pulgram's (1970) second principle, that is, the principle of minimal coda and maximal onset. Just like the Onset First Principle, this is one of the principles that are used in determining syllable division in languages. It is one of the three principles developed by Pulgram (1970) after realising the intimate relationship between word structure and syllable structure. It applies in a situation where the consonants between two syllable peaks do not all occur in word initial position. According to the principle, as many consonants as necessary should be attached to the coda of the previous syllable in order to provide the onset of the next syllable with a permissible word-initial shape.

The onset First Principle is explained below using the three-tiered structure of the syllable. In constructing syllables for languages, the phonemes on the phonemic tier are first linked to the Cs and Vs on the CV-tier. All consonantal phonemes are linked to Cs, while all vowel phonemes are linked to Vs. All V-elements are prelinked to σ^- 's (syllables). In other words, the vowel is the most essential part of a syllable therefore it is automatically associated with a syllable node. Without the vowel, the syllable node would not exist except in the case of syllabic consonants. In the word in example (9), the vowel [ɛ:] is prelinked to the σ^- node. C-elements on the left (onset) are then linked to the syllable node as long as they form acceptable syllables in the

language. In the word in example (9), / t / is the only C-element on the left and it forms an acceptable onset for Dholuo. Subsequently, C-elements on the right (coda) are linked to the syllable node. The phoneme in the coda, in example (9) is / k /. It forms an acceptable coda.

There are many issues and processes concerning the syllable that this theory attempts to define and solve. It is not possible to include all of them here. The ones that touch on syllable weight have therefore been selected. Some of the issues have been dealt with where necessary in the course of the study.

In this study, CV Phonology is used to define the Dholuo syllable Structure. It defines the syllable structure at the level of vowels and consonants.

1.7.1.4. Metrical Phonology

1.7.1.4.1 Introduction

As already stated in section 1.6, the main proponents of MP are Hogg and McCully (1987) and Goldsmith (1990). MP is used because it tries to show that there is a significant relationship between syllable weight and stress. The explanation that follows concerning the theory of Metrical Phonology is as propounded by Goldsmith (1990). Though Metrical Phonology is one of our minor theories, it appears to have been discussed at length because its two formalisms are included as seen in 1.7.1.4.2 and 1.7.1.4.3, below.

The theory has two distinct formalisms; one using metrical trees, the other using metrical grids. The two are relatively similar (Goldsmith 1990)

and are therefore used in this study. Metrical trees are similar to syntactic representations. They have constituent structure the lowest-level constituents containing ‘*rhyme-projections*’ ,i.e., syllable without the onset material. Metrical grids are used to represent horizontally the basic beats of the utterances and vertically the strength that is assigned to that beat in the rhythm of the word or phrase. Below are examples of the two formalisms:

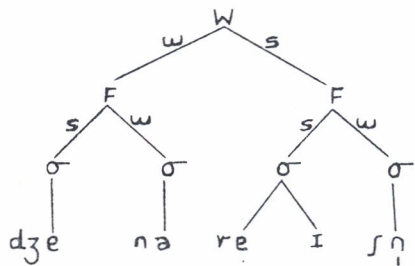
(11)(a) Metrical tree

word level (W)

foot level (F)

syllable level (σ)

segmental level



(b) Metrical grid

segmental level

dʒe na re I ʃŋ

Row 0 (mora or syllable row)

x x x x x

Row 1 (foot row)

x x

Row 2 (word row)

x

Partly adopted from Goldsmith (1990:191).

Goldsmith (1990:170) states that the two formalisms share in common the idea:

- (i) that the study of stress is different in kind from the study of other phonological characteristics;
- (ii) that it is fundamentally a study of the relative prominence of syllables and higher-level units, such as the foot;
- (iii) that the most important characteristics determining stress patterns are rhythm (i.e. alternating prominence) and sensitivity to inherent syllable (or rhyme) weight;
- (iv) that stress representations are hierarchical.

Apart from expressing hierarchical relationship found among syllable

rhymes, secondary stress patterns, primary word patterns, and ultimately phrase level prominences, the two versions or approaches have explored and utilized the notion of extrametricality (also see section 1.7.1.4.3). This refers to a situation where a unit (mora) is marked, making it invisible as far as the rules that build metrical structure are concerned.

1.7.1.4.2 Metrical Trees

In this arboreal framework, it is the rhyme that is important, but not the onset, in stress assignment. In the original form of metrical notation, rhymes were organized into simple constituents. Each constituent had two daughters at most and each daughter was labeled with a rhythmic weak (w)/strong(s) (Hogg and McCully, 1987).

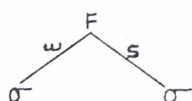
The organization into rhythmic constituents is carried out as follows; syllable rhymes are arranged into constituents called feet, feet are in turn organized into constituents that make up the phonological word as shown in example (11a) above.

In the process of constructing the feet, it must be specified whether they are left-headed (where the left most rhyme of the foot is stressed) or right-headed (where the rightmost rhyme of the foot is stressed). A rhyme that is stressed is therefore in the head-position of a metrical foot.

Feet that only contain two syllables are called bounded feet. The directionality of rule application must also be specified, that is, whether these feet are to be constructed rightwards from the beginning of a word (left-to-right) or leftwards from the end of a word (right-to-left). In situations where a

word has three or five syllables, one syllable is left over as a result of the rest of the syllables being arranged into binary feet. Since it is a requirement that feet be established for all syllables, a degenerate foot is established at the end or beginning of such a word. In example (11a), the two feet are left headed. The head (or stressed) constituents of (11a) are marked with an 's' and the other constituent with a 'w'. The solitary or degenerate feet do not have the s/w (metrical) notation. A right-headed foot and degenerate foot are constructed as shown below:

(12)(a) right-headed foot

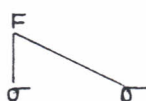


(b) degenerate foot



Durand (1986) and Lerdahl and Jackendoff (1983) are quoted by Goldsmith (1990) in differentiating the left-headed from right-headed cases by placing the node representing the foot constituent geometrically above the head. In other words, the foot node is placed directly above the rhyme that is stressed as shown in the examples below.

(13)(a) left-headed



(b) right-headed



(c) degenerate foot

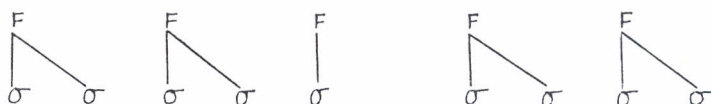


This kind of notation is referred to as the head-marked (metrical) notation. It is this notation that is used in this study. But not the s/w notation, because it allows feet to contain more than one non-headed position.

From all the foregoing stipulations of metrical theory based on trees there is: Rule Parameter 1 which states that the foot structure created is either

left-headed or right-headed and Rule Parameter 2 which states that the feet can be constructed from either left-to-right or right-to-left. The two parameters create four simple systems for assigning binary feet across a word as in (14) below.

(14)(a) Left-headed binary feet, erected from left-to-right.



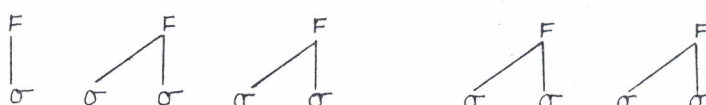
(b) Left-headed binary feet, erected from right-to-left.



(c) Right-headed binary feet, erected from left-to-right.

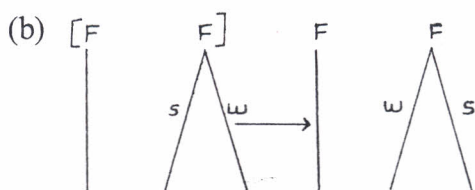
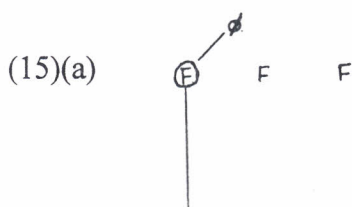


(d) Right-headed binary feet, erected from right-to-left.



Partly adopted from Goldsmith (1990:173)

In cases where there is no stress on the initial syllable like in (14b), a rule must be posited to delete such non-branching feet. Such a stray syllable is by convention, assigned to the nearest foot at word level. The rule states that when two feet follow a non-branching foot, that foot is deleted. The rule can be briefly stated as in (15a).



In a tri-syllabic word, the initial non-branching foot is not deleted but the labeling is reversed on the branching foot to avoid a ‘stress-clash’. The rule is stated in (15b) above. The rules stated in (15) have the effect of avoiding a stress clash. The notation fails to reveal that the degenerate foot creates a stress-clash because the non-degenerate foot are trochaic (s/w). A stress shift is possible in a trisyllabic word, but not a five syllable word because if the (s/w) labeling was reversed in the latter, it would create a stress-clash between the second and third foot.

Languages establish a binary distinction involving syllable weight: heavy and light syllables. Within the framework of Metrical Phonology, if the rhyme of a syllable is geometrically branching, it is a heavy syllable; if it does not branch, then it is a light syllable. Goldsmith (1990:177) states that:

The Principles of stress foot establishment will need to have access to syllable weight if they are to place stress feet correctly in these systems, known as quantity-sensitive systems

In quantity-sensitive systems, heavy syllables demand to be stressed which means that they must appear in head (‘strong’) position. In other words, weak nodes do not dominate branching nodes. This is also known as the weak-nodes-don’t-branch principle of metrical theory.

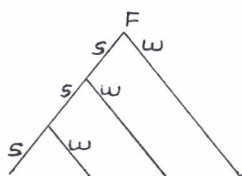
Languages that are not quantity-sensitive do not respect the weak-nodes-don't-branch principle. Goldsmith (1990:178) states Hayes suggestion for a different notion of segregating the quantity-sensitive from the insensitive systems as follows:

...that all languages will impose the weak-nodes-don't-branch principle on the foot-structures that they create but that languages may differ with respect to whether they extend the domain of this prohibition down into the rhyme structure that the foot-tree is geometrically sitting upon. In the quantity-sensitive systems, the structures to which the foot defining principles extended included the rhyme structure; in quantity-insensitive ones, the prohibition would stop at the rhyme node itself, would not look inside and therefore would not be aware if, perchance, a branching rhyme were to fall in a weak metrical position.

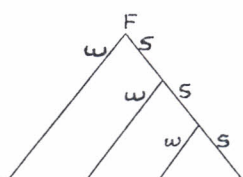
This then yields Rule Parameter 3, which states that in quantity sensitivity, limitations on well-formed metrical structure include (do not include) the highest level of the internal structure of the rhyme.

Though originally metrical theory only allowed binary metrical tree construction, not all feet are restricted to a length of two syllables. One arboreal account suggests that for unbounded left-headed and right-headed feet, what is available is a branching rhyme structure as in (16a) and (16b), respectively (Goldsmith, 1990).

(16)(a)



(b)

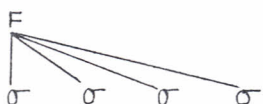


The rule parameter 4 for the establishment of foot structure is that a

foot node may (may not) dominate another foot node. If a foot node is not allowed to dominate another foot node then there will only be binary branching feet. If it is allowed to dominate another then a recursive structure as in (16) is allowed. In establishing the size of foot for their words, languages apply the maximality condition. This means that they establish the largest size possible, subject to the constraints imposed more generally by the grammar.

The head-marked notation has been developed to represent unbounded foot structure. It distinguishes metrical structures whose maximal branching is binary and those without any limitation on the maximal number of nodes that can be dominated. The latter is seen in example (17).

(17)(a) Left-headed



(b) Right-headed



Goldsmith (1990) Summarizes the parameters established for the construction of feet as follows:

(18)Parameter 1: Left/right- headed: the foot structure created is either left-headed or right-headed.

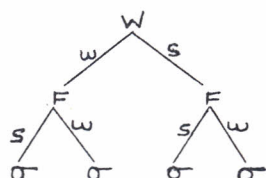
Parameter 2: Left-to-right/right-to-left application: feet can be constructed from left-to-right or right-to-left.

Parameter 3:Quantity-sensitive/insensitive: a well-formed metrical structure may or may not include the internal structure of the rhyme.

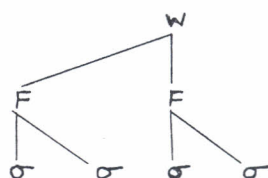
Parameter 4:Bounded/unbounded feet: a foot node may or may not dominate another foot node.

The notion of primary stress in a word is expressed in this theory. It is the prominence of one of the stress feet with respect to the other stress feet of the word that need to be expressed as in (19).

(19)(a) s/w notation



(b) Head-marked notation



As already stated at the beginning of this section, the rhyme-level metrical structure organizes segments, rhymes are then organized by the foot-level metrical structure and the word-level metrical structure organizes feet. Goldsmith (1990) observes that the strict hierarchy has not been respected in all work on metrical structure: rules that organize syllables into feet, for example may fail to apply. This situation may force word-level rules to apply directly to the syllable-level metrical structure without an intervening foot-level structure.

This system seems to assume that the principles of a language which establish a word-level or primary stress always pick on a syllable that has already been given secondary stress on other grounds. This syllable must be the head of a foot. Languages that violate this orderly bottom-to-top sequence are easily handled using metrical grid (Goldsmith 1990).

Practically, only Rule Parameter 1 really matters in establishing word-level structure. The word-level primary stress is chosen from the first (left-headed word-level tree structure) or the last (right-headed word-level tree

structure) foot of the word, in systems where the establishment of the foot structures precedes that of word-level structures.

The parameters already established can be used to define word-level metrical rules as well. This enables us to add Parameter 5 which states that the structure is either at word or foot level.

As already stated, Goldsmith (1990) asserts that word-level stress could be the assignment of a special tonal melody to a syllable, in addition to the stress effects observed on other secondarily stressed syllables. This brings about a natural distinction between a primary stress and a secondary stress.

Some languages have a single word-level stress. It is assumed that this single stress is the result of more than one foot being assigned, along with a regular word-level structure. The non-primary stresses are not phonetically realised and a parameter called suppression of non-primary stress has to be postulated to account for such systems. This parameter is used when considering languages that do not have the phonetic means for expressing assignment of secondary stress. It is said that the phonetic effects are only indirect. This implies that the secondary stress system is only used to help in determining the location of primary stress. In giving a more complete account of a stress system, suppression of non-primary stress would not be considered as a single parameter. It would be considered as an extreme point along a continuum because the phonetic effects corresponding to secondary stress (the effects that are assigned to a syllable in the head-of-foot position) vary from one language to another.

1.7.1.4.3 Metrical Grids

According to Goldsmith (1990:231):

A metrical grid consists of rows and columns of marks represented by asterisks (or X's) which indicate the relative strength of successive stressable units.

It therefore refers to a set of three layers (or more) which run parallel to the string of syllables that make up the word. The lowest layer (that is the layer after individual segments) has a series of X's, one for each mora in the string. This row is called mora row, Row 0 or syllable row. The next layer up, that marks the head of feet and represents simple or secondary stress is called foot row or Row 1. This layer contains an X only above stressed syllables. The top layer has an X only above the syllable that receives the main stress of the word. It is called the word row or Row 2. In cases where the degrees of phrase-level prominence should be described, additional layers can be introduced. Example (11b) clearly shows that the height of columns represents the degree of stress prominence placed on each syllable.

In a metrical grid, a stress clash can be defined as the occurrence of two successive X's without an 0 in between. A clash can appear in the second or third layer as shown below.

(20)(a) Clash in the third layer

	CV CV CV # CV CV CV CV CV									
Row 0 (mora row)	x	x	x		x	x	x	x	x	
Row 1 (foot row)	o	x	o		x	o	x	o	x	
Row 2 (word row)		x			x		o		o	

(b) Clash in the second layer

CV CV CV CV

Row 0 (mora row) x x x x

Row 1 (foot row) o x x o

The first rule of grid construction is called the End Rule (ER). It places a grid mark on the extreme left or extreme right of whatever domain it is specified for. When End Rule operates at foot-level, being applied at the left end, it is the first syllable of the word that it will stress. To show that the rule is adding grid marks at the foot-level, the grid level must be specified in addition to End Rule (Initial) or End Rule (Final). Therefore the correct statement of End Rule includes two specifications, namely, Initial and Final and the grid level (word or foot).

The effect of End Rule is to place a grid on top of the leftmost (or rightmost) grid mark on the foot-level, when it applies at the word-level. In this case, a grid mark is not placed on the absolutely leftmost or rightmost syllable. Each grid mark is a projection for the next higher level to act upon.

The notion of extrametricality frequently interacts with the application of End Rule. Extrametricality refers to a situation where the initial or final syllables are ignored in the assignment of stress. If the initial or last syllables are ignored, the rules of stress assignment are formulated more easily (Durand 1990). The lowest level grid mark of a word-final or word-initial syllable is put in brackets to show that it is extrametrical. This makes further rules (e.g. rules for construction of the foot-level) blind to the existence of that grid mark and therefore syllable.

The second rule is the rule of Perfect Grid. It correspond to the process

of establishing bounded feet across the word in arboreal metrical representations. Goldsmith (1990) states that Prince formulated this rule to move across a word (scanning it from left to right or from right to left) assigning a grid mark to every other grid mark on the immediately lower row. It should also be specified whether Perfect Grid will assign grid marks to the odd-numbered positions or even-numbered positions in its direction of scan. The latter is called trough first assignment while the former is called peak first because a grid mark is assigned to the first position, third position and so on. Example (21) shows how Perfect Grid applies.

(21)	CV CV CV CV CV CV CV CV CV
Row 0 (mora row)	× × × × × × × × ×
Row 1 (foot row)	× × × × ×
Row 2 (wora row)	× × ×

The Perfect Grid of Row 1 was formulated to apply at foot-level, from left to right and on odd-numbered positions (peak-first). In Row 2, it applies at the next grid level up, but still from left to right and on odd numbered positions.

The function of Perfect Grid is to create sequences of stressed-unstressed units. However, when scanning from left to right for example, it may find itself stressing a syllable that is immediately followed by a stressed syllable. This may happen if End Rule (Final), for example, has applied on the same grid row. Such cases are also brought about by quantity sensitive rules. Normally, Perfect Grid does not apply in such a way as to create a stress-clash. In cases where a stress-clash would occur, the rule of Perfect Grid is

allowed ‘Forward Clash Override’.

The analysis of quantity-sensitive systems brings about the third important grid rule. As already stated above, each grid in Row 1 corresponds to a mora. When the rule of Perfect Grid is assigning a grid mark on Row 1, it will always assign a grid mark to one of the moras of a heavy syllable. Systems that do not allow a stress clash, will allow a stress on the first syllable following a stress heavy syllable, as in (22).

(22)	CV CVV CV CV
Row 0 (mora row)	× ×× × ×
Row 1 (foot row)	× ×

In a situation where a grid mark in Row 1 falls on the second mora of a heavy syllable, the stress has to be corrected by being shifted to the first. This shifting occurs because the first mora of a heavy syllable is more sonorous and more prominent than the second. This is what is known as the weak mora stress correction. Using the weak mora stress correction, (23a) is automatically and immediately corrected to (23b).

(23)(a)	CV CVV CV CV
Row 0 (mora row)	× ×× × ×
Row 1 (foot row)	× ×
(b)	CV CVV CV CV
Row 0 (mora row)	× ×× × ×
Row 1 (foot row)	× ×

This kind of correction, for the sake of Perfect Grid, is one way of ensuring that heavy syllables are stressed.

There are languages that are quantity-sensitive and therefore stress their heavy syllables but without the alternating stress pattern or the rule of Perfect Grid. In such languages, a rule simply called Quantity-Sensitivity (QS) applies to create a grid mark, or a series of grid marks, on the foot row over any heavy syllables.

In summary, the four rules of establishing a metrical grid are:

- (24) (i) Extrametricality: the initial or final syllables in Row 0 is put in brackets to make it extrametrical or invisible.
- (ii) End Rule: a grid mark is placed on the extreme left or right of Row 1 or Row 2.
- (iii) Perfect Grid: a grid mark is placed after every other grid mark on Row 1 and Row 2.
- (iv) Quantity-Sensitivity: a grid mark is placed over any heavy syllables on Row 1.

Metrical Phonology is used to define syllable weight in relation to stress, in this study. It is also used in the analysis of the general pattern of stress in Dholuo.

1.7.1.5 The Nature of the Syllable

The syllable has been defined variously by various linguists. Gimson (1989) recognises that there exists at a higher level, a unit greater than the phoneme (sound segment) which is distinct from the word or morpheme. This unit is known as the syllable. According to Gimson (1989), the recognition of the existence of the syllable from ancient times has led to many attempts to

define it. He gives the phonetic approach to the syllable which is an attempt at a universal definition of the syllable. The prominence theory, which is one of the phonetic approaches, states that some sounds are usually more sonorant than others in any given utterance. The number of peaks of sonority therefore show the number of syllables and syllable boundaries are found between sounds of relatively weak prominence (Gimson, 1989).

Goldsmith (1990) gives two traditional views regarding the nature of the syllable. The two views recognise that a spoken utterance is usually divided into chunks of segments or units. The first view, which focuses on the rise and fall of energy, is the sonority view of the syllable (the second view is discussed later in this section). The sonority hierarchy is then developed. The sounds are ranked according to the degree of openness of the vocal apparatus and propensity for voicing during production. The ranking given by Goldsmith (1990:111) begins with the most sonorous sound as follows:

- Vowels
 - low vowels
 - mid vowels
 - high vowels
- glides
- liquids
- nasals
- obstruents
 - fricatives
 - affricates
 - stops

The sonority hierarchy is also given by Hooper (1972) and Katamba (1989). Katamba (1989) explains that since the syllabic potential of a sound depends on its propensity to vocalise, it is expected that the more open a vowel is, the more likely it is to be the peak of sonority in its syllable. Gimson (1989) states

that this theory is not foolproof because prominence cannot be easily perceived in each position where a vowel occurs. However, this definition is important because it shows that syllable peaks should be associated with vowels.

The other phonetic approach to the syllable is the pulse theory (Gimson, 1989). It is also known as the motor theory. It was first developed by Stetson (1951). According to Stetson (1951), speakers emit syllables each in turn as independent activities of the intercostal muscles, that is, chest pulse. The theory states that the number of syllables in an utterance is determined by the number of chest pulses, accompanied by increases in air pressure. Gimson (1989) states that this theory may be a bit problematic when vowels that belong to two different syllables follow one another as in the English word /sɪ:ɪŋ/. He says it is doubtful whether a double chest pulse will be evident in the articulation of such a word. As already indicated in Ngala (1994), it is not easy to determine chest pulses when one is speaking.

The second traditional view given by Goldsmith (1990) is based on a more syntactic approach. The syllable is looked at as a constituent definable in familiar phrase structure terms, just like the sentence. This means that the syllable is composed of constituents. The syllable has a certain number of slots of syntagmatic positions. In these positions, subsets of phonological segments of the language occur in well-formed utterances. Earlier researchers hold the same view, for example, Harris (1951), Haugen (1956) and Fudge (1969). The constituents referred to here are the onset, nucleus (peak) and coda and the individual vowels (V's) and consonants (C's). The nucleus and coda are

jointly referred to as the core or rhyme.

There is also the linguistic approach or the phonological approach which tries to give a language specific definition of the syllable. In this approach, a unit of greater magnitude than the phoneme or sound segment is better defined with reference to a particular language, that is, in linguistic terms rather than in general phonetic terms with universal application (Gimson, 1989). Permissible combination of sounds determine what a syllable is. Gimson (1989:57) uses the example of the utterance [ŋga:] to explain what this approach advocates as follows:

...such an utterance as [ŋga:] might be found to consist of three units in one language -/ŋ-ga-a/, two in another /ŋ-ga/, and even one in another -/ŋga:/.

The utterance in the above quotation shows that languages divide their syllables in different ways. Hyman (1975) gives the basic assumption of the linguistic approach to the syllable. This assumption is that there is an intimate relationship between word structure and syllable structure. This implies that what a word can begin with shows what a syllable can begin with and what a word can end in shows what a syllable can end in. In a language with consonant clusters, clusters found at the beginning of a word are the same clusters that form a syllable onset, while clusters at the end of a word are the same clusters found in the syllable coda. The peak is associated with a vowel. Where a word begins with a peak, it means that syllables in that language can occur without an onset.

Fudge (1969) and Derek (1982) recognise the syllable as a phonological entity or reality. Derek (1982) defines the syllable as the smallest

rhythmic unit in a language. He likens the syllable to a step in walking; saying that it is a repeatable event that keeps the utterance going and it is the carrier of all the linguistic elements in a language. He notes that the rhythmic character of a syllable is:

...clearly revealed by what we do if we wish to count the syllables in a word or phrase; we pronounce them in strong, regular rhythm, perhaps accompanying each with a muscular movement.

He notes that counting syllables comes quite naturally, while counting phonemes or whole words is quite unnatural.

Another definition of the syllable is quoted from Hooper (1973) by Odhiambo (1981:13) as follows:

...the smallest pronounceable phonological unit that may be multi segmental (i.e. the smallest pronounceable unit).

All these views about and definitions of the syllable are very important because they show the nature of the syllable. With the constituents of the syllable in mind, it is now easier to discuss the notion of syllable weight in languages. As it will be seen in the rest of this section and elsewhere in the study, syllable weight is closely related to stress. Therefore, it is not possible to discuss syllable weight in isolation.

In discussing factors affecting stress placement, Hyman (1975) gives the phonological factors. The phonological structure of a syllable may make it stressable. The syllable is divided into the onset and core. For example, in a CVC sequence, C is the onset and VC is the core. In most languages, a syllable with a short vowel as the only element of its core cannot be stressed and stress must pass to the neighbouring syllable (Hyman, 1975). Such a

syllable is said to be light. A syllable that is stressed and can be said to be heavy, has a core which consists of either a long vowel (V:), a VV or VC sequence, or a combination of these (i.e. VVC or V:C) (Newman, 1972). According to Newman (1972) ,Allen (1973), Goldsmith (1990) and Kenstowicz (1994) among others, this distinction in syllable weight, that is, the distinction between light and heavy syllables, is an important phonological variable in a statement of stress placement.

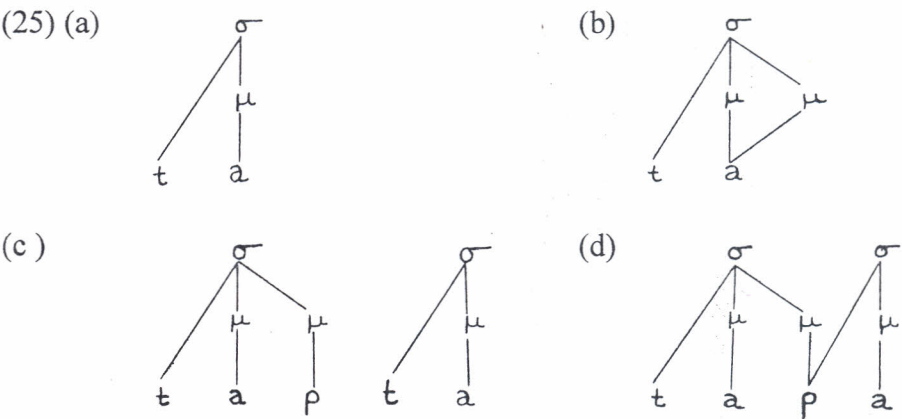
Stress is assigned only to a heavy syllable in most languages (Hyman, 1975). It is observed that all languages with a heavy versus light syllable dichotomy have a vowel length contrast. They have CV contrasting with CV:, which patterns with CVC (Hyman, 1975). In the absence of vowel length contrast, Hyman (1975) notes that there would be a contrast between an open CV syllable and a closed CVC syllable. He observes that since no language requires that stress be on stressed syllables only, a CV syllable will always be able to accept stress in the absence of a CV: syllable. The explanation for syllable weight as a factor in stress placement cannot be purely phonetic because CV functions as a light syllable in languages with vowel-length contrast and as a syllable equal in weight to CVC in languages without a vowel-length contrast (Hyman, 1975).

Allen (1973) in his study of Latin observes that onset consonants do not count in the determination of syllable weight. The same observation is also made, for other languages, by Hulst and Smith (1985). Allen (1973) also observes that Latin accents a heavy penult and stress shifts to the antipenult only if the penult is light. In Egyptian Arabic, when a word ends in a short

vowel (CV), stress is on the penultimate syllable if it has a long vowel (CVV), a short vowel followed by a germinate consonant (CVG, where G=germinate) or a vowel followed by the first consonant of a cluster (CVC) (Kenstowicz, 1994). CVV, CVG and CVC behave as a group as opposed to CV.

In generative grammar, the notion of the mora is recruited from traditional grammar to express the idea that a light syllable consists of a single unit of quantity, while a heavy syllable contains two units. The notion of the mora therefore helps to explain what is constant in all the heavy syllables specified above, making them different from the light syllable (Kenstowicz, 1994).

According to McCarthy and Prince (1986) and Hayes (1989), a heavy syllables receives a bimoraic representation, unlike a light syllable, as seen in (25).



The symbol ‘μ’ is used to represent a mora. The various properties of the representation in (25) above are given by Kenstowicz (1994:293) as follows:

First, the key idea is that the mora is not a species of sound but rather an elementary prosodic unit that, like the syllable, organizes the phonemes in a particular way. Second , the mora is a constituent of the syllable intervening between the [σ] and the phonemic string. Third,

what unifies the various syllables is their bimoraic structure; they differ in how the second mora relates to the phonemic string...Fourth, prenuclear onset consonants do not pass through a mora and hence are weightless. This formalizes the generalization that stress rules sensitive to weight do not take account of onset consonants.

Just like Kenstowicz (1994), Goldsmith (1990) notes that the most common characteristic that defines what a heavy syllable consists of is the existence of two positions in the rhyme. He then observes that a VV and VC both count as two positions in the rhyme. He also notes that a heavy syllable in all languages is not defined by the existence of two positions in the rhyme. In some languages, the primary distinction between heavy and light syllables involves the existence of full as opposed to reduced vowels, respectively (Goldsmith, 1990).

Hulst and Smith (1985) observe that in many languages, there are syllables that attract a particular stress or tone. These syllables contain either segments of a certain type or a certain number of segments. They state that such syllables are known as heavy syllables as opposed to light syllables.

1.7.1.6 The Nature of stress

Kenstowicz (1994) in discussing stress in languages, states that it has no uniform phonetic correlates, unlike length and tone. He states that in generative grammar, stress is seen as an abstract relation of prominence whose existence is signaled through other prosodic features such as heightened pitch, increased duration and subtle aspects of vowel and consonant quality, for example, lack of vowel reduction and aspiration or germination of some consonants in some languages.

Stress is a property of vowels and more generally of syllables (Kenstowicz, 1994). He asserts that the stress properties of a given syllable can be determined by the way syllables of a word are treated by the grammar of a language and by the perceptions and judgements of the native speaker. Another evidence that can determine the stress properties of a syllable are the adjustments a language may resort to in order to avoid a sequence of stressed syllables (see section 1.7.1.4.1 for a discussion on how a stress clash can be avoided in some languages).

In some languages, the distribution of stress takes syllable weight into consideration. In others, a syllable bears stress because of its location in a word, for example, stress may be initial as in Finnish and Czech (Kenstowicz, 1994). Hyman (1975) also shows that Hungarian has stress on the initial syllable. Stress could also be final as in French and Turkish or penultimate as in Polish. In placing word stress, languages that pay attention to particular properties of syllables or to a particular position of a syllable in a word are known as fixed stress languages because stress is restricted to a particular syllable (Hyman, 1975).

In yet other languages, stress of a syllable may be an unpredictable property of the lexical items in which the syllable is located. In other words, the make-up of a word determines stress placement (Kenstowicz, 1994). In consideration of the make-up of a word, the prefixes, roots and suffixes may determine stress placement. Such languages are said to be free stress languages (Hyman 1975).

Several degrees of prominence are recognized in various languages.

For example, in the word 'Tennessee', speakers of English perceive the final syllable to be stronger than the first, but in 'Tennessee state', the prominence reverses. The initial syllable is stronger than the final syllable. When this word is said in isolation, the last syllable has primary stress, the first syllable has secondary stress, while the second syllable is unstressed (Kenstowicz, 1994).

Stress has long distance effects. According to Kenstowicz (1994), no other phonological property exhibits such long-distance effects like stress (apart from tone). He goes on to give an example from English compound words. He observes that the prominence of the first member keeps increasing cyclically in proportion to the depth of embedding, when compound words have primary stress on the first syllable.

In many languages, stress involves the repetition of the basic pattern. For example, Tryon (1970) characterizes Maranungku, an Australian language, as having primary stress on the initial syllable and secondary stress on every other syllable as follows: 'CVCV, 'CVCV"CV, 'CVCV"CVCV and 'CVCV"CVCV"CV. The symbol ' " ' is used to indicate secondary stress. There is the repetition of the stressed + unstressed motif across the word. The same is said to occur in English in a smaller scale (Kenstowicz, 1994). A stressed + an unstressed syllable forms a stress foot. A foot is defined by Hulst and Smith (1985) as a relatively strong (stressed) syllable followed by a sequence of relatively weak (unstressed) syllables.

Stress can therefore be defined in terms of its phonetic properties and linguistic function (Hyman, 1975). He states that as far as phonetic properties are concerned, a changing pitch (usually falling from a stressed to an

unstressed syllable or rising from an unstressed syllable), greater duration and greater force of articulation (for example, aspiration and germination of consonants) correlate with stress. In other words, as already stated stress is realised through these features.

One of the linguistic functions of stress is to show one syllable per word as being the most prominent. In other words there is culmination of prominence. This is the culminative function of stress. Prominence is culminative in all stress languages. Stress also has a demarcative function, that is, it is used to signal word boundary, especially in fixed stress languages. Stress has a lexical function in languages where it is marked on the lexical item as part of the underlying phonological form (Hyman, 1975). He points out that in English, stress is assigned to the first syllable in bisyllabic nouns and to the second syllable in verbs, as in *convert* and *con vert*, respectively.

1.7.1.7 The Nature of Tone

Tone is used to refer to the different pitches of the voice that combine to form certain patterns of pitch variation (Sethi and Dhamija, 1992). Pitch then refers to the rate of vibration of the vocal folds (Kenstowicz, 1994). The higher the rate of vibration, the higher the resulting pitch becomes (Katamba, 1989). Pitch differences are used phonemically, in tone languages, either to differentiate between word meanings or to convey grammatical distinctions (Katamba, 1989).

Unlike stress which is said to be culminative in nature, having a demarcative function, tone resembles the segmental phenomena (Hyman,

1975). In other words, only one syllable per word can have primary stress, while any number of syllables in a word can have a high tone as long as the language in question permits (Hyman, 1975).

Some of the tones that feature in the researches of Kenstowicz (1994), Durand (1990) and Hyman (1975), just to mention a few are high, mid, low, low-rising, falling-rising, high-rising, high-falling and downstep. A distinction is drawn between register tone languages and contour tone languages. Hyman (1975) quotes Pike's (1948) distinction between the two. He points out that register tone languages refer to languages where tonal contrast consists of different levels of steady pitch. Register tone languages therefore use the high, low, mid and downstep tones. These tones could therefore be referred to as the register tones. He also points out that contour tone languages use tones which are not level in their production. They rise and fall in pitch. Contour tones are therefore tones that do not have a steady pitch height. The difference between a contour system and a register system is that the basic tonemic unit is gliding instead of level.

In certain languages, tones can be analysed in terms of binary features such as [+/- high] or [+/- low] (Durand, 1990). The feature [+/- stiff] is used to characterize sounds produced when the vocal cords are stiff or tense. The feature [+/- slack] is used to characterize sounds made with a slack non-tense vocal cords (Durand, 1990). The feature stiff is said to be an articulatory correlate of high pitch. He points out that [+ slack] is an articulatory correlate of low pitch, while neutral pitch is the result of [-stiff, -slack]. While voiceless stops tend to raise the pitch of adjacent vowels, voiced stops [+slack] tend to

cause a downward drift in pitch (Durand, 1990). He observes that the use of the same feature to describe voiced and voiceless sounds on the one hand and the high and low pitch on the other, shows how they may affect one another. Hyman (1975) states that in Nupe, low tone spreading takes place only when the intervening consonant is voiced. He adds that in Ngizim, the high tone spreading takes place when the intervening consonant is voiceless, a sonorant or an implosive. He quotes Hyman and Schuh (1974) in proposing that a voiced obstruent can block the spreading of a high tone through it, in the same way that a voiceless stop blocks the spreading of a low tone. They add that sonorants are neutral since they allow both low and high tones to spread through them.

The two high tones in a sequence of high-low-high tones are not pronounced at the same pitch level, in many African languages (Hyman, 1975). The second high tone, though phonetically identical to the first high tone, is pronounced at a slightly lower pitch than the first. He observes that the interval from high to low is greater than from low to high. He calls this phenomena downdrift. It applies progressively to each high tone that is preceded by a low tone.

Like Goldsmith (1990), Hyman (1975) recognizes the fact that in some languages, some morphemes such as grammatical affixes and pronouns may lack a tone while in others the same morpheme may consist of a tone only. In connection with syllable weight, it is already noted that in Section 1.8.1.5. that certain syllables attract a particular tone (Hulst and Smith, 1985).

1.7.2 Review of Literature on Dholuo Phonology

In the section that follows, the relevant literature on Dholuo phonology is given. I agree with Oduol (1990) that researches on Dholuo fall under two categories. The first category consists of simple grammatical descriptions of Dholuo which seem to target those interested in acquiring the basic knowledge of Dholuo. This group includes studies by researchers such as Malo (1952), Huntingford (1959) and Stafford (1967). The second category consists of researches on particular aspects of Dholuo language. Some of these studies include Okombo (1977, 1982, 1986), Omondi (1982), Odhiambo (1981), Oduol (1990) and Ngala (1994). Apart from the fact that none of these studies carries a detailed analysis of syllable weight and the effects it has on Dholuo phonology, almost all of them do not use the theories used in this study. However, most of these studies have aspects that are relevant to the present study and therefore they feature in the literature review below and in other parts of this work.

1.7.2.1 The Dholuo Syllable Structure

According to Ngala (1994), the Dholuo syllable has a maximum of one consonant in the onset followed by the peak and then a maximum of one consonant in the coda, i.e., (C)V(C). The vowel is the only obligatory element in the Dholuo syllable. She then states that the peak consists of a short vowel, a long vowel or a vowel-vowel sequence. However, she does not deal with the notion of syllable weight.

In his discussion of syllable weight in Dholuo, Okombo (1982) starts by

quoting Newman's (1972) position. Although this position is already given in section 1.7.1.5, I once again state it to clearly show the basis of Okombo's analysis of the differences between light and heavy syllables in Dholuo. According to Newman (1972), syllable weight only refers to the core of a syllable. In regard to syllable weight, there are light and heavy syllables. He states that the core or rhyme of a heavy syllable consists of either a long vowel (V:), a vowel-vowel sequence (VV) or a vowel followed by a consonant (VC) or a combination of these (i.e. (V:C) or (VVC)). The rhyme of a light syllable consists of a short vowel (V).

Okombo (1982) then gives a distinction between the two types of syllables in Dholuo. He says that a light syllable in Dholuo consists solely of a short vowel. Some of the words that he gives to show the syllables that have short vowels are listed below. The short vowels are in bold type. The symbol '\$' indicates syllable boundary.

- (26) a\$gu:\$**lu** 'pot'
a\$di:\$**ta** 'basket'
o:\$**lo** 'tiredness'

He then says that the rhyme of a heavy syllable consists of a lengthened vowel or a vowel followed by a consonant (where the vowel is not long), as seen in (27a) and (27b), respectively. Once again the rhymes with heavy syllables are in bold type.

- (27)(a) ca:**k** 'milk'
ho:\$no 'miracle'
s:**u**:\$na 'mosquito'

(b) ka n \$na	‘donkey’
le w \$ni	‘cloths’
po s \$ta	‘post office (English loan)’

In Dholuo, a heavy syllable can also consist of a vowel-vowel or a glide-vowel sequence. The words given by Okombo are in (28) below. The symbol ‘~’ means is also realised as.

(28) a\$ cj e	~	a\$ cr e	‘one’
o\$ tje \$no	~	o\$ tie \$no	‘night’
a\$ gwa \$ta	~	a\$ gua \$ta	‘calabash’

Some of the words used as examples are drawn from Ngala (1994).

Okombo’s (1982) discussion of syllable weight is very important to this study because it shows which syllables could be considered to be heavy or light in Dholuo. The relationship between syllable weight and stress is at the center of our study. However, his discussion of syllable weight is not extensive and therefore there is need to carry out a thorough research on syllable weight in Dholuo, i.e., light/heavy syllable dichotomy in Dholuo.

1.7.2.2 Phonological Processes Involving Vowels

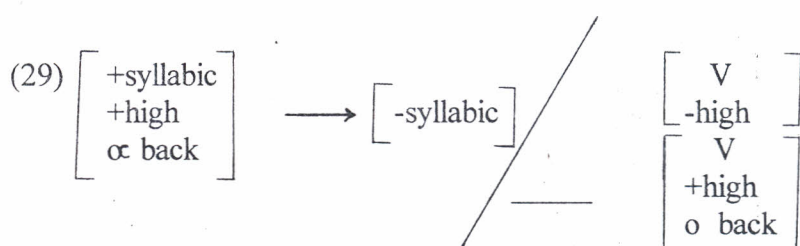
There are phonological processes involving vowels that seem to be affected by syllables weight in Dholuo. Okombo (1982) states that the major phonological processes involving vowels are glide-formation, deletion, compensatory lengthening, root lengthening and vowel harmony. In this study, vowel harmony is not discussed because it does not have any effect on and is not affected by syllable weight. Apart from the vowel processes given

by Okombo (1982), Odhiambo (1981) includes assimilation in her study of the major vowel processes in Dholuo. As explained in section 6.2.1, all examples of utterances that would pass for assimilation are treated as instances of compensatory doubling or lengthening.

1.7.2.2.1 Glide-Formation

The two glides that exist in Dholuo are /j/ and /w/. Okombo (1982) states that these are the two glides that are formed in Dholuo. He then gives the rule of glide formation as follows:

that a high vowel becomes a glide when it is immediately followed by either a non-high vowel or a high vowel with the opposite value for the feature (back); i.e. when it is followed by a different vowel (Okombo, 1982:21).



(Okombo, 1982:21)

He then goes on to give examples of phrases where the process can be seen as follows:

(30) pi + orumo $\longrightarrow$ pjorumo 'water is finished'

fu + εco $\longrightarrow$ fweco 'there is a puff-adder'

There are situations where the rule is optional and others where it is obligatory (Okombo, 1982). Glide formation in Dholuo therefore seems to transform two syllables into one syllable with a Glide-vowel (G-V) sequence.

1.7.2.2.2 Vowel Deletion

Odhiambo (1981) states that vowel deletion involves the loss of segments. Deletion does not affect vowels only. It also affects consonants and syllables. Deletion also affects word internal and word final syllables (Odhiambo, 1981). I only intend to discuss deletion that brings about a change in the internal structure of the peak, otherwise the rest are beyond my scope. For example, one of my main concerns is with deletions that are also compensated for by lengthening the remaining vowel phoneme. The process of vowel deletion with lengthening is seen in the following examples from Okombo (1982:23).

- (31) $l_{\epsilon} + a\epsilon\epsilon l \longrightarrow la:c\epsilon l$ 'one axe'
 $l_{\epsilon} + \epsilon co \longrightarrow l_{\epsilon}:co$ 'there is the axe'
 $l_{\epsilon} + \epsilon t\epsilon:r \longrightarrow l:t\epsilon:r$ 'the axe is broken'

He gives the rule for vowel deletion as follows:

$$(32) \begin{bmatrix} V \\ -high \end{bmatrix} \longrightarrow \emptyset \quad \begin{bmatrix} V \\ +syllable \\ -heavy \end{bmatrix}$$

(Okombo, 1982:23)

This rule states that a non-high (-high) vowel is deleted when it precedes a vowel in a light (-heavy) syllable. The study shows that even high vowels can be deleted.

1.7.2.2.3 Compensatory Lengthening

Okombo (1982) states that compensatory lengthening occurs when part of a word is deleted. He goes on to say that deletion does not always lead to compensatory lengthening and this makes it impossible to give a general rule. The examples of lengthened vowels given under sections 1.7.2.2.2 (vowel deletion) are instances of compensatory lengthening.

1.7.2.2.4 Root Lengthening

Ngala (1994:139) quotes Okombo (1982) in stating that:

Dholuo vowels are phonemically short. However there is a rule, which lengthens a vowel when it precedes one or two consonants followed by either one or no vowel at all in utterance-final position. This affected vowel is what we call the root vowel. In a consonant-final word, it is the last vowel; in a vowel-final word, it is the second last vowel in a word.

Okombo (1982:25) then states the rule as follows:

(33) $V \longrightarrow [+long] / \text{---} C_1^2 V'_0 \# S$

The vowel that has become long under the conditions specified above is said to have undergone root-lengthening.

Odhiambo (1981) states that the process is known as root-lengthening because it only occurs when a vowel that meets the structural description of the rule is part of the root. She goes on to explain that pronominal prefixes a-, -o-, for first, second and third person singular, respectively, fail to undergo the process of root-lengthening even though they occur in the right syllable structure. She argues that when these prefixes are attached to monosyllabic (CV) verbs in the present imperfective aspect they do not undergo root-lengthening as in the examples below:

(34) a:^hr 'I am going', but not a:^hr

ɪ ʔ ɪ ‘you are going’, but not ɪ : ʔ ɪ

ɔʔ ɪ ‘he/she is going’, but not ɔ : ʔ ɪ

Omondi (1982) discusses word-roots in her analysis of stress and length. She states;

Dholuo word-roots are monosyllabic. Stress is fixed and it falls on the root syllable of the word. For example, in the citation form of the verb when the final vowel is almost always / and as such could be regarded as the verb-root. So in a verb like *tedo* (to cook), stress is on the e ... (Omondi, 1982:21).

The explanations given by Odhiambo (1981) and Omondi (1982) clearly show or illustrate that it is a word-root that is mostly affected by phonological processes in Dholuo. For information on stress and length refer to section 1.7.2.3 and Chapter 4.

In the examples that follow, the word in bold type in (i) shows the environment under which the affected vowel is lengthened, while (ii) shows where it remains short. The symbol ‘#’ is used to indicate word boundary.

(35)(a)(i) # nɔ # kɛ\$θɔ # **cɪ:k** # ‘he went against the custom’

(ii) # **cɪk** # nɔ # nɛ # bɛ:r # ‘that custom was good or valued’

(b)(i) # kaw # **kɛ:\$dɛ** # ‘take a stick’

(ii) # gem # na # **kɛ\$dɛ** # nɔ # ‘get me that stick’

The present study shows that it is the stressed syllable that is lengthened or doubled.

In her study of the KSN and B-U dialects of Dholuo, Oduol (1990) states that root vowel length constitutes a dialect variable. She indicates that in the KSN dialect, the root vowel-lengthening rule (given in (33)) always applies (c.f. Oduol, 1990).

1.7.2.3 Stress & Vowel Lengthening

Omondi (1982) considers the process of vowel lengthening in Dholuo as a product of stress. She states that since length is a function of stress, every stressed syllable may be lengthened. She goes on to say that in the words *tedo* 'to cook', *jatedo* 'a cook' and *tedora* 'to cook myself' the /e/ is the long vowel. In KSN, the /e/ of the word *tedora* 'to cook myself' does not have a long vowel, but it bears the main word stress. She then concludes that Dholuo might be regarded as an example of a language in which according to Lehiste (1970) duration or length may be regarded as one of the phonetic manifestations of stress. Her assertion is found to be right, in Chapter 4, where it is observed that stress has the effect of doubling vowels. In other words, stress is realised through vowel doubling.

Odhiambo (1981) observes that though stress has a tendency to lengthen vowels, syllables are also stressed depending on their phonological structure. She also notes that in many languages, stress can only be assigned to a heavy syllable. She also points out the possibility that the placement of stress in Dholuo is subject to syllable weight especially in those syllables containing long vowels. She supports this possibility by saying that Dholuo is a language with a heavy/light syllable dichotomy. She continues to say,

This possibility is further supported by the consideration that Dholuo has a general predictable rule by which the penultimate syllable in a word, where stress is most closely detectable, is lengthened in utterance final position (Root-lengthening) (Odhiambo, 1981:32).

It is observed that root-lengthening is not restricted to the vowel in the

penultimate syllable in a word, it can also affect a vowel in the last syllable of a word, as shown in (35a,i) in section 1.7.2.2.4. It is therefore my concern in this study to find out whether the ultimate syllable that has undergone vowel root-lengthening is stressed.

Odhiambo (1981) clearly points out that though she does not intend to investigate the relationship between stress and length, it is important to note that what is referred to as lengthening by the process of root-lengthening can be phonetically interpreted as stress. She ends her brief discussion on length and stress by asserting that:

Given the possible reciprocal relationship between stress and length, that is, that the heavy (long vowel) syllables are stressable and that stress tends to lengthen vowels, we cannot conclusively say which one determined the other without carrying out a full investigation (Odhiambo, 1981:32).

Odhiambo's (1981) observation shows that the relationship between syllable weight and stress in Dholuo is an area that has not been researched into or investigated. This is part of what I set out to investigate.

Stafford (1967) discusses stress but not in relation to vowel lengthening. He claims that stress is normally on the last-but-one syllable. He says this stress does not move when suffixes are added. He further states that the plural imperative suffix *-uru* is an exception and therefore bears stress. In Chapter 4, the investigation shows that the suffix *-uru* has stress on its first syllable.

He argues that in many bisyllabic words the first syllable is a prefix. Since this prefix is never stressed, the stress falls on the last syllable. The words he gives as examples are in (36) below. The symbol ' ' is used to

indicate stress in the words in (36) and in all the other sections where word stress is marked.

(36) a ¹ par	‘ten’
a ¹ dek	‘three’
ɔ ¹ mbɔŋ	‘ankle’
pa ¹ θɪ	‘child’

He concludes by saying that loan words are restressed to obey this rule as in *Kamera* ‘camera’ and *mtoka* ‘motor car’. The words *apar*, *adek* and *ɔmbɔŋ* fall under Category 8 in Chapter 4. In this category of words, stress is on the second syllable. The stress pattern of the word *pa θɪ* is in Category 12 in Chapter 4. It is observed that in the KSN variety of Dholuo, stress falls on the first syllable of this word.

1.7.2.4 Tone in Dholuo

Stafford (1967) discusses tone briefly. He says that though tone is used to differentiate words with the same spelling, it is often stated that tone is not an important feature. He further observes that this misconception is intensified by the fact that differences of tone are not shown in written Luo. Stafford (1967) seems to admit that tone is an important feature in Dholuo but does not carry out any study to show its importance. This study shows the tone pattern of Dholuo words and how the tone is related to syllable weight.

Oduol (1990) in her study of the dialects of Dholuo identifies the phonological, grammatical and lexical features which mark each dialect. Her study, apart from revealing that Dholuo has two dialects (namely; KSN and B-

U), explores certain aspects in Dholuo phonology that are important to this study. She shows how the tone pattern in certain words in KSN dialect differ from those of B-U dialect (Oduol, 1990).

Oduol (1990) also notes that tone is the subject of Okombo (1977). The latter, in his study, investigates the form and functions of tone in Dholuo. In this study it is the form of tone that is of interest. Studies by Okombo (1977) and Oduol (1990) are therefore used as sources in my secondary data collection.

Okombo (1982) suggests three basic and three derived tone patterns. The three basic tones are Low(L), High(H) and Downstepped High (DH) (or (!H) c.f. Kenstowicz 1994). The three derived tone patterns are Low-Rising (LH), High-Falling (HF) (represented as (HL) in the present study) and High-Hanging (H!H). The present study reveals how these tones are manifested in words and whether their patterns are affected by or affect syllable weight.

1.8 Methodology

1.8.1 Data Collection

Data was collected, as already stated, from speakers of the KSN variety of Dholuo. The population in our sample included the young, old, educated, uneducated, mobile, non-mobile, male and female competent speakers of Dholuo, four people being chosen for each category. The used sample was therefore to some extent representative. The sampling could be said to be a bit judgemental because only data from those considered to be competent speakers of the language was used.

Data collection involved participant-observer activities. It was thus possible to note all the information considered to be relevant. Where necessary, the informants or speakers were asked to repeat their utterances several times. Data was therefore obtained deliberately with the informants' awareness of what was taking place. It is worth noting that all the informants were relatives and other people whose acquaintance the researcher had made earlier. Their utterances were tape recorded (with their permission), so that the researcher could listen to them over and over again. This method is also used by Ngala (1994) and researchers such as Stafford (1967). Stafford (1967:89) notes that:

The only way to approach correct pronunciation is by regular conversation with Luo people, repeating each word or phrase after them, preferably with the help of a tape recorder...

Where necessary, utterances were repeated to the approval of the informants. Their intuitions were thus used to evaluate the researcher's perception of recorded utterances. All this was, of course, in addition to the researcher's own intuitions as a native speaker of Dholuo.

1.8.2 Data Analysis

After listening to various speakers and the tape recorded information over and over again, data was transcribed phonetically. In this phonetic transcription, particular attention was paid to the following phonological phenomena: vowel doubling (vowel lengthening), sequences of two different vowels, short vowels, deletion, gliding of high vowels, stress, high tone, low tone, downstepped high tone, high-falling tone, low-rising tone, high-hanging

glide, syllable boundaries and word boundaries. All monosyllabic words were then grouped together. The same was done to bisyllabic, trisyllabic, and other polysyllabic words. These words were further subdivided into smaller groups. For example, monosyllabic words were subdivided according to the tone patterns they exhibited.

The theories of Autosegmental Phonology, CV-Phonology and Metrical Phonology were then used in interpreting and describing the findings presented in Chapters 3,4,5 and 6.

CHAPTER 2

A PHONEMIC INVENTORY OF DHOLUO SOUNDS

2.0 Introduction

In section 1.5, it is indicated that the study includes a phonemic inventory of Dholuo sounds. The syllable is also composed of sound segments. It is therefore important to discuss Dholuo sounds in order to familiarize the reader with the sounds that are referred to from time to time in the study.

2.1 Consonants

There are twenty six consonants in Dholuo. Five of these are prenasalised consonants, as seen in (37) below. In (37), the consonants are classified according to the manner of articulation, voicing and place of articulation. In each cell, the voiced sound is on the right, while its voiceless counterpart is on the left.

(37) Consonantal Phonemes of Dholuo.

Place of articulation Manner of articulation	Bilabials		Labio-dentals		Dentals		Alveolars		palatals		Labio-velars		Velars		Glottals	
Stops	p	b			t	d	c	ɟ			k	g				
Fricatives			f	θ	ð	s									h	
Nasals		m					n		ɲ				ŋ			
Laterals							l									
Rolls(trills)							r									
Glides									j		w					
Prenasalised stops		mb			nθ		nd		ɲɟ				ŋg			

Adopted from Okombo (1982:19) and Ngala (1994:49)

The occurrence of the voiceless glottal stop /ʔ/ is recognised by Okombo (1982). He states that the sound has a doubtful phonemic status and occurs meaningfully in a few cases. It is for this reason that the sound /ʔ/ has not been included in (37) above. Okombo (1982:19) then gives examples of words with the sound /ʔ/ , as shown in (38) below.

- (38) ʔmʔm ‘no’
- ʔaʔa ‘no’
- ʔeʔe ‘here is’

In (37) above, there are two palatal stops (/c/ and /ɟ/). Just like Odhiambo. (1981) and Okombo (1982), it is my observation that in Dholuo these palatal stops are in free variation with palato-alveolar affricates.

The five prenasalised stops are put on a separate row from either stops or nasals because they all have two phases of articulation. The first phase is a nasal phase while the second is a stop phase. They are all single internally complex segments.

All the International Phonetic Alphabet (IPA) symbols representing Dholuo consonants have been matched with the corresponding orthographic representation in (39) below.

(39) Orthographic Representation (OR)		IPA Symbols
Upper Case , Lower Case		
P	p	p
B	b	b
M	m	m
MB	mb	mb

F	f	f
TH	th	θ
DH	dh	ð
NDH	ndh	nð
T	t	t
D	d	d
S	s	s
N	n	n
L	l	l
R	r	r
ND	nd	nd
CH	ch	c
J	j	ʃ
NY	ny	ɲ
Y	y	j
NJ	nj	ɲʃ
W	w	w
K	k	k
G	g	g
NG'	ng'	ŋ
NG	ng	ŋg
H	h	h

2.2 Vowels

There are nine pure vowels in Dholuo . The vowel chart in (40) shows

these pure vowels. It is partly adopted from Okombo (1982).

(40) Dholuo Vowels

	Front	back
High	i	u
	ɪ	ʊ
Mid	e	o
	ɛ	ɔ
Low	a	

Where I use the symbol /ɔ / for the mid back vowel, Okombo (1982) uses the symbol /ɒ / .

These nine vowels can be grouped into four pairs. Each pair contains a [+ Advanced Tongue Root] ([+ATR]) and a [- Advanced Tongue Root] ([-ATR]) partner (Okombo , 1982). In [+ATR], the tongue root is advanced. In other words, the root of the tongue is projected forward to create a greater pharyngeal opening (Kenstowicz,1994). In [-ATR], the tongue root is retracted. One single vowel does not have a partner, as seen in (41) below. It is noted that there are researchers such as Omondi (1982) and Tucker and Bryan (1966) who claim that /a/ also reflects a tongue root contrast, therefore showing that a fifth pair exists. (41) shows the orthographic representation of Dholuo vowel sounds as well as the IPA symbols used to represent them. All the IPA symbols on the right are [-ATR] , while those on the left are [+ATR].

(41) Orthographic Representation		IPA Symbols
Upper Case	Lower Case	

A	a	a	
E	e	e	ɛ
I	i	i	ɪ
O	o	o	ɔ
U	u	u	ʊ

Abercrombie (1967) states that many languages have vowel segments whose qualities are not constant. Their qualities change in the course of production. Such sounds, which he calls diphthongs could be a sequence of vowels or a sequence of a semi-vowel (glide) and a vowel. He then argues that these sequences should occupy one syllable. Dholuo seems to be one of these languages.

Odhiambo (1981) and Ngala (1994) note that in speech Dholuo speakers are unable to distinguish between a high vowel-vowel sequence and a glide-vowel sequence. The two sequences therefore seem to be in free variation. The glide-vowel sequence or the high vowel-vowel sequence occupy the same syllable (Ngala, 1994). Odhiambo (1981) states that the diphthongs of Dholuo are represented underlying as a vowel sequence. She argues that if diphthongs are represented in that manner, they not only fit in the entire phonemic structure but also simplify the phonological structure of the language.

I agree with the view that the so called diphthongs of Dholuo are best treated as vowel sequences rather than single phonemes because it is only the first vowel of the syllable peak in a high vowel-vowel sequence that is realised either as a high vowel or a semi-vowel. The second vowel in the sequence is

always the same. Diphthongs that are viewed as single phonemes have two phases of articulation, just like the prenasalized consonants in section 2.1 above. In my view, a change in the articulation of the first phase of the phoneme should affect the second phase. This is not the case in Dholuo. In other words, a change in the first vowel does not affect the second and therefore they are vowel sequences occupying the same syllable peak.

In (42) , a few examples are given to show how the vowel sequences occur in Dholuo words. I have used some examples from Ngala (1994:55) . All the high vowel-vowel or glide-vowel sequences are in bold type.

(42) ɔg ʋɛ	~ ɔg wɛ	‘lizard’
twɔrɔ	~ twɔrɔ	‘sisal’
cva kɔ	~ cwa kɔ	‘to boil’
θuol	~ θwɔl	‘snake’
dɪ ɛ l	~ dje ɛ l	‘goat’
ðɪ ɾaŋ	~ ðja ŋ	‘cow’
bɪe ʃro	~ bje ʃro	‘placenta’
due	~ dwe	‘month’
a\$ɔ ia \$mbo	~ a\$ɔ ja \$mbo	‘name of a person’
mua \$ndu	~ mwa \$ndu	‘wealth’

The examples in (42) show that any of the two high front vowels (/i/ and /ɪ /) and the two high back vowels (/ʊ/ and /u/) could be the initial element in a high vowel-vowel sequence , thereby being easily replaced by the semi-vowels /j/ and /w/, respectively. All vowel-vowel sequences occupying the same syllable peak must begin with a high vowel.

In summary, there are twenty-six consonantal phonemes and nine vowel phonemes in Dholuo.

CHAPTER 3

THE DHOLUO SYLLABLE STRUCTURE

3.0 Introduction

In this chapter, the structure of the Dholuo syllable is analysed. The Dholuo syllable structure is also the subject of Ngala (1994), to which the reader may refer for a more detailed account. Having discussed the sounds that exist in Dholuo, in Chapter 2, it is important to show how these sounds combine to form syllables. In other words, it is important to investigate the syllable types that are found in Dholuo. This kind of investigation makes it possible for one to show, in Chapter 4 (where the relationship between syllable weight and stress is discussed), the types of syllables that may be considered to be heavy in Dholuo and also show how they differ from the light ones.

CV Phonology model of Clements and Keyser (1983) is used in the analysis given below. This model is useful in giving a clear analysis of the syllable structure at the level of vowels and consonants, thus revealing the syllable types that exist in Dholuo. The assumptions of CV Phonology will therefore be stated briefly once again. In CV Phonology, the syllable is assumed to have a three-tiered structure consisting of the syllable node, the CV-tier and the segmental tier (Clements and Keyser, 1983). The syllable nodes of the syllable tier dominate the elements of the CV-tier while those of the CV-tier dominate those of the segmental tier. The CV-tier defines syllable peaks or non-peaks, that is, functional positions within the syllable. The vowel

element is associated with the syllable peak. Any element dominated by the C-element of the CV-tier is non-syllabic, whereas any element dominated by the V-element is syllabic.

In Dholuo words of more than one syllable, the Onset First Principle (see section 1.7.1.3.3) is used to show that it is onset consonants that should be joined first to the syllable node after the peak. The peak is already prelinked to the syllable node. Coda consonants are then joined to the syllable node.

In broad terms, Dholuo has both open and closed syllables. An open syllable ends in a vowel, while a closed syllable ends in a consonant (Ladefoged, 1975). A closed syllable may be composed of either an onset, peak and coda or a peak and coda. The onset, peak and coda are the three phonetic parts of a syllable (Ladefoged, 1975). In this chapter reference is made to these three parts of the syllable. As already stated, the peak and coda, as opposed to the onset, are referred to as the core (Ladefoged, 1975).

The specific manifestations of open and closed syllables are discussed in 3.1 and 3.2, respectively. Each type of syllable is represented on a chart to show clearly whether it is an open or closed syllable. In the analysis below, monosyllabic, bisyllabic, trisyllabic and other polysyllabic words have been used.

3.1 Open Syllables

There are several types of open syllables in Dholuo. One of the syllable types that exists in Dholuo consists of a consonant followed by a vowel (i.e. CV syllable). Such a syllable is referred to here as a Type A

syllable. A majority of words in Dholuo have a Type A syllable. The kind of syllable is found in both monosyllabic and polysyllabic words. The examples in (43) show that they can occur in any part of a word. All the Type A syllables are in bold type.

(43)(a) syllable tier

CV-tier

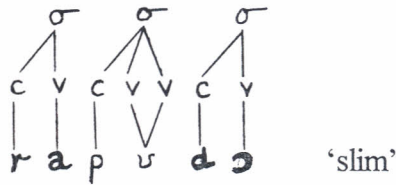
phonemic tier



(b) syllable tier

CV-tier

phonemic tier



(c) Monosyllabic words

θɔ ‘to die’

ka ‘here’

jo ‘road’

co ‘toilet’

ji ‘people’

ɔ ‘mouth of’

pi ‘water’

(d) Bisyllabic words

ci:**lo** ‘dirt’

go:**lo** ‘to remove’

br :**jo** ‘to squeeze out’

pa:**ka** ‘must’

fue**no** ‘to find out’

ʃo\$ti:c ‘workers’

si\$buor ‘lion’

ra\$te:ŋ ‘black’

(e) Trisyllabic words

mi \$nɛ:\$**me** ‘jiggers’

ra\$bo:\$**ndo** ‘bald headed’

ba\$ru:\$**pe** ‘letters (loan)’

o\$ri:\$**ndi** ‘stool’

ma\$ra\$lu:m ‘green one’

ʃɔ \$ma\$ri:ɛk ‘clever people’

(f) Polysyllabic words

pi\$ʃɔ\$pi:\$**ʃɔ** ‘quickly’

ka\$ma\$ga:\$**mbo** ‘name of a place’

e\$ro\$ka\$ma:\$**no** ‘thank you’

ɲa\$di\$bi\$ri:\$**ʃɔ** ‘seven times’

o\$ji\$mo\$re\$u:\$ru ‘good evening (when greeting
many people)’

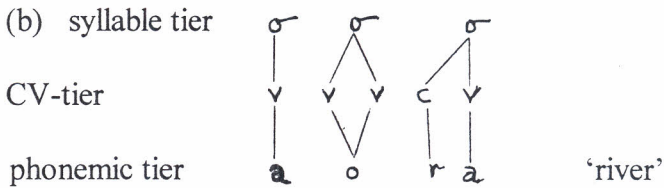
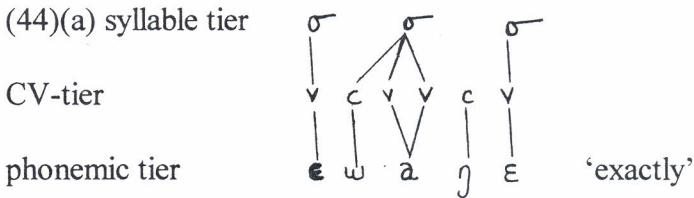
ma\$ko\$ra\$ci:c ‘right side’

ma\$ra\$u\$ci:ɛl ‘sixth’

It is seen above that a majority of the syllables are Type A syllable. According to Clements and Keyser (1983), all languages have the Type A syllable.

Dholuo has short vowels that form syllables on their own; that is, without an onset or coda. Apart from existing in monosyllabic lexical items,

Type B syllable (i.e. V syllable) is found in bisyllabic, trisyllabic and other polysyllabic words in Dholuo. All the syllables that consist of the nucleus only are in bold type in (44) below.



(c) Monosyllabic words

- a** 'to leave'
- e** 'at, in, during, to'
- i** 'to wrestle'
- o** 'an exclamation of surprise'

(d) Bisyllabic words

- e:\$**e** 'here, take it'
- ba:\$**o** 'wood or timber'
- ca:\$**i** 'tea (loan)'

(e) Trisyllabic words

- a**\$u:\$ma 'name of a person'
- a**\$**u**\$cɪɛl 'six'
- o**\$te:\$ŋga 'hawk'
- ɔ**\$bo:\$kε 'leaves'
- a**\$gu:\$lu 'pot'

ɔ\$ɕɪ:\$kɔ 'nine'

(f) Polysyllabic words

ɔ\$bɔ\$ŋgɔ\$bɔ:\$ŋgɔ 'a type of lizard'

ɔ\$ja\$wɔ\$ɾɛ 'good morning'

a\$bɔ\$ɾa\$ma:c 'wayward/ without any order'

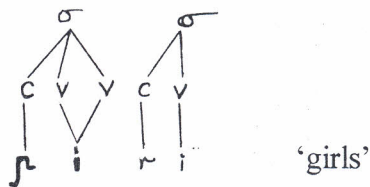
The examples in (44) show that Type B syllables is found mostly in word-initial position. There are a few cases where it is found in word medial and final positions. The charts in (43) and (44) show that all the syllables in bold type have short vowels because only a single V of the CV - tier dominates the terminal element of the phonemic tier.

Type C syllable consists of a consonant followed by a long vowel (i.e. CV: syllable). They are found in words of any number of syllables. A few examples of Type C syllable are given in (45). The relevant syllables are in bold type.

(45)(a) syllable tier

CV-tier

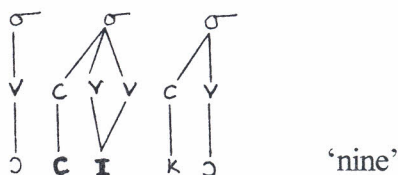
phonemic tier



(b) syllable tier

CV-tier

phonemic tier



(c) Monosyllabic words

lo: 'soil'

(d) Bisyllabic words

lo:\$ro 'to lock'

mu:\$^ɣdo 'darkness'

te:\$do 'to cook'

fu:\$jo 'to fly'

θa:\$lɔ 'to slap'

ki:\$te 'stones'

he:\$ra 'love'

(e) Trisyllabic words

a**bo:**\$ro 'eight'

ma**no:**\$nɔ 'useless'

ma**sɪ:**\$ra 'trouble / tragedy'

o**ko:**\$lo 'millepede'

ɔ**mbu:**\$lɪ 'vote / dice'

(f) Polysyllabic words

pa:\$dɪ**rrɪ:**\$jɔ 'twice'

pɪ\$le**prɪ:**\$le 'everyday'

θa\$ra**ŋge:**\$je 'gate ways'

e\$ro\$ka**ma:**\$nɔ 'thank you'

ma\$dɔ\$ŋgɔ**do:**\$ŋgɔ 'big ones'

sɪ\$ga\$la**ga:**\$la 'cheers'

ɔ\$bɔ\$ŋgɔ**bo:**\$ŋgɔ 'a type of lizard'

The examples in (45) show that the Type C syllable is mostly found in the penultimate syllable. The charts in (45) show that when a vowel is long, it is associated with or occupies two positions on the CV-tier. In other words, a long vowel is immediately dominated by two elements of the CV-tier,

Open syllables in Dholuo could also consist of a long vowel only (i.e. V:). The Type D syllable (V: syllable) is given in the example in (46).

‘name of a person’

(b) Bisyllabic words

๖:๑๖ ‘to pour’

kuau:\$ru ‘please ask for (plural)’

Ja\$●:\$te ‘messenger’

Joe: Steve 'messengers'

$\int a_{\mathbf{o}}^{\mathbf{r}}$ 'name of a person'

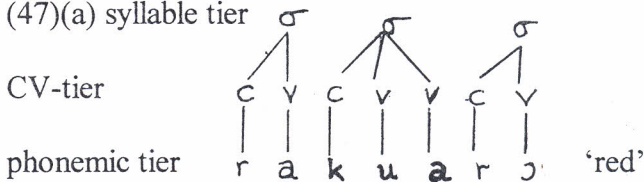
(f) Polysyllabic words

ma\$la\$**ī**:\$ka ‘angel (loan)’

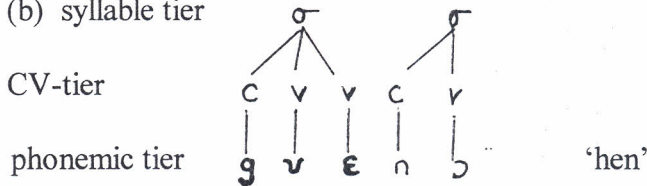
The Type D syllable is mostly found in the penultimate syllable, just like Type C syllable.

Open syllables in Dholuo could also be composed of a consonant followed by a high vowel-vowel sequence or a semi vowel-vowel sequence in the same syllable. Type E syllable (i.e. CVV) exists in a majority of Dholuo words, as seen in the examples in (47).

(47)(a) syllable tier



(b) syllable tier



(c) Monosyllabic words

bv3 under'

сүε 'fat'

kū 'sew (command)'

kuo 'theft'

tie 'foot of'

two 'sickness'

due 'month'

(d) Bisyllabic words

ɲɛ\$rɔ 'to laugh at'

ɲuo\$go 'lice'

ɔ\$**ɟue** 'lizard'

ɟa\$**luo** 'member of the Luo tribe'

ɟa\$**kuo** 'thief'

dr\$**cɔɔ** 'married man'

wuo\$θo 'to walk'

ɟue\$jo 'to bark'

(e) Trisyllabic words

o\$**die**\$ciɛŋ 'day time'

a\$**pva**\$jɔ 'rabbit'

ɲi\$**ɟuo**\$gi 'puppies'

ɲa\$**ɟue**\$nɔ 'chick'

o\$**sie**\$pe 'friends'

a\$**ɔia**\$mbo 'name of a person'

ɔ\$**bva**\$ŋgɔ 'brain'

ɔ\$**ɬɛ**\$nda 'cockroach'

(f) Polysyllabic words

ka\$ra\$**cɔɔ**\$ɲɔ 'name of a place'

ɟa\$sa\$**muo**\$jo 'lazy person'

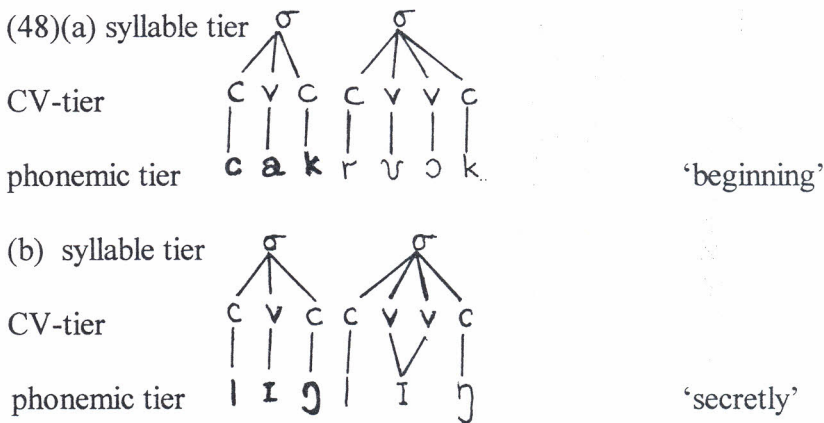
mɔ\$**ɬva**\$rɔ\$re 'circular'

ta\$nda\$**wva**\$ja 'abundant'

The Type E syllable occurs in word initial, medial and final positions, as seen in (47). It is seen that Type E syllable has a sequence of two vowels. Since the articulation of these sequences involves gliding of the tongue from one position to another, they cannot be represented like the vowels of Type C and D syllables. Each of the two vowels occupies a single position on the CV-tier, because they are different.

3.2 Closed Syllables

A closed syllable refers to a syllable that has a consonant after the peak. A number of syllables in Dholuo have a consonant ending. The first type of closed syllable has a consonant as the onset, a vowel peak and then a consonant ending (i.e. CVC). In this study, this type of syllable is referred to as Type F syllable. It occurs in a wide range of Dholuo words as shown in the examples in (48). The relevant syllables are in bold type.



(c) Bisyllabic words

- pog**\$ruok

‘difference’
- wlc**\$kuot

‘shame’
- wlc**\$ba:v

‘headache’

pa rʃrʊk	‘worries’
ca ndʃrʊk	‘trouble/ sufferings’
do ŋgʃrʊk	‘advancement’
lɔ kʃrʊk	‘change’

(d) Trisyllabic words

maʃ ti nʃti:n	‘in small proportions’
maʃ jo mʃjo:m	‘weak one’
ɔʃ ŋo ŋgʃrʊk	‘chameleon’
gr kʃmɔ:ʃkɔ	‘other things’
miʃ de kʃre	‘sickly’
lɪʃ ga ŋgʃla	‘sword’

(e) Polysyllabic words

kaʃ pa mʃka:ʃgo	‘name of a place’
oʃ li kʃti:ʃga	‘bat’

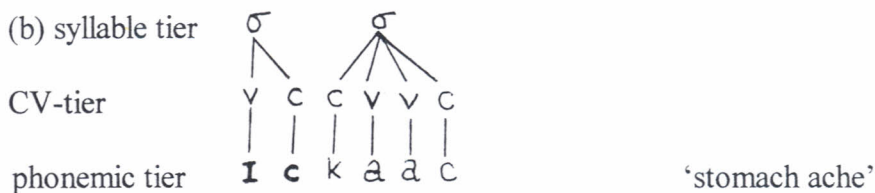
The Type F syllable does not occur in word final position. It occurs in word initial and medial positions, as seen in the examples in (48).

The Type G syllable in Dholuo has a short vowel followed by a consonant (i.e. VC). It does not have an onset. It is my observation that it is found in a few words. All the relevant syllables in (49) are in bold type.

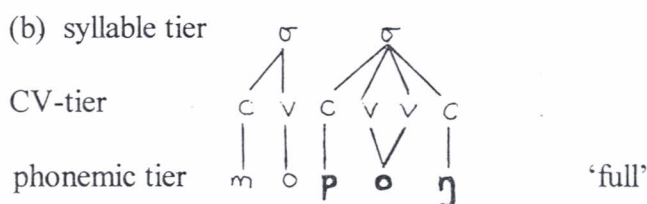
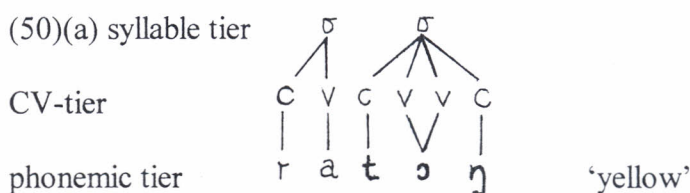
(49)(a) syllable tier

CV-tier	<pre> graph TD S1((σ)) --- V1[V] S1 --- C1[C] S2((σ)) --- C2[C] S2 --- V2[V] S2 --- V3[V] V1 --- a[a] C1 --- n[n] C2 --- t[t] V2 --- i[i] V3 --- e[e] </pre>
phonemic tier	a n t i e

‘I am present’



Another type of closed syllable in Dholuo occurs with an initial consonant followed by a long vowel and then one consonant in the coda (i.e CV:C). Words with the Type H syllable are given in (50) below.



(c) Monosyllabic words

ŋi:c ‘wet/ cold’

mo:n ‘women’

bi:m ‘monkey’

wa:ŋ ‘to get burnt’

(d) Bisyllabic words

ma\$jo:m ‘soft one’

ʃo\$pu:r ‘farmers’

ra\$lu:m ‘green’

a\$pa:r ‘ten’

a\$bi:c ‘five’

(e) Trisyllabic words

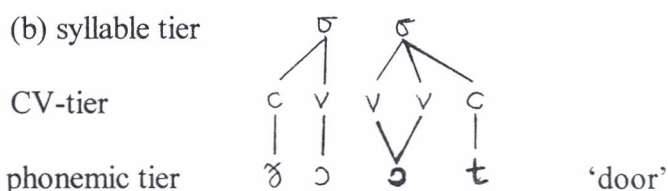
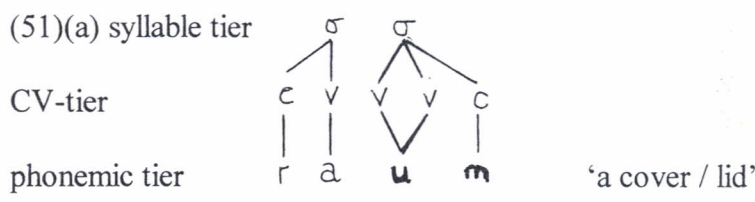
kɔ\$ra\$ ca:m	‘left’
kɔ\$ra\$ ci:c	‘right’
ma\$tin\$ ti:n	‘in small proportions’
ma\$jom\$ jo:m	‘weak one’
ku\$lu\$ nde:ŋ	‘beetle’

(f) Polysyllabic words

ma\$ko\$ra\$ ca:m	‘left side’
ma\$ko\$ra\$ ci:c	‘right side’
a\$ba\$ra\$ ma:c	‘wayward / without any order’

The examples in (50c),(50d),(50e),and (50f) shows that Type H syllable occurs in word final position.

The Type 1 syllable has a long vowel followed by a consonant in the coda (ie V:C). This kind of syllable does not have an onset. It occurs in very few words. This may be due to the tendency of syllables in Dholuo to have a CV structure rather than VC structure . Type 1 syllable is indicated in bold type in (51).



- (c) **a:n** ‘me’
- i:n** ‘you (singular)’

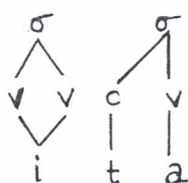
u:n	'you (plural)'
e:m	'thigh'
ɪ:c	'stomach'
i:t	'ear'
ɪ:p	'tail'
i:w	'tail of'
ɔ:r	'brother-in-law'
u:m	'nose'

When suffixes are added to most of the nouns in (51c), the C in the V:C sequence is resyllabified. The C becomes the onset of the following syllable. The examples that show resyllabification are given in (52) below.

(52)(a) syllable tier

CV-tier

phonemic tier

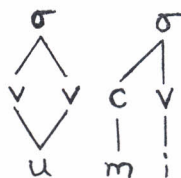


'my ear'

(b) syllable tier

CV-tier

phonemic tier



'your nose'

(c) i:\$te 'his/her/its ear'

i:\$ti 'your ear'

u:\$ma 'my nose'

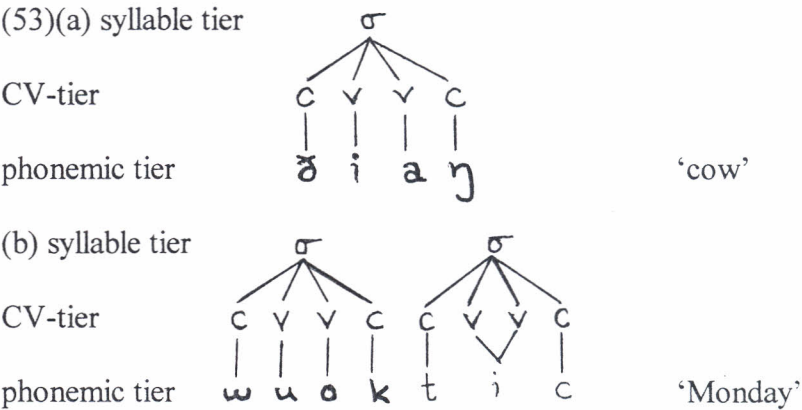
u:\$me 'his/her/its nose'

ɔ:\$ra 'my brother-in-law'

ɔ:\$re 'his/her brother-in-law'

ɔ:\$ri 'your brother-in-law'

Another type of syllable, referred to as Type J in this study, has a single consonant in the onset followed by a high vowel-vowel sequence in the peak and a single consonant in the coda (i.e. CVVC). There are many words with this structure as illustrated in (53).



ɔ\$ g ual	‘frog’
ra\$ bu on	‘potato’
wa\$ r uck	‘salvation’

(e) Trisyllabic words

o\$die\$ ci en	‘day time’
ɔ\$ŋɔŋg\$ r uck	‘chameleon’
ʃa\$ra\$ bu on	‘a member of the Kikuyu tribe’

(f) Polysyllabic words

o\$ ti en\$o\$ ti en	‘spider’
ma\$pa\$ka\$ ci en	‘eternal’
ma\$ra\$u\$ ci el	‘sixth’

The CVVC syllables in bold type show that Type J syllable can occur in word initial, medial and final positions.

3.3 Summary

In summary, the syllable types that exist in Dholuo are:

(54) Type A: CV

Type B: V

Type C: CV:

Type D: V:

Type E: CVV

Type F: CVC

Type G: VC

Type H: CV:C

Type I: V:C

Type J: CVVC

Type C, D, H and I should be represented as follows in CV Phonology.

(55) Type C: CVV

Type D: VV

Type H: CVVC

Type I: VVC

Type C would then be merged with Type E and Type H with Type J. I have chosen to represent them in this manner (i.e. CV:, V:, CV:C and V:C) to show that the vowels involved have been doubled as opposed to Type E and J, where the two vowels involved are not similar. The difference between Type C and H on one hand and Type E and J on the other is that in the latter the two vowels are underlying (i.e. inherent) while in the former, one of the two vowels is derived by a vowel-doubling (gemination) rule (see section 4.5). Thus type C, D, H and I may be underlying or derived. Some of the words with an underlying doubled vowel are seen in example (110e) below. Type E and J are underlying. A very simple diagrammatic representation of the surface and underlying levels of syllables in Dholuo is given below in (56).

(56) surface level

(C)VV(C)

(C)V(C)

underlying level

(C)VV(C)

(C)V(C)

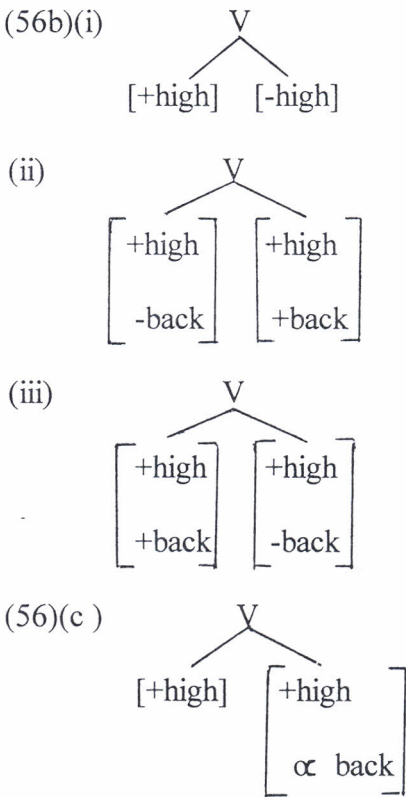
Underlying (C)VV(C) syllables are realised on the surface as

(C)VVC), while underlying (C)V(C) syllables are realised as (C)VVC) or (C)V(C).

It is seen that there are underlying vowel clusters within a syllable and no consonant clusters. Clements and Keyser (1983:31) state that:

The positive syllable structure conditions (PSSCs) state the general canonic forms of well-formed consonant or vowel clusters in terms of sequences of natural classes.

It is therefore possible to give the PSSCs for Dholuo vowel clusters, as seen in (56b). (56b,ii) and (56b,iii) could be merged to form (56c)



Any cluster within a syllable that does not conform to (56b) or (56c) is ill-formed and would thus belong to the negative syllable structure conditions for Dholuo.

Dholuo has the primary set of the core syllable types proposed by Abercrombie (1967) and Clements and Keyser (1983).These are CV,V,CVC

and VC. According to Clements and Keyser (1983), CV syllable, which exists in the grammar of all languages, is operated on to yield the other three types of syllables. The two parameters that are applied to yield V, CVC, and VC are as follows:

- (57)(a) delete syllable initial C
 - (b) insert syllable final C
- (Clements and Keyser 1983:28)

(57a) alone yields V. (57a) and (b) yield VC, while (57b) alone yields CVC.

Languages are then classified by Clements and Keyser (1983:29) into four types as follows:

- (58) Type I : CV
- Type II: CV, V
- Type III: CV, CVC
- Type IV: CV, V, CVC, VC

From the analysis in this chapter, it is clear that Dholuo is a Type IV language.

Apart from the parameters given in (57), some languages allow more than one consonant or vowel within a syllable. Dholuo is a language that allows consecutive V elements. Therefore, in defining Dholuo in terms of its maximal syllable, the formula CV^*C would be used. The symbol ' * ' refers to more than one vowel. From the data in this chapter, it is seen that the maximum number of vowels is two. Therefore, a more precise formula is CV^2C . This formula or notation implies that the maximal syllable in Dholuo has two vowels in the nucleus and a maximum of one consonant in the onset and also in the coda.

In Chapters 4 , all these syllable types are considered to be either light

or heavy, depending on how they are affected by or affect stress.

CHAPTER 4

THE RELATIONSHIP BETWEEN SYLLABLE WEIGHT AND STRESS

4.0 Introduction

Having discussed the syllable types that occur in Dholuo, in Chapter 3, it is now possible to show how these syllable types are related to stress and which among them are considered as being heavy or light.

According to Kenstowicz (1994), phonological quantity in most cases determines the distribution of stress. This seems to be the case in Dholuo as seen in the discussion in this chapter.

The theory of Metrical Phonology is used extensively in this chapter. Both metrical trees and metrical grids are used to show the relationship between stress placement and syllable weight. The two formalisms are used to show that whether either trees as grids are resorted to in constructing feet for Dholuo words, the stress pattern that emerges is the same. A detailed account of the two formalisms is given in section 1.7.1.4 above.

In all the charts in this chapter, Metrical Trees are seen on the upper side of the phonemic tier, while Metrical Grids are on the lower side of the same tier. In constructing feet for Dholuo words, the head-marked notation is used. This is where a foot node is placed directly above the syllable that is stressed. A stressed syllable is therefore in the head position of a metrical foot. Trees have therefore been used to organize Dholuo syllables into feet and feet into words.

Through the use of the head-marked notation, one can show that all structures at the foot level are left-headed, while at the word-level, they are right-headed. Parameter 1 (that is, the requirement that when one is constructing feet, one must specify whether they are left-headed or right-headed) is therefore accomplished. Closely related to Parameter 1 is Parameter 2, which states that the directionality of rule application must also be specified. This has been accomplished in section 4.2 (under Category 14) where it is stated that Dholuo feet are constructed leftwards from the end of a word.

Metrical Trees are used to show syllables that have a branching nucleus as opposed to those that do not. The CV-tier enables me to show that when a syllable node dominates two vowels, that syllable is stressable and may receive the main word stress. By placing the foot node directly above all syllables that have a branching nucleus, the third parameter, which states that in all Quantity Sensitive systems, heavy syllables demand to be stressed, is used to show that Dholuo is a Quantity Sensitive language. The fourth parameter states that foot structures may be bounded or unbounded. In words of more than two syllables (section 4.2 and 4.3), it is seen that Dholuo has an unbounded foot structure.

In constructing Metrical Grids for Dholuo words, only two rules are used. The two rules are Quantity Sensitivity and End Rule (Final and Initial). In the application of Quantity Sensitivity, a grid mark is placed, on Row 1, over any heavy syllable. Quantity Sensitivity alone is enough to show which word is stressed, in most Dholuo words. In some other words, End Rule Final

is applied in addition to Quantity Sensitivity. Therefore , whereas Quantity Sensitivity is applied at the foot level, End Rule Final applies at the word level, as seen in the example in (59).

(59) phonemic tier	w	u	o	n	d	r	ʊ	ɔ	k	‘pretence’
Row 0(mora row)		×	×				×	×		
Row 1(foot row)				×				×		
Row 2(word row)									×	

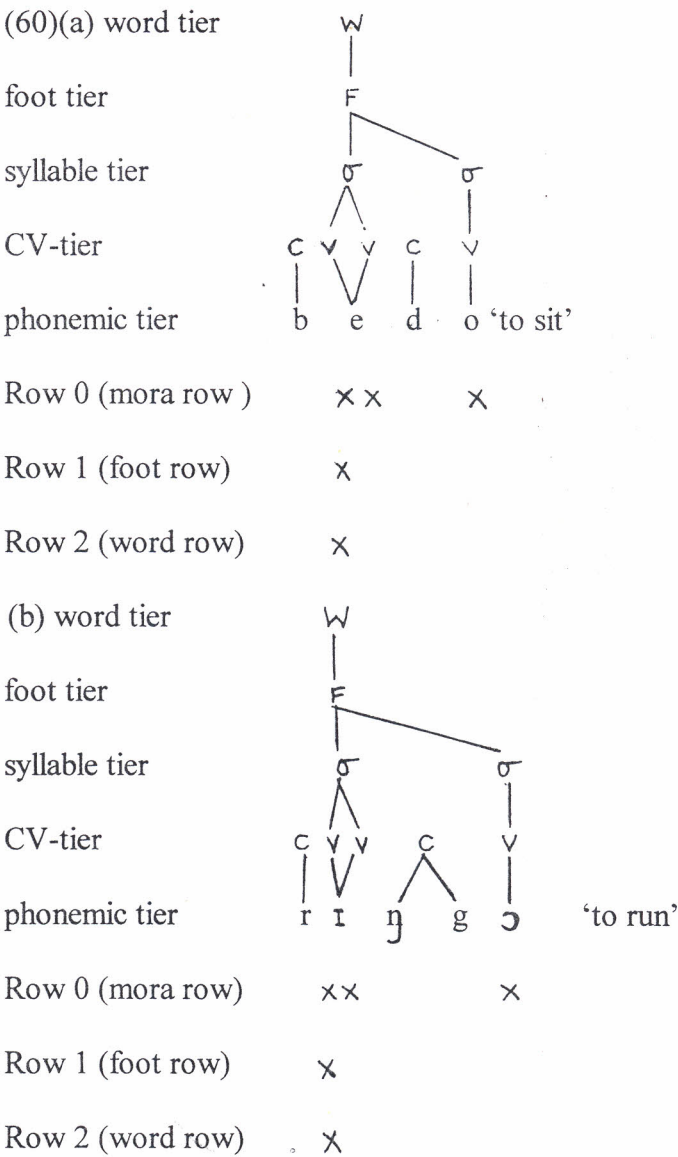
In (59), Quantity Sensitivity has applied on Row 1 because a grid mark has been placed over all the heavy syllables. End Rule Final has applied on Row 2 (word row) because a grid mark has been placed on the extreme right. This is also illustrated by the words in example (73). End rule places a grid mark on the extreme right or left of the domain it is specified for. For Dholuo words with a heavy syllable, End Rule places a grid mark on the extreme right (final position). End Rule Final is therefore applied because the grid mark is placed on the right end of a word. End Rule Final helps to show that it is the last heavy syllable in a word that is stressed. In words with light syllables only, neither Quantity Sensitivity (which places a grid mark over all heavy syllables) nor End Rule Final applies. Only End Rule Initial (which places a grid mark over the syllable on the extreme left) applies. End Rule Initial shows that in words with light syllables only, stress is on the first syllable as seen in example (81). More explanations on how trees and grids are used are given in the course of the analysis in this chapter.

Both short and long words are used to exemplify the relationship between syllable weight and stress in Dholuo. The discussion starts with an

analysis of bisyllabic words followed by trisyllabic and other polysyllabic words. Though the discussion is based on the lexical level, the sentence level is included in a few cases, where necessary.

4.1 Stress in Bisyllabic Words

Most bisyllabic Dholuo words have stress on their first syllable. A majority of verbs in Category 1 are infinitive verbs ending in -o or -ɔ . The stress pattern of such verbs is shown diagrammatically in (60).



Other examples of verbs in this category are given in (61). The main stress of the word is marked at the beginning of the syllable.

- (61) 'gɔ :\$jɔ 'to beat'
 'ke:\$to 'to put'
 'wa:\$ŋɔ 'to burn'
 'bɛ:\$tɔ 'to slash'
 'ne:\$go 'to kill'
 'nɛ:\$nɔ 'to see'
 'tu:\$co 'to pierce'
 'o:\$ro 'to send'
 'ɪ :\$ðɔ 'to climb'
 'pa:\$kɔ 'to praise'
 'ma:\$kɔ 'to catch / get hold of'

As seen in the words in (60) and (61) , stress is on the initial syllable. The CV-tier shows that all these initial syllables have a long vowel. The primary word stress is on the syllable with a doubled vowel and therefore it is this same syllable that is heavy. The second syllable in each word in (60) and (61) has a short vowel and it is not stressed. The second syllable is therefore a light syllable.

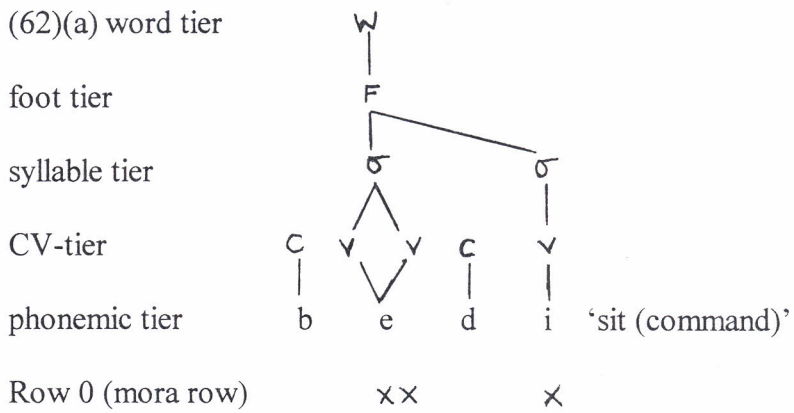
The words in (60) form a single metrical foot that is left-headed. The third parameter (Quantity Sensitivity) for establishing a foot structure is applied. The first syllable is stressed and its nucleus is branching unlike that of the second. The first syllable is therefore made the head of the metrical foot thus creating a structure that is left-headed. The word node then immediately

dominates only one foot node.

In analysing the words using the metrical grid, the rule of Quantity Sensitivity is also applied as seen on Row 1 (foot row) of example (60). A grid mark is placed over any perceived heavy syllable on the foot row or Row 1 (see section 1.7.1.4.3). The first syllables of these bisyllabic words in (60) have a grid mark on the foot row to show that they are stressed. End Rule Final then applies at the word level. It normally places a grid mark on top of the right most foot level mark. In this case, there is only one foot level mark. As the words in example (73) show , it is the last heavy syllable in a word that is stressed. In the bisyllabic words in (60) and (61), I assume that the only heavy syllable of each word is the last syllable. Therefore, End Rule Final applies at word-level to show that it is the last heavy syllable that is stressed.

The two charts in (60) show that the syllable tier only dominates the elements in the nucleus. In Chapter 3, where the descriptive strategies of CV Phonology are used, the syllable includes both the elements in the onset and coda. The theory of MP recognises the fact that the syllable includes the onset and coda, apart from the nucleus. In (60) above, the C elements on the CV-tier are not linked to the syllable tier because they do not matter in stress placement. Therefore, the two theories (i.e. CV phonology and MP) do not create a conflict in any way. They both help, in slightly different ways, to explain issues that are relevant to the study. CV phonology helps to show the general structure of the Dholuo syllable. MP then helps me to give the stress pattern of Dholuo words. The stress pattern is seen alongside the weight structure of the syllables in each word.

When suffixes are added to replace the vowels -o and -ɔ in (60) and (61), stress does not move or shift. The vowel in the first syllable remains long, while that of the second syllable remains short. The examples are given in (62) .



'wa:\$ŋa	'burn me'
'be:\$ti	'you slash (command)'
'bɛ:\$tɛ	'slash him/ her/ it'
'ne:\$ga	'kill me'
'ne:\$gi	'you kill (command)'
'nɛ:\$nɛ	'see him/ her/ it'
'nɛ:\$na	'see me'
'ɪ:\$rɛ	'bewitch him/ her/ it'
'ɪ:\$ra	'bewitch me'

All the suffixes in (62c) are personal pronouns. According to Okombo (1982) these personal pronouns have both the free and bound forms as follows:

(63) Free forms

Bound forms

an

a-

in

ɪ - ~ɪ -

en

e- ~ɛ -

(Okombo, 1982:42)

It is the bound forms that occur in the words in (62c). -a refers to 'me', -ɪ or -I refers to 'you' (second person singular), while -e or -ɛ refers to 'him/her/it'.

Apart from the verbs listed above, words from other classes (such as nouns) have a similar stress pattern. A few phrases also display the same stress pattern. Examples of these non-verbs are given in (64).

(64) 'mu:\$ɔo 'darkness'

'e:\$ka 'then'

'ɔ:\$kɔ	'outside'
'mɔ:\$ndɔ	'so that'
'ma:\$lo	'up'
'pa:\$co	'home'
'ri:\$ŋo	'meat'
'ɲi:\$ri	'girls'
'ɲɲu:\$gu	'groundnuts'

Stress does not shift when suffixes are added to the base form of some bisyllabic nouns. The base form of these bisyllabic nouns is 'CV : \$ CV. The bisyllabic words created as a result of suffixation also have the structure 'CV : \$CV, as shown below.

(65)(a) 'we : \$ ndo 'visitor (base form)'

'we : \$ I o 'visitors'

'we : \$ nda 'my visitors'

'we : \$ nde 'his/her visitors'

'we : \$ ndi 'your visitors (2nd person singular)'

'we : \$ ndu 'your visitors (2nd person plural)'

(b) 'r i:\$ŋo 'meat (base form)'

'ri:\$ŋga 'my meat'

'ri:\$ŋge 'his/ her meat'

'ri:\$ŋgi 'your meat (2nd person singular)'

'ri:\$ŋgu 'your meat (2nd person plural)'

(b) 'go:\$wi 'debt'

'go:\$pe 'debts'

'go:\$pe	'his/ her debt'
'go:\$pa	'my debt'
'go:\$pi	'your dept (2nd person singular)'
'go:\$pu	'your debt (2nd person plural)'

It is my observation that when some suffixes are added to some monosyllabic words of the form CVC or VC, the resulting words have the structure 'CV : \$ CV or 'V : \$CV , respectively. The first syllable has a long vowel and it is stressed unlike the second. The first syllable is therefore heavy, unlike the second. The examples are given in (66).

(66)(a)'nɪ :ŋg 'name (base form)'

'nɪ :\$ŋgɛ 'names'

'nɪ :\$ŋgɛ 'his/ her/ its name'

'nɪ :\$ŋga 'my name'

'nɪ :\$ŋgɪ 'your name (2nd person singular)'

(b)'i:t 'ear (base form)'

'i:\$te 'ears'

'i:\$te 'his/ her/ its ear'

'i:\$ta 'my ear'

'i:\$ti 'your ear (2nd person singular)'

(c)'ɔ :r 'brother-in-law'

'ɔ :\$cɛ 'brothers-in-law'

'ɔ :\$rɛ 'his brother-in-law'

'ɔ :\$ra 'my brother-in-law'

'ɔ :\$rɪ 'your brother-in-law (2nd person singular)'

The examples in (66) show that there is resyllabification of the final C in CV : C and V:C sequences, when suffixes are added to form new words. Since a majority of syllables in Dholuo have CV structure, the resyllabification of the coda consonant in CV : C and V:C syllables occurs to create the preferred syllable structure. The coda consonant becomes the onset of the second syllable in all the bisyllabic words given in (66). As already stated, the resulting words from ɾɪ:ɟɟ , i:t and ɔ:r have either the structure 'CV : \$CV or 'V : \$CV. Once resyllabification has taken place, the vowel in the root of the word is stressed and therefore it is heavy. The root is stressed unlike the suffix.

Category 2 of words in Dholuo has stress on the initial syllable, just like Category 1. All the words in Category 2 have a vowel-vowel sequence in the nucleus of their first syllables. In this category, there are many infinitive verbs ending in -o or . The metrical structure of these verbs is given in (67a) and (b). More examples are in (67c).

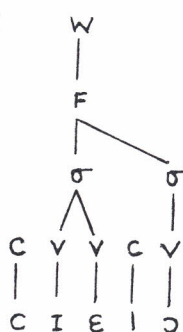
(67)(a) word tier

foot tier

syllable tier

CV-tier

phonemic tier



'to fry'

Row 0 (mora row) x x x

Row 1 (foot row) x

Row 2 (word row) x

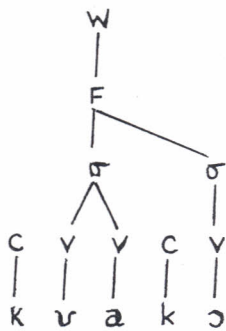
(b) word tier

foot tier

syllable tier

CV-tier

phonemic tier



'to embrace'

Row 0 (mora row)

x x x

Row 1 (foot row)

x

Row 2 (word row)

x

(c) 'fʊɛ\$ɲɔ 'to find out'

'gʊɛ\$ɲɔ 'to kick'

'ɲɪɛ\$ɾɔ 'to laugh at'

'θie\$ðo 'to treat'

'ɲɪɔ\$ɪɔ 'to give birth to'

'wuo\$θo 'to walk'

'jʊɛ\$ɲɔ 'to sweep'

'cʊa\$dɔ 'to beat'

'ɲɪa\$ðɔ 'to sharpen'

'mʊɔ\$ɲɔ 'to swallow'

'ɲɪɛ\$ðɔ 'to milk'

When suffixes are added to replace the vowels -o and -ɔ in (67), stress does not shift. The first syllable remains stressed while the second one is unstressed, as seen in (68).

(68) 'gʊɛ\$ɲɛ 'kick him/ her/ it'

'gʊɛ\$ɲa 'kick me'

'pɪɛ \$rɛ	'laugh at him/ her/ it'
'pɪɛ \$ra	'laugh at me'
'θie\$ðe	'treat or cure him/ her/ it'
'θie\$ða	'treat or cure me'
'cɪa\$dɛ	'beat him/ her/ it'
'cɪa\$da	'beat me'
'dɪɔ\$ke	'take him/ her/ it back'
'dɪɔ\$ka	'take me back'

Category 2 of words from other classes, apart from verbs, are given in (69). They also have a high vowel-vowel sequence in the first syllable and a short vowel in the second syllable . The first syllable is stressed and is therefore heavy, unlike the second.

(69) 'ɲie\$lo	'python'
'tɪɔ\$rɔ	'sisal'
'ɲuo\$go	'lice'
'ɲie\$go	'jealous'
'mua\$ndu	'wealth'
'gɪɛ\$ɲɔ	'hen'
'ɲuo\$no	'generosity'
'kue\$ro	'taboo'
'kuo\$jo	'sand'

When suffixes are added to the base form of some of the bisyllabic nouns, stress does not shift. All the base forms of these bisyllabic nouns have the structure 'CVV \$ CV. The words formed as a result of suffixation also

have the structure ${}^1\text{CVV} \$ \text{CV}$, as seen in (70).

- (70)(a) ${}^1\text{lue} \$ \text{d} \text{ɔ}$ ‘hand (base form)’
 ${}^1\text{lue} \$ \text{te}$ ‘hands’
 ${}^1\text{lue} \$ \text{t} \text{ɛ}$ ‘his /her hand’
 ${}^1\text{lue} \$ \text{ta}$ ‘my hand’
 ${}^1\text{lue} \$ \text{ti}$ ‘your hand (2nd person singular)’
 (b) ${}^1\text{tɪ} \text{ɛ} \$ \text{l} \text{ɔ}$ ‘leg’
 ${}^1\text{tɪ} \text{ɛ} \$ \text{nde}$ ‘legs’
 ${}^1\text{tɪ} \text{ɛ} \$ \text{nd} \text{ɛ}$ ‘his/ her/ its leg’
 ${}^1\text{tɪ} \text{ɛ} \$ \text{nda}$ ‘my leg’
 ${}^1\text{tɪ} \text{ɛ} \$ \text{nd} \text{ɪ}$ ‘your leg (2nd person singular)’

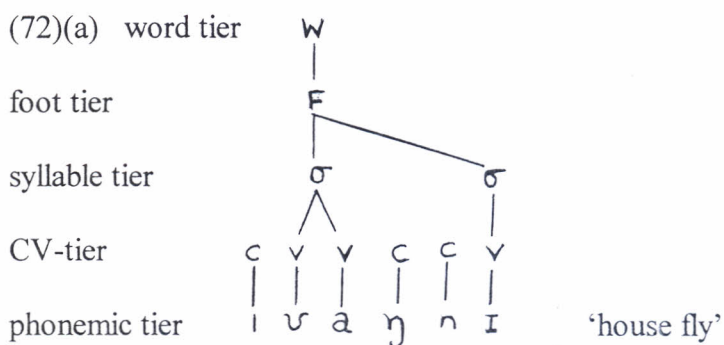
Suffixes added to monosyllabic words of the form CV^2C result in the formation of words with the structure ${}^1\text{CVV} \$ \text{CV}$. The first syllable has a sequence of two vowels and it is stressed. The first syllable is therefore heavy unlike the second. Once again resyllabification takes place to create the preferred syllable structure. The examples are given in (71).

- (71)(a) ${}^1\theta \text{uo} \text{l}$ ‘snake (base form)’
 ${}^1\theta \text{uo} \$ \text{nde}$ ‘his / her /its snake’
 ${}^1\theta \text{uo} \$ \text{nde}$ ‘snakes’
 ${}^1\theta \text{uo} \$ \text{nda}$ ‘my snake’
 ${}^1\theta \text{uo} \$ \text{ndi}$ ‘your snake’
 (b) ${}^1\text{ruo} \theta$ ‘lord (base form)’
 ${}^1\text{ruo} \$ \text{d} \text{e} \text{ɪ}$ ‘lords’
 ${}^1\text{ruo} \$ \text{d} \text{e}$ ‘his/ her lord’

¹ruo\$[̂]o[̂]a ‘my lord’

¹ruo\$[̂]o[̂]i ‘your lord (2nd person singular)’

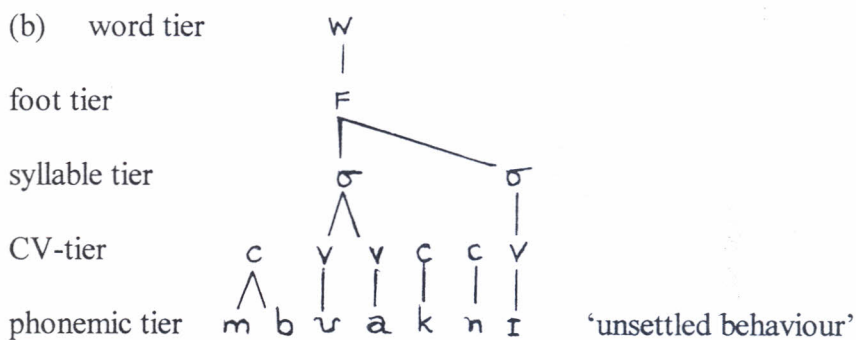
Category 3 words in Dholuo have the structure ¹CVVC\$CV. The first syllables in this category of words are stressed and are therefore heavy. All the second syllables of the words are light. The examples of the words in Category 3 are given in (72).



Row 0 (mora row) x x x

Row 1 (foot row) x

Row 2 (word row) x



Row 0 (mora row) x x x

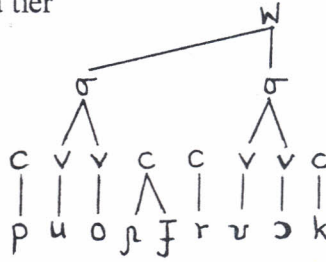
Row 1 (foot row) x

Row 2 (word row) x

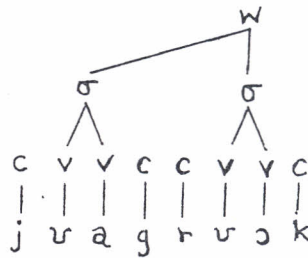
(c) ¹cieg\$̂ni ‘near/ close’

¹c[̂]v[̂]a[̂]r\$̂ni ‘bed bags’

examples of words in this category are given in (73).



Row 0 (mora row) x x x x

Row 2 (word row) $\times$ 

Row 0 (mora row) x x x x

Row 2 (word row) x

r ʋ ak\$ rʋɔ k 'dressing'

gʷɔp\$ rʷɔk 'scratching'

in structure. In other words, they both have CVVC structure. In Category 4 above, the main word stress is on the last syllable, which has CVVC structure. Therefore it is a heavy syllable. If it is to be assumed that, in Category 3, stress

is on the first syllable because of the presence of two consecutive vowels, then the two syllables of Category 4 should receive equal stress. However, it is my observation that stress is on the last syllable.

In the two charts in (73), just like in all the words analysed so far, the rule of Quantity Sensitivity applies to create a grid mark over all heavy syllables. A grid mark is therefore placed over both syllables on the foot row of (73a) and (b). This means that both syllables are stressable. However, one syllable must bear the primary word stress. Since it is the last syllable that is stressed, End Rule Final applies to create a grid mark over this last syllable.

According to Goldsmith (1990:187):

If stress falls on the last heavy syllable in a word, then it follows immediately that the language must erect left-headed unbounded feet, since the word level structure can pick out only the first and last foot and a right-headed foot-system will always stress the last syllable.

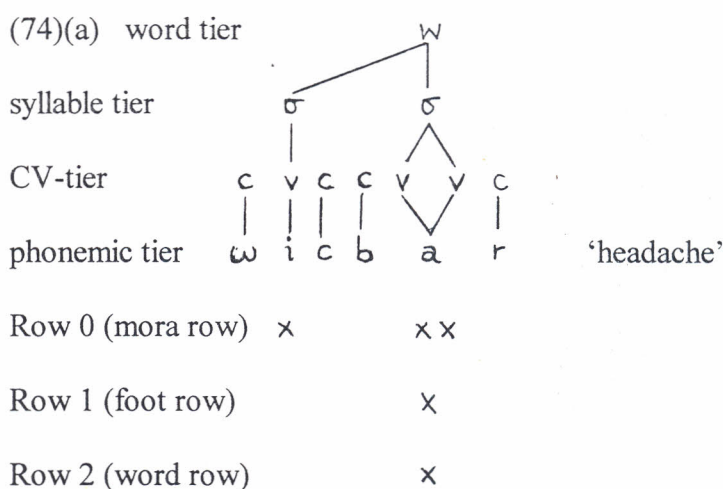
As already stated, section 4.2 and 4.3 show that stress falls on the last heavy syllable in Dholuo. All foot structures erected for Dholuo words are then, according to MP, left-headed. The theory therefore, leads me to assume that where there are left-headed structures (as in Categories 1,2 and 3) the foot level metrical structure is created first. Goldsmith (1990:189) also asserts that:

If no rule establishes foot-level metrical structure, then the word level metrical tree can just take the rhyme-nodes as their terminal elements....

In Category 4, it is assumed that the foot level metrical structure does not intervene between the word level metrical structure and rhyme-nodes. The words have two syllables each and the main word stress is on the second syllable. This then yields a right-headed structure for each word. Since the structure created is right headed and not left-headed like all the other foot

structures created so far, it means that the foot level metrical structure has been skipped. The word level metrical structure is assumed to have taken the rhyme-nodes as their terminal elements. Categories 1,2 and 3 therefore, have a foot tier, while Category 4 does not have a foot tier between the syllable tier and word tier.

Certain compound words in Dholuo form bisyllabic words. Since compound words are not many in Dholuo the stress patterns of all the encountered compound words have been represented on charts. The compound words are also divided into several categories. Category 5 of lexical items in Dholuo have the structure CVC\$'CV:C and VC\$'CV:C. The metrical structures of words in Category 5 is given in (74).

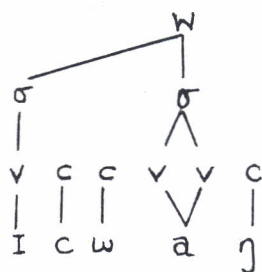


(b) word tier

syllable tier

CV-tier

phonemic tier



'annoyance/ anger'

Row 0 (mora row) x

x x

Row 1 (foot row)

x

Row 2 (word row)

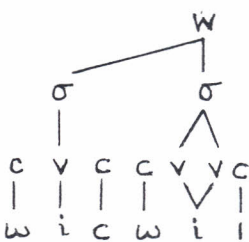
x

(c) word tier

syllable tier

CV-tier

phonemic tier



'forgetfulness'

Row 0 (mora row) x

x x

Row 1 (foot row)

x

Row 2 (word row)

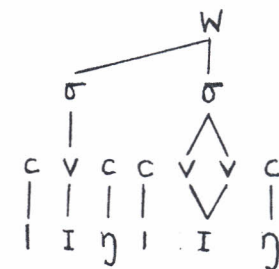
x

(d) word tier

syllable tier

CV-tier

phonemic tier



'secretely'

Row 0 (mora row) x

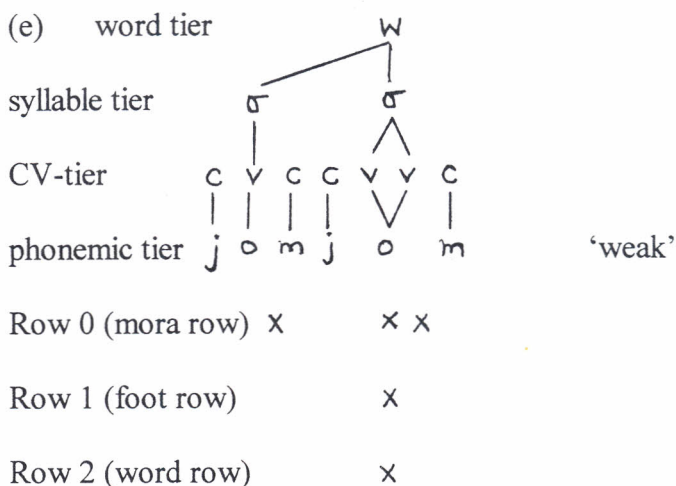
x x

Row 1 (foot row)

x

Row 2 (word row)

x



In all the words in (74), the first syllable is not stressed and it has a short vowel. The first syllable is therefore light. The second syllable has a long vowel and it is stressed. It is heavy. The word $/ɪŋəˈlɜːʃ/$ in Category 5 is not a compound word but it has a structure that is similar to the compound words in this category. The same applies to the word $joməˈjoːm$. These are reduplicatives.

Category 6 words have the structure $CVCs^1CVVC$. The words in this category are formed from verbs by the addition of the suffix $-rʊʊk$ to the root of verbs which have a reflexive form (Stafford, 1967). The examples of words in this category are given in (75). These words are formed in the same way as those in Category 4. Some of their reflexive forms are seen in Category 21 and 22 (e.g. $paʃkəʃre$ ‘to praise (reflexive)’).

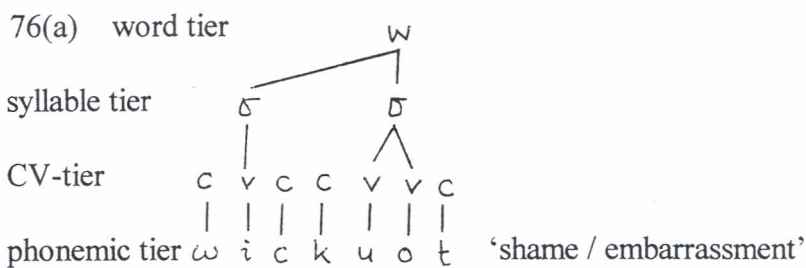
121

stress does not shift when suffixes are added and that only the suffix *-‘uru’* (which is almost equal in meaning to ‘please’ and is only used when requesting for something from more than one person as seen in Section 4.2) bears stress. However, it is my observation that apart from the suffix *-‘uru’*, the suffix *-rʊɔk* which is a noun-forming suffix, bears stress. Primary word stress is therefore on the second syllable. It is this second syllable that is heavy. The first syllable is not stressed and therefore it is light.

One of the possible reasons why the suffix is stressed and not the root is that the suffix has a sequence of two vowels unlike the root. The articulation of the two consecutive vowels is therefore more prominent and longer than that of the single short vowel in the root. In all the words in Categories 1 and 2, stress remains on the root when suffixes are added. All the suffixes that are in these two categories have short vowels. The suffix in Category 6 is therefore different from the suffixes in Categories 1 and 2.

The other possible reason for stress on the suffix *-rʊɔk* is that in Dholuo stress falls on the last heavy syllable as seen in words of more than two syllables in Section 4.2 and 4.3.

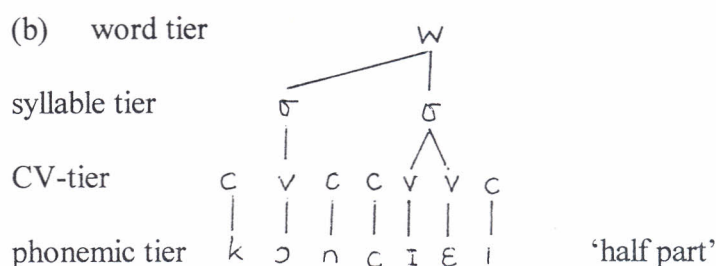
In Category 6, there are also compound words with the structure CVC\$¹CVVC. The words are represented diagrammatically in (76).



Row 0 (mora row) x x x

Row 1 (foot row) x

Row 2 (word row) x



Row 0 (mora row) x x x

Row 1 (foot row) x

Row 2 (word row) x

The main word stress is on the second syllable in the compound words in Category 6. The second syllable has a sequence of two vowels and it is heavy. The first syllable is not stressed, it is light and it has a short vowel.

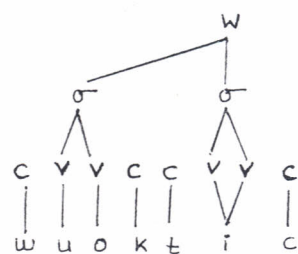
Category 7 has a single compound word with the structure CVVC\$¹CV:C. It is the second syllable that has the main word stress, as seen in (77).

(77) word tier

syllable tier

CV-tier

phonemic tier



'Monday'

Row 0 (mora row) x x x x

Row 1 (foot row) x x

Row 2 (word row) x

(77) shows that if two syllables seem to be heavy, it is the last heavy syllable that receives primary stress.

The words in Category 8 have the structure V\$'CV:C or CV\$'CV:C.

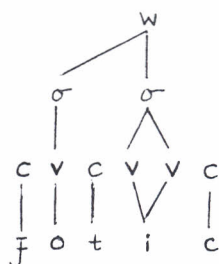
The first syllable is not stressed and is light, while the second one is stressed and is heavy, as seen in (78).

(78)(a) word tier

syllable tier

CV-tier

phonemic tier



'workers'

Row 0 (mora row) x x x

Row 1 (foot row) x

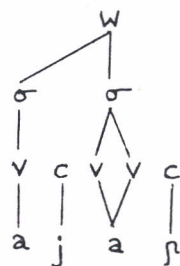
Row 2 (word row) x

(b) word tier

syllable tier

CV-tier

phonemic tier



'an abuse'

Row 0 (mora row) x x x

Row 1 (foot row) x

Row 2 (word row) x

(c) o\$'pu:k 'tortoise'

o\$'ko:t 'bell'

a\$'de:k 'three'

a\$'lɔ:t 'vegetable'

ma\$'bɪ:θ 'sharp one'

ma\$'tu:t 'deep one'

ra\$'tenj 'black'

ra\$'lu:m 'green'

ja\$'mɪ:n 'sister/daughter of my mother'

ni\$'ke:c 'because'

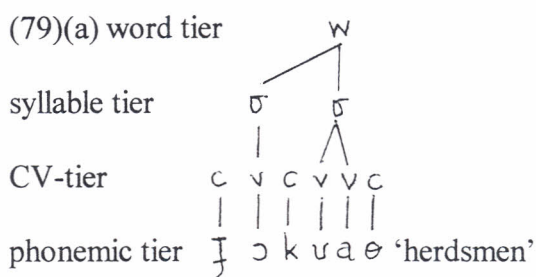
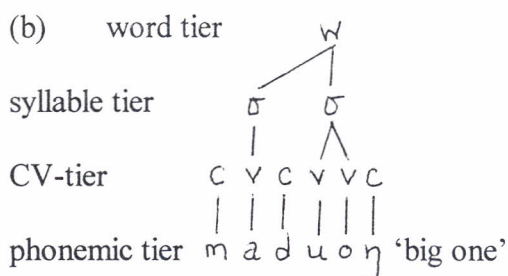
ʃa\$'wa:r 'saviour/redeemer'

ʃi\$'ko:n 'kitchen (loan)'

Some of the words in (78) have affixes. Examples of these affixes are 'ja-' and 'ʃa-' or 'ʃo-'. 'ja-' is used before certain nouns to denote small or young things (Stafford,1967). 'ja-' could also mean 'daughter of'. 'ʃa-' or 'ʃo-' are noun forming prefixes. They are prefixed to words to show their work or class (Stafford,1967). Whereas 'ʃa-' indicates singular, 'ʃo-' indicates

plural. All these prefixes are not stressed and they form light syllables. All the second syllables of the words in (78) have long vowels. They are also stressed and therefore they form heavy syllables.

Category 9 of bisyllabic words have the structure CV\$¹CVVC or V\$¹CVVC. A few examples of such words are given in (79).

Row 0 (mora row) $\times \quad \times \quad \times$ Row 1 (foot row) $\times$ Row 2 (word row) $\times$ Row 0 (mora row) $\times \quad \times \quad \times$ Row 1 (foot row) $\times$ Row 2 (word row) $\times$

(c) ʒa\$ʔɯɔk 'witch/ wizard'

ʒa\$'puɔŋ ʃ 'teacher'

ɔ \$gval 'frog'

o\$'ndiek 'hyena'

a\$'c_I ∈ l 'one'

a\$'ŋvɛn 'four'

ka\$'jɪɛm 'in vain'

ra\$'buor 'brown'

pa\$'guok 'puppy'

Just as in (78), some of the first syllables of (79) are prefixes. All the first syllables are light and are not stressed. All the second syllables have a sequence of two vowels, are stressed and therefore are heavy.

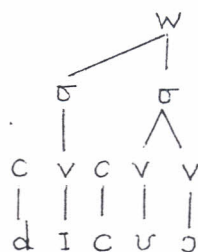
Bisyllabic words in Category 10 have the structure CV\$'CVV or V\$'CVV. In this category of words, primary stress is on the second syllable, as seen in the examples in (80).

(80)(a) word tier

syllable tier

CV-tier

phonemic tier



'married man'

Row 0 (mora row)

x x x

Row 1 (foot row)

x

Row 2 (word row)

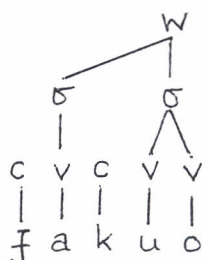
x

(b) word tier

syllable tier

CV-tier

phonemic tier



'thief'

Row 0 (mora row)

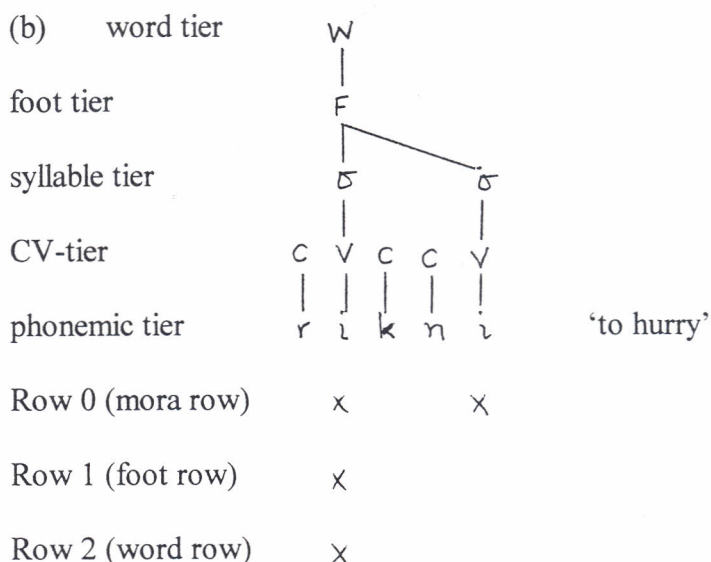
x x x

Row 1 (foot row)

x

Row 2 (word row)

x



- (c) 'θir\$no 'state of not growing'
- 'ʃam\$ni 'domestic animals in general'
- 'pel\$ni 'knives'
- 'ring\$re 'body'
- 'pap\$nr 'to boil'
- 'pug\$no 'to be fat'
- 'rok\$ni 'to behave in a manner that shows that one is
unsettled or anxious'

Words in Category 12 have the structure 'CV\$CV and 'V\$CV. Once again both syllables have a short vowel and are light. There are a few words in this category. The examples are given in (82). The first syllable is articulated with greater force than the second. The rules of Metrical Phonology that apply to Category 11 are the same rules that apply to Category 12.

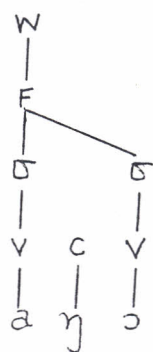
(82)(a) word tier

foot tier

syllable tier

CV-tier

phonemic tier



'what'

Row 0 (mora row)

x x

Row 1 (foot row)

x

Row 2 (word row)

x

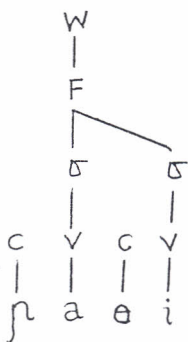
(b) word tier

foot tier

syllable tier

CV-tier

phonemic tier



'child'

Row 0 (mora row)

x x

Row 1 (foot row)

x

Row 2 (word row)

x

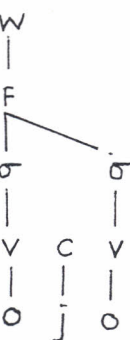
(c) word tier

foot tier

syllable tier

CV-tier

phonemic tier



'name of a person'

Row 0 (mora row)

x x

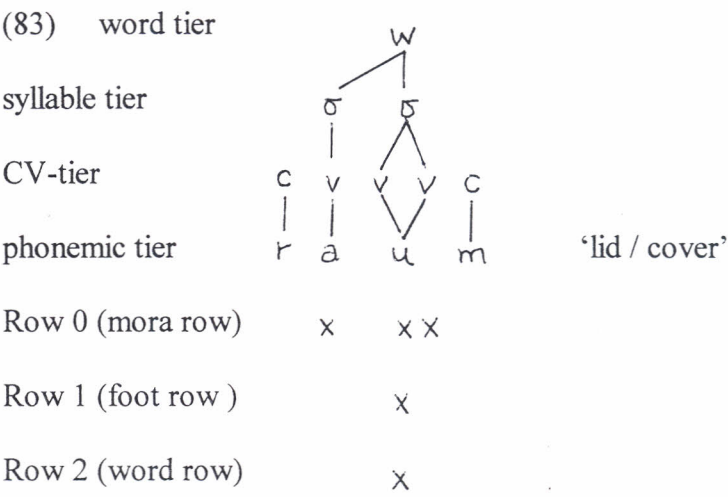
Row 1 (foot row)

x

Row 2 (word row)

x

The Dholuo word in Category 13 has the structure CV\$¹V:C. The first syllable has a single short vowel, while the second one has a doubled vowel. The second syllable is stressed and therefore it is heavy. The word in this category is given in (83).



The rule of Quantity Sensitivity applies on the foot row, just as in (60) and all the other words with one heavy syllable.

4.2 Stress in Trisyllabic Words

Trisyllabic words also display a unique stress pattern. A majority of trisyllabic words have stress on the second last or penultimate syllable. Words in Category 14 have the main stress on syllables with either V: or CV: structure. The examples are given in (84) below.

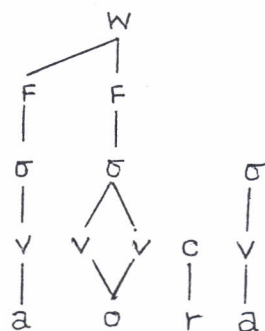
(84)(a) word tier

foot tier

syllable tier

CV-tier

phonemic tier



'river'

Row 0 (mora row) x x x x

Row 1 (foot row) x

Row 2 (word row) x

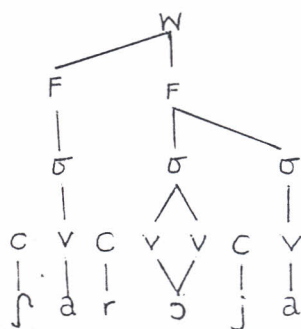
(b) word tier

foot tier

syllable tier

CV-tier

phonemic tier



'calf'

Row 0 (mora row) x x x x

Row 1 (foot row) x

Row 2 (word row) x

(c) a\$'u:\$ma 'name of a person'

o\$'o:\$k 'name of a person'

na\$'o:\$ro 'name of a person'

(d) a\$'gu:\$lu 'pot'

a\$'h1:\$pa 'very much'

a\$'gu:\$ce 'pots'

o\$'si:\$ki 'bush'

o \$'ga:\$nda 'beans'

o\$'te:\$ŋga	'hawk'
(e) pa\$'sa:\$je	'God'
fɔ\$'dɔ:\$ŋgɔ	'elders'
fa\$'tɛ:\$lɔ	'leader'
ba\$'ru:\$pe	'letters'
ka\$'mɔ:\$rɔ	'somewhere'
mɪ \$'sʊ:\$mba	'bachelor'

The words in example (84) have the structures V\$'V:\$CV, V\$'CV:\$CV and CV \$'CV:\$ CV. In all these words, the vowels in the penultimate syllable have been doubled. Stress is also on the penultimate syllable. The penultimate syllable is therefore heavy unlike the first and last syllables.

In (84), the first syllable of each word has a degenerate foot. In other words, the foot node in the first syllable is not branching and therefore there is exactly one daughter node under it. The second foot of the words in (84) is branching and the head of the foot has a heavy nucleus. Therefore at word level it is the second foot that receives the main word stress. The word level metrical structure created for Category 14 is right-headed.

According to the theory of Metrical Phonology, when a degenerate foot remains at the left end of a word, it means that the foot structures are constructed leftwards from the end of a word (see (14b) and (14d)). When a degenerate foot appears on the right end of a word it means that foot structures are constructed rightwards from the beginning of a word (see (14a) and (14c)). In section 4.1, Goldsmith (1990:187) has already been quoted in stating that if a language stresses its last heavy syllable, then the foot structures created for

words in that language must be left-headed. Since Dholuo stresses the last heavy syllable (as seen in (73) and since the degenerate foot remains on the left end of a word (as seen in (84)), then Dholuo feet are left-headed and are constructed from right to left (i.e., leftwards). In constructing metrical grids for words in this category, the rule of Quantity Sensitivity is first applied . Since there is only one syllable with two successive ‘Xs’ on the foot row, a grid mark is placed over it. End Rule Final then applies to show that the last heavy syllable of the word is stressed.

According to Stafford (1967), the singular imperative of most verbs consists of a shortened form of the verb. The plurals of these singular imperatives is formed by the addition of the suffix *-uru*. It is my observation that when the suffix is joined to these verbs, trisyllabic words are formed, as seen in (85).

(85) Infinitive	Singular	Plural	Meaning
	Imperative	Imperative	
'be:\$do	be:d	be\$'du:\$ru	'sit'
'dɔ:\$ɲɔɔ	dɔ:ɲɔ	dɔ\$'ɲɔɔ:\$ru	'get in'
'ke:\$lo	ke:l	ke\$'lu:\$ru	'bring'
'crɛ\$lo	crɛl	crɛ\$'lu:\$ru	'fry'

It is also my observation that resyllabification takes place when the suffix *-uru* is added to the singular imperative. The singular imperative is monosyllabic and has either a CV:C or CVVC structure. The corresponding plural imperative has either the structure CVC \$'CV:\$CV or CVV\$'CV:\$CV, respectively. The plural imperatives with the structure CV\$'CV : \$CV or CV\$

'V:\$CV form part of Category 14 of words in Dholuo. Their stress pattern is given in (86) below. The plural imperatives with the structure CVV\$'CV:\$CV form Category 24 of words in Dholuo and are discussed at the end of this section. The main word stress is on the suffix and not the root.

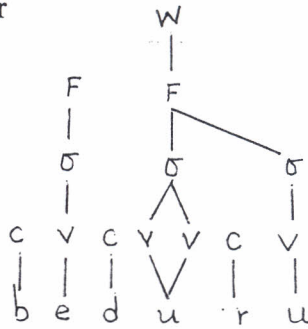
(86)(a) word tier

foot tier

syllable tier

CV-tier

phonemic tier



'please sit (plural)'

Row 0 (mora row)

x x x

Row 1 (foot row)

x

Row 2 (word row)

x

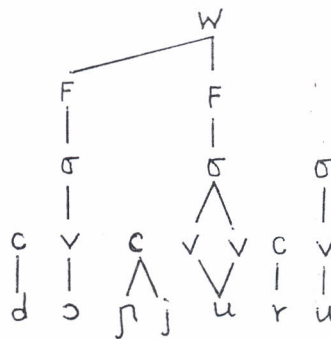
(b) word tier

foot tier

syllable tier

CV-tier

phonemic tier



'please get in (plural)'

Row 0 (mora row)

x x x

Row 1 (foot row)

x

Row 2 (word row)

x

(c) tɪ \$'mu:\$ru 'please do (plural)'

nɛ \$'u:\$ru 'please see (plural)'

go\$'lu:\$ru 'please remove (plural)'

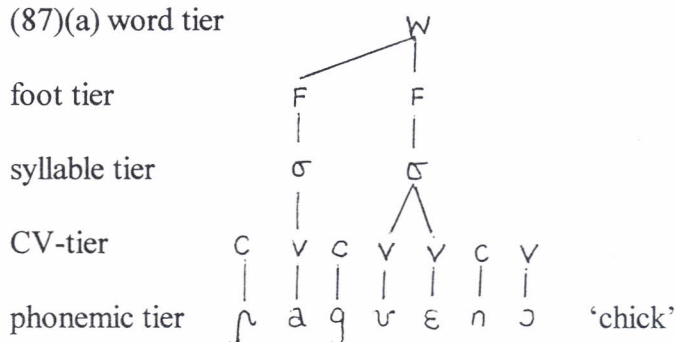
ma\$'pu:\$ru 'please look for (plural)'

ke\$'lu:\$ru 'please bring (plural)'

ka\$'wu:\$ru 'please take (plural)'

Words in Category 15 , just like Category 14 have the main stress on the penultimate syllable. The penultimate syllable has a sequence of two different vowels . Words in this category are given in examples (87).

(87)(a) word tier

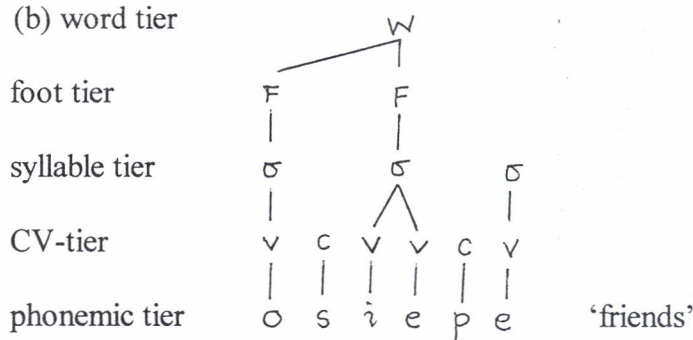


Row 0 (mora row) x x x x

Row 1 (foot row) x

Row 2 (word row) x

(b) word tier



Row 0 (mora row) x x x

Row 1 (foot row) x

Row 2 (word row) x

(c) ɲi\$'guo\$gi 'puppies'

ka\$'wuo\$no 'today'

ra\$'cuɔ\$ɲɔ 'name of a place'

ra\$¹kua\$ro 'red'

ma\$¹cɪɛ \$lɔ 'another'

mo\$¹kʊɔ \$ŋgɔ 'first'

(d) a\$¹pʊɔ \$cɛ 'rabbits'

a\$¹gʊa \$tɔ 'calabash'

a\$¹ɔia \$mbo 'name of a person'

ɔ\$¹lʊɛ \$nda 'cockroach'

ɔ\$¹bʊɔ \$lɔ 'mushroom'

Words in this category have either the structure CV\$¹CVV\$CV or V\$¹CVV\$CV. The main stress is detected on the only syllable that is heavy.

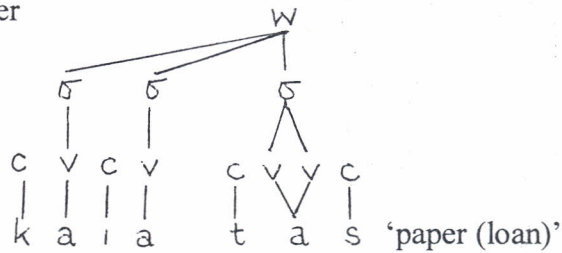
Certain trisyllabic words have stress on their last syllable. In these words, the first two syllables are light while the last one is heavy. Words in Category 16 are given in (88).

(88)(a) word tier

syllable tier

CV-tier

phonemic tier



Row 0 (mora row) x x x x

Row 1 (foot row) x

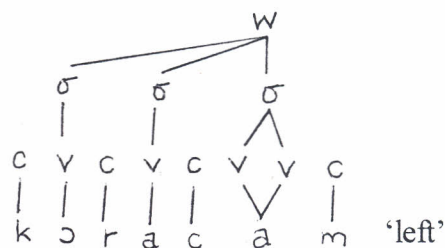
Row 2 (word row) x

(b) word tier

syllable tier

CV-tier

phonemic tier



Row 0 (mora row) x x x x

Row 1 (foot row) x

Row 2 (word row) x

(c) kɔ\$ra\$ci:c 'right'

ða\$ra\$ŋga:c 'gate'

ma\$ra\$'ca:r 'white one'

ma\$ra\$'te:ŋ 'black one'

ma\$ra\$'lu:m 'green one'

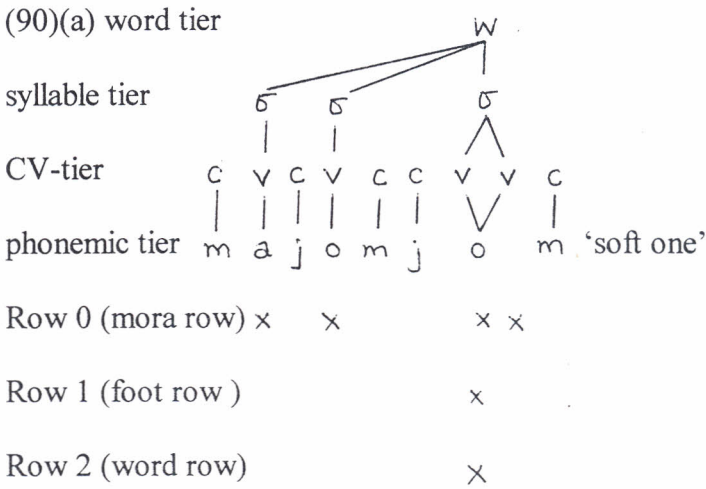
kʊ \$lʊ \$'ndɛ :ŋ 'beetle'

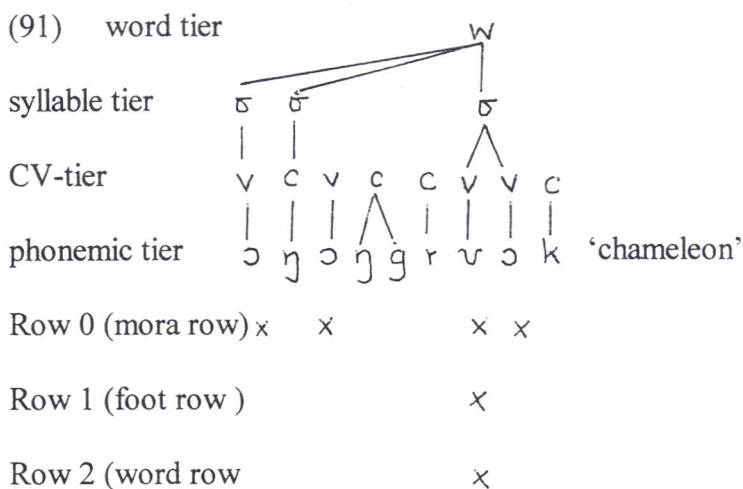
The stressed syllable in Category 16 has the structure CV:C. The vowel has been doubled. Each of the other two syllables has a short vowel and are not stressed. The syllable with a doubled vowel is therefore heavy.

Since it is the last syllable that is stressed and the rest of the syllables are not, I have assumed that there is no room for construction of the foot tier. The word level metrical structure has taken the syllable nodes as their terminal elements. There is room for the construction of a foot tier only where the heavy syllable is non-final as in (84), (86) and (87). A non-final heavy syllable, in Dholuo, gives room for construction of left-headed feet. If a foot is constructed, ^{as in} ~~for~~ example (88), it would be incorrect because it would mean that the foot is right-headed. From example (73), it is already known that

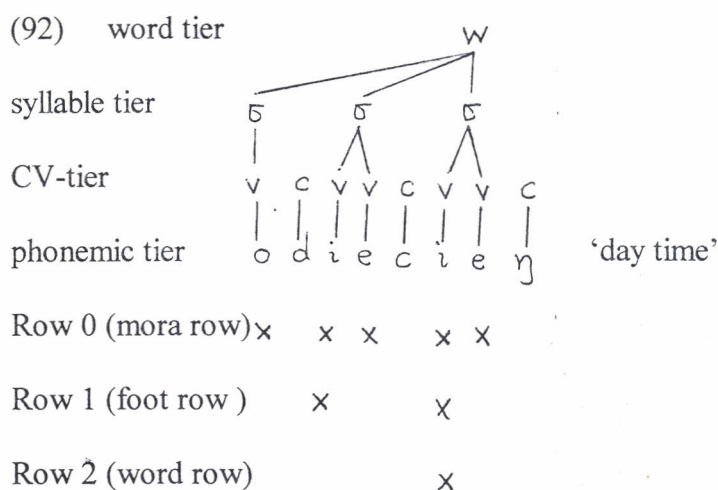
this category is CV \$ CV \$ 'CVVC.

Category 18 of words in Dholuo has the structure CV\$CVCS'¹CV:C or V\$CVCS'¹CV:C. It is the last syllable that is stressed and therefore it is heavy. The first two syllables are not stressed. They are light. The examples are given in (90).

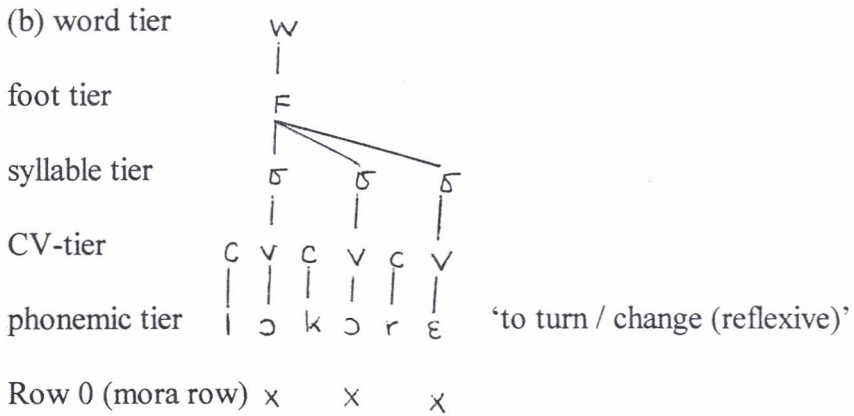




Category 20, just like Category 19, has one word. The structure of the word is V\$CVV\$'CVVC, as seen in chart (92).



In all the trisyllabic words analysed so far, except the one in Category 20, two of the syllables have a short vowel. In Category 20, only one syllable has a short vowel. The other two syllables have a VV sequence. The two syllables therefore seem to bear the same weight. It is the last heavy syllable that is stressed and therefore it is the head of the word, as seen in the metrical tree in (92). The metrical grids on the rows just below the phonemic tier show that the last heavy syllable of the word is stressed on Row 1 or the foot row, the rule of Quantity Sensitivity applies to create a grid mark over all heavy



(c) 'ba\$ŋɔ\$ɾɛ 'get squashed/ disfigured (reflexive)'

'ŋa\$ɔ\$ɾɛ 'to cut (reflexive)'

'pa\$ɔ\$ɾɛ 'to praise (reflexive)'

'na\$ŋɔ\$ɾɛ 'to lick (reflexive)'

'mu\$ko\$ɾɛ 'to crumble down (reflexive)'

'ku\$lo\$ɾɛ 'to bend (reflexive)'

'la\$ndɔ\$ɾɛ 'to spread from one place to another'

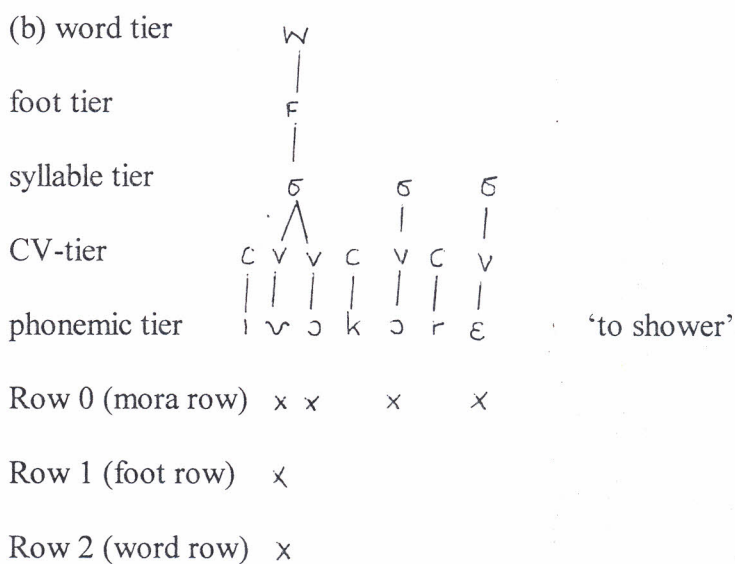
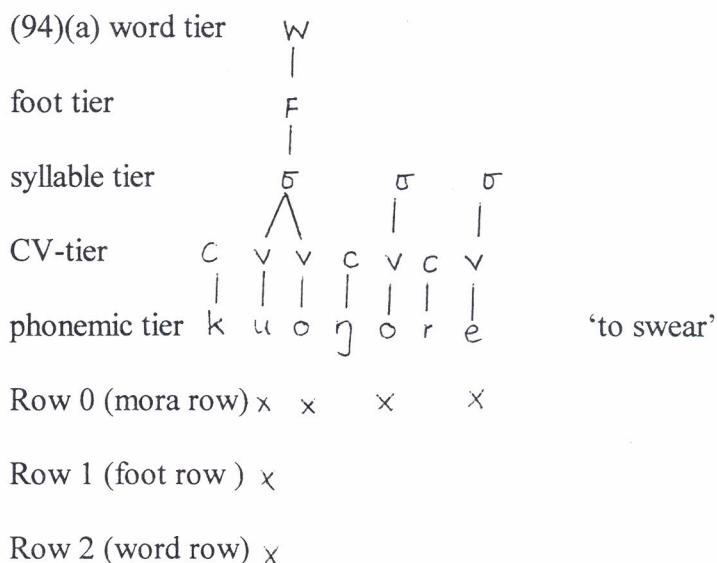
'ri\$to\$ɾɛ 'to take care'

'ta\$mɔ\$ɾɛ 'to refuse'

All the syllables in the words in (93) are light. The first syllable receives the main word stress. On the mora row, a grid mark is placed over all syllables. End Rule Initial, which places a grid mark on the extreme left of the word, is applied on the foot row to show the head of the foot. End Rule Initial is applied again at word level to show that it is the first syllable that receives primary stress.

Category 22 of words in Dholuo consists of reflexive form of verbs

with the structure CVV\$CV\$CV, as seen in examples (94).



(c) $!m \vee \supset \$m \supset \$r \in$ 'to rush unexpectedly'

'rua\$ko\$re 'to dress (reflexive)'

' $\forall r \in S \supset \exists p \in S$ ' 'to discover (reflexive)'

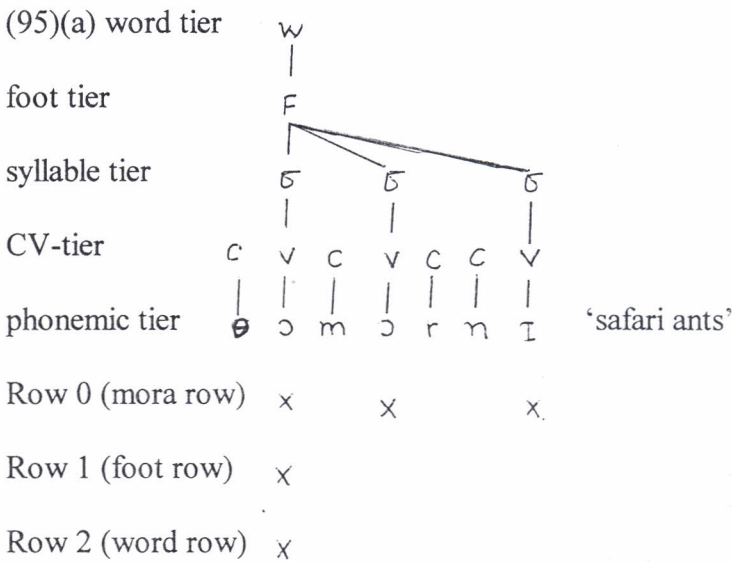
¹cu a \$nɔ \$rɛ ‘to stumble (reflexive)’

¹ cʋa \$kɔ \$rɛ ‘to boil (reflexive)’

'puo\$njof\$re 'to learn (reflexive)'

¹ $d \vee a \$ n \supset \$ r \in$ 'to mess (reflexive)'

Words in Category 23 consist of the structure 'CV\$CVC\$CV. All the three syllables have a short vowel. The metrical structure or stress pattern of these words is given in (95). In constructing the metrical grids for words in this category, End Rule Initial applies in the same way that it does for words in Category 21.



(b) 'lɪ \$gang\$la 'sword'

'o\$cup\$no 'a kind of ant'

'mɪ \$dɛr\$ma 'only son'

Category 24 of words in Dholuo have either CVV\$'CV:\$CV or CVV\$'V:\$CV structure. This category is discussed in example (85). The stress pattern of the words is given in (96).

(96)(a) word tier

foot tier

syllable tier

CV-tier

phonemic tier

Row 0 (mora row)

Row 1 (foot row)

Row 2 (word row)

(b) word tier

foot tier

syllable tier

CV-tier

phonemic tier

Row 0 (mora row)

Row 1 (foot row)

Row 2 (word row)

(c) $p\upsilon\tau\$'lu:\ru 'please give birth (plural)'

$d\upsilon\tau\$'ku:\ru 'please return (plural)'

$luo\$'ngu:\ru 'please call (plural)'

$wuo\$'gu:\ru 'please get out (plural)'

$k\upsilon\tau\$'u:\ru 'please sew (plural)'

$wuo\$'\theta u:\ru 'please walk (plural)'

Words in Category 25 have the structure $CVC\$'CV:\CV . Stress is on the penultimate syllable and therefore it is heavy. Examples of words in this

category are given in (97).

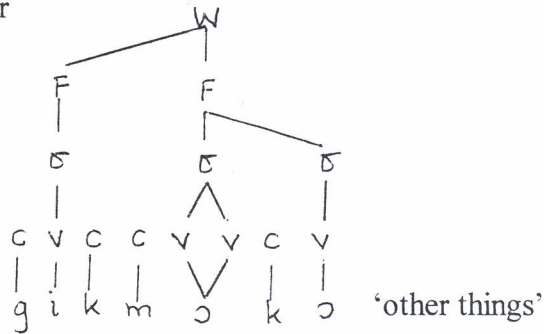
(97)(a) word tier

foot tier

syllable tier

CV-tier

phonemic tier



Row 0 (mora row) x x x x

Row 1 (foot row) x

Row 2 (word row) x

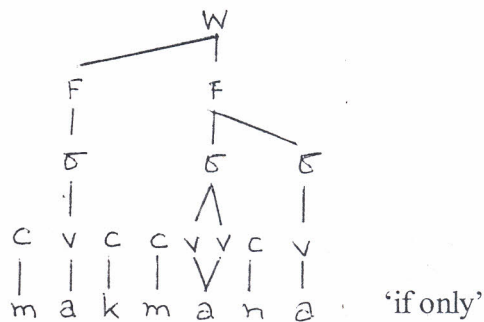
(b) word tier

foot tier

syllable tier

CV-tier

phonemic tier



Row 0 (mora row) x x x x

Row 1 (foot row) x

Row 2 (word row) x

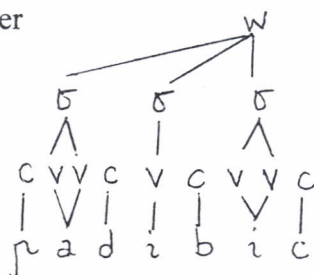
Words in Category 26, 27 and 28 in Dholuo have the prefix *ja:\$dɪ* to indicate the number of times. Words in Category 26 have the structure CV:\$CV \$!CV:C. In the words in this category, two syllables have a doubled vowel. The main word stress is perceived in the last syllable with a doubled vowel, as seen in (98).

(98)(a) word tier

syllable tier

CV-tier

phonemic tier



'five times'

Row 0 (mora row) x x x x x

Row 1 (foot row) x x

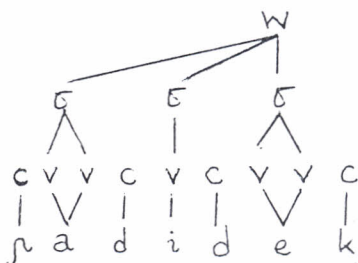
Row 2 (word row) x

(b) word tier

syllable tier

CV-tier

phonemic tier



'three times'

Row 0 (mora row) x x x x x

Row 1 (foot row) x x

Row 2 (word row) x

The word in Category 27 has the structure CV : \$ CV \$ ' CVVC as seen

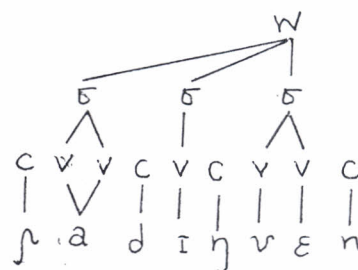
in (99).

(99) word tier

syllable tier

CV-tier

phonemic tier



'four times'

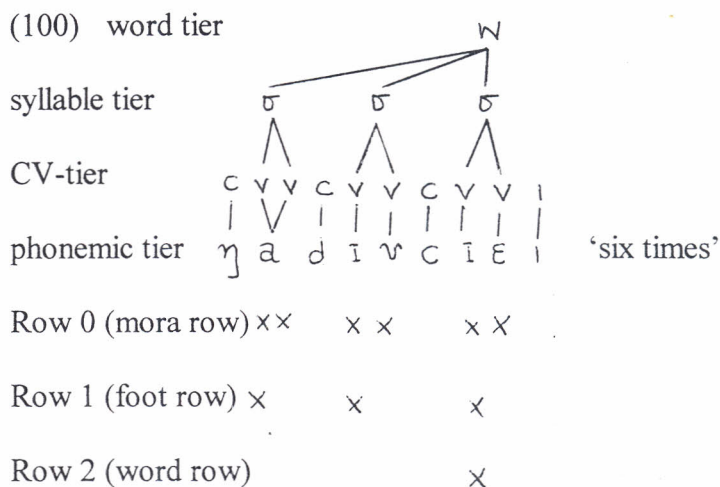
Row 0 (mora row) x x x x x

Row 1 (foot row) x x

Row 2 (word row) x

This word , just like the words in Category 26, has the main word

Category 28 has a word with the structure CV:\$CVV\$'CVVC. The first syllable has a doubled vowel, while the last two have a sequence of two different vowels each. The three syllables are stressable by virtue of their structure. It is my observation that stress is on the last syllable of this word, as seen in (100).



The majority of words in Dholuo are either monosyllabic , bisyllabic or trisyllabic . Polysyllabic words of four or more syllables are not very many, when compared with monosyllabic, bisyllabic and trisyllabic words. The categories of words that represent the stress pattern in polysyllabic words are therefore not many.

Words in Category 29, have either the structure V\$CV\$'CV:\$CV\$, CV\$CV\$'V:\$CV\$, CV\$ CV\$'CV:\$CV\$, CV\$CV\$CV\$'CV:\$CV\$ or V\$CV\$CV\$'CV:\$CV\$. The stress pattern of these words is given in (101).

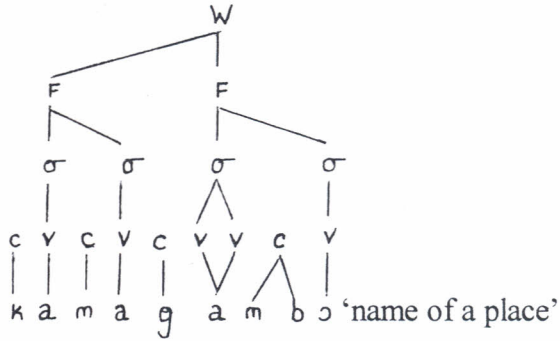
(101)(a) word tier

foot tier

syllable tier

CV-tier

phonemic tier



Row 0 (mora row) x x x x

Row 1 (foot row) x

Row 2 (word row) x

(b) a\$br \$'rɪ:\$jɔ 'seven'

ða\$ra\$'nge:\$je 'gates'

ma\$la\$'ɪ:\$ka 'angel'

sa\$wa\$'go:\$ŋgo 'name of a place'

e\$ro\$ka\$'ma:\$nɔ 'thank you'

There are yet other words in this category which could be referred to as reduplicatives. In some of these words, a portion of or a whole word is repeated. The examples are given in (102).

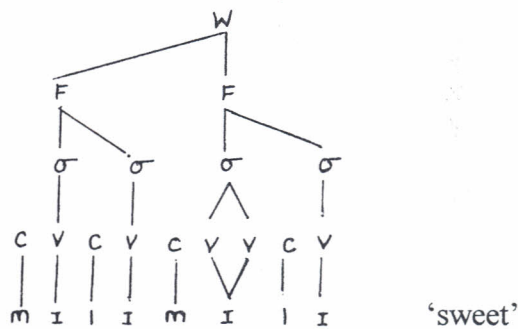
(102)(a) word tier

foot tier

syllable tier

CV-tier

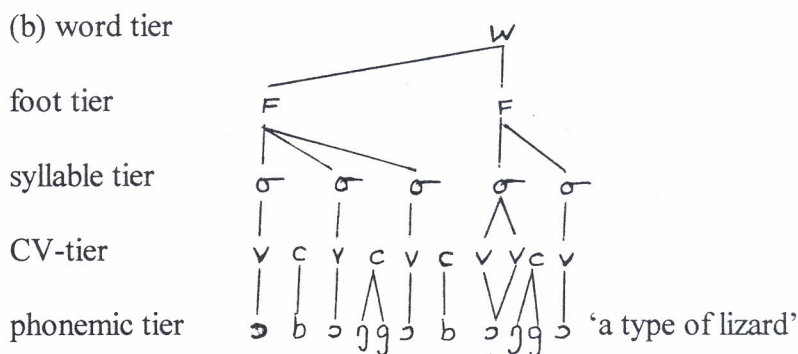
phonemic tier



Row 0 (mora row) x x x x x

Row 1 (foot row) x

Row 2 (word row) x



Row 0 (mora row) x x x x x x

Row 1 (foot row) x

Row 2 (word row) x

(c) ka\$ wɪ \$ra\$'wɪ :\$ra ‘dizziness’

ga\$la\$'ga:\$la ‘awkward’

pɪ \$lɛ\$'pɪ :\$lɛ ‘every day’

pɪ \$jɔ\$'pɪ :\$jɔ ‘quickly’

sɪ \$ga\$la\$'ga:\$la ‘ullaletions’

ma\$tɪ \$ndɔ\$'tɪ :\$ndɔ ‘small ones’

Stress is on the penultimate syllable in the words in (101) and (102) .

The stressed syllable has a doubled vowel. It is this penultimate syllable that is heavy. All the other syllables have a short vowel and are therefore light.

There are words in Dholuo that are formed by the addition of the prefix *na:\$dɪ-* which is used to indicate the number of times . As already seen in Categories 26, 27 and 28, this prefix is normally added to numerals. The examples are given in (103).

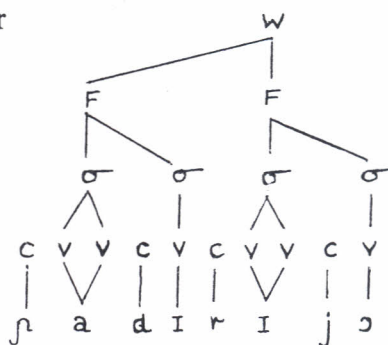
(103)(a) word tier

foot tier

syllable tier

CV-tier

phonemic tier



'twice'

Row 0 (mora row)

x x x x x

Row 1 (foot row)

x x

Row 2 (word row)

x

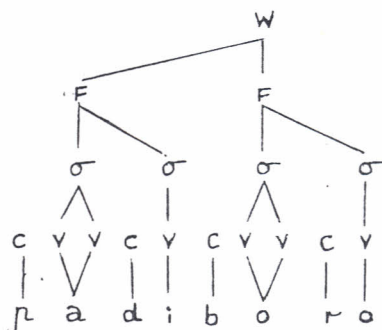
(b) word tier

foot tier

syllable tier

CV-tier

phonemic tier



'eight times'

Row 0 (mora row)

x x x x x

Row 1 (foot row)

x x

Row 2 (word row)

x

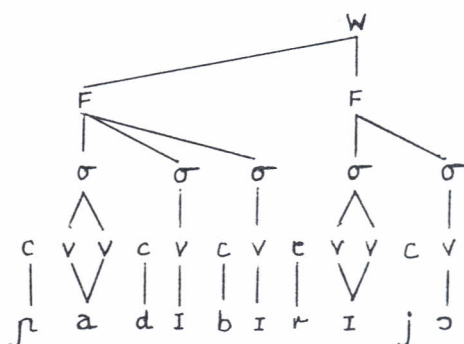
(c) word tier

foot tier

syllable tier

CV-tier

phonemic tier



'seven times'

Row 0 (mora row)

x x x x x

Row 1 (foot row)

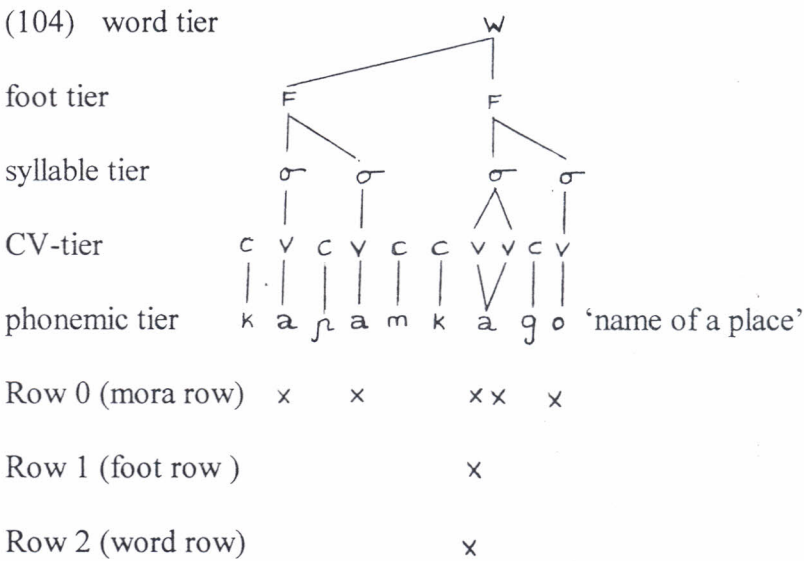
x x

Row 2 (word row)

x

Two syllables in each of the words in category 30 have a doubled vowel. This means that those two syllables are stressable. It is my observation that the main word stress falls on the last syllable with a doubled vowel, as seen in the metrical trees and grids in (103).

The Dholuo word *ka \$ɲ am\$ 'ka: \$ go* forms a category of its own, that is , Category 31. The stress pattern of this word is given in (104) . All the syllables are light except the penultimate syllable which is stressed and has a doubled vowel.



In Category 32 of polysyllabic words, just like Categories 30 and 31, stress is on the penultimate syllable and therefore the penultimate syllable is heavy. All other syllables have a short vowel and do not receive the main word stress. The stress pattern of Category 32 is given in (105).

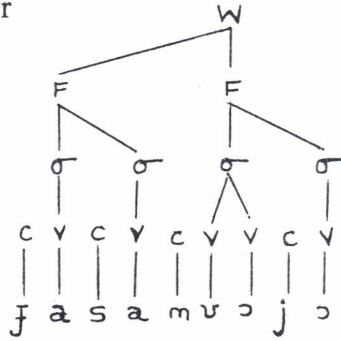
(105)(a) word tier

foot tier

syllable tier

CV-tier

phonemic tier



'lazy person'

Row 0 (mora row) x x x x x

Row 1 (foot row) x

Row 2 (word row) x

(b) ka\$ra\$cɔ\$ɲɔ 'name of a place'

ta\$nda\$'wɔ\$ja 'abundant'

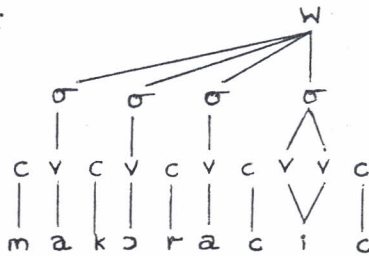
Words in Category 33 have the structure CV\$CV\$CV\$'CV:C or V\$CV\$CV\$'CV:C. In this group of words, stress is on the last syllable, which has a doubled vowel, as seen in (106). The first three syllables have a short vowel. The last syllable is heavy, while all the remaining are light.

(106)(a) word tier

syllable tier

CV-tier

phonemic tier



'right side'

Row 0 (mora row) x x x x x

Row 1 (foot row) x

Row 2 (word row) x

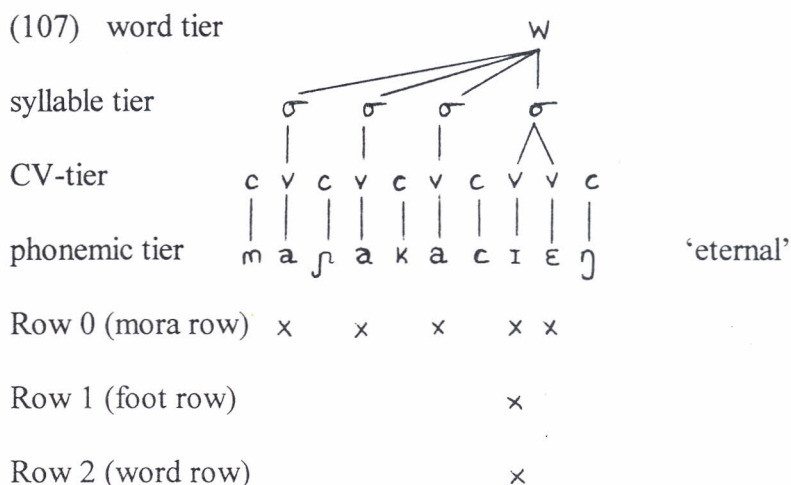
(b) ma\$ka\$ra\$'ca:m 'left side'

a\$ba\$ra\$'ma:c 'wayward/ without any order'

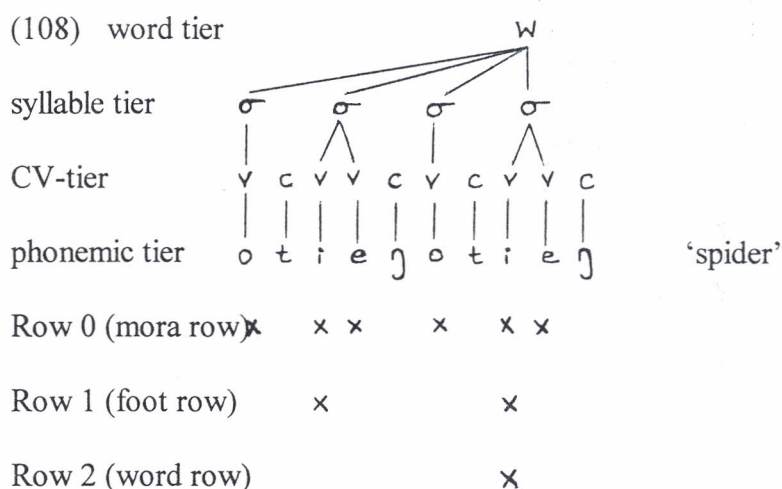
Since the last syllable is stressed and all the others are not, the foot tier

does not intervene between the syllable tier and the word tier.

Category 34, just like Category 33, has stress on the final syllable. Category 34 has a sequence of two different vowels in the final syllable. Being the stressed syllable, it is heavy. The word in this category is represented diagrammatically in (107). It has the structure CV\$CV\$CV\$'CVVC.



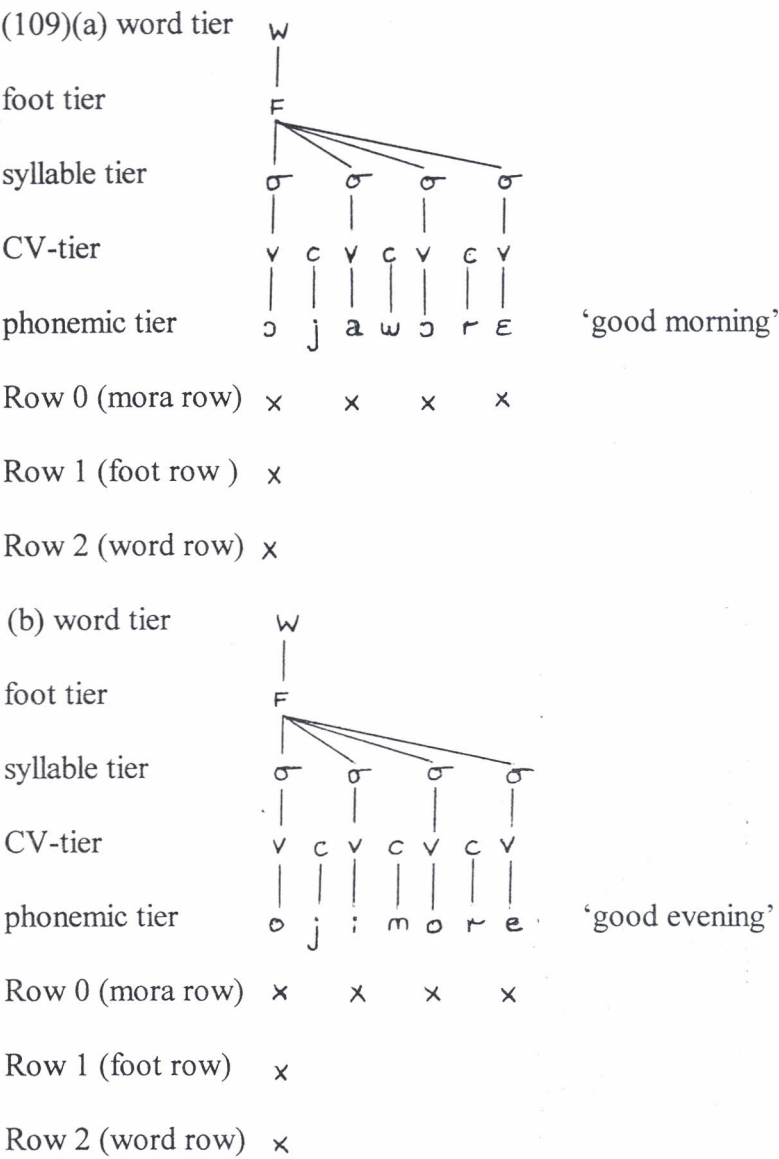
The word in Category 35 has the structure V\$CVVC\$V\$'CVVC, as seen in (108).



The word in (108) has two syllables with a vowel-vowel sequence. It is the last syllable with this kind of sequence that is stressed.

Category 36 has the structure 'CV\$CV\$CV\$CV. The words in this

category are given in (109).



(b) word tier

foot tier

syllable tier

CV-tier

phonemic tier

Row 0 (mora row)

Row 1 (foot row)

Row 2 (word row)

W

F

σ

σ

σ

σ

V

C

V

C

V

C

V

o

j

i

m

o

r

e

x

x

x

x

x

x

‘good evening’

End Rule Initial applies on the foot row and word row, just as in Categories 11,12,21 and 23.

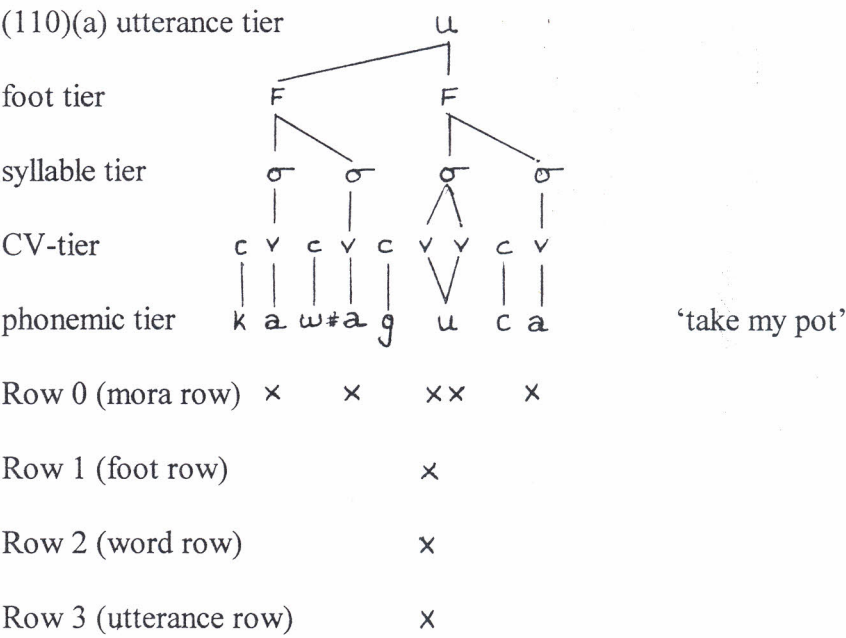
4.4 Vowel Doubling at Sentence Level.

In section 4.0, it is indicated that the research is based on the lexical level. Accordingly, the sentence is included only as far as it helps to show the positions where the underlying short vowels are realized as doubled vowels

on the surface. Therefore, the intention here is not to deal with sentence level stress at length, but to show that stress at the sentence level has the effect of doubling underlying short vowels when they occur in certain positions.

According to Durand (1990), the concept of foot is very useful in the classification of stress systems at the lexical level. Though he uses MP to give an example of sentence level stress, it is his feeling that the theory best describes only word level stress. The theory of MP is used to briefly discuss sentence level stress.

In some Dholuo sentences, a vowel is doubled in the penultimate position of a word that is in utterance-final position. The examples of utterances with such doubled vowels are given in (110) below. The symbol ‘u’ refers to utterance. The word tier has been left out because some foot structures defy word boundaries, as seen in (110a).



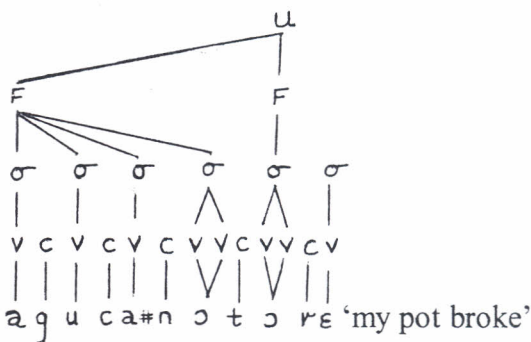
(b) utterance tier

foot tier

syllable tier

CV-tier

phonemic tier



Row 0 (mora row) x x x x x x

Row 1 (foot row) x x

Row 2 (word row) x

Row 3 (utterance row) x

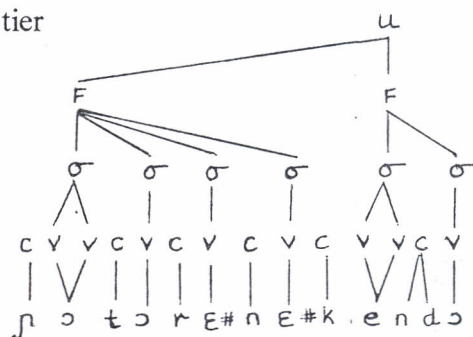
(c) utterance tier

foot tier

syllable tier

CV-tier

phonemic tier

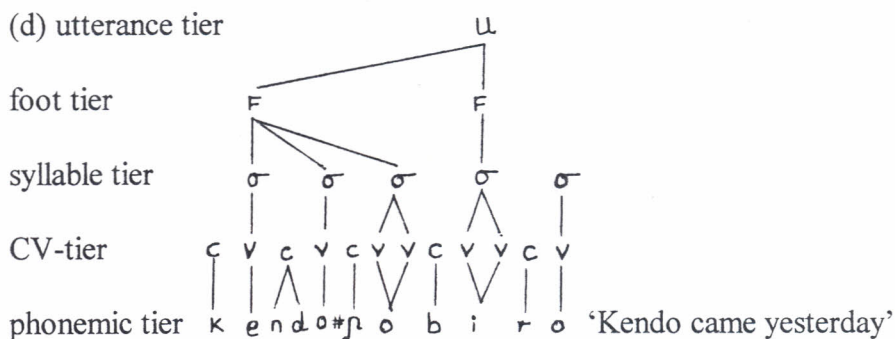


Row 0 (mora row) x x x x x x

Row 1 (foot row) x x

Row 2 (word row) x

Row 3 (utterance row) x



Row 0 (mora row) x x x x x x

Row 1 (foot row) x x

Row 2 (word row) x

Row 3 (utterance row) x

In (110a) and (b), focus is on the Dholuo word *a\$gu:\$ca*. In example (110a), the penultimate syllable is realised with a doubled vowel because the word occurs in utterance final position. When the word is non-final, as in (110b), the vowel remains short. The word *no:\$to:\$re* in (110b) occurs in utterance final position, consequently its penultimate syllable has a doubled vowel and this is where sentence level stress is detected. The same word has a doubled vowel in the antepenultimate position as a result of deletion followed by compensatory doubling (see section 6.2.1 and 6.2.2 for a discussion of compensatory doubling or lengthening). Compensatory doubling in this word does not determine or affect the location of stress. In (110c), the same word is in a non-final position. The word has a short vowel in its penultimate position and it does not bear the primary sentence level stress. The same applies to the word in *ke:\$ndo* in (110c). It is stressed in utterance final position, hence the doubling of the vowel in its penultimate syllable. In (110d), stress is not on the word *ke\$ndo* and therefore all its vowels are short. All these words with stress

on the penultimate syllable, end in a vowel.

It is my observation that most words with the structure V:\$CV always have a long vowel on the first syllable when they occur in any part of an utterance. According to Odhiambo (1981) (who makes the same observation), words of this type also have the structure VC(C)V. I assume that a CC sequence in Odhiambo's (1981) analysis refers to the prenasalised consonants such as /m b / and / ng/ which in this study are treated as single internally complex sounds (see section 2.1 above). The examples of these words are given in (110e) below. Most of the examples given are also given by Odhiambo(1981).

(110)(e) u:\$mo 'to cover'

ɪ:\$kɔ 'to prepare'

e:\$re 'where'

o:\$ŋge 'to be absent'

i:\$ro 'smoke'

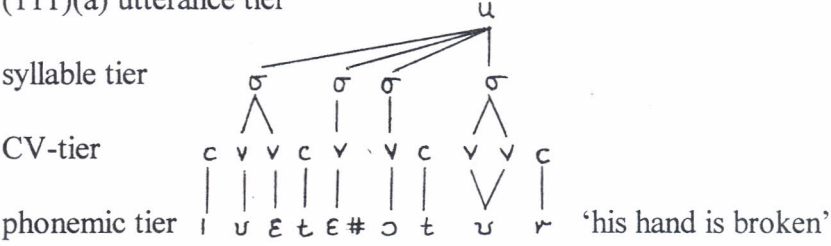
u:\$mbo 'drawing water'

The long vowels in (110e), occur in positions that call for vowel doubling both when the words are said in isolation and when they occur in utterance final position. They occur in positions that attract stress. Okombo (1977) attempts to explain the existence of these doubled vowels in any position of the word. I agree with his argument that a vowel which is [+ root lengthening] may maintain that property even when it is not in a position that requires root lengthening.

The last vowel of a word could also be doubled in utterance final

position as seen in (111).

(111)(a) utterance tier



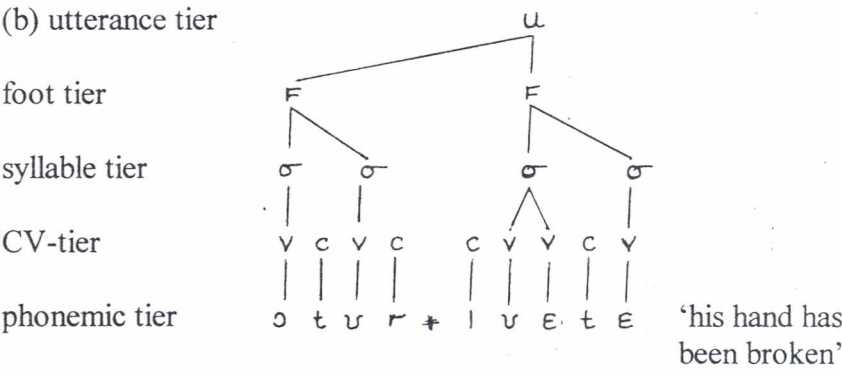
Row 0 (mora row) x x x x x x

Row 1 (foot row) x x

Row 2 (word row) x

Row 3 (utterance row) x

(b) utterance tier



Row 0 (mora row) x x x x x x

Row 1 (foot row) x

Row 2 (word row) x

Row 3 (utterance row) x

nodes because the word tier and foot tier have been avoided. The word tier has been avoided because the stressed syllable not only governs the rest of the syllables they form the same word with, but also syllables in the preceding word. The foot tier has been omitted because Dholuo feet are left-headed.

As the words in examples (111a),(c) and (d) show, it is the last vowel that is stressed. The last vowels in the three words have been doubled because they occur in words that are in utterance final position . In all the other positions, in the utterance, the words do not have doubled vowels. The difference between the words with the doubled vowels in (110) and (111) is that those in (110) are in words ending in a vowel, while those in (111) are in words ending in a consonant.

Stress in Dholuo is detected towards the end of an utterance, through vowel doubling. Stress therefore has the effect of doubling Dholuo vowels. In a vowel final word stress is detected on the penultimate syllable and in a consonant final word, stress is detected on the last syllable. This stress pattern is what Okombo (1982) calls root lengthening (see section 1.7.2.2.4 above). He states that, in a word ending in a consonant, in utterance final position, it is the last vowel that undergoes root-lengthening. In a word ending in a vowel, in utterance final position, root-lengthening takes place on the second last or penultimate vowel.

The discussions of stress in Dholuo words , in sections 4.1, 4.2 and 4.3, also show that stress is on the penultimate syllable in words ending in a vowel and on the last syllable in words ending in a consonant. The best example of stress in the penultimate syllable is seen in examples (101) and (102). In

these words stress is detected through the doubling of the penultimate vowel. Stress on the last syllable is seen in the examples in (88). All these words end in a consonant. The stress pattern of words in utterance final position is similar to that of words said in isolation.

The Dholuo word /lʊɛ\$ tɛ/ in example (111 a) and (b) shows that the structure of its first syllable does not change whether the word is in utterance final or any other position. This means that words with syllables that have a sequence of two different vowels underlyingly have the same sequence on the surface. In example (111b), it is the syllable with a CVV sequence that governs the rest of the syllables in the utterance.

4.5 Summary

In this section, the stress pattern of Dholuo words is summarised . The symbols ‘l’ and ‘h’ are used to represent light and heavy syllables, respectively. The categories of words in Dholuo are outlined in (112) below. The weight structure of each category is also given on the extreme right.

(112)(a) Bisyllabic words

Category 1 :	'CV:\$CV/'V:\$CV	'h\$l
Category 2 :	'CVV\$CV	'h\$l
Category 3 :	'CVVC\$CV	'h\$l
Category 4 :	CVVC\$'CVVC	h\$'h
Category 5 :	CVC\$'CV:C/ VC\$'CV:C	l\$'h
Category 6 :	CVC\$'CVVC/ VC\$'CVVC	l\$'h
Category 7 :	CVVC\$'CV:C	h\$'h

Category 8 :	V\$'CV:C/ CV\$'CV:C	l\$h
Category 9 :	CV\$'CVVC/ V\$'CVVC	l\$h
Category 10:	CV\$'CVV/ V\$'CVV	l\$h
Category 11:	'CVC\$CV	'l\$l
Category 12:	'CV\$CV/'V\$CV	'l\$l
Category 13:	CV\$'V:C	l\$h
(b) Trisyllabic words		
Category 14:	CV\$'CV:\$CV/ V\$'CV:\$CV/ V\$'V:\$CV	l\$h\$l
Category 15:	CV\$'CVV\$CV/V\$'CVV\$CV	l\$h\$l
Category 16:	CV\$CV\$'CV:C	l\$l\$h
Category 17:	CV\$CV\$'CVVC	l\$l\$h
Category 18:	CV\$CVC\$'CV:C/ V\$CVC\$'CV:C	l\$l\$h
Category 19:	V\$CVC\$'CVVC	l\$l\$h
Category 20:	V\$CVV\$'CVVC	l\$h\$h
Category 21:	'CV\$CV\$CV	'l\$l\$l
Category 22:	'CVV\$CV\$CV	'h\$l\$l
Category 23:	'CV\$CVC\$CV	'l\$l\$l
Category 24:	CVV\$'CV:\$CV/ CVV\$'V:\$CV	h\$h\$l
Category 25:	CVC\$'CV:\$CV	l\$h\$l
Category 26:	CV:\$CV\$'CV:C	h\$l\$h
Category 27:	CV:\$CV\$'CVVC	h\$l\$h
Category 28:	CV:\$CVV\$'CVVC	h\$h\$h

(c) Polysyllabic words

Category 29: CV\$CV\$'CV:\$CV	l\$l\$'h\$l
CV\$CV\$'V:\$CV	l\$l\$'h\$l
V\$CV\$CV\$'CV:\$CV	l\$l\$l\$'h\$l
V\$CV\$'CV:\$CV	l\$l\$'h\$l
CV\$CV\$CV\$'CV:\$CV	l\$l\$l\$'h\$l
Category 30: CV:\$CV\$'CV:\$CV	h\$l\$'h\$l
CV:\$CV\$CV\$'CV:\$CV	h\$l\$l\$'h\$l
Category 31: CV\$CVC\$'CV:\$CV	l\$l\$'h\$l
Category 32: CV\$CV\$'CVV\$CV	l\$l\$'h\$l
Category 33: CV\$CV\$CV\$'CV:C	l\$l\$l\$'h
Category 34: CV\$CV\$CV\$'CVVC	l\$l\$l\$'h
Category 35: V\$CVVC\$V\$'CVVC	l\$h\$l\$'h
Category 36: 'CV\$CV\$CV\$CV	'l\$l\$l\$l

The rules that summarize the stress pattern of Dholuo words are given in (113) below. Let us call them Lexical Category Stress Rules (LCSR). In the rules, a branching syllable refers to a syllable that has two vowels in the nucleus. In other words, it refers to a syllable that occupies two V positions on the CV - tier.

(113a) LCSR for Bisyllabic Words

For any pair of nodes [N1 ,N2]w, where N1 and N2 are syllables and w is a word, N2 is stressed if and only if its nucleus branches.

(b)LCSR for Trisyllabic Words

For any three nodes [N1 , N2 , N3]w, where N1,N2 and N3 are.

syllables and w is a word;

(i) N2 is stressed if and only if its nucleus branches and that of N3 does not branch.

(ii) N3 is stressed if and only if its nucleus branches.

(iii) N1 is stressed if and only if the nucleus of N2 and N3 do not branch.

(c) LCSR for Polysyllabic Words (Most polysyllabic words have four syllables therefore the rules developed apply to words with four syllables only. For any four nodes [N1,N2,N3,N4]w where N1,N2,N3 and N4 are syllables and w is a word;.

(i) N3 is stressed if and only if its nucleus branches and that of N4 does not branch.

(ii) N4 is stressed if and only if its nucleus branches.

(iii) N1 is stressed if and only if the nucleus of N2 , N3 and N4 do not branch.

The application of (113a) would produce the stress pattern given in Categories 1 to 13. The application of (113b,i) would produce the stress pattern seen in Categories 14,15,24 and 25. The application of (113b,ii) would yield Categories 16, 17, 18, 19, 20, 26, 27 and 28. If (113b,iii) is applied , it would yield Categories 21, 22 and 23. The rule in (113c,i) would produce Categories 29, 30, 31 and 32. Categories 33, 34 and 35 would be produced by the rule in (113c,ii). Finally, the application of (113c,iii) would produce Category 36.

From the outline of the stress pattern of Dholuo , it is clear that there is

a distinct relationship between syllable weight and stress. The concept of syllable weight in Dholuo is the distinction between light and heavy syllables, which in most cases is conditioned by or conditions stress. Syllables that are stressed in almost all the categories are the syllables that are considered to be heavy. Therefore, a heavy syllable in Dholuo is a syllable that is stressed in almost all cases. The heavy syllables in Dholuo have the following structure:

(114)(a) CV:

(b) V:

(c) CV:C

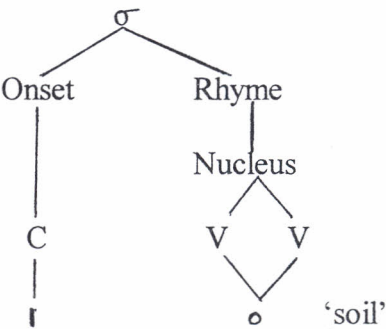
(d) V:C

(e) CVV

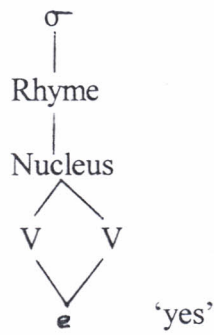
(f) CVVC

For the purpose of representing heavy syllables diagrammatically, charts similar to the ones Durand (1990) uses in discussing the CV-tier in MP have been used in this study. The charts showing the heavy syllables in Dholuo are given in (115) below. The charts show that for a syllable to be heavy, the nucleus must branch. The onset and coda are irrelevant .

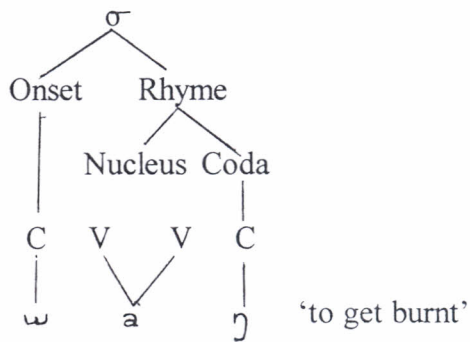
(115)(a) CV:



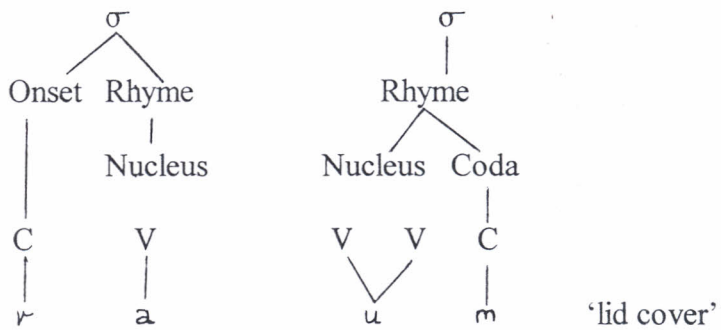
(b) V:



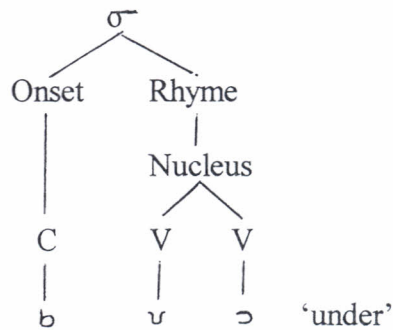
(c) C V:C



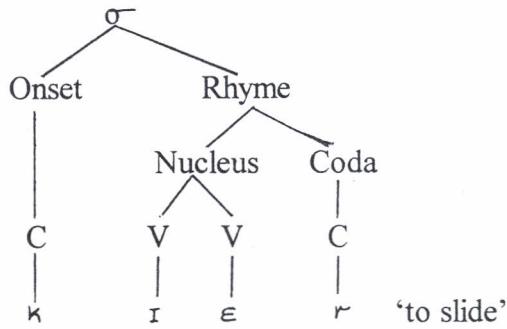
(d) The second syllable of the word *raʃu:m* represents a heavy syllable with a V:C sequence.



(e) CVV



(f) CVVC



Some of these heavy syllables, as seen in section 4.4, are stressed because of their position in a word. When they are stressed, the vowels become doubled hence the representation CV:, V:, CV:C and V:C. As already stated in section 4.4, stress in Dholuo is detected in the penultimate position in a vowel final word and in the last syllable in a consonant final word. For a syllable to have a doubled vowel, it must be in a position where stress is detected. Stress therefore has the effect of doubling vowels in Dholuo, thus transforming syllables from being light to being heavy. Stress is realised through vowel doubling in the penultimate positions in Categories 1,14, 24, 25,29, 30 and 31. Stress is also realised through vowel doubling in the last syllable of the word in Categories 5,7,8,13,16, 18, 26 and 33. Duration in Dholuo is therefore an effective cue of stress.

All the heavy syllables discussed in the preceding paragraph are realised as light syllables in all the other positions where they are not stressed. These heavy syllables are therefore not underlying. They are derived or acquired on the surface when they occur in positions where stress is detected in Dholuo. The rule that derives the vowels that are doubled on the surface is given in (116). It is known as the Vowel Doubling Rule (VDR).

(116) VDR

(a) For any pair of nodes [N1 ,N2]w where N1 and N2 are the two final syllables of a word, the vowel in N1 is doubled if and only if it is stressed and N2 is vowel-final.

(b) For any pair of nodes [N1 ,N2]w, where N1 and N2 are the final two syllables of a word, the vowel in N2 is doubled if and only if N2 is consonant-final and is stressed.

There are Dholuo syllables that appear to be inherently heavy. These heavy syllables have the structure CVV and CVVC. They differ from the syllables with a doubled vowel in that their nucleus is made up of a sequence of two different vowels. In most categories, these heavy syllables appear to be at the right position, that is, where stress is easily detected in Dholuo. In Categories 2,3,15 and 32, the heavy CVV syllable is stressed in the penultimate position in vowel final words. The syllables with CVVC structure are stressed in Categories 4,6,9,17, 19, 20, 27, 28, 34, and 35, where they occur as the last syllable of the words.

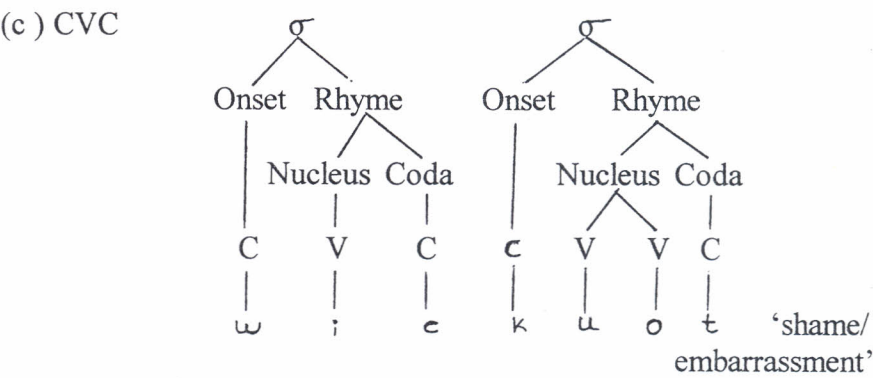
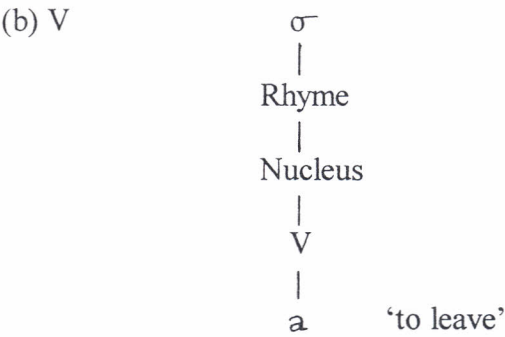
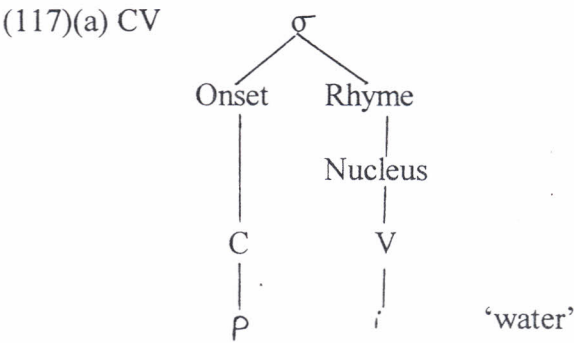
In some words, CVV syllables are stressed because of the inherent structure, for example in Category 10, the last syllable has an inherent CVV structure. Words in Category 10 are vowel final, yet stress is on the last syllable and not the penultimate syllable possibly because of the inherent structure of the syllable.

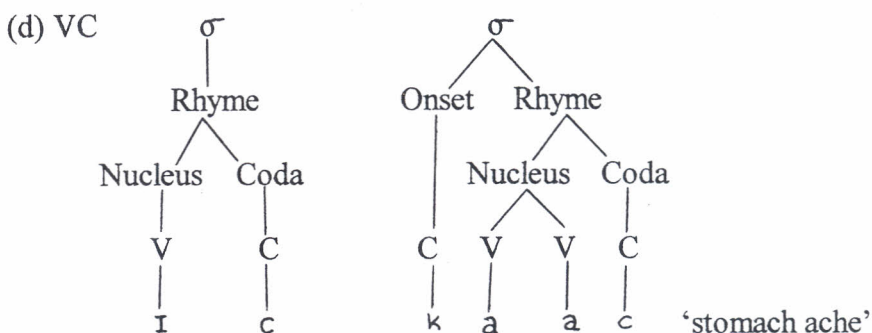
For a syllable to be considered as being heavy in Dholuo, it must have two vowels in the nucleus, as seen in (115) above. The two vowels in the nucleus could be underlying (inherent) or derived (acquired) on the surface by

a Vowel Doubling Rule.

There are words with two syllables of the same weight, i.e., CVVC\$ CVVC structure as in Category 4. In such a situation, it is the second syllable that is stressed. This means that in Dholuo, it is always the last heavy syllable in a word that is stressed.

Most syllables that are not stressed are light. Therefore, a light syllable in Dholuo is a syllable that is unstressed in almost all cases. The structures of light syllables are given in (117) below.





In (117c) and (d) the first syllables are light. In some Dholuo words, these light syllables are stressed (articulated with greater intensity) when all the syllables are light and when they are the first syllables of such words. The light syllables that are stressed are seen in Categories 11, 12, 21, 23 and 36. The light syllables in Dholuo therefore have the following structure:

(118)(a) CV

(b) V

(c) CVC

(d) VC

In the light of the theory of MP, it can be concluded that Dholuo feet are left-headed. They are constructed left-wards (right-to-left) from the end of a word. Dholuo is a Quantity -Sensitive language because its weak nodes (non-branching nucleus) do not dominate branching nodes (branching nucleus). In other words, it is seen that the head of a foot, in a situation where there is a heavy syllable, is always a heavy syllable. Dholuo has an unbounded foot structure. In constructing metrical trees for Dholuo words, it is seen that the metrical structure at the word level or tier is right headed.

When using metrical grids, the Rule of Quantity Sensitivity applies on Row 1, after a grid mark has been placed over each mora. In the application of

Quantity Sensitivity, a grid mark is placed on the mora of a syllable with two successive grid marks. End Rule Final then places a grid mark on Row 2, over the syllable on the extreme right on Row 1. It shows that it is the last heavy syllable in a word that is stressed. In words with only light syllables, End Rule Initial applies on Row 1 to place a grid mark over the syllable on the extreme left on Row 0. End Rule Initial applies again on Row 2 to place a grid mark over the syllable on the extreme left on Row 1.

The use of the two approaches has proved to be very useful. For example, through the use of metrical trees, it has been possible to show the directionality of the construction of Dholuo feet. This would have been difficult if grids only were used. Grids have been useful in showing the difference between stress in bisyllabic words with light syllables only (Categories 11, and 12) and stress in bisyllabic words with a heavy syllable followed by a light one (Categories 1, 2, and 3). The difference is in the rules that build the metrical grid. In bisyllabic words with only light syllables, End Rule Initial applies at both the foot and word level. In bisyllabic words with a heavy syllable followed by a light syllable, Quantity Sensitivity applies on the foot row, while End Rule Final applies on the word row. This difference is not captured by the rules of constructing metrical trees.

The use of both trees and grids show that Dholuo is a Quantity Sensitive language. In all words with a heavy syllable, stress must always be on the heavy syllable. Stress has the effect of doubling vowels that are otherwise short. The structure of some syllables make them receive primary word stress.

CHAPTER 5

THE RELATIONSHIP BETWEEN SYLLABLE WEIGHT AND TONE

5.0 Introduction

The main aim of this chapter is to show the relationship that exists between syllable weight and tone. Having discussed the syllable types that exist in Dholuo (Chapter 3) and having shown which among them are considered to be heavy or light (Chapter 4), I am now in a position to show how these syllable types relate to tone placement.

According to Hyman (1975:207):

...pitch and duration (in that order) are much more effective cues to stress than intensity.

... since pitch is seen to be the most important signal of stress and since pitch is clearly the most important cue to tone, the difference between stress and tone is a linguistic one and not a phonetic one.

Kenstowicz (1994:48) also asserts that:

The perception of stress may be elicited by increased duration, heightened pitch and sometimes more subtle aspects of vowel and consonant quality.

In Chapter 4, it is already seen that increased duration is an important sign of stress in Dholuo. For example, when stress is placed on the penultimate syllable in a vowel-final word, the vowel in the penultimate syllable doubles. The doubled vowel has a longer duration than the one that is not. This duration shows that the affected syllable is stressed.

Syllable weight, in Chapter 4, has been given a language specific

definition in Dholuo in terms of its close relationship with stress . Therefore, in discussing the relationship between tone and syllable weight, stress cannot be left out. The views cited above also show that pitch is an important cue to both stress and tone. It is therefore important, at this stage, to define pitch once again. According to Kenstowicz (1994), pitch refers to the rate of vibration of the vocal folds. Sethi and Dhamija (1992) state that varying pitches of the voice combine to form patterns of pitch variation or tones.

The form and function of tone in Dholuo is the subject of Okombo (1977). In this study, it is the form of tone in words that is dealt with. In other words, the nature of pitch variation in Dholuo words is analysed in order to find out if it has any relationship with syllable weight.

The two principles of Autosegmental Phonology that are used to describe the pattern of tone in charts are the Obligatory Contour Principle and Left-to-right Mapping Principle. The Obligatory Contour Principle states that adjacent identical autosegments should not have the same value and should therefore be collapsed. Identical autosegments are collapsed if there is no reason to keep them separate (see section 1.7.1.2.3).

According to the Left-to-right Mapping Principle, association lines are introduced to join Tone bearing Units (TBU's or vowels) and tones in a one-to-one fashion from left-to-right. The WFC, which was formulated by Goldsmith (1976), is used to ensure that the relation between the tonal tier and TBU's is well formed. According to WFC, association lines do not cross, all TBU's are associated to at least one tone and all tones are associated to at least one TBU. More explanations on how the theory of Autosegmental Phonology

is used are given in the course of the analysis in this chapter.

This discussion focuses on tone and syllable weight in Dholuo words. It therefore starts with the analysis of monosyllabic words followed by bisyllabic, trisyllabic and other polysyllabic words. The tones that feature in Dholuo words are given below.

- (119)(a) Low (L)
- (b) High (H)
- (c) Downstepped High (!H) or (LH see section 5.2)
- (d) Low-Rising (LH)
- (e) High-Falling (HL)
- (f) High-Hanging (H!H) or (HLH see Section 5.2)

(119a), (b) and (c) are level tones, while (d) , (e) and (f) are contour tones which are treated as sequences of level tones in this study.

Just as in the discussion of stress in Chapter 4, the sentence level is used only where necessary.

5.1 Tone in Monosyllabic Words

The low tone is found in monosyllabic words. It is found in both heavy and light syllables, as in the following examples. These monosyllabic words form Group 1.

(120)(a) phonemic tier	ɿ	ɿ	'people'
CV-tier	c	v	
tonal tier		L	

(b) phonemic tier m ɔ 'oil'
 | |
 CV-tier c v
 |
 tonal tier L

(c) pi 'water'

lɛ 'axe'

ŋa 'who'

ti 'germinate/ grow old'

i 'to wrestle'

wi 'on top of'

The words in (120) are all light syllables with a low tone. The heavy syllables are given in (121).

(121)(a) phonemic tier b ε ɾ 'good / beautiful'
 | / \ |
 CV-tier c v v c
 |
 tonal tier L

(b) phonemic tier d ɪ ε l 'goat'
 | | | |
 CV-tier c v v c
 |
 tonal tier L

(c) lo: 'soil'

wa:ŋ 'to get burnt'

ŋɛ:ŋ 'many'

lɪ:t 'painful'

ʒɪ:m 'to speak a foreign language'

la:k 'tooth'

(d) lɪɛc 'elephant'

kuot 'to swell'

kuon 'ugali'

guok 'dog'

ðɪaŋ 'cow'

Words in Group 2 have a high tone. This tone is found in both light and heavy syllables. The words in (122) are all light syllables.

(122)(a) phonemic tier ɪ e 'animal'

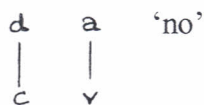
CV-tier



tonal tier



(b) phonemic tier



CV-tier

tonal tier



(c) co 'toilet'

ðɔ 'mouth of'

gɪ 'with'

ka 'here'

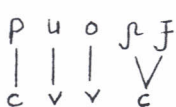
ci 'wife of'

ndɪ 'extremely'

The words in (123) are examples of monosyllabic words that are heavy and have a high tone.

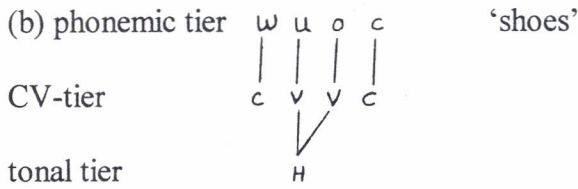
(123)(a) phonemic tier p u o ʃ ʃ 'lesson'

CV-tier



tonal tier





(c) pɪ:n 'earth/ world/ ground'

tɪ:n 'little/ small'

ra:c 'badness'

tɔ:ŋ 'spear/ egg'

cu:n 'liver'

(d) jɪɛn 'medicine/ wood/ log'

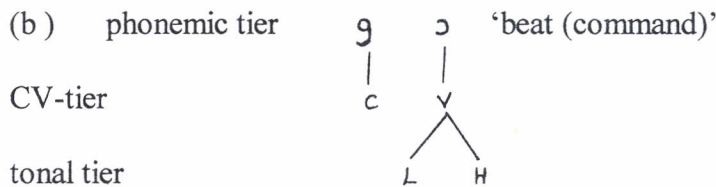
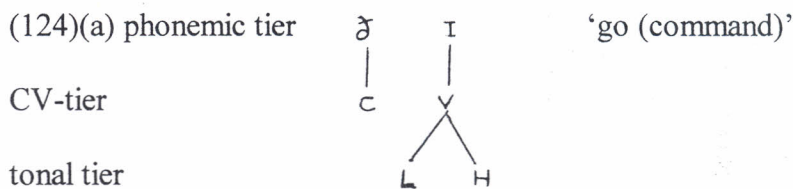
ciɛŋ 'eventually'

duoŋ 'big'

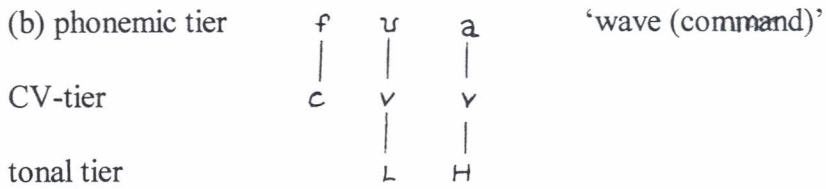
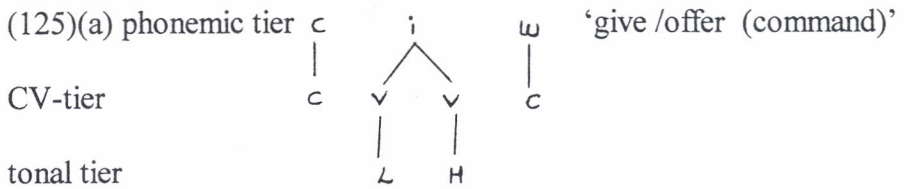
lʊɛn 'war'

luoŋg 'call/ invitation'

Dholuo words in Group 3 have a low-rising tone. The low-rising tone occurs on light syllables, as seen in (124).



The examples in (125) show that the low-rising tone occurs on heavy syllables.



(c) dɪ:r ‘throw (command)’

da:r ‘migrate (command)’

ba:r ‘split (command)’

do:ŋ ‘remain (command)’

(d) miec ‘village’

jɪɛr ‘choose (command)’

rɪɛmb ‘send away/ drive (command)’

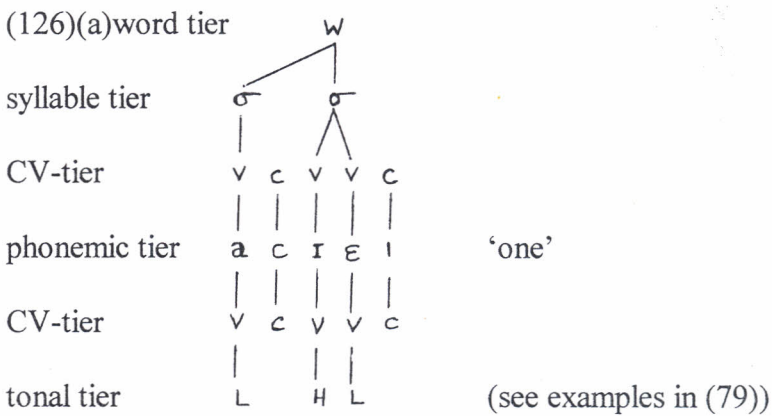
mɪɛl ‘dance (command)’

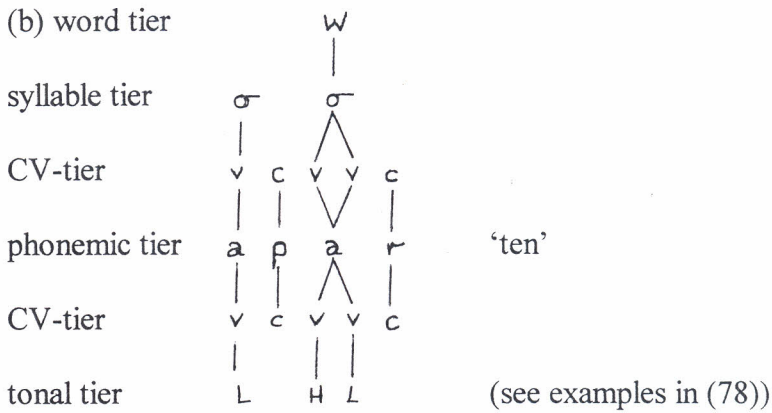
The examples in (124) and (125) show that the low-rising tone is mostly found in commands. The low-rising tone is represented as a sequence of level tones in (124) and (125). The analysis provided in this section does not show any relationship between tone and syllable weight. This analysis is important because it shows the tones that are found in monosyllabic words. These are the low, the high and the low-rising tones. Most monosyllabic words have a low tone. The tones that are not found in monosyllabic words are the downstepped high tone, the high-falling tone and the high-hanging glide. These tones are found in words of more than one syllable.

5.2 Tone in Bisyllabic Words

Bisyllabic words in Dholuo have various tone patterns. Just as the monosyllabic words in section 5.1, the bisyllabic words are grouped according to their tone pattern. Words in Group 4 have a low tone on the first syllable, followed by a high-falling tone on the second syllable. The tone pattern of Group 4 is therefore L\$HL.

It is my observation that the second syllable of each of the words in Group 4 is heavy. The second syllable is stressed and this is the same syllable that has a contour tone. The charts in (126) give a diagrammatic representation of the words in Group 4. In this study, Metrical Phonology has been used on the upper side of the phonemic tier to display the corresponding stress pattern and weight structure of the syllables. Autosegmental Phonology is used on the lower side to show the tone pattern of the words. In the subsequent representations, only the charts of Autosegmental Phonology are used because the CV-tier, which exists in Autosegmental Phonology, is capable of showing the weight structure of the syllables. Relevant details on stress are found in Chapter 4.





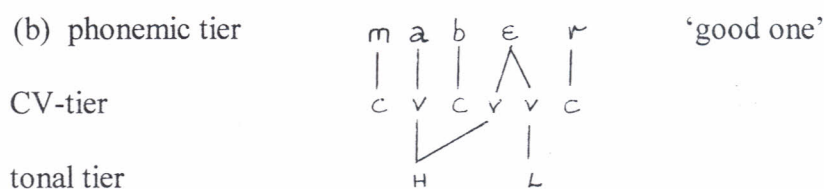
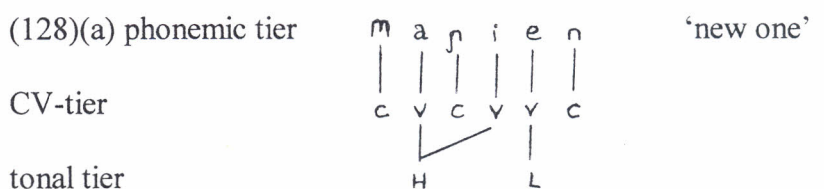
Notice that the CV-tier appears twice because on one side there is Metrical Phonology representation, while the other has Autosegmental Phonology representation. The charts in (126) show that the C elements of the CV-tier are neither TBUs nor stress bearing units in Dholuo. In (126), the high-falling tone of the second syllable is represented as a sequence of level tones. The CV-tier shows that the word has a total of three TBUs and three level tones. The Left-to-right Mapping Principle is used in matching the TBUs and tones. Association lines have been used to join the TBUs and tones in a one-to-one fashion from left to right. Each mora therefore has a single tone. Other examples of words in this class are given in (127).

- (127) ʃi\$ko:n ‘kitchen’
- o\$ndiek ‘hyena’
- o\$ciɛŋ ‘name of a person’
- a\$de:k ‘three’
- a\$bi:ch ‘five’
- a\$ŋvɛn ‘four’
- a\$ja:p ‘an abuse’

In each word in (127), the primary word stress is marked. Apart from being

stressed because of the existence of an inherently heavy syllable or a derived heavy syllable, it is also my observation that the second syllable is perceived as being stressed because of the changing pitch.

Dholuo words in Group 5 have the tone pattern H\$HL. The examples of words in this group are given in (128).

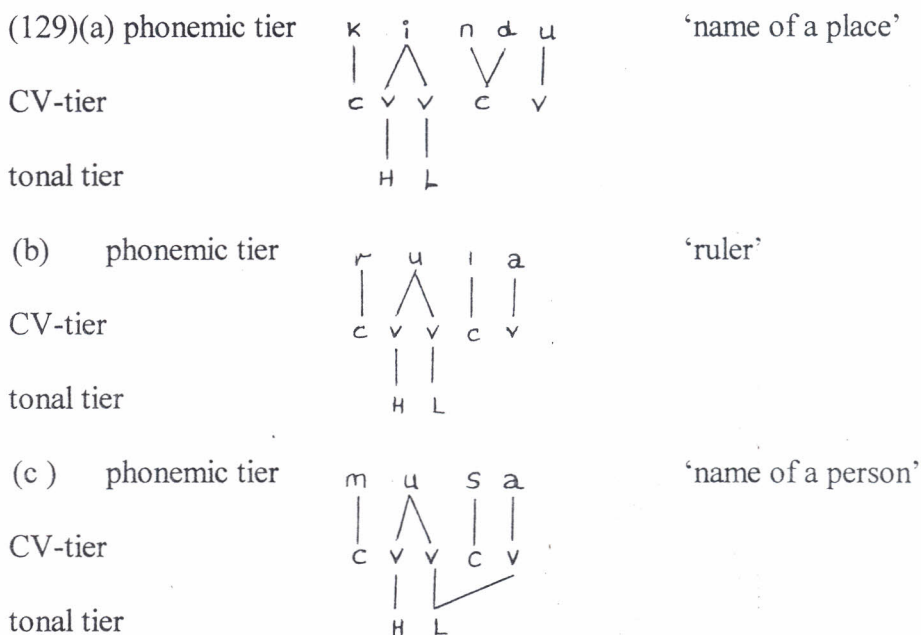


- (c) si\$buor ‘lion’
 ma\$co:n ‘ancient one’
 ma\$le:r ‘clean one’
 ma\$ra:c ‘bad one’
 ma\$ŋε:n ‘many’

Just as in Group 4, the high-falling tone or contour tone is found on the syllable that is heavy and is stressed. The Obligatory Contour Principle is used in the charts in (128). The first syllable has a high tone while the second syllable, which has a contour tone, begins with a high tone. This is then a situation where two adjacent identical autosegments follow one another. In Autosegmental Phonology, the Obligatory Contour Principle does not allow adjacent identical autosegments to follow one another, unless they are separated by word boundary. The high tone of the first syllable in (128)

therefore appears to spread to the first mora of the second syllable. The high tone of the first and second syllables have been collapsed into one.

Dholuo words in Group 6 have the tone pattern HL\$L. Words in this group are very few. Most of them are borrowed from other languages. All the words in this group are represented using the charts of Autosegmental Phonology, in (129) below.



The contour tone of the first syllable coincides with a heavy syllable. The second mora of the first syllable has an L tone. This same tone is found in the mora of the second syllable. The OCP therefore leads ~~me to~~ collapse the L tones, as seen in (129) above.

Words in Group 7 have the tone pattern L\$H!H. This means that a downstep tone exists in the second syllable of these words. According to Kenstowicz (1994:341),

Downstep indicates a situation in which a high tone has a downdrifted phonetic value but there is, at least on the surface, no preceding low tone to mark the division from preceding high, which is articulated at the 'normal' value. Downstep is usually marked by the ! sign placed

between one high and the following downstep high.

Downstep therefore shows a high tone that is realised at a slightly lower pitch than the preceding high tone. Kenstowicz (1994) observes that the analysis of downstep and downdrift is controversial. He adopts the interpretation of downdrift as a left to right parsing of the tonal tier into L H (c.f. Clements (1979) and Huang (1985)). L H forms a tonal feet. This tonal feet is realised or pitched at a slightly lower level than the preceding one.

The downstepped high tone could therefore be analysed as a sequence of LH tone . This tone is quite different from the low-rising (LH) tone because the low tone of the downstepped high is not realised on the surface. It is underlying and could therefore be analysed as a floating tone that precedes a high tone. It has the effect of transforming the high tone that it precedes into a downstepped high tone.

From the explanation of the downstep tone given above, words in Group 7 have the tone pattern L\$HLH. The first syllable has a low tone while the second one has a high-hanging-glide or a high downstepped-high tone. The high-hanging glide does not go to the level of the low tone, unlike the high-falling tone. It remains at the level of the downstep high tone. This tone pattern is mostly found in questions. The examples are given in (130) below.

- (130)(a) phonemic tier a p o l ‘a kind of deer’
- CV-tier v c v v c
- tonal tier L H LH
- (b) a\$ke:l ‘Can I bring?’
- a\$ka:w ‘Can I take?’

a\$ ɔ̌i:r	‘Can I push?’
a\$ ɔ̌ɾ	‘Can I go?’
a\$wa:ŋ	‘Can I burn?’
a\$ma:n	‘Can I look for?’
a\$ku a	‘Can I ask for/ borrow?’

In example (130), the high-hanging-glide, which is a contour tone, occurs on a heavy syllable. All the examples in (130b) are questions and therefore belong to the sentence level. At the sentence level, the H!H tone occurs in both heavy and light syllables. Stress is on the syllable with the H!H tone. Stress is perceived on these syllables because they are heavy and also because of the presence of a contour tone. Where both syllables are *light*, as in the question ‘a\$ ɔ̌ɾ’, the presence of the H!H tone on the second syllable makes it more prominent than the first. The sentence level is beyond the scope of this research. I have therefore just discussed it briefly.

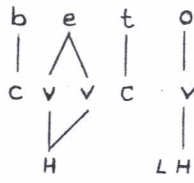
The tonal tier has a floating low tone as seen in (130a). The floating low tone has the effect of making the following high tone a downstepped high tone. It is floating because it is not linked to any segment on the other tiers.

The tone pattern H\$!H (H\$!LH) is found in a majority of words in Dholuo. Words with this tone pattern form Group 8. Most of the words in this group are verbs. A few from other classes such as nouns, pronouns and adjectives also occur in Group 8. In a majority of these words, the downstepped high tone is found on light syllables. The high tone is found on heavy syllables. The downstepped high tone in Dholuo is always preceded by the high tone. The examples of words in this group are given in (131).

(131)(a) phonemic tier

CV-tier

tonal tier

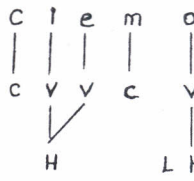


‘slashing’

(b) phonemic tier

CV-tier

tonal tier



‘food / eating’

(c) bi:\$ro ‘coming’

ci:\$do ‘to be dirty’

go:\$ro ‘drawing’

ge:\$do ‘building’

ha:\$mo ‘yawning’

ko:\$mo ‘planting’

ke:\$ndo ‘matrimony’

ma:\$ra ‘mine’

re:\$go ‘grinding’

(d) bu:\$pɿɔ ‘to smile’

cie:\$do ‘frying’

gue:\$jo ‘to bark’

kue:\$lo ‘stealing’

luo:\$ko ‘washing’

pɿɛ:\$rɔ ‘laughing’

ɲie:\$lo ‘python’

rie:\$mbo ‘driving’

tua:\$ro ‘snoring’

wuo\$jo 'talking'

(e) ma\$ri:ɛɲ 'shining'

ma\$du:ŋ 'smelling one'

The high tone on the first syllable makes the length of the syllable quite distinct or audible. It is clear from the high tone that the first syllables of (131a), (131b), (131c), and (131d) have a longer duration than those of (131e), which have short vowels. The high tone therefore has the effect of making the weight of the syllable more noticeable or distinct.

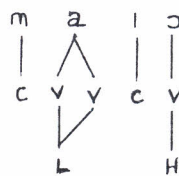
The H\$!H (H\$!LH) tone pattern is mostly found in bisyllabic words with vowels that are articulated when the tongue root is advanced, that is [+ATR]. Only a few are articulated with a retracted tongue root, that is [-ATR]. Those that are [-ATR] include buɔ\$ɲɔɔ, ɲi:ɛ\$ɔ and ma\$ri:ɛɲ in our examples. All the rest of the words in Group 8 have vowels that are [+ATR].

Words in Group 9 have a L\$H tone pattern. A majority of words in this group have CV:\$CV structure. The examples of words in this group are given in (132).

(132)(a) phonemic tier

CV-tier

tonal tier

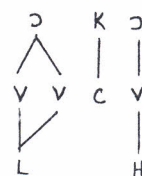


'up'

(b) phonemic tier

CV-tier

tonal tier



'outside'

(c) nda\$lo 'days'

bu:\$ŋgu 'forest'

ki:\$di	‘stone’
ke:\$ndo	‘again’
wɪ:\$pɔ	‘bird’
nɔ:\$nɔ	‘useless’
po:\$lo	‘heaven’
(d) a\$lɔ:t	‘vegetable’
o\$ko:t	‘bell’
ra\$ɔ:ŋ	‘yellow’
(e) ʃa\$duŋ	‘old man’
ʃa\$puŋʃ	‘teacher’
ra\$buon	‘potato’
(f) kua\$ru	‘your grandfather (endearingly)’
puo\$ðo	‘garden’
(g) a\$ŋɔ	‘what’
pa\$θɪ	‘child’
da\$pi	‘water pot’
(h) ɔ\$gʋɛ	‘lizard’

The examples show that the high tone occurs on syllables that are considered to be heavy, as well as on those that are considered to be light. The words in (132) also show that the low tone is found on both heavy and light syllables. Unlike the low tone, the high tone helps to emphasize the weight structure of the syllable. The existence of a high tone on a particular syllable makes its duration more distinct or clear. For example, the light syllables of example (132 c) are more distinct than those of (132 d). The distinctness is

attributed to the existence of a high tone on the second syllable of words in (132 c). The light syllables of (132 d) have a low tone and therefore one has to be quite keen to be able to detect that the syllables are light. Likewise, the heavy syllables of (132 d) and (e) are more distinct than those of (132 c) and (f). The heavy syllables of the former have a high tone, while those of the latter have a low tone.

Words that form Group 10 have a H \$ H tone pattern. There are many words in Dholuo with this pattern, as seen in example (133).

(133)(a) phonemic tier

CV-tier

tonal tier

k i t e

c v v c v

H

'stones'

(b) phonemic tier

CV-tier

tonal tier

n e r a

c v v c v

H

'uncle'

- (c) na:\$kɔ 'girl'
- ti:\$gɔ 'bead'
- we:\$ndo 'visitor'
- mɔ:\$kɔ 'others'
- he:\$ra 'love'
- ða:\$kɔ 'woman'
- ða:\$nɔ 'human being'
- e:\$ka 'then'
- ta:\$dɔ 'roof'
- (d) mua\$ndu 'wealth'

pie\$go 'jealous'
 nuo\$go 'lice'
 nuo\$no 'generosity'

In (133 a) and (b) above, the high tone is seen to spread from the first vowel to the last vowel of the bisyllabic words. The words therefore have a uniform tone. Once again the high tone has the effect of making each syllable distinct. The existence of the high tone makes it easy to tell whether a syllable is light or heavy.

The last group of bisyllabic words, that is, Group 11 has a L \$ L tone pattern as seen in the examples in (134).

(134)(a) phonemic tier

CV-tier

tonal tier

'to sit'

(b) phonemic tier

CV-tier

tonal tier

'to roast'

(c) c v : \$ n > 'to force'

ca : \$ m > 'to eat'

r : \$ d > 'to climb'

ke : \$ to 'to put'

ma : \$ r > 'mother-in-law'

r r : \$ ŋ g > 'to run'

(d) c v a \$ d > 'to beat'

f v ε \$ p > 'to find out'

gυε\$ηɔ	‘chicken’
luo\$ŋgo	‘to call’
θie\$ðo	‘to treat’
tυɔ\$ɾɔ	‘sisal’
(e) cieɡ\$ni	‘near /close’
lvɑŋ\$ni	‘house fly’
cvaɾ\$ni	‘bed bags’
mbv ak\$ni	‘unsettled behaviour’
(f) rik\$ni	‘to hurry’
kud\$ni	‘worm’
θir\$no	‘state of not growing’
(g) ɔ\$ɡv al	‘frog’
ʃɔ\$kv aθ	‘herdsmen’
ʃ a\$ʃv ak	‘witch/ wizard’
ra\$buor’	‘brown’
(h)ɔo\$ti:c	‘workers’
o\$pu:k	‘tortoise’
ra\$ca:r	‘white’
ra\$te:ŋ	‘black’
(i) cak\$ɾvɔ k	‘beginning’
dɔ ŋɡ\$ɾvɔ k	‘advancement’
wic\$kuot	‘embarrassment/ shame’
war\$ɾvɔ k	‘salvation’
(j) jv ag\$ɾvɔ k	‘pleas/ cries’

puop^ɲʃrɔ̌k 'learning'

wuond^ɲʃrɔ̌k 'pretense'

rɔ̌ak^ɲʃrɔ̌k 'dressing'

(k) wuok^ɲʃti:c 'Monday'

wic^ɲʃba:r 'headache'

ɪc^ɲʃwa:ŋ 'anger'

wic^ɲʃwi:l 'forgetfulness'

The examples in (134) show that most bisyllabic words in Dholuo have a L \$ L tone pattern. The low tone does not make me easily detect whether a syllable is light or heavy. In other words, it does not have the effect of making each syllable distinct, unlike the high tone.

A word in Group 12 has a H\$L tone pattern. The one word so far identified in this group is ʃam^ɲʃni 'domestic animals in general'. This tone pattern does not seem to be common among Dholuo words.

5.3 Tone in Trisyllabic words

Trisyllabic words in Dholuo display varying tone patterns. There are trisyllabic words with a low tone on the first syllable, a high-falling tone on the second syllable and a low tone on the third syllable (L \$ HL \$ L). These words form Group 13. The charts in (135a) and (b) give a diagrammatic illustration of the tone pattern of words in this group. Other examples are given in (135c) and (d).

(135)(a) phonemic tier a r ɪ j ɔ ‘two’
 CV-tier | | / | |
 v c v v c v
 tonal tier | | | / |
 L H L

(b) phonemic tier ɔ g a n d a ‘beans’
 CV-tier | | / | / |
 v c v v c v
 tonal tier | | | / |
 L H L

(c) a\$bo:\$ro ‘eight’

ɔ\$ga:\$lɔ ‘name of a person’

ɔ\$so:\$gɔ ‘weaver bird’

a\$pa:\$ŋgɔ ‘name of a person’

o\$te:\$ŋga ‘hawk’

o\$do:\$ŋgo ‘name of a person’

ɔ\$ju:\$ma ‘nonsense’

a\$ke:\$lo ‘name of a person’

(d) o\$tie:\$no ‘name of a person’

ɔ\$lu:\$nda ‘cockroach’

o\$bie:\$ro ‘name of a person’

In all the words in examples (135), the contour tone is on the syllable that is heavy. It is this same syllable that receives the main word stress. Once again, the contour tone on the second syllable of each word is treated as a sequence of level tones. The second syllable of these trisyllabic words is perceived as being stressed because of the changing pitch (apart from their duration). The second mora of the second syllable in (135) has a low tone. The third syllable also has a low tone. These two tones, as seen in (135a) and (b)

are collapsed into one, as required by the OCP.

Words in Group 14 have the tone structure L\$HL\$H. In the words in this group, the main word stress is on the second syllable which also has a contour tone. This second syllable is also heavy. The examples of the words in this group are given in (136) below.

(136)(a) phonemic tier	a	k	i	ɲ	i	'name of a person'
CV-tier			^			
	v	c	v	v	c	v
tonal tier						
	L		H	L		H

(b) phonemic tier	a	t	ɔ	ɔ	g	a	'basket'
CV-tier			^	^			
	v	c	v	v	c	v	
tonal tier							
	L		H	L		H	

(c) a\$ku:\$ru 'dove/ pigeon'

a\$ðo:\$la 'wound'

ɔ\$me:\$ra 'kinsman'

o\$gu:\$du 'hat'

o\$ri:\$ti 'bye'

a\$ɲɔ:\$ga 'medicine man'

a\$ɲɔ:\$jɔ 'rabbit'

(e) ti\$mu:\$ru 'please do (plural)'

be\$du:\$ru 'please sit (plural)'

ke\$lu:ru 'please bring (plural)'

ne\$u:\$ru 'please see (plural)'

(f) kɔa\$u:\$ru 'please ask for (plural)'

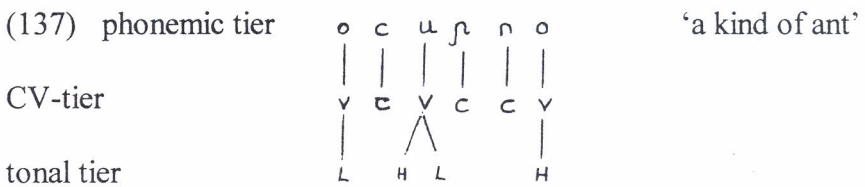
cɪe\$lu:\$ru 'please fry (plural)'

nɔ \$lu:ru ‘please give birth (plural)’

dɔ \$ku:\$ru ‘please return (plural)’

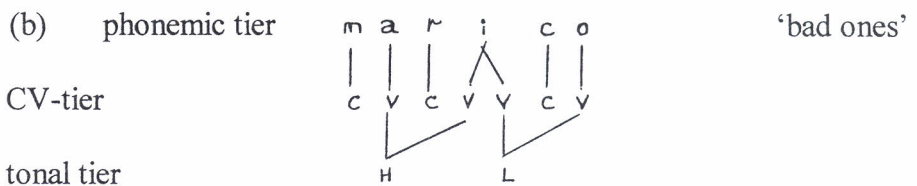
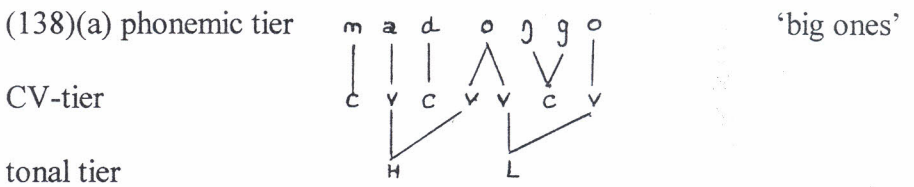
(g) o\$cvpno ‘a kind of ant’

The word in (136g) is the only trisyllabic word in my data with a contour tone on the syllable that is not heavy. All the syllables in this word are light. In this word, the mora of the second syllable would therefore have two tones associated with it, as seen in (137) below.



One TBU is associated with two tones on the tonal tier. In all the other examples in (136), there are four TBU's and four tones. When the Mapping Principle is applied, each tone is joined to a TBU in a one-to-one fashion from left-to-right.

Group 15 of words in Dholuo has a H\$HL\$L tone pattern. Words in this group are given in (138).



(c) ma\$ɬɪ:\$ndɔ ‘small ones’

ma\$ka:\$rɛ ‘exact’

ma\$la:\$ndɔ 'brown or light one'

(d) ma\$cie\$ko 'short ones'

ma\$cieg\$ni 'close'

The middle syllable of these trisyllabic words is heavy. It is this same syllable that has a contour tone and is stressed. There are just a few words in this group.

Words in Group 16 have a H\$HL\$H tone pattern. The words in this group are few. The examples of the words in this group are given in (139).

(139)(a) phonemic tier g o k i ɲ i 'morning'

CV-tier c v c v v c v

tonal tier H L H

(b) ma\$ciɛ\$ɪɔ 'another one'

ka\$wuo\$no 'today'

(c) ma\$ɲɔ:\$ɲɔ 'useless/ empty'

mɪ \$rɪ:\$ma 'anger'

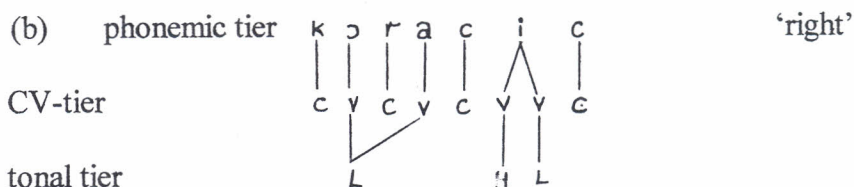
The second syllable of each word is heavy and is stressed as well. The contour tone is also on this syllable.

Some words with a doubled vowel on the third or last syllable have a contour tone on this same syllable. This heavy syllable is stressed. These words form Group ¹⁷16 and they have the L\$L\$HL tone pattern. The words in this group are given in (140).

(140)(a) phonemic tier k ɔ r a c a m 'left'

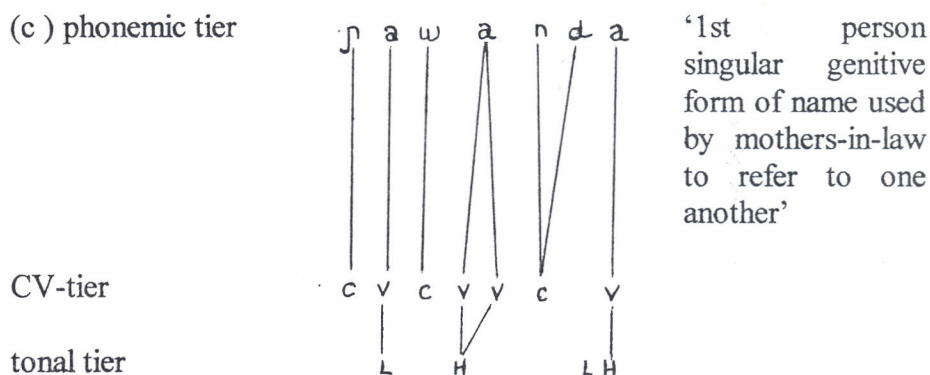
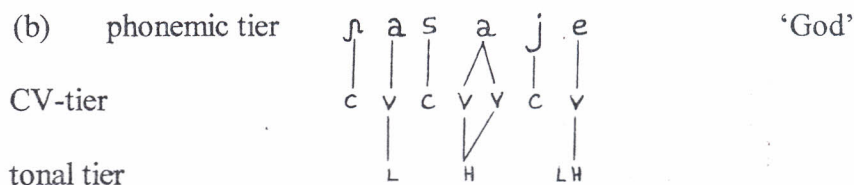
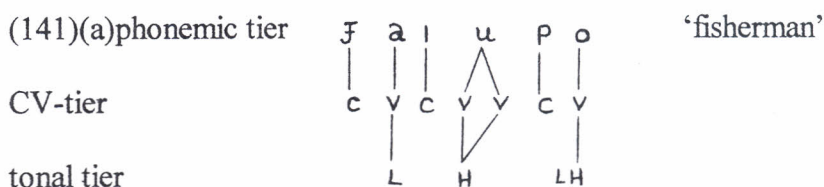
CV-tier c v c v c v c

tonal tier L H L



Group 18 of words in Dholuo has a L\$H\$!H (L\$H\$!H) tone pattern.

The words in this group are given in example (141).



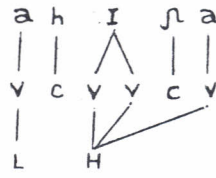
The downstepped high tone comes after the high tone, as seen in (141) above. The high tone on the middle syllable makes the weight of that syllable distinct. The penultimate syllable is heavy.

Words in Group 19 have the tone pattern L\$H\$H. There are quite a number of words in this group. The examples are given in (142) below.

(142)(a) phonemic tier

CV-tier

tonal tier

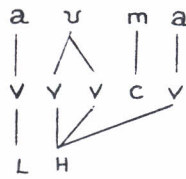


‘very’

(b) phonemic tier

CV-tier

tonal tier



‘name of a person’

(c) a\$gu:\$lu ‘pot’

a\$dɪ:\$ta ‘basket’

a\$ta:\$rɔ ‘inside out’

ba\$ru:\$pe ‘letters (loan)’

gi\$mɔ:\$rɔ ‘something’

ma\$ɲv:\$rɔ ‘woman who has just given birth’

pa\$ɾɔ:\$mbɔ ‘lamb’

ɔ\$ga:\$nda ‘crowd/ tribe/ nation’

(d) a\$ɸvɔ \$εε ‘rabbits’

a\$gɯa\$ta ‘calabash’

a\$ðia\$mbo ‘name of a person’

ɔ\$bɯɔ \$ŋgɔ ‘brain’

o\$ndie\$gi ‘hyenas’

ra\$kuas\$ro ‘red’

ra\$kuo\$mbe ‘hunch backs’

All the penultimate syllables are heavy and have a high tone. The first

and last syllables are light. The first syllable has a low tone, while the last has a high tone. The high tone on the second syllable has the effect of making the increased or long duration of that syllable more audible or distinct. The high tone of the third syllable has the effect of making the short duration of the light syllable more audible.

Group 20 of words in Dholuo has a L\$L\$H tone pattern. The examples of words in this group are given in (143).

(143)(a) phonemic tier

o

r

i

n

d

i

v

c

v

y

c

v

L

H

low stool

(b) phonemic tier

b

a

ɲ

ʃ

ɔ

r

ɛ

c

v

c

v

c

v

L

H

get squashed

(c)

o\$si:\$ki

‘bush’

ɔ\$ɖu:\$ma

‘maize’

o\$ko:\$lo

‘millipede’

o\$ru:\$ca

‘day after tomorrow’

(d)

ci\$ko\$re

‘to jump’

ga\$ɲɔ\$re

‘complicated’

go\$ndo\$re

‘crooked /meandering’

ku\$lo\$re

‘to bend (reflexive)’

pa\$ko\$re

‘to praise (reflexive)’

ɲa\$ɖɔ\$re

‘to cut (reflexive)’

(e)

o\$tie\$no

‘name of a person’

a\$die\$ri 'truth'

(f) d u a \$ n a \$ r e 'to mess'

kuo \$ n o \$ r e 'to swear'

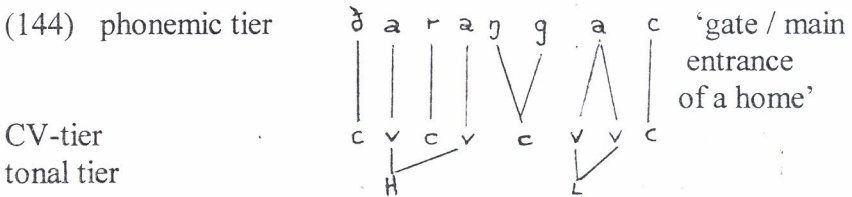
l u o \$ k o \$ r e 'to shower /bath'

m u o \$ m o \$ r e 'to rush unexpectedly'

r u o \$ k o \$ r e 'to dress (reflexive)'

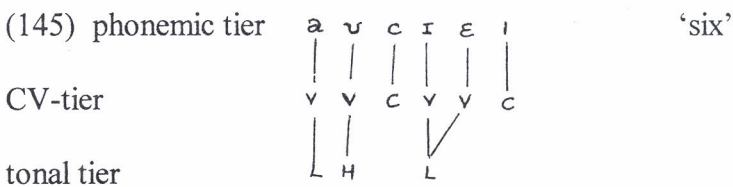
The high tone of the third or last syllable of the word has the effect of making the short duration of that syllable quite audible.

The trisyllabic word that forms Group 21 has a H\$H\$L tone pattern , as seen in (144).



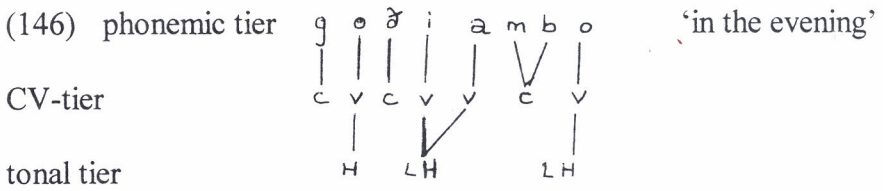
The high tone on the first and second syllables makes the duration of the two syllables more distinct than that of the third syllable which has a low tone.

The word in Group 22 has a L\$H\$L tone pattern, as seen in (145).



In (145), it is the third or last syllable of the word that is stressed. This syllable has a low tone. The first two syllables are light and not stressed. However, the high tone on the second syllable can be misleading because it can make one wrongly indicate that primary word stress is on that syllable. The high tone has the effect of making the second syllable quite audible.

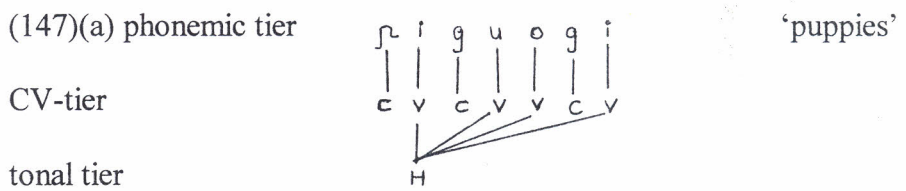
The trisyllabic word in Group 23 has a H\$!H\$!H (H\$!LH\$!LH) tone pattern, as seen in (146).



The high tone on the first syllable has the effect of making its short duration quite noticeable.

The second and third syllables of the word in Group 23 have a downstepped high tone. The pitch of the second syllable of this word is slightly lower than that of the first syllable which has a normal high. The pitch of the third syllable is slightly lower than that of the second syllable. The third syllable therefore has a lower pitch than the first two. The tones of the second and third syllables are affected by the floating low tones preceding the high tones.

Group 24 of words in Dholuo has a H\$H\$H tone pattern. This high tone has the effect of making the length of each syllable quite noticeable. The examples of words in this group are given in (147).



- (b) ka\$ma:\$nɔ̃ ‘that way /like that’
- ma\$ŋgɛ:\$ma ‘whole /alive one’
- mɛ:\$sɔ̃:\$mba ‘unmarried person’
- ma\$se:\$ra ‘trouble’

Dholuo words in Group 25 have a L\$L\$L tone pattern. There are very many words in this group. The examples of words in this group are given in (148) below.

(148)(a) phonemic tier
CV-tier
tonal tier

‘river’

(b) phonemic tier
CV-tier
tonal tier

‘vegetables’

(c) a\$gu:\$ce ‘pots’

ʃa\$t ε:\$lɔ ‘leader’

ʃɔ\$dɔ:\$ŋgɔ ‘elders’

pa\$rɔ:\$ja ‘calf’

ɔ\$bɔ:\$kε ‘leaves’

ɔ\$ɕɪ:\$kɔ ‘nine’

ra\$bo:\$lo ‘banana’

(d) pa\$gυε\$no ‘chick’

o\$sie\$pe ‘friends’

(e) o\$die\$ciɛŋ ‘day time’

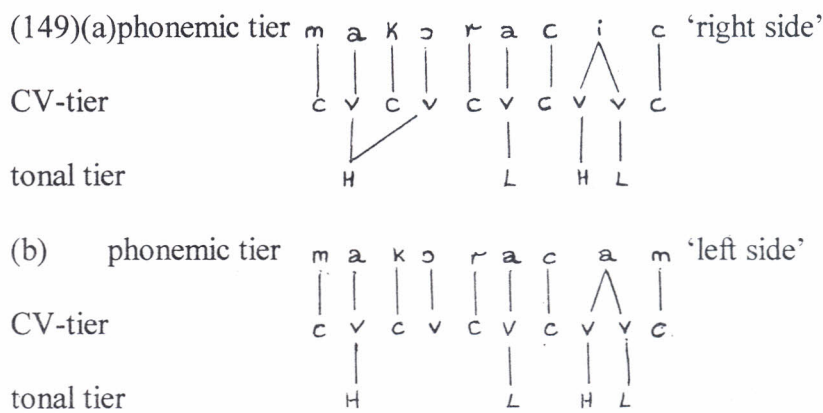
(f) θɔ\$mr\$nr ‘safari ants’

The low tone, just like the high tone is found in both light and heavy syllables.

5.4 Tone in Polysyllabic words

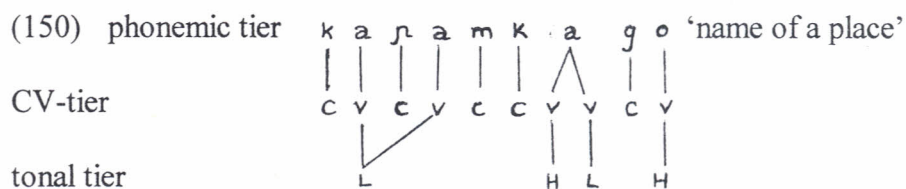
As already stated in section 4.3, polysyllabic words in Dholuo are not many. The examples of words that portray the various tone are therefore not many.

Words in Group 26 have a H\$H\$L\$HL tone pattern. The words that portray this tone pattern are given in (149).



The last syllable of the word is stressed and is heavy. That is the same syllable that has a contour tone. The contour tone is a high-falling tone. According to the charts of AP in (149), if syllable boundaries were to be ignored, the tone pattern of the words would be collapsed into HLHL.

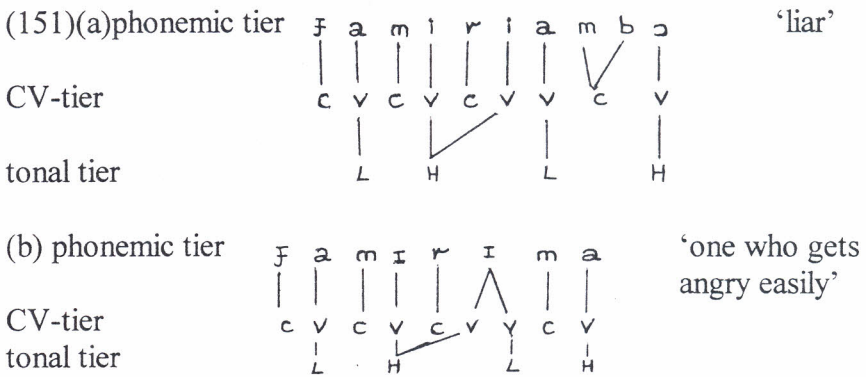
The word in Group 27 has a L\$L\$HL\$H tone pattern, as seen in (150) below.



Example (150) shows that the collapsed tone pattern of the word is LHLH. It is arguable that the high-falling tone is on a heavy syllable. The vowel doubling in the penultimate syllable and the changing pitch are

indicators that primary word stress is on the syllable.

Group 28 of words in Dholuo has a L\$H\$HL\$H tone pattern, as seen in (151) below.



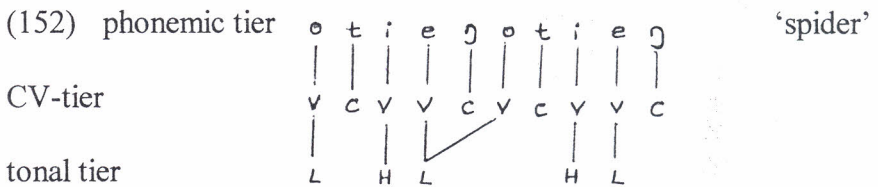
The collapsed tone pattern of Group 28 is similar to that of Group 27.

(151a) shows that the falling tone is on a syllable that is inherently heavy:

(151b) shows that the falling tone is on a syllable that has a doubled vowel.

The contour tone therefore occurs on syllables that are heavy.

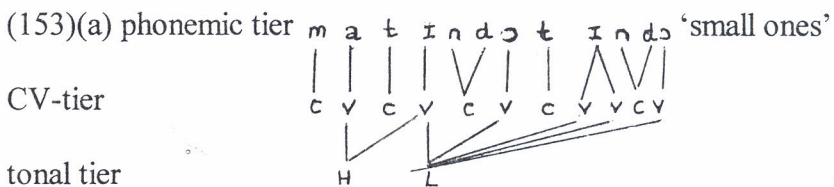
The word in Group 29 has a L\$HL\$L\$HL tone pattern. The diagrammatic illustration of the word in (152) shows that this tone pattern can be collapsed into LHLHL, if syllable boundaries are ignored.

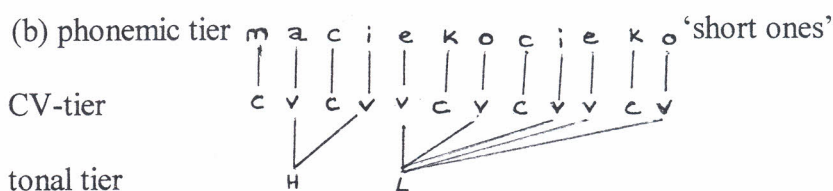


The contour tone is on the two inherently heavy syllables of the word.

Group 30 of words in Dholuo has the tone pattern H\$HL\$L\$L\$L\$.

Words in this group are given in (153), below.



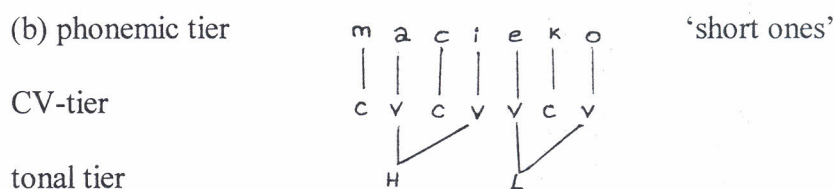
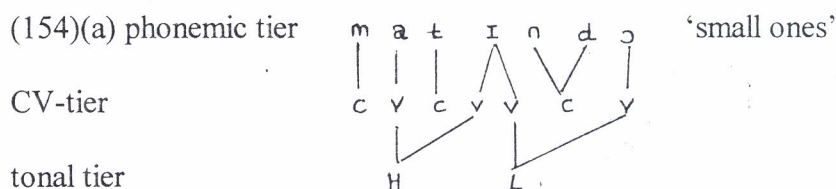


(c) ma\$ d> \$ ng> \$ d> : \$ ng> ‘big ones’

ma\$ ri\$ co\$ ri: \$ co ‘bad ones’

ma\$ bε\$ j> \$ bε: \$ j> ‘good / beautiful ones’

The last two syllables of each of these words is repeated for a wide range of contextually determined nuances of roughly the same communicative significance as -ish in such English words as smallish, bigish, etc. If the last two syllables are left out, the words would still have the same meaning, as seen in (154).



(c) ma\$ d> \$ ng> ‘big ones’

ma\$ ri: \$ co ‘bad ones’

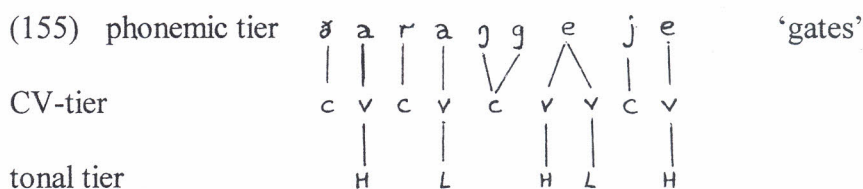
ma\$ bε: \$ j> ‘good / beautiful ones’

As seen in the polysyllabic words in (153a) and (c), the contour or falling tone is on light syllables. In (153b), the contour tone is on an inherently heavy syllable. In (154), the contour tone is on heavy syllables. When the last two syllables of the trisyllabic words in (154) are repeated, the polysyllabic

words of (153) are formed. The doubled vowel of (154a) and (c) become short, as seen in (153a) and (c) and stress is on the new penultimate syllable. The penultimate syllable has a doubled vowel, as seen in (153a) and (c).

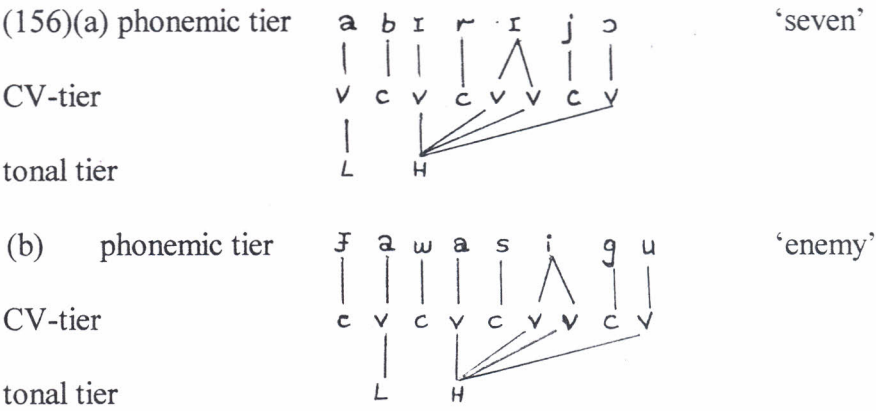
One observable tendency in such words seems to be that when a vowel becomes short because it is no longer in a position where stress is detected, the tone previously associated with it is not deleted. The tone remains. This is illustrated in (153a) and (154 a). In (154a), a high tone is associated with the first mora of the second syllable, while a low tone is associated with the second mora of the same syllable. This means that the heavy syllable has a high falling or contour tone. In (153a), the only mora of the second syllable is associated with both the high and low tone. This means that a light syllable, that was initially heavy due to its position in a word, has retained the contour tone. This is what is known as tone stability in the theory of Autosegmental Phonology (see section 1.7.1.2.7 above). When an element on one autosegmental tier is deleted, it does not necessarily affect the tone it was associated with on another tier.

The word that forms Group 31 has a H\$L\$HL\$H tone pattern, as seen in (155).



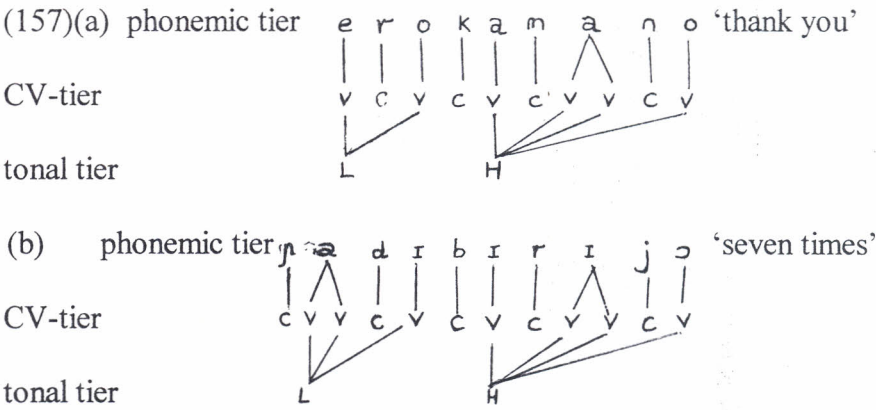
The high tone on the first and last syllables has the effect of making the duration of each syllable quite noticeable. The contour tone is on a heavy syllable.

Group 32 of words in Dholuo has the tone pattern L\$H\$H\$H, as seen in (156).



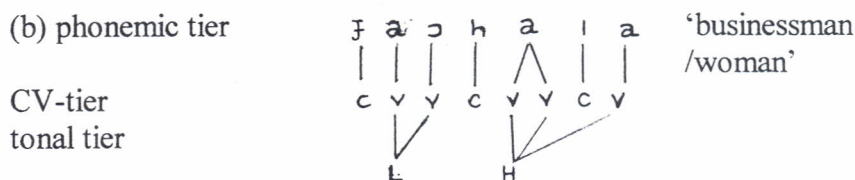
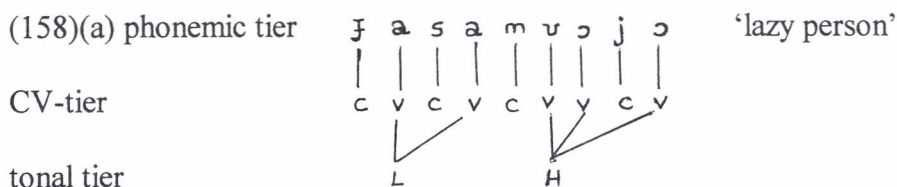
In (156), the duration of the syllables with a high tone is more distinct than that with a low tone.

Group 33 of words has the tone pattern L\$L\$H\$H\$H. The words in this group are given in (157).

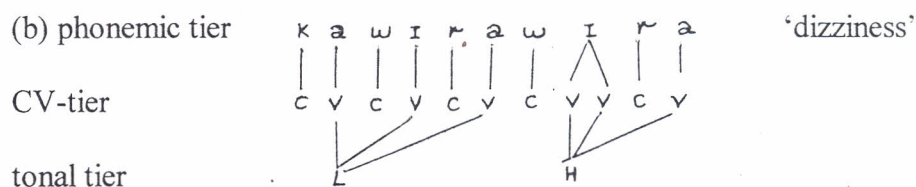
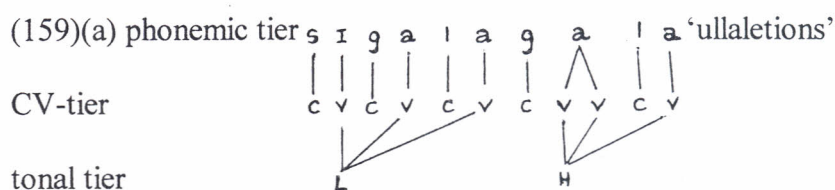


Just as in (156), the duration of a syllable with a high tone in (157) is more distinct than that with a low tone.

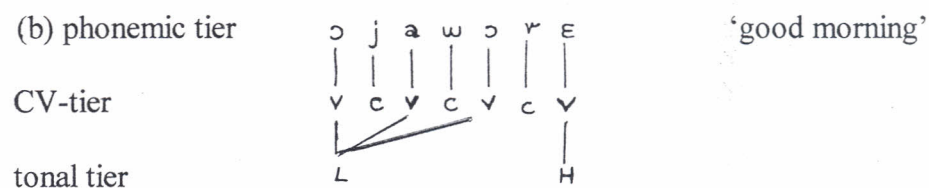
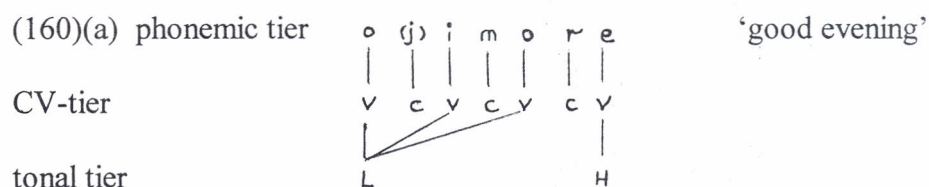
Group 34 of words in Dholuo has the tone pattern L\$L\$H\$H, as seen in (158).



Word in Group 35 have a L\$ L\$ L\$ H\$ H\$ tone pattern, as seen in (159).

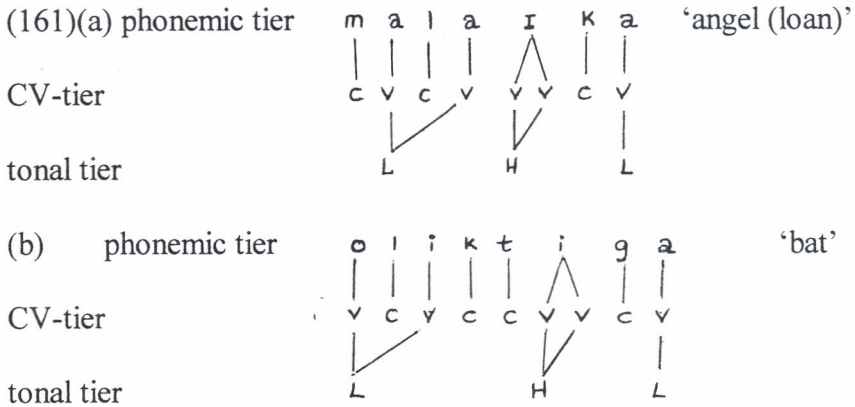


Group 36 of words has the tone pattern L\$ L\$ L\$ H\$, as seen in (160).

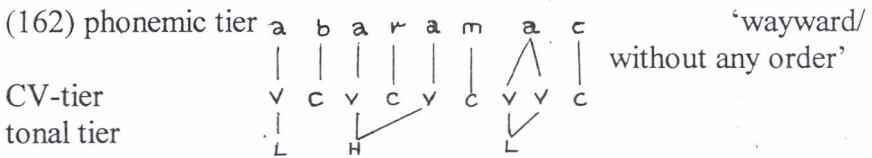


All the syllables in the words in Group 36 are light. The high tone on the last syllable makes its articulation quite distinct, as compared to the syllables with the low tone. The /j/ sound in (160a) is put in brackets because it is optional. The tone patterns of the words in Group 32, 33, 34, 35 and 36 could all be merged to form LH, as seen in the diagrams representing each group.

The polysyllabic words in Group 37 have L\$L\$H\$L tone pattern. The examples of words in this group are in (161). The high tone is on a heavy syllable.

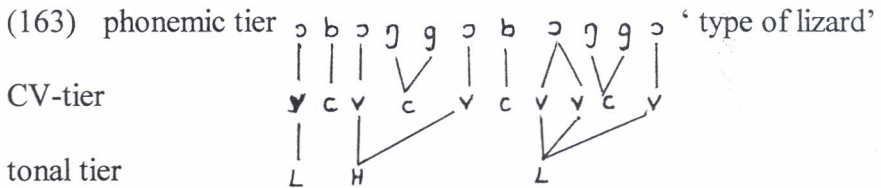


The word in Group 38 has the tone pattern L\$H\$H\$L, as seen in (162).



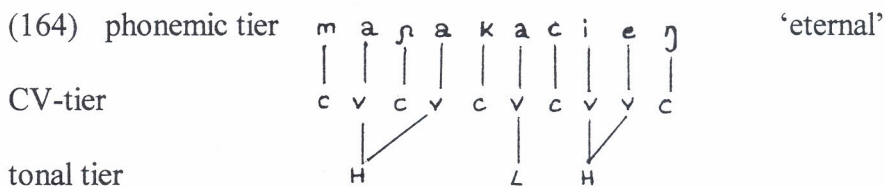
A low tone is on the syllable that is heavy. The high tone on the two middle syllables of the word in (162) makes their short duration quite distinct.

The word in Group 39 has the tone pattern L\$H\$H\$L\$L, as seen in (163).



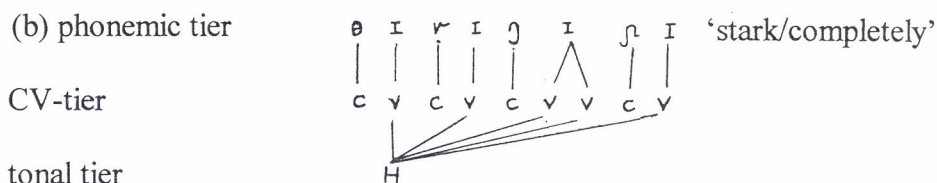
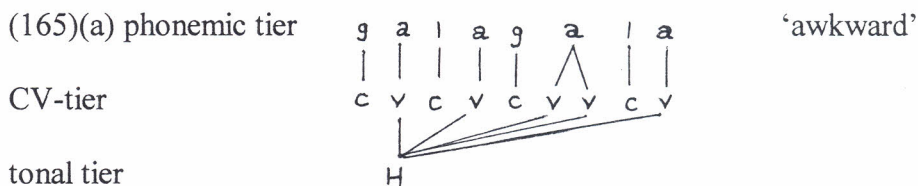
Just as in Group 38, the high tone on the two middle syllables of the word in Group 39 has the effect of making their short duration quite distinct. The tone patterns of the words in Groups 37, 38 and 39 could all be collapsed into LHL tone pattern, as seen in the diagrams representing each group.

The word in Group 40 has the tone pattern H\$H\$L\$H as seen in (164).



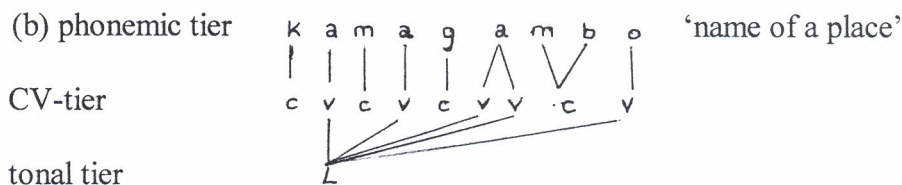
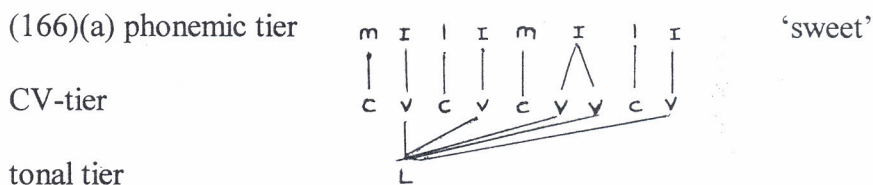
The collapsed tone pattern of this word is HLH. The articulation of each syllable with a high tone is quite distinct.

Group 41 of words has the tone pattern H\$H\$H\$H, as seen in (165).



The high tone makes the articulation of each syllable quite distinct.

Group 42 of words in Dholuo has a L\$L\$L\$L tone pattern. A majority of polysyllabic words are in this group. The words in this group are in (166).



(c) pɪɾ\$le\$pr:\$le ‘everyday’

pɪɾ\$jo\$pr:\$jo ‘quickly’

pa:\$dɪ \$rɪ:\$jɔ̃ ‘twice’

pa:\$dɪ \$bo:\$ro ‘eight times’

(d) ka:\$ra:\$cɔ̃:\$jɔ̃ ‘name of a place’

ta:\$nda:\$wɔ̃:\$ja ‘abundant/ extremely large’

In these words, all the syllables have a low tone.

5.5 Summary

In this section, the tone patterns of Dholuo words are summarized. The groups of words are outlined in (167) below. The weight structure of each group is given on the extreme right. The primary stress of each group is marked where the weight structure of each syllable is given. Since the OCP does not allow a sequence of similar tones, identical tones have been merged and the emerging pattern for each group is put in brackets.

(167)(a) Monosyllabic words

Group 1 : L(L) h/l

Group 2 : H(H) h/l

Group 3 : LH(LH) h/l

(b) Bisyllabic words

Group 4 : L\$HL(LHL) l\$'h

Group 5 : H\$HL(HL) l\$'h

Group 6 : HL\$L(HL) 'h\$l

Group 7 : L\$H!H(LHLH) l\$'h/ 'l\$l

Group 8 : H\$!H(HLH) 'h\$l/ l\$'h

Group 9 : L\$H(LH) 'h\$l/ l\$'h/'l\$l

Group 10 : H\$H(H)	'h\$1
Group 11: L\$L(L)	'h\$/ I\$'h/ h\$'h/'I\$1
Group 12: H\$L(HL)	'h\$1

(c) Trisyllabic words

Group 13: L\$HL\$L(LHL)	I\$'h\$1
Group 14: L\$HL\$H(LHLH)	I\$'h\$/ 'I\$1\$1
Group 15: H\$HL\$L(HL)	I\$'h\$1
Group 16: H\$HL\$H(HLH)	I\$'h\$1
Group 17: L\$L\$HL(LHL)	I\$I\$'h
Group 18: L\$H\$!H(LHLH)	I\$'h\$1
Group 19: L\$H\$H(LH)	I\$'h\$1
Group 20: L\$L\$H(LH)	I\$'h\$/ 'h\$1\$/ 'I\$1\$1
Group 21: H\$H\$L(HL)	I\$I\$'h
Group 22: L\$H\$L(LHL)	I\$I\$'h
Group 23: H\$!H\$!H(HLHLH)	I\$'h\$1
Group 24: H\$H\$H(H)	I\$'h\$1
Group 25: L\$L\$L(L)	I\$'h\$/ I\$h\$'h/ 'I\$1\$1

(d) Polysyllabic words

Group 26: H\$H\$L\$HL(HLHL)	I\$I\$I\$'h
Group 27: L\$L\$HL\$H(LHLH)	I\$I\$'h\$1
Group 28: L\$H\$HL\$H(LHLH)	I\$I\$'h\$1
Group 29: L\$HL\$L\$HL(LHLHL)	I\$h\$I\$h
Group 30: H\$HL\$L\$L\$L(HL)	I\$h\$I\$'h\$/ I\$I\$I\$'h\$1
Group 31: H\$L\$HL\$H(HLHLH)	I\$I\$'h\$1

Group 32: L\$H\$H\$H(LH)	l\$!\$'h\$l
Group 33: L\$L\$H\$H\$H(LH)	h\$!\$!\$'h\$l/ l\$!\$!\$'h\$l
Group 34: L\$L\$H\$H(LH)	l\$!\$'h\$l
Group 35: L\$L\$L\$H\$H(LH)	l\$!\$!\$'h\$l
Group 36: L\$L\$L\$H(LH)	'l\$!\$!\$
Group 37: L\$L\$H\$L(LHL)	l\$!\$'h\$l
Group 38: L\$H\$H\$L(LHL)	l\$!\$!\$'h
Group 39: L\$H\$H\$L\$L(LHL)	l\$!\$!\$'h\$l
Group 40: H\$H\$L\$H(HLH)	l\$!\$!\$'h
Group 41: H\$H\$H\$H(H)	l\$!\$'h\$l
Group 42: L\$L\$L\$L(L)	l\$!\$'h\$l

Some of the tone patterns that are in brackets are similar. For example, the tone patterns of Group 5 and 6 are similar. In (168) all the groups that have a similar collapsed tone pattern are put together. (168) therefore gives a more precise summary of the tone patterns of Dholuo words as reflected by my data.

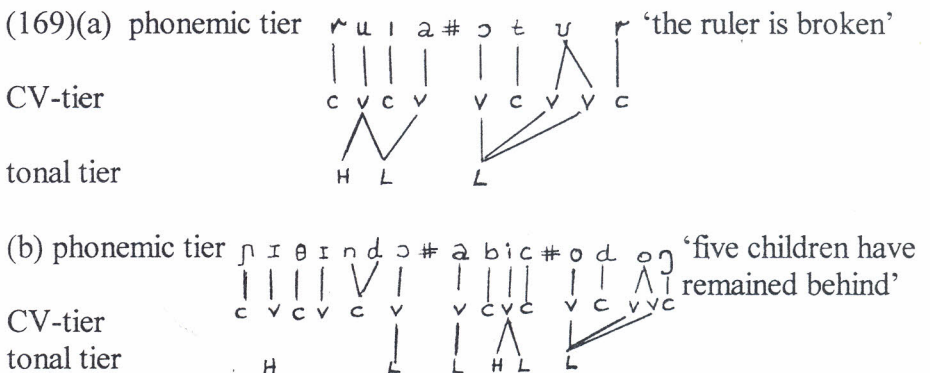
(168)(a) H	(Group 2,10,24 and 41)
HL	(Group 5,6,12,15,21 and 30)
HLH	(Group 8,16 and 40)
HLHL	(Group 26)
HLHLH	(Group 23 and 31)
(b) L	(Group 1,11,25 and 42)
LH	(Group 3,9,19,20,32,33,34,35 and 36)
LHL	(Group 4,13,17,22,37,38 and 39)

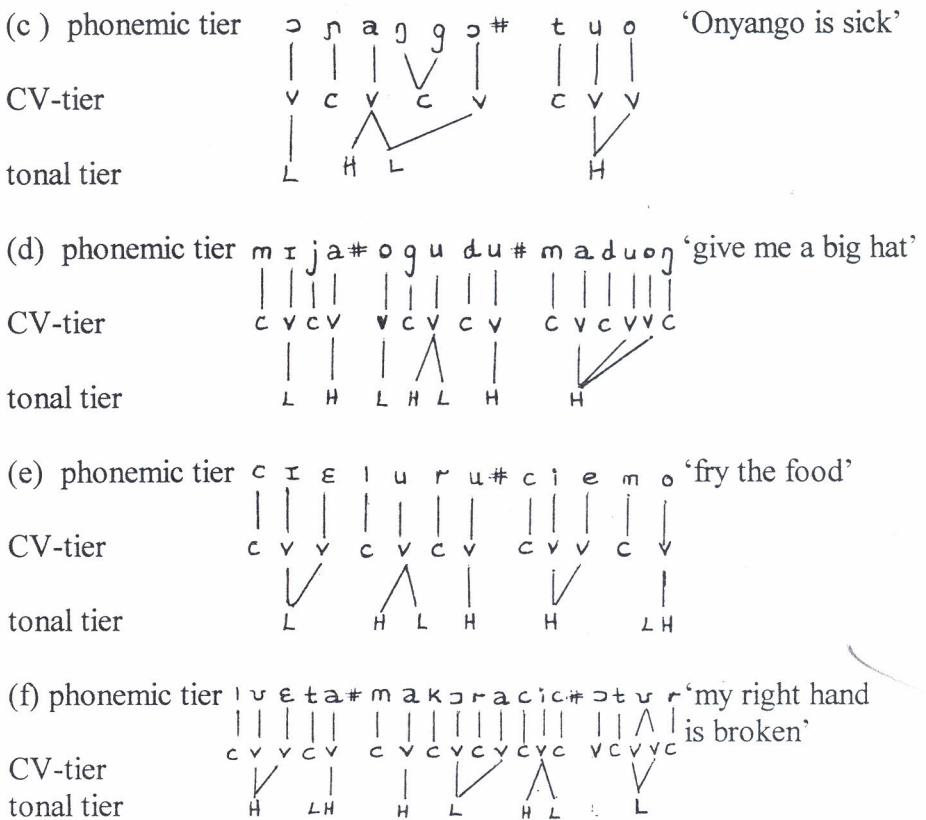
LHLH (Group 7,14,18,27 and 28)

LHLHL (Group 29)

From the summary given in (167), it can generally be stated that the floating low tone and the high-falling tone do not occur in monosyllabic words. The low-rising tone does not occur in words of more than one syllable.

The data analysis done at various stages above also shows that there is a relationship between syllable weight and tone. The high-falling tone, in almost all the cases, is found on syllables that are considered to be heavy. The groups that show this relationship are 4, 5, 6, 13, 14, 15, 16, 17, 26, 27, 28, 29 and 30. The high-falling tone is also found in the position where stress is easily detected in Dholuo. It mostly occurs on the penultimate or the last syllable of a word. This relationship is seen in a majority of Dholuo words, when they are uttered in isolation. It is important to point out that when words in these groups occur in utterance-non-final positions, the syllables that are not inherently heavy become light, as seen in section 4.4. The syllables become light because they occur in the non-final words of the utterance. In other words, they are found in positions that do not attract stress. Though the syllable is light because one mora is lost, the contour tone remains as seen in (169) below.





In Group 14, the word *o\$ɕun\$no* has a high-falling tone on its second syllable. In this word, all the syllables are light. Group 30 also has words with a high-falling tone on light syllables. These are the only two groups with cases of irregularity in the relationship I have stated between syllable weight and tone. These two cases are not sufficient enough to make anyone doubt the conclusion that high-falling tone is found on heavy syllables, in words of more than one syllable, in Dholuo. A majority of these heavy syllables are stressed.

As already stated in section 1.6, the restriction of contour tones to the initial or final positions of a domain could be a clue to the directionality of tonal assignment. Since the falling tone is mostly detected towards the end of a word (that is, in either the penultimate or the last syllable of a word), tonal assignment in Dholuo could be left-to-right. The left-to-right mapping principle has worked well with the Dholuo data. All the TBUs have acquired

their tonal associations through the application of the AC by direct matching or mapping with an underlying tone.

It is also observed that the high tone has the effect of making the duration of each syllable quite clear. When a high tone is on a heavy syllable, it is very clear from an acoustic point of view that the syllable has a short duration. In other words, it is easier to detect the weight structure of syllables with a high tone than those with a low tone.

CHAPTER 6

THE RELATIONSHIP BETWEEN SYLLABLE WEIGHT AND VOWEL PROCESSES

6.0 Introduction

In this chapter, the role of syllable weight in deletion, compensatory lengthening and glide formation is analyzed. In Chapter 4, the syllable types that are considered to be heavy as well as those that are considered to be light are stated. The syllable types that provide an environment for deletion, compensatory lengthening and glide formation are shown in this chapter. The types of syllables that result or emerge from these three phonological processes involving vowels are also shown.

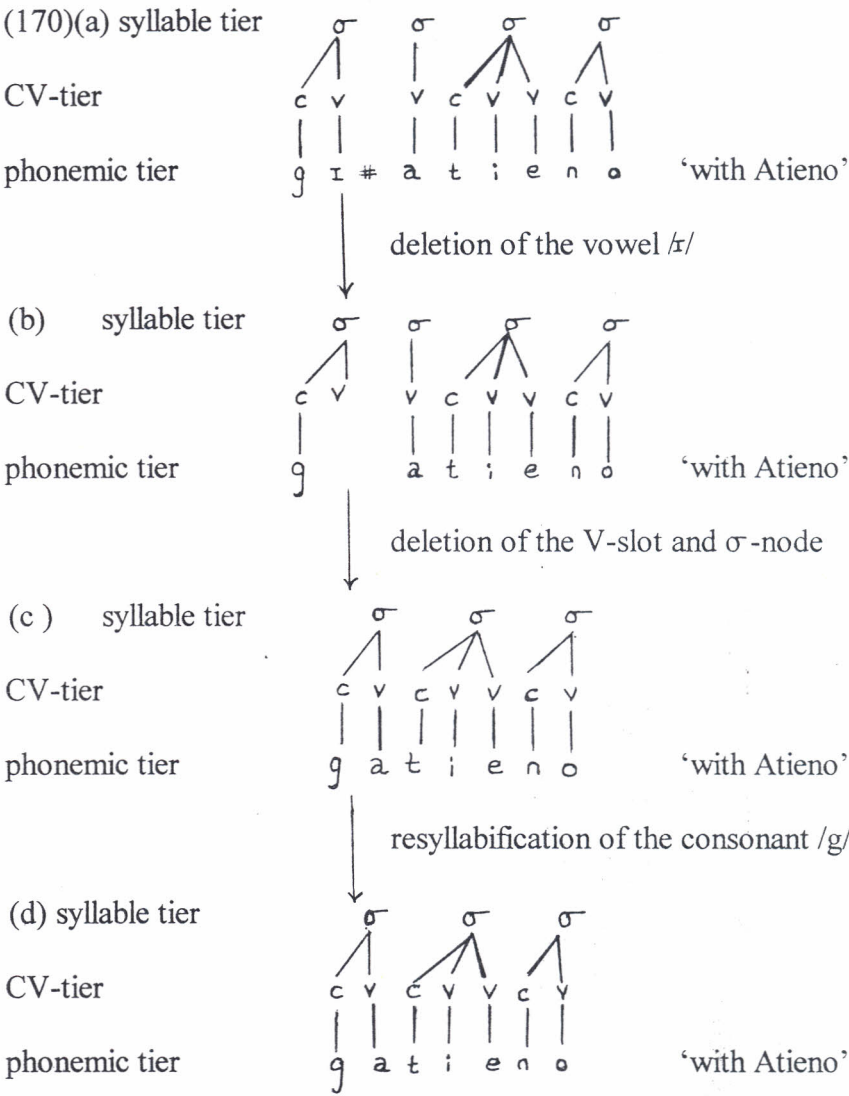
As already noted in section 1.7.2.2, the major phonological processes involving vowels are deletion, compensatory lengthening, glide formation, root lengthening and vowel harmony (Okombo 1982). Odhiambo (1981) includes assimilation in her discussion of these phonological processes. As seen in the discussion in this chapter, some of the examples Okombo (1977, 1982) gives as instances of compensatory lengthening are treated as instances of assimilation by Odhiambo (1981). The present study focuses on compensatory lengthening but not assimilation because in my view, the theory of Autosegmental Phonology is more able to express compensatory lengthening than assimilation using autosegmental notation, as seen from the definition of the former and further explanations of this process in section 6.2 below.

Some of the phonological processes involving vowels have not been discussed in this chapter. Root lengthening has been left out because it has already been discussed in section 4.4. Vowel harmony has also been left out because, in my view, it does not have any crucial relationship with syllable weight in Dholuo. In other words, vowel harmony falls beyond the scope of this study.

It is important to point out that whereas the researches done by Okombo (1977,1982) are based on the KSN dialect of Dholuo, Odhiambo (1981) is based on B-U dialect. As far as these phonological processes are concerned, the two dialects do not differ significantly. Though this chapter draws a lot from the discussions of Okombo (1977, 1982) and Odhiambo (1981), I feel that it is a very necessary chapter because it analyses in detail the relationship between syllable weight and the three vowel processes (namely deletion, compensatory lengthening and glide formation). The studies by Okombo and Odhiambo do not dwell much, if at all, on the role of syllable weight in these vowel processes. The theory used in the analysis below (Autosegmental Phonology) is also different from those used by Okombo and Odhiambo.

The three tiers that are used to express the relationship between syllable weight and the relevant vowel processes are the syllable tier, CV-tier and the phonemic tier. The syllable tier and CV tier jointly show the weight of each syllable. The phonemic tier shows the segments that delete, lengthen (double) or glide. Association lines show the relationship between elements on the three tiers. Such lines therefore help me to express instances of

deletion, ressociation, lengthening (doubling) or gliding. To briefly illustrate how the theory is used, an example involving the process of vowel deletion is given in (170) below.



sound /g/ is ressociated or resyllabified . It is joined to the nearest syllable which in this case is on its right. The ultimate goal of autosegmental analysis will have been achieved using Dholuo data. Goldsmith (1990:74) summarises this goal 'as being':

the reduction of natural phonological processes to changes that can be expressed in the minimal autosegmental notation, a notation that includes at its core just deletion and ressociation.

The discussion that follows begins with deletion, followed by compensatory lengthening and then glide formation. In the discussion of deletion, compensatory lengthening is mentioned. In the discussion of compensatory lengthening, deletion is also be touched on because there are instances of deletion that lead to compensatory lengthening. The two processes cannot therefore be separated or kept apart entirely. The terms compensatory lengthening and compensatory doubling are used interchangeably because, in my view, when compensatory lengthening takes place, the affected vowel on the phonemic tier appears to be doubled on the CV-tier after occupying the place previously occupied by another vowel. The vowel is doubled because it occupies two positions on the CV-tier instead of one .

The three processes are discussed as they occur in monosyllabic and polysyllabic words. Unlike in Chapter 4 and 5, where polysyllabic words refer to words of four or more syllables, polysyllabic words in this chapter refer to words of two or more syllables. In both monosyllabic and polysyllabic words, the three processes are discussed as they occur at word boundary. When these processes occur at word boundary, it is seen, in section 6.1, 6.2 and 6.3, that

their environment of occurrence is affected by the weight of the syllable. At word boundary, some of these processes change the weight of the syllable, as seen in section 6.2. Where these processes occur word internally (see Odhiambo 1981), it is my observation that they mostly do not have an effect on and are not affected by syllable weight. Word internal vowel deletion is discussed briefly in examples (185), (186) and (187).

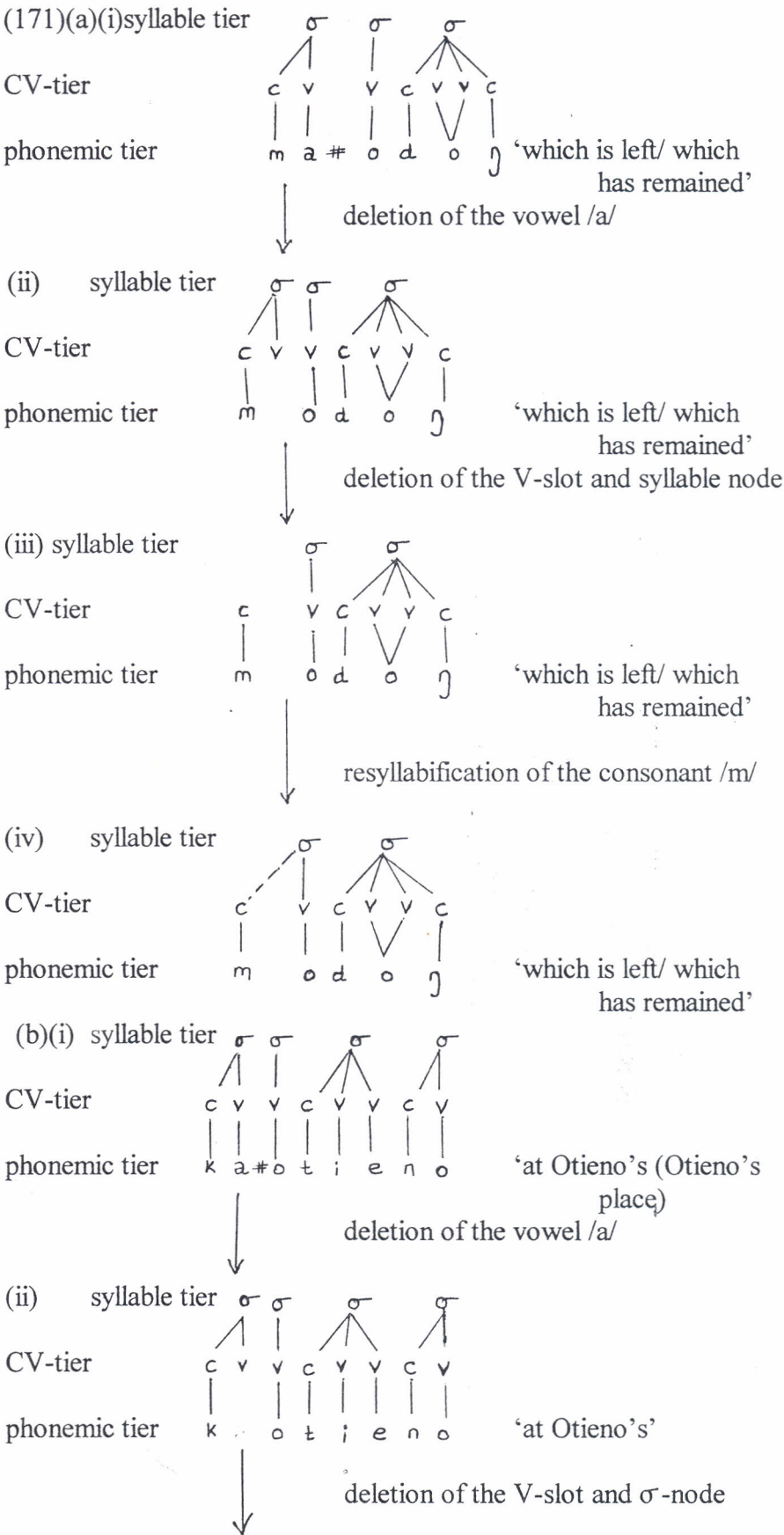
6.1 Vowel Deletion

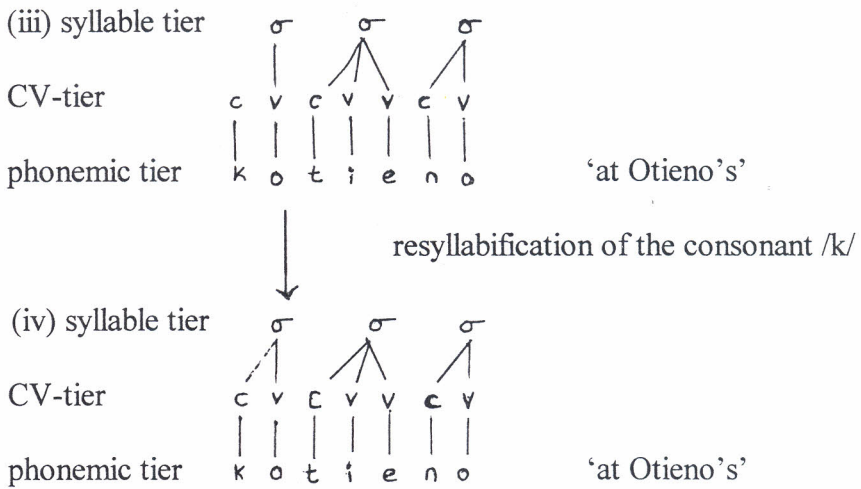
As already stated in section 1.7.2.2, deletion is a process that involves loss of segments (Odhiambo 1981). Apart from vowels, it may involve consonants and syllables. It is therefore the eliding of sounds in certain environments. In this section, only deletions that have an effect on the internal structure of the syllable nucleus are discussed. For example, deletions that involve loss of consonants are left out because as already stated in Chapter 4 (section 4.5), onsets and codas are irrelevant in determining syllable weight. Onsets and codas consists of consonants only.

6.1.1 Vowel Deletion in Monosyllabic Words

The final vowel of a monosyllabic word deletes when it precedes an initial short vowel of the following word. The same observation is made by Omondi(1982), Odhiambo(1981) and Okombo(1982). Okombo(1982) states that it is specifically the non-high vowels that are deleted when followed by a vowel which is in a light syllable. This study shows that both the high and non-high vowels are deleted. The examples in (171) show the environment

where deletion takes place.





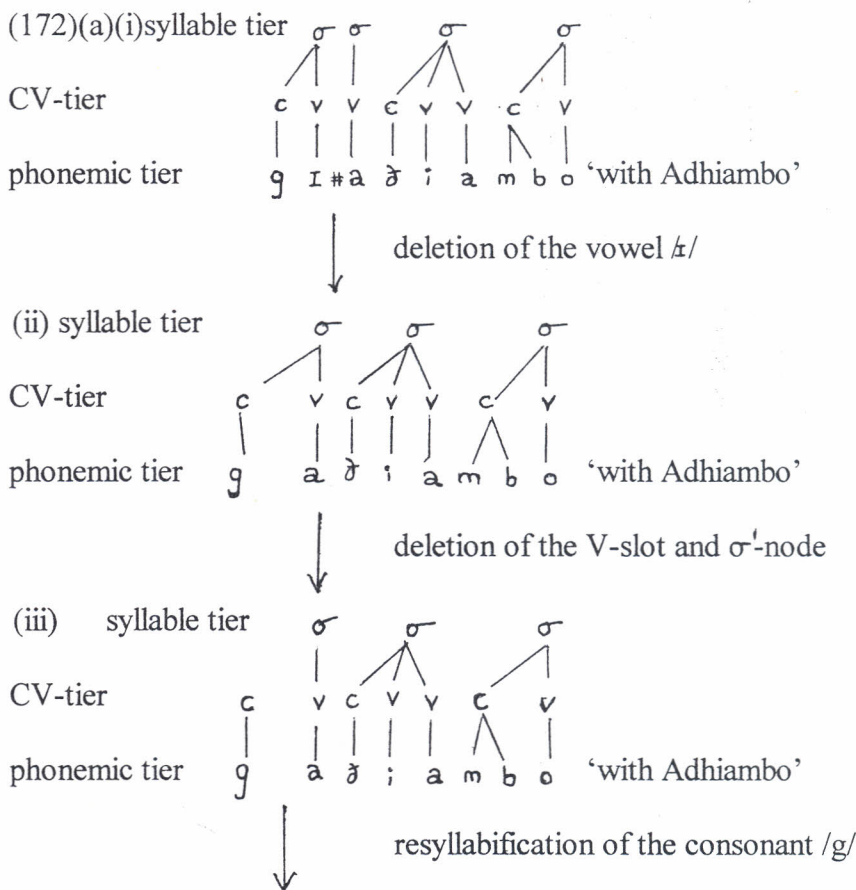
- (c) ka#ɔ \$gʋal → kɔ \$gʋal ‘like a frog’
- ka#i \$ke:\$lo → ki \$ke:\$lo ‘if you bring’
- tɔ#ɪ \$tɪ \$mɔ#ə \$ŋɔ → tɪ \$tɪ \$ma \$ŋɔ ‘but what are you doing’
- ma#o \$ciɛŋ → mo \$ciɛŋ ‘then Ochieng’
- ma#ɔ \$fɪ:\$swɔ → mɔ \$fɪ:\$swɔ ‘which is stupid’

The deletion process is demonstrated clearly in (171a) and (b). In (171a,i) and (171b,i), the diagrammatic illustration of each utterance shows how the utterance is articulated in very slow speech. Each word is uttered individually. In (171a,ii) and (171b,ii), the vowel on the phonemic tier is deleted, therefore it does not appear in the diagrammatic representation of the utterance. In (171a,iii) and (171b,iii), there is no ressyllabification of the floating V-slot on the CV-tier with any other sound on the phonemic tier, the V-slot is deleted. The syllable node is consequently deleted because the most essential part of a syllable is the peak or nucleus, which is always a vowel except in the case of syllabic consonants. Therefore, in the absence of a V-slot that is to be dominated by the syllable node, the syllable node is also deleted. The C-slot on the CV-tier remains floating because it is temporarily not joined to any

syllable node. In (171a,iv) and (171b,iv), the broken association lines between the C-slot and syllable node show that resyllabification has taken place to give the forms that occur in rapid everyday speech.

The last example in (171c) is from Odhiambo(1981). In (171c) all the examples before the arrow show the words in very slow speech. Each of the words is uttered individually. The utterances after the arrow show how the words occur in rapid speech.

All the examples in (171) show that the vowel that is deleted forms a light syllable. The vowel that it precedes at word boundary also forms a light syllable. The individual vowels that are deleted in the words in (171) are all non-high vowels. The high vowels can also be deleted in the same environment , as seen in the words in (172) below.



deletion of the V-slot and σ'-node

(iii) syllable tier

CV-tier

phonemic tier

σ

σ

σ

c

v

c

v

v

c

v

g

ə

ð

i

ə

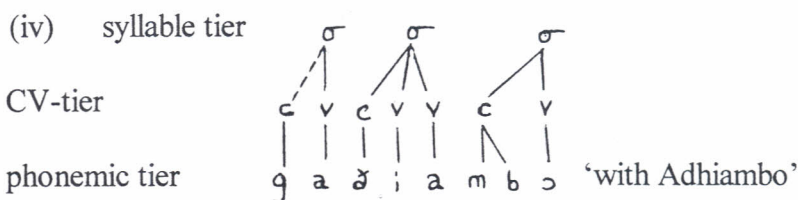
m

b

o

'with Adhiambo'

resyllabification of the consonant /g/



(b) $nɪ \# a\$tuo \longrightarrow na\tuo 'that I am sick'

$nɪ \# u\$cie\$mo \longrightarrow nu\$cie\mo 'that you (plural) are eating'

$a\$pɪ \# jɔ \# gɪ \# o\$do \# ŋgo \longrightarrow a\$pɪ \# jɔ \# go\$do \# ŋgo$ 'Apiyo and Odongo'

$kuon \# gɪ \# a\$lɔ:t \longrightarrow kuon \# ga\$lɔ:t$ 'ugali and vegetables'

$mɪ \# a\$ma \# \$kɛ \longrightarrow ma\$ma \# \$kɛ$ 'until I caught him'

$mɪ \# ɔ \# gɔ \# \$jɛ \longrightarrow mɔ \# gɔ \# \$jɛ$ 'then he beat him'

As already stated in this section and in section 1.7.2.2, Okombo(1982) argues that the non-high or low vowels of Dholuo are deleted when followed by a vowel which forms a light syllable. He then gives the rule that describes this deletion as follows:

$$(173) \begin{bmatrix} V \\ -high \end{bmatrix} \longrightarrow \emptyset \quad \text{---} \quad \begin{bmatrix} V \\ +syllable \\ -heavy \end{bmatrix}$$

To include the observation that even the high vowels delete, the rule would be slightly changed to be:

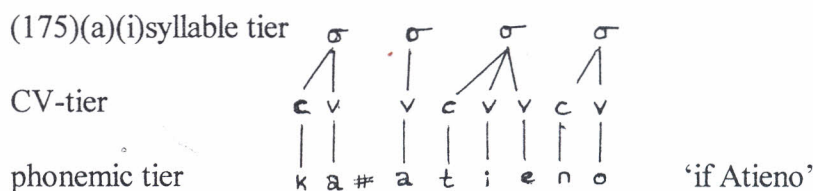
$$(174) \begin{bmatrix} V \end{bmatrix} \longrightarrow \emptyset \quad \text{---} \quad \begin{bmatrix} V \\ +syllable \\ -heavy \end{bmatrix}$$

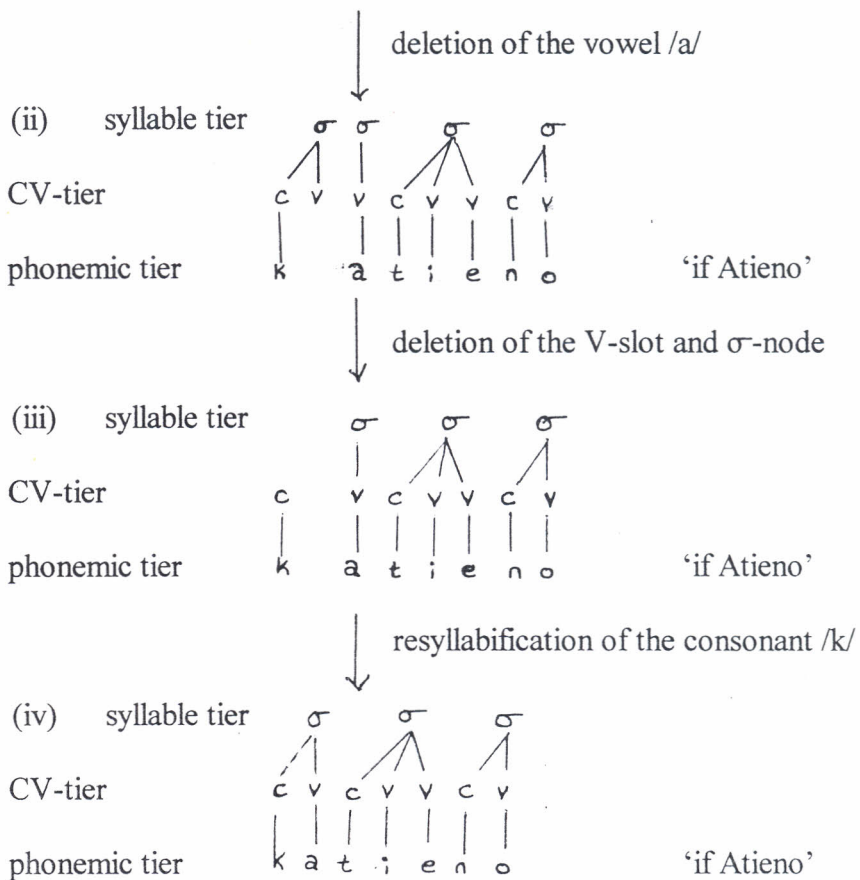
Odhiambo (1981:59) quoting Okombo(1977) in his arguments about the deletion rule given in (173) states that:

Okombo argues that he limits his rule to deletion of the non-high vowels because it is the non-high vowels that regularly undergo deletion. According to him, the high vowels behave normally if they undergo glide formation. Those high vowels that delete are seen as exceptions because they do what only non-high vowels do regularly. He says that if we include the high vowels in the deletion rule then we are hard put to account for the relationship between the process of glide formation and vowel deletion at word boundary in Dholuo. That is, that the high vowels sometimes glide when the structural description of vowel deletion is met.

In my view, just like Odhiambo (1981), the deletion rule should include the high vowels because as the examples in (172) show, they are usually deleted at word boundary when they precede word initial vowels that form light syllables. Since the high vowels can either delete or glide at word boundary, they should be included in both the deletion and glide formation rule. The difference between the words that allow deletion and those that do not could also be lexical. Therefore there may be a need to mark high-vowel final Dholuo words as being (in the lexicon) [+ deletion] or [-deletion]. The difference between monosyllabic content words [+ compensatory doubling] and monosyllabic function words [- compensatory doubling] could also be binary.

Both the high and non-high vowels delete at word boundary when they precede vowels that are similar or identical to them. The examples of utterances which illustrate this are given in (175) below.





(b) $nɪ\#ɪ\ \$ca:m \longrightarrow nɪ\ \$ca:m$ ‘that you eat’

$nɪ\#ɪ\ \$dɔ:\$ɲɪɪ \longrightarrow nɪ\ \$dɔ:\$ɲɪ$ ‘that you get in’

$ka\#a\ \$ŋga:\$ga \longrightarrow ka\ \$ŋga:\ga ‘at Anga ga’s (Angaga’s place)’

$ka\#a\ \$do:ŋ \longrightarrow ka\ \$do:ŋ$ ‘if I remain’

$tɔ\#\# \ \$ðɪ\#ka:\$ɲɛ \longrightarrow tɔ\ \$ðɪ\ \$ka:\$ɲɛ$ ‘but where has he gone’

From the examples in (175) above, it can be seen that the adjacent vowels at word boundary are similar. Of the similar vowels, it is the word final vowel that is deleted. After resyllabification, the word initial vowel at word boundary acquires an onset.

Just like Odhiambo (1981), it is my observation that word-final vowel deletion without lengthening or doubling the following vowel occurs in monosyllabic function words. Odhiambo (1981:56) explains that:

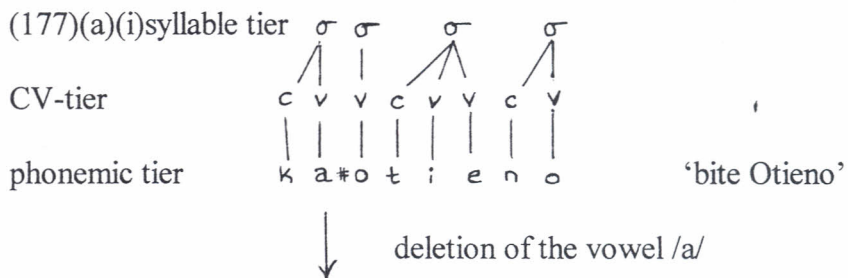
In this group therefore we have words, that in terms of the traditional grammar parts of speech are classified as conjunctions and prepositions. It also includes relative pronouns.

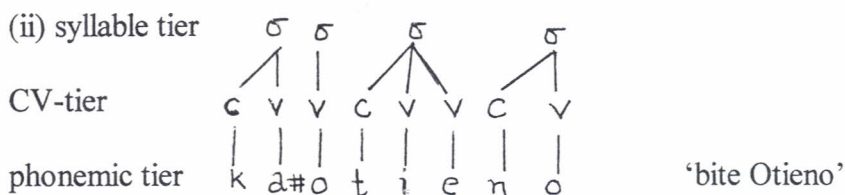
Some function words are given in (176). These words are also given by Odhiambo (1981). They already appear in the examples of Dholuo utterances given so far.

(176) Monosyllabic Function Words

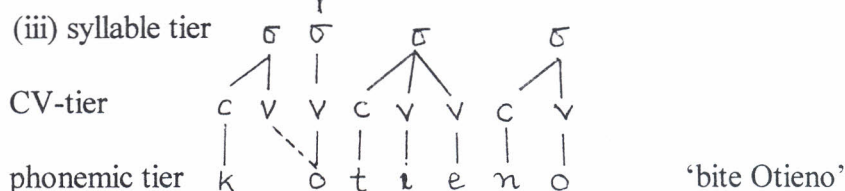
tɔ	‘but’
gɪ	‘with/ and’
nɪ	‘that/ for/ to’
ma	‘then/ until/ so/ which/ what/ who’
mɪ	‘then/ until/ so’
ka	‘at/ if/ like or as/ when’

There are yet other monosyllabic words that delete their final vowel at word boundary with the concomitant lengthening of the following vowel. In other words, while the word final vowel at word boundary deletes, the word initial vowel occupies the place left by the deleted vowel. The same observation is made by Okombo (1977,1982). A few examples of such utterances are given in (177) below.

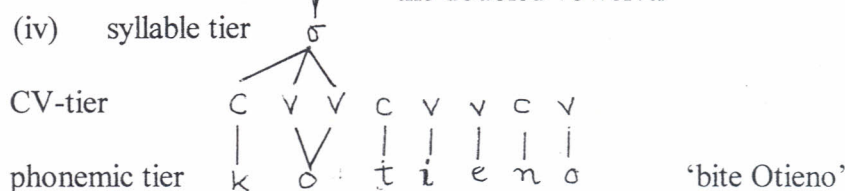




ressociation of the floating V-slot



merging of the two σ -nodes dominating the doubled vowel /a/



(b) $ka\#o\$bv\#l\#o \longrightarrow ko:\$bv\#l\#o$ ‘bite the mushroom’

$ko\#a\$crl \longrightarrow ka:\crl ‘one guard’

$ko\#e\$co \longrightarrow ke:\co ‘there is a gourd’

$le\#a\$crl \longrightarrow la:\crl ‘one axe’

$le\#u\$ka:\$w\#o \longrightarrow lu:\$ka\$w\#o$ ‘you (plural) have taken the axe’

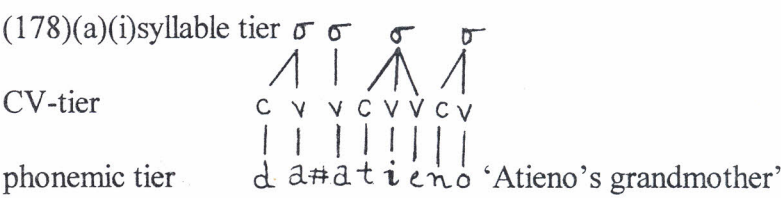
Some of the examples in (177b) are from Okombo (1982). The utterance given in (177a,i) is an instance of very slow speech where each word is uttered distinctly. (177a,ii) shows that the word final vowel of the monosyllabic word is deleted at word boundary. In (177a,iii), the word initial vowel that was following the deleted vowel doubles so that it now associates with the floating V-slot. In other words, the floating V-slot ressociates with the word initial vowel. The broken association line between the temporarily floating V-slot and the vowel /a/ shows or indicates this ressociation. Unlike

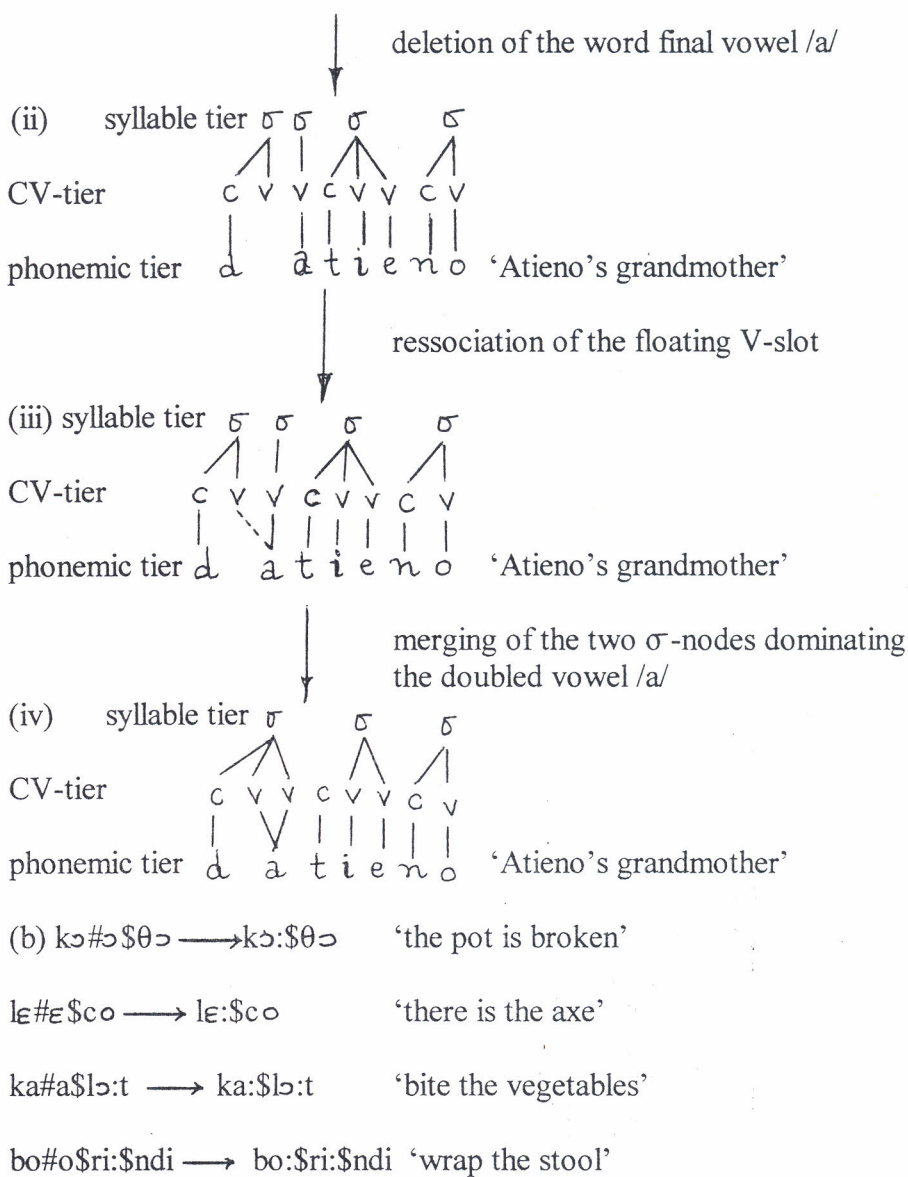
in deletion without lengthening, the V-slot that is temporarily floating and the syllable node immediately dominating it are not deleted because of the ressyllabification that has taken place. After ressyllabification has taken place, the doubled vowel appears to be ambisyllabic. As seen in the analysis of the Dholuo syllable structure in Chapter 3, Dholuo does not have any ambisyllabic sound segments. Since there are no ambisyllabic sounds in Dholuo, the two syllable nodes dominating the doubled vowel are merged, as seen in (177a,iv). (177a,iv) then represents the utterance in rapid everyday speech.

The utterances in (177) show that the vowel that deletes is light and that the one that is doubled as a result of deletion also forms a light syllable. It is observed that deletion leaves room for the formation of a heavy syllable. (177a,i) shows that the two syllables at either sides of the word boundary are light. After deletion and doubling or compensatory lengthening has taken place, a heavy syllable emerges as seen in the first syllable of (177a,iv).

Odhiambo (1981) argues that utterances such as the ones in (177) above are instances of assimilation. Her arguments are given in section 6.2 where compensatory lengthening is discussed.

The non-high word final vowels delete at word boundary when they precede vowels that are identical to them. The word initial vowels then double to occupy the positions left by the deleted vowels. The examples of utterances which illustrate this are given in (178) below.





Odhiambo (1981) observes that the long vowels such as those in the utterances in (177) and (178) are derived when monosyllabic content words are involved and not monosyllabic function words. The monosyllabic content words occur as the first syllables in every utterance in (177) and (178). According to Pei (1966:53), content words are:

Words which have lexical or semantic rather than functional and grammatical meaning.

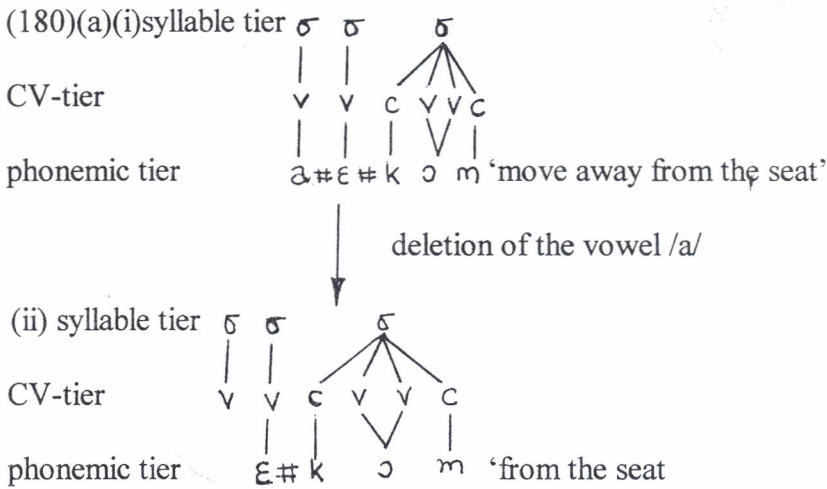
A few examples of the monosyllabic content words are given in (179) below. These examples are also given by Odhiambo (1981). They are seen in the

utterances in (177) and (178).

(179) Monosyllabic Content Words

bo	‘wrap’
ka	‘bite (command)’
lɛ	‘axe’
le	‘animal’
ci	‘wife of’
pi	‘water’
ʃi	‘people’
ju	‘tear (command)’

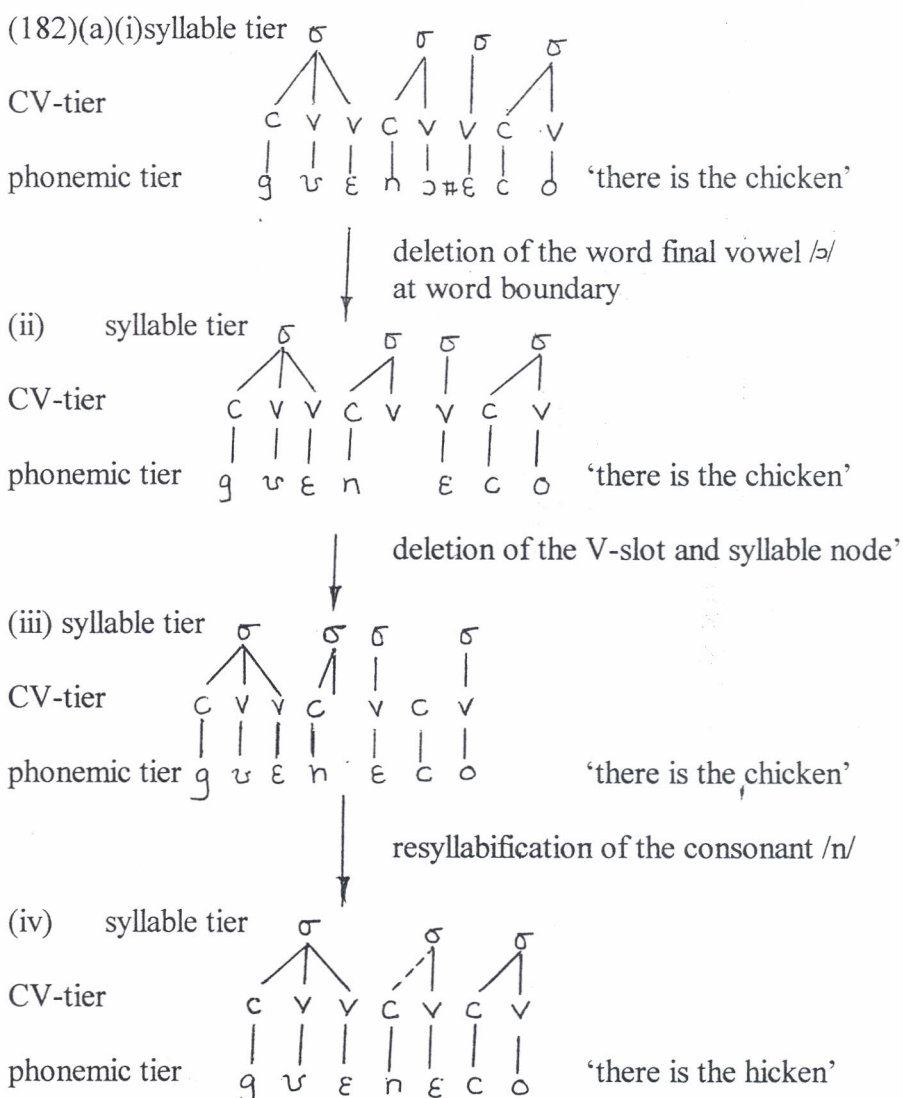
Just like Odhiambo (1981), it is my observation that there are situations in which a word final vowel does not delete when followed by a word initial vowel at word boundary. Deletion does not take place when a vowel that should undergo deletion is the only component of the word. The rule of deletion does not apply because if it does, the meaning of the utterance would be distorted. The examples of utterances with monosyllabic words that do not allow deletion are given in (180).



vowel is a heavy syllable. All the vowels in such an utterance are retained, as seen in all the utterances before the arrow.

6.1.2 Vowel Deletion in Polysyllabic Words

As defined in section 6.0, polysyllabic words refer to words of two or more syllables. In polysyllabic words, a word final vowel deletes at word boundary when it precedes a vowel which is in a light syllable. The vowel that is preceded does not lengthen. The examples of utterances that show deletion in polysyllabic words are given in (182) below.



(b) wɪ\$ɲɔ# ε\$co → wɪ\$ɲε\$co 'there is the bird'

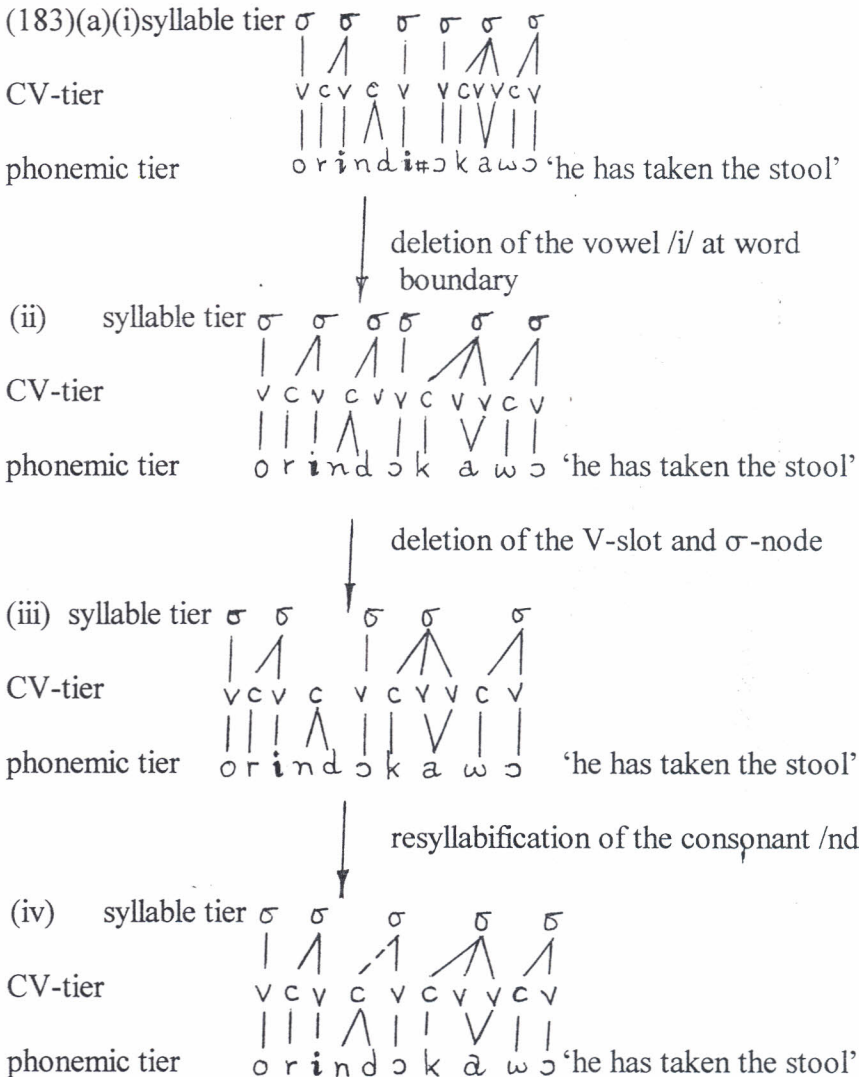
ɔ\$bɔ\$ke # ɔ\$tuɔ → ɔ\$bɔ\$ke\$tuɔ 'the leaves are dry'

ɲa\$ko # a\$ceɪl → ɲa\$ka\$ceɪl 'one girl'

o\$te\$nga # e\$co → o\$te\$nge\$co 'there is the hawk'

ʃo\$ste # a\$de:k → ʃo\$sta\$de:k 'three messengers'

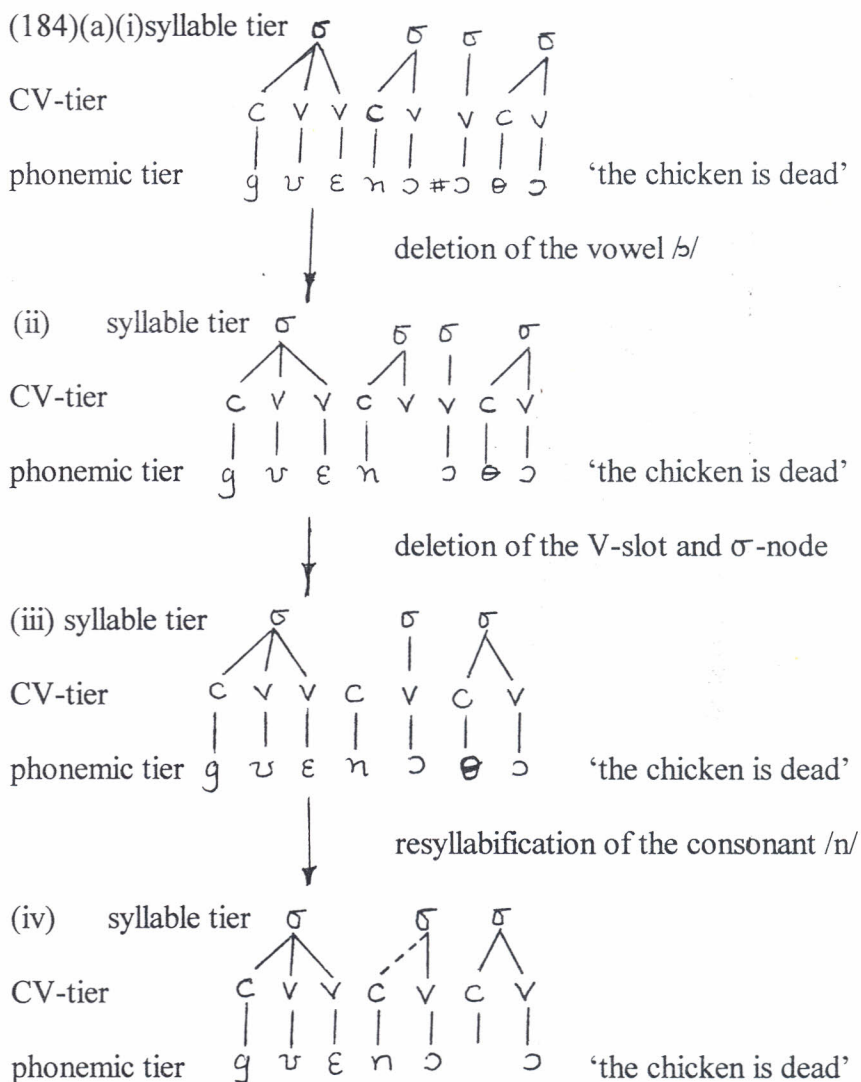
All the vowels deleted in (182) are non-high vowels. The high vowels can also be deleted in the same environment, as seen in the words in (183) below.



(b) a\$gu\$lu # ɪ\$pa:\$ndɔ → a\$gu\$ɪɪ\$pa:\$ndɔ 'you have hidden the pot'

- $rɪ\$ŋgɪ \# a\$hɪ:\$pa \longrightarrow rɪ\$ŋga \$hɪ:\pa 'run very much'
 $nu\$mu \# a\$hɪ:\$pa \longrightarrow nu\$ma\$hɪ:\pa 'very raw'
 $bu\$ru \# o\$ru:\$mo \longrightarrow bu\$ro\$ru:\mo 'the ash is finished'
 $guo\$gi \# ɔ\$la:l \longrightarrow guo\$gɔ\$la:l$ 'the dogs are lost'
 $ʃa\$pi\$di \$o\$bi:\$ro \longrightarrow ʃa\$pi\$do\$bi:\$ro$ 'the nurse has come'

All the Dholuo vowels in polysyllabic words delete at word boundary when they precede vowels that are identical to them. The examples of utterances which show this deletion are in (184) below).



$a\$gu\$lu \# u\$ke:\$lo \longrightarrow a\$gu\$lu\$ke:\lo 'you (plural) have brought

the pot'

o\$ri\$ndi # i\$ke:\$lo → o\$ri\$ndi\$ke:\$lo 'you have brought the stool'

ɔ\$bɔ\$ke # ε\$co → ɔ\$bɔ\$ke\$co 'there are the leaves'

pa\$ko # ɔ\$we → pa\$ko\$we 'the girl has been left'

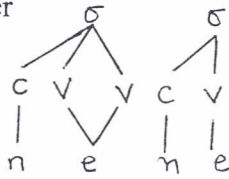
pa\$la # a\$ka:\$wo → pa\$la\$ka:\$wo 'I have taken the knife'

Just like Odhiambo (1981), it is my observation that the final syllable of some polysyllabic words is usually deleted. In this group of words, it is the light syllable that is always deleted, as seen in (185).

(185)(a)(i) syllable tier

CV-tier

phonemic tier



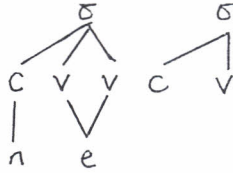
'distant past'

deletion of the word final syllable

(ii) syllable tier

CV-tier

phonemic tier



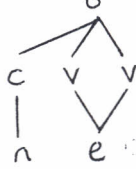
'distant past'

deletion of one association line joining the vowel /e/ of the phonemic tier and V-slot

(iii) syllable tier

CV-tier

phonemic tier



'distant past'

a light syllable emerges

(iv) syllable tier

CV-tier

phonemic tier



'distant past'

(b) ne:\$nde → ne 'recent past tense maker'

be:\$nde → be 'question marker /also'

ti:\$nde → ti 'nowadays'

po:\$ro → po 'yesterday'

gɪ\$mo:\$ro → gɪ\$mo 'something'

ka\$mo:\$ro → ka\$mo 'somewhere /may be'

The word-final syllable in all the words in (185) is deleted. The deleted syllable is a light syllable. Unlike Odhiambo (1981), it is observed that after the word final syllable is deleted, the new word final syllable occurs with a short vowel. The vowel is shortened because in KSN dialect of Dholuo, a word final open syllable cannot have a doubled vowel. (185a,i) shows the word when it is articulated in full.(185a,ii) shows that the last syllable is deleted because there are no association lines to join the C-slots and V-slots of the CV-tier to the phonemic tier. One association line joining the V-slot and the vowel /e/ is deleted to show that the vowel is no longer doubled, as seen in (185a,iii). (185a,iv) then shows that a light syllable then emerges.

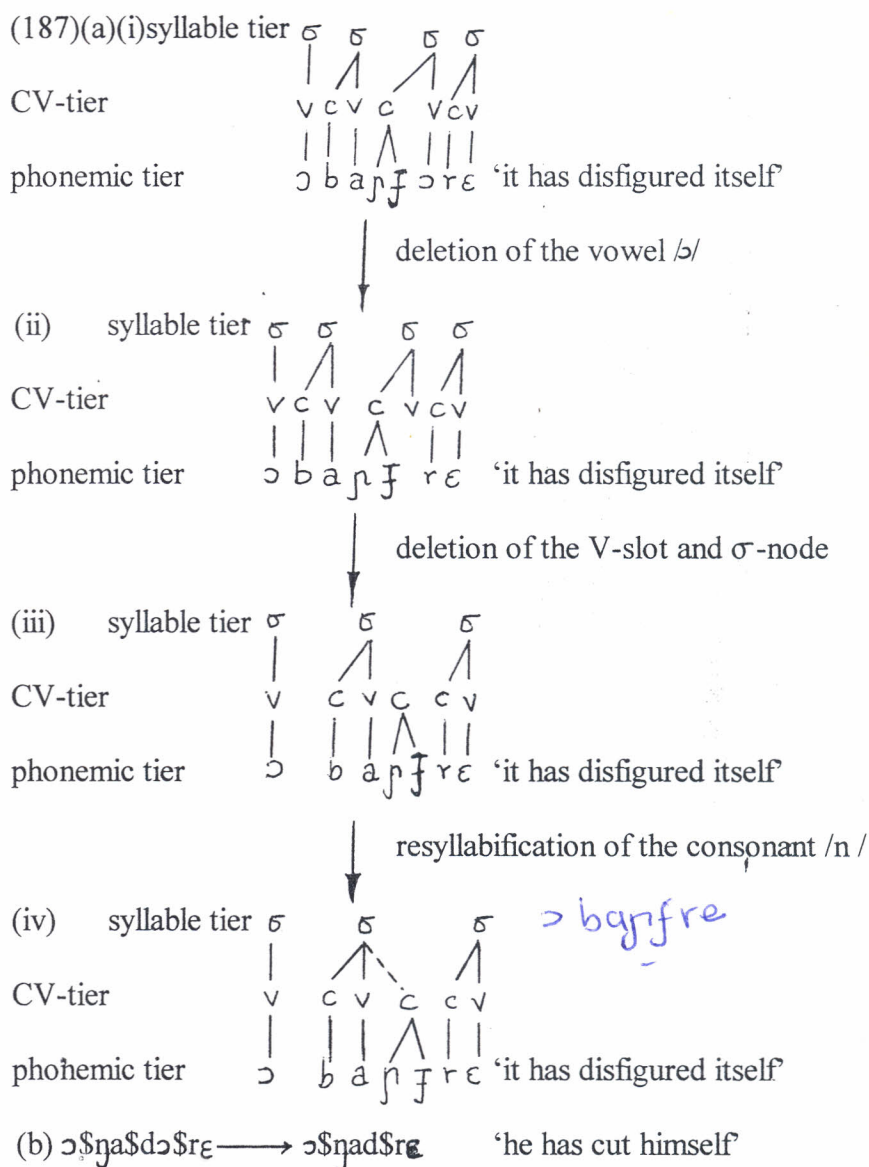
As already stated in section 4.2, some trisyllabic words are formed by the addition of the suffix *-rɛ* to infinitive verbs. Most speakers of the KSN variety of Dholuo articulate these words with all their syllables. In the speech of a few, the word appears to have less syllables because one vowel is deleted, as seen in (187) below. According to Odhiambo (1981), these words may optionally delete the vowel before the reflexivised subject.

Odhiambo (1981: 49) then explains how reflexivisation takes place using the verb /bɪðɔ/ 'be upright' and the third person singular pronominal

subject /en/, as seen in (186).

- (186)(a) ε n ɔ \$ b r \$ ʔ ɔ ε n
 ‘she’ ‘make upright’ ‘she’
- (b) ε n ɔ \$ b r \$ ʔ ɔ r ε
 ‘she’ ‘make upright’ ‘reflexivised subject’
- (c) ɔ \$ b r \$ ʔ ɔ \$ r ε ‘she makes herself upright’

In (186c) all the vowels of the utterance are present. The examples in (187) show the process of vowel deletion.



ɔ\$pa\$ʔ\$ʀɛ → ɔ\$pa\$ʔ\$ʀɛ 'she/he is praising her/himself'

ɔ\$ta\$mo\$ʀɛ → ɔ\$ta\$mo\$ʀɛ 'she/he has refused'

ɔ\$ʀua\$ʔ\$ʀɛ → ɔ\$ʀua\$ʔ\$ʀɛ 'she/he is dressing'

ɔ\$ʀua\$ʔ\$ʀɛ → ɔ\$ʀua\$ʔ\$ʀɛ 'she/he has stumbled'

o\$puo\$ʔ\$ʀɛ → o\$puo\$ʔ\$ʀɛ 'she/he is teaching himself'

In (187) the reflexivised subject is '-rɛ'. The examples show that the vowel before the reflexivised subject optionally deletes. The vowel that deletes is in a light syllable. The examples in (187a,i), (187a,iv) and (187b) show the two ways in which utterances with the reflexivised subject can be articulated. (187a,i) shows the utterance with all the vowels, deletion has not taken place. In (187a,ii) the vowel on the phonemic tier is deleted and therefore it does not appear in the diagrammatic representation of the utterance. In (187a,iii), there is no reassociation of the floating V-slot on the CV-tier with any other sound on the phonemic tier. The V-slot is therefore deleted. The syllable node is subsequently deleted because it does not have any nucleus to dominate. The C-slot on the CV-tier then remains floating because it is temporarily not joined to any syllable, as seen in (187a,iii). In (187a,iv), the broken association line between the C slot and syllable node shows that resyllabification has taken place. (187a,iv) therefore shows the form with a deleted vowel. The floating C-slot dominating the consonant /ɲ/ becomes a coda rather than an onset because in Dholuo a cluster of /ɲr/ within the same syllable does not exist.

Just like Odhiambo (1981), it is observed that there are exceptions to the rule of word final vowel deletion in polysyllabic words. Word final

vowels do not delete at word boundary if the following vowel is in a heavy syllable. The examples are given in (188) below.

- (188) $\text{pa}\$ \theta \text{r} \# \text{o}:\$ \eta \text{ge} \longrightarrow * \text{na}\$ \theta \text{o}:\$ \eta \text{ge}$ ‘there is no child’
 $\text{tr}\epsilon \$ \text{nd} \epsilon \# \text{r}:\$ \text{l} \epsilon \longrightarrow * \text{tr}\epsilon \$ \text{nd} \text{r}:\$ \text{l} \epsilon$ ‘his leg is itching’
 $\text{a}\$ \text{t} \text{ɔ} \$ \eta \text{ga} \# \text{ɔ}:\$ \text{r} \epsilon \longrightarrow * \text{a}\$ \text{t} \text{ɔ} \$ \eta \text{g} \text{ɔ} \text{r} \epsilon$ ‘his brother-in-law’s basket’
 $\text{o}\$ \text{si} \$ \text{ki} \# \text{e}:\$ \text{r} \epsilon \longrightarrow * \text{o}\$ \text{si} \$ \text{ke}:\$ \text{r} \epsilon$ ‘where is the bush’
 $\text{ɟ} \text{o} \$ \text{wa} \$ \text{si} \$ \text{gu} \# \text{i}:\$ \text{do} \longrightarrow * \text{ɟ} \text{o} \$ \text{wa} \$ \text{si} \$ \text{gi}:\$ \text{do}$ ‘the enemies are
night running’

All the forms after the arrow are wrong. All the vowels should be retained, as seen in the utterance before the arrow.

Odhiambo (1981:76) states that word final vowel deletion does not take place in:

...those genitive forms where the final vowel indicating possessor is not identical to the initial vowel of the following word.

The same observation is made in this study, as seen in example (189) below.

- (189) $\text{guo} \$ \text{ga} \# \text{e} \$ \text{co} \longrightarrow * \text{guo} \$ \text{ge} \$ \text{co}$ ‘there is my dog’
 $\text{guo} \$ \text{ga} \# \text{v} \$ \text{g} \text{ɔ}:\$ \text{j} \text{ɔ} \longrightarrow * \text{guo} \$ \text{g} \text{v} \$ \text{g} \text{ɔ}:\$ \text{j} \text{ɔ}$ ‘you (plural) have beaten
my dog’
 $\text{guo} \$ \text{ga} \# \text{r} \$ \text{g} \text{ɔ}:\$ \text{j} \text{ɔ} \longrightarrow * \text{guo} \$ \text{gr} \$ \text{g} \text{ɔ}:\$ \text{j} \text{ɔ}$ ‘you have beaten my dog’

In (189), all the examples after the arrow are incorrect. In rapid everyday speech, the utterances remain just as they are before the arrow. If deletion takes place, the utterances acquire a different meaning. Deletion is therefore blocked.

Though some personal pronouns have been given in section 4.1, it is

necessary to give them once again in order to show how they occur in an environment that calls for deletion. Odhiambo (1981:77) gives these affixes as follows:

(190)(a) Pronominal suffixes indicating the possessor

- a 'mine'
- i 'yours (singular)'
- e~ 'his'
- u~ 'yours (plural)'

(b) Pronominal person prefixes

- a 'first person singular'
- i~ 'second person singular'
- u~ 'second person plural'

It is seen that the prefixes in (190b) are similar to some of the suffixes in (190a). Odhiambo (1981) further observes that the pronominal suffix *-e* 'his/hers' is identical to the prepositions 'on/at/to' and some word final vowels. Therefore as already seen in (189), deletion is blocked if a word final vowel indicating the possessor precedes a dissimilar vowel, which is identical to any of the other vowels indicating the possessor.

Like Odhiambo (1981), it is observed that deletion takes place if the word final vowel indicating the possessor precedes a word initial vowel that is not identical to any of the genitive markers. The examples are given in (191) below.

(191) guo\$ga #ɔ\$la:l → guo\$gɔ\$la:l 'my dog is lost'

guo\$ga #ɔ\$ka:\$ja → guo\$gɔ\$ka:\$ja 'my dog has bitten me'

guo\$ga #ɔ\$ma:\$ke → guo\$gɔ\$ma:\$ke 'my dog has caught him'

All the forms that allow deletion in (191) are in light syllables.

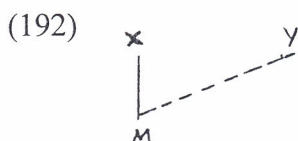
6.2 Compensatory Doubling

According to Goldsmith (1990:73):

Compensatory lengthening refers generally to a process of lengthening a segment - most commonly a vowel, but not always - which is seen as a response to a prior process which removed or in some way shortened the segments previously present.

This definition is similar to the one given by Okombo (1982) in section 1.7.2.2.3. He states that compensatory lengthening occurs when part of a word is deleted. It is also similar to that of Odhiambo (1981). She states that compensatory lengthening is a process of vowel lengthening motivated by the loss of a segment. Unlike Okombo (1982), Odhiambo (1981) argues that compensatory lengthening takes place word internally.

In the autosegmental framework , compensatory lengthening is represented as in (192).



Adopted from Goldsmith (1990:73)

X and Y are on the skeletal or CV tier, while M is an element on the phonemic tier. Goldsmith (1990) explains that a process is considered as an instance of compensatory lengthening if its diagrammatic representation is similar to the one in (192). X and M are associated to each other. Y is not associated to any element on the phonemic tier. The broken association lines show that the process of compensatory lengthening associates Y and M (Goldsmith, 1990). He states that one further condition must be met for this process to be an example of compensatory lengthening. This condition is that Y must have been associated with an element on the phonemic tier at an

6.2.1 Compensatory Doubling in Monosyllabic Words

(193)(a)(i) syllable tier

CV-tier

phonemic tier

deletion of the word final vowel /ε/ at word boundary

(ii) syllable tier

CV-tier

phonemic tier

ressociation of the floating V-slot

(iii) syllable tier

CV-tier

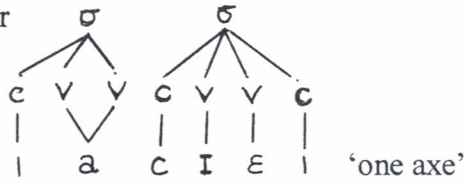
phonemic tier

‘merging of the two syllable nodes dominating the doubled vowel /a/’

(iv) syllable tier

CV-tier

phonemic tier



(b) $bo \# \sigma \$m\epsilon:\$na \longrightarrow b\sigma:\$m\epsilon:\$na$ 'wrap omena (a kind of fish)'

$ka \# \sigma \$m\epsilon:\$na \longrightarrow k\sigma:\$m\epsilon:\$na$ 'bite omena (a kind of fish)'

$le \# \sigma \$rɪ:\$ŋg\sigma \longrightarrow l\sigma:\$rɪ:\$ŋg\sigma$ 'the animal has run away'

$le \# \sigma \$ma:\$k\epsilon \longrightarrow l\sigma:\$ma:\$k\epsilon$ 'the animal has caught him'

$k\sigma \# o\$do:\eta \longrightarrow ko:\$do:\eta$ 'the gourd has remained'

The example in (193a) is from Okombo (1982). If the diagram in (192) is compared to that in (193b,iii), it can be seen that they are very similar. The V-slot previously associated with the deleted word final vowel can be compared to Y on the CV - tier in diagram (192). The V - slot associated with the doubled word initial vowel /a/ can be likened to X, while the doubled vowel /a/ can be likened to M.

Example (193a) shows that compensatory lengthening takes place at word boundary. (193a,ii) shows that the word-final vowel is deleted at word boundary when the following word begins with a vowel that forms a light syllable. The short word-initial vowel then doubles so that it associates with the floating V-slot, as seen in (193a,iii). The place of the word final deleted vowel is occupied by the word-initial vowel. The broken association line between the temporarily floating V-slot and the vowel /a/ shows the ressociation. The doubled vowel then appears to be ambisyllabic because it is dominated by two syllable nodes. The two syllable nodes dominating the doubled vowel are merged (as seen in (193a,iv) because Dholuo does not have

Compensatory lengthening also takes place when the deleted word final vowel is similar to the doubled word-initial vowel, as in the following examples.



(b) lɛ#ɛ\$co → lɛ:\$co 'there is the axe'

kɔ#ɔ\$θɔ → kɔ:\$θɔ 'the gourd is broken'

co # o\$lo:r → co:\$lo:r 'the toilet is locked'

mɔ#ɔ\$la:l → mɔ:\$la:l 'the oil is lost'

The first two examples of (194b) are from Okombo (1982). The lengthened vowels are all word initial vowels as illustrated in (194a,iii). As seen in all the examples in (193) and (194), all the monosyllabic words appearing in utterance initial position are content words. These words are also seen in examples (177) and (178). It is deletion of the final vowels of these monosyllabic content words that is compensated for by lengthening the following vowel.

The vowel process described in (193) and (194) is according to Odhiambo (1981) not compensatory lengthening but assimilation. The doubling of the word initial vowel that is seen in (193a,iv), (193b), (194a,iv) and (194b) is as a result of assimilation, but not deletion followed by compensatory lengthening, in Odhiambo's (1981) view.

Odhiambo (1981:47) argues that assimilation,

...takes place at the word boundary where the final vowel of a word assimilates to the initial vowel of the following word, and with a concomitant resyllabification creates a long vowel.

She argues in favour of assimilation by claiming that the phonetically motivated rule of word final vowel deletion is only regular for all polysyllabic words and monosyllabic function words. In monosyllabic content words, its application is blocked by the stronger word boundary of these words. Assimilation therefore takes place in monosyllabic content words.

Odhiambo (1981) develops her arguments further by stating that the final vowel of all polysyllabic words is weak. This vowel occurs at a word boundary that contains no other non-phonetic information other than the boundary because the distinction between content and function words is not crucial to the application of the deletion rule in polysyllabic words. The process of deletion of the word final vowel therefore applies regularly and productively.

In monosyllabic function words, the final vowel is strong and occurs at a word boundary which has non-phonetic information about the grammatical class of function words. This boundary is considered weak because function words are non-basic. The boundary is therefore not able to block a phonological rule (Odhiambo 1981). She then states that the process of final vowel deletion thus applies productively to monosyllabic function words.

In monosyllabic content words, Odhiambo (1981) states that the final vowel is strong and occurs at word boundary. The boundary contains non-phonetic information about the grammatical class of content words. The boundary is considered strong because content words are basic. She argues that vowel deletion rule is therefore blocked from applying across it. The vowels assimilate to the point of articulation of the initial vowel of the following word (see Odhiambo (1981) for other details and rules),

In my view and according to the theory of Autosegmental Phonology, a process where a vowel fully occupies the position of another vowel, therefore resulting in the existence of a long vowel is best explained as deletion followed by ressylation and this is basically what compensatory

lengthening is. My theoretical framework therefore favours compensatory lengthening rather than assimilation for the utterances in (193) and (194). Furthermore Odhiambo (1981:71) proposes a very convincing argument that favours compensatory lengthening as follows:

We note that the argument proposed... that the distinction between content and function words is responsible for the forms with short and long vowels at word boundary could also be used to support Okombo's claim that those forms with long vowels, acquire vowel length by the process of compensatory lengthening. It could be proposed that the process of word-final vowel deletion applies regularly to both function and content words. However because the monosyllabic content words are more basic than the function words, the loss of the final vowel of monosyllabic content words is compensated for by lengthening the initial vowel of the following word.

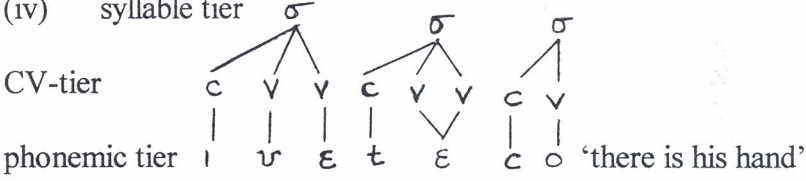
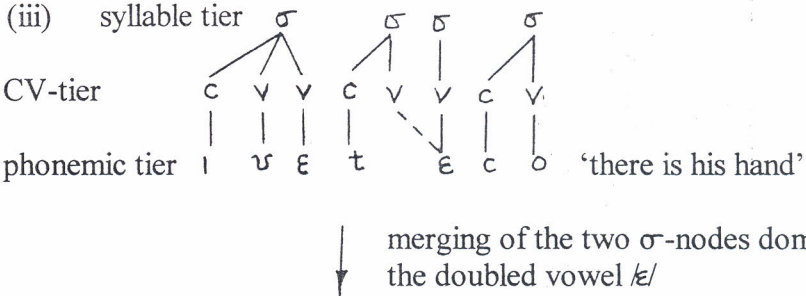
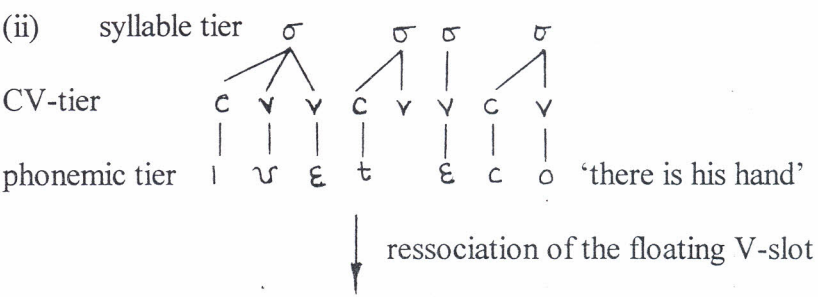
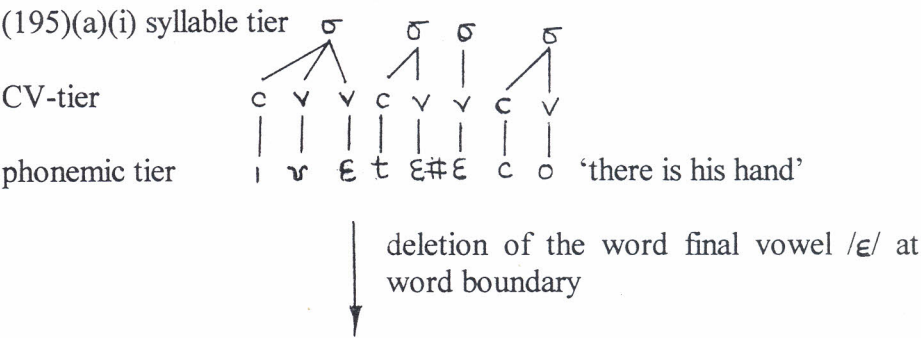
In the quotation above, 'Okombo's claim' refers to Okombo's (1977, 1982) claim. Odhiambo's (1981) observation therefore shows that the vowel process described in (193) and (194) may reasonably be treated as an instance of compensatory lengthening.

Compensatory lengthening does not take place in monosyllabic function words. It only takes place in monosyllabic content words. It is my observation that compensatory lengthening affects only the non-high vowels. I agree with Okombo (1977) that the word /ɣi/ 'people' undergoes both the process of compensatory doubling and glide formation in certain environments, as shown in section 6.3.1 (example 201) below.

6.2.2 Compensatory Doubling in Polysyllabic Words

Okombo (1977) states that word final vowel deletion followed by compensatory doubling takes place when a word initial vowel at word

boundary is the same as the word final vowel that is indicating the possessor. The examples are given in (195). This is the only environment for compensatory lengthening in polysyllabic words.



(b) lʊɛ\$ta # a\$ɕrɛl → lʊɛ\$ta:\$ɕrɛl

'my one hand'

lue\$ti # i\$tu:\$co → lue\$ti:\$tu:\$co

'you have pieced your hand'

ri\$ngu # u\$ke:\$lo → ri\$ngu:\$ke:\$lo

'you (plural) have brought your meat'

$k\text{ɔ}\$mba \# a\$cr\epsilon l \longrightarrow k\text{ɔ}\$mba:\$cr\epsilon l$ 'my one chair'

$k\text{ɔ}\$mbi \# i\$ke:\$lo \longrightarrow k\text{ɔ}\$mbi:\$ke:\lo 'you have brought your
chair'

The word - final vowel that deletes in (195) is in a light syllable. The word initial vowel that the word final vowel precedes is also in a light syllable. When compensatory doubling occurs, a heavy syllable is created. This process therefore leads to the formation of a heavy syllable.

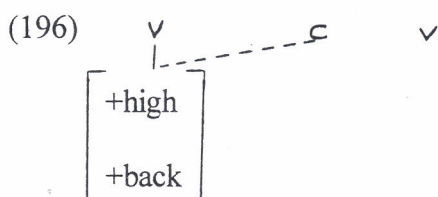
6.3 Glide formation

As indicated in section 1.7.2.2.1 the two glides that exist in Dholuo are /j/ and /w/. Some surface glides are then derived by the process of glide formation at word boundary (Odhiambo 1981). The aim of ~~this~~ section is to show the relationship between glide formation and syllable weight.

Before giving the analysis in this section, it is important to show the relationship between the high vowels and the glides and how the theory of Autosegmental Phonology is going to be used. Kenstowicz (1994:23), in his discussion of the sounds of speech, observes that:

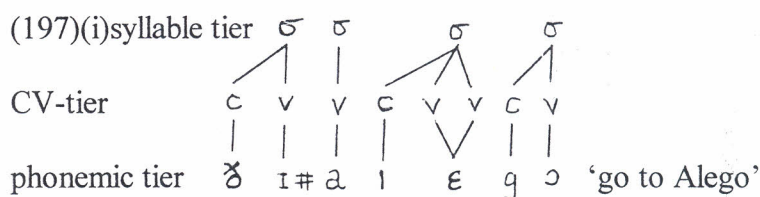
The semivowels [y] and [w] are close kin to the corresponding high vowels [i] and [u]. If one articulates an [i] and then slowly constricts the tongue body, the pronunciation shades into ... [y]. [u] shades into [w] under similar constriction. Intuitively, [y] and [w] are consonantal variants of the vowels [i] and [u] ... Vowel sequences (V+V) are phonologically unstable ... One response is to separate the vowels by a "dummy" or "generic" consonant: $V + V \longrightarrow VCV$. In an intuitive sense... the features of the preceding high vowel seeps into this position.

He then gives the idea diagrammatically using autosegmental notation, as shown in (196).

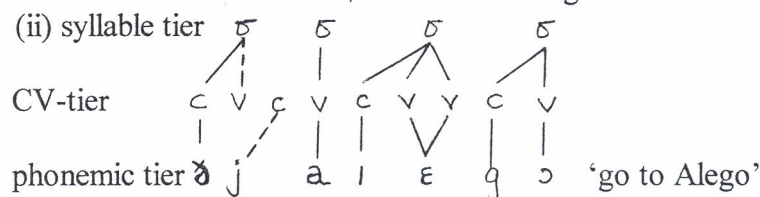


The diagram in (196) shows that in a situation where a high vowel is followed by a dummy consonant, the latter acquires the characteristics of the former. If the high vowel in VCV sequence is /i/ then /y/ is formed, if it is /u/ then /w/ is formed.

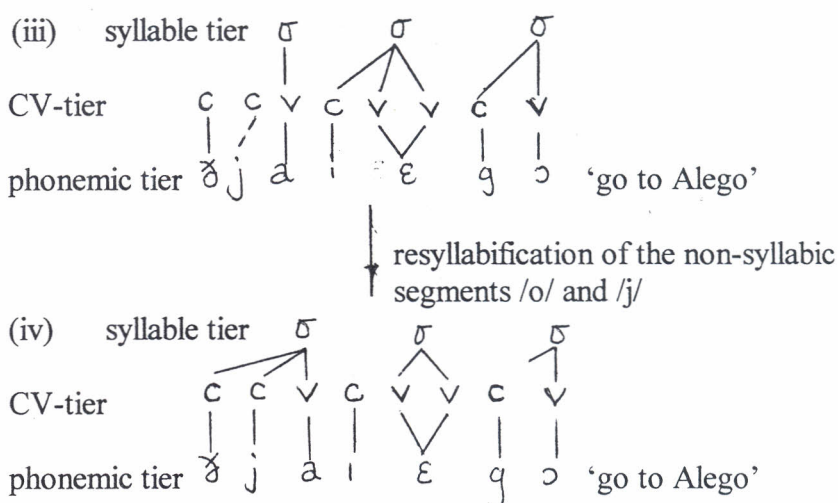
This is the same idea expressed in the theory of Autosegmental Phonology. Goldsmith (1990) indicates that some floating skeletal positions are posited. Once again, the skeletal positions simply refer to C- and V-positions on the C-V tier. In this study, it is C- positions or C- slots that are floating. An unassociated C-slot is seen to intervene between a word final high vowel and either a word initial non- high vowel or a high vowel with the opposite value for the feature [back]. Example (197) shows how the floating C- position intervenes hence the formation of a glide.



deletion of the association line between V-slot and ɛ / followed by the ressociation of ɛ /with the floating C-slot hence glide formation

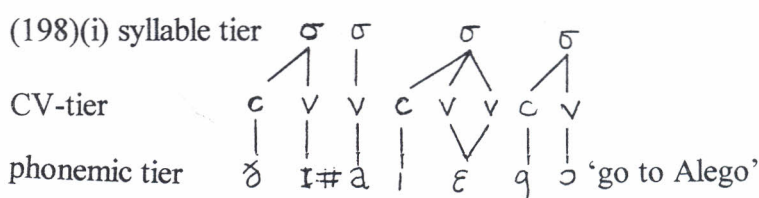


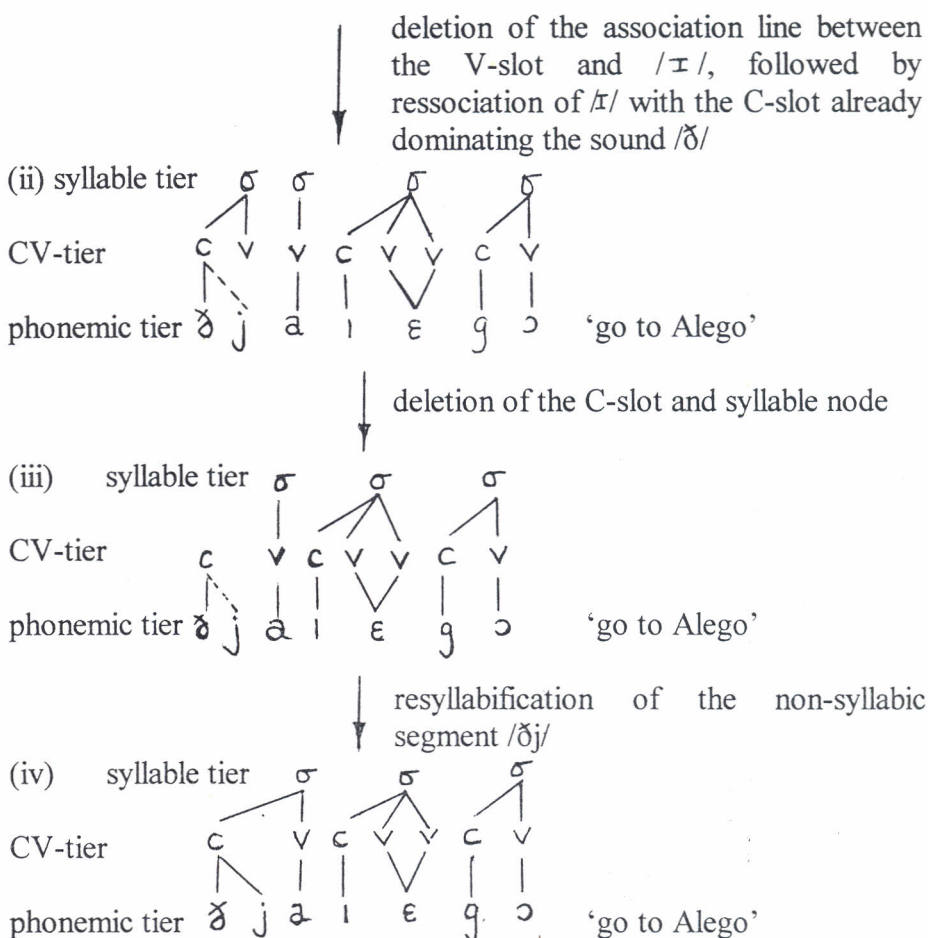
deletion of the floating V-slot and σ -node



Example (197i) shows that glide formation takes place at word boundary. (197ii) shows that there is a floating C-slot between the word final high vowel and the word initial low vowel. The association line between the V-slot and /ɪ/ is deleted. The vowel /ɪ/ on the phonemic tier is then ressociated with the floating C-slot. The vowel /ɪ/ then becomes the front glide /j/. In (197iii), the V-slot originally dominating the vowel /ɪ/ and the syllable node are deleted. In (197iv), the two non-syllabic sounds that are not associated with any syllable are resyllabified. The utterance in (197iv) then shows the glide in rapid speech. This is one way of analysing the surface glides that are formed in utterances.

Goldsmith (1990) in his analysis of the glide formed when the prefix 'mu-' is added to words beginning with vowels, gives another way of analysing surface glides. The same Dholuo utterance used in (197) is used to explain what Goldsmith (1990) proposes. The utterance is given once again in (198) below.





Unlike (197), (198) does not have any floating skeletal position. In (198i), the utterance is given in the form of speech that is deliberately slow. In (198 ii), it is seen that the consonants /ð/ and /j/ are dominated by a single C-slot so that it appears as if the two sounds form a single internally complex sound /ðj/. The association line between the V-slot and the word final vowel /ɪ/ is deleted. The vowel /ɪ/ is therefore transformed into a glide. Since the V-slot is not dominating any sound on the phonemic tier, it is deleted along with the syllable node dominating it, as seen in (198 iii). There is then resyllabification of the non-syllabic segment /ðj/, as shown in (198 iv).

For Luganda, Goldsmith (1990) argues that the two segments /m/ and

/w/, that form a prefix, can associate with a single C-slot hence giving a sound that is represented orthographically as ‘mw’. He then gives or summarizes the rule of glide formation, as shown in (199).



Adopted from Goldsmith (1990:52)

In this rule, the symbol ‘α’ stands for any consonant sound. The high vowel becomes a glide by being associated with a C-slot. Goldsmith (1990) includes the CV - tier and the phonemic tier, he does not include the syllable tier. Any explanations provided about the syllable tier are my own. The syllable tier is very important because it helps the reader to easily notice the weight of each syllable. It must therefore be included in all our explanations.

In this study, the analysis in (197) is preferred. The inclusion of an underlyingly floating C-slot enables me to associate the high vowel with an independent C-slot that does not have any association with another segment on the phonemic tier. The sounds /ɔ̯/ and /j/ therefore correctly appear as two independent segments. The representation in (198) makes the two independent sounds /ɔ̯/ and /j/ appear as if they form a single sound or phoneme. They are two independent sounds because in cases of vowel deletion, the deletion does not affect the consonant sound, immediately, preceding it, as seen in Section 6.1 From an articulatory point of view, the production of the consonant sound is completed before that of the glide begins. In the analysis of glide formation in Dholuo, the analysis in (197) rather than (198) is used. The analysis in (198) may apply to languages where

6.3.1 /j/ Formation in Monosyllabic Words

(200)(a)(i) syllable tier

CV-tier

phonemic tier

‘Otieno’s wife’

deletion of the association line between
the V-slot and /i/ followed by
ressociation of /i/ with the floating C-slot
hence glide formation

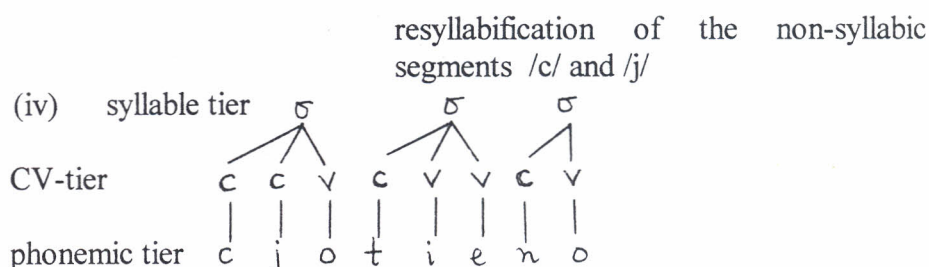
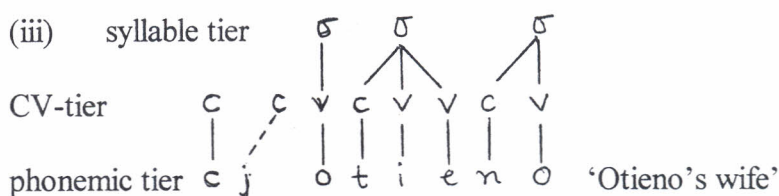
(ii) syllable tier

CV-tier

phonemic tier

‘Otieno’s wife’

deletion of the floating V-slot and σ -node



(b) $\text{ɟi} \# \text{ɔ} \$ \text{rɪ} : \$ \text{ŋgɔ} \longrightarrow \text{ɟj} \text{ɔ} \$ \text{rɪ} : \$ \text{ŋgɔ}$ 'people have run away'

$\text{mɪ} \# \text{o} \$ \text{tɪe} \$ \text{no} \longrightarrow \text{mj} \text{o} \$ \text{tɪe} \$ \text{no}$ 'give Otieno'

$\text{gi} \# \text{o} \$ \text{tɪe} \$ \text{no} \longrightarrow \text{gjo} \$ \text{tɪe} \$ \text{no}$ 'Otieno's property'

$\text{pi} \# \text{o} \$ \text{kɛl} \longrightarrow \text{pjo} \$ \text{kɛl}$ 'water has been brought'

$\text{ɔ} \text{ɪ} \# \text{a} \$ \text{lɛ} : \$ \text{gɔ} \longrightarrow \text{ɔja} \$ \text{lɛ} : \$ \text{gɔ}$ 'go to Alego'

In (200i), the utterance is given the way it appears in slow deliberate speech. Each word is uttered distinctly. After the association line between the V-slot and the sound / i / is deleted, a glide is formed by ressociating the /i/ with the floating C-slot. Since there is no vowel to ressociate with the V-slot, the latter is deleted along with the syllable node, as seen in (200iii). The two non-syllabic segments are resyllabified, as seen in (200iv).

The monosyllabic words whose high vowels undergo glide formation are all in light syllables. The vowels they precede, that is, word initial vowels at word boundary are also in light syllables. These light syllables in word initial position are composed of the nucleus only. The words that undergo the obligatory /j/ formation are monosyllabic content words. The same observation is made by Odhiambo (1981). Odhiambo (1981) and Okombo

(1977) observe that the word /ɟi/ forms an exception. According to Okombo (1977), the word can either undergo glide formation or deletion of its final vowel when followed by /ɔ, o/ (in adjectives) or /ʊ, u, a/. According to Odhiambo (1981), the last vowel can either form a glide or be assimilated. The examples in (201) show instances where a glide is formed as well as where deletion takes place. Some examples are from Odhiambo (1981).

- (201)(a) ɟi # ɔ\$ɕɪ:\$kɔ → (i) ɟja\$ɕɪ:\$kɔ 'nine people'
 (ii) ɟɔ:\$ɕɪ:\$kɔ 'nine people'
- (b) ɟi # u\$luo\$ŋgo → (i) ɟju\$luo\$ŋgo 'have you called people'
 (ii) ɟu:\$luo\$ŋgo 'have you called people'
- (c) ɟi # a\$de:k → (i) ɟja\$de:k 'three people'
 (ii) ɟa:\$de:k 'three people'
- (d) ɟi # a\$ɾɪ:\$jɔ → (i) ɟja\$ɾɪ:\$jɔ 'two people'
 (ii) ɟa:\$ɾɪ:\$jɔ 'two people'
- (e) ɟi # a\$bi:c → (i) ɟja\$bi:c 'five people'
 (ii) ɟa:\$bi:c 'five people'

Monosyllabic function words with a CV syllable structure undergo /j/ formation when their front high vowels are followed by vowels that are either non-high or high with the opposite value for the feature [back]. I agree with Odhiambo (1981:93-94) that:

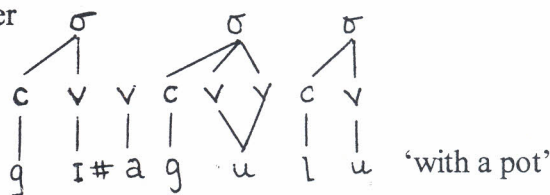
In monosyllabic function words, however, the high vowels in the final position can optionally undergo either glide formation or deletion...

Some of the monosyllabic function words that undergo glide formation are given in (202).

(202)(a)(i) syllable tier

CV-tier

phonemic tier

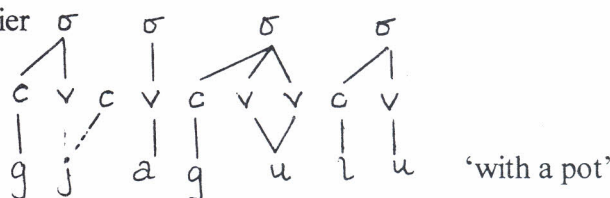


↓ deletion of the association line between the V-slot and /ɪ/ followed by ressociation of /ɪ/ with the floating C-slot hence glide formation

(ii) syllable tier

CV-tier

phonemic tier

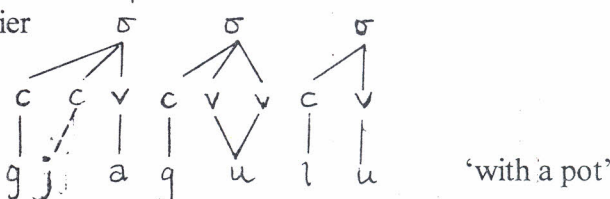


↓ deletion of the floating V-slot and σ-node

(iii) syllable tier

CV-tier

phonemic tier

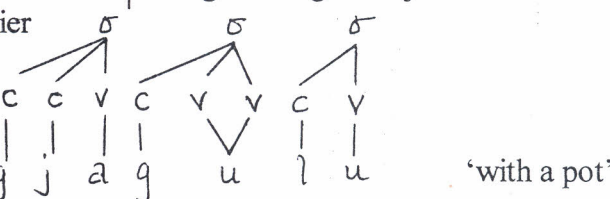


↓ resyllabification of the non-syllabic segments /g/ and /j/

(iv) syllable tier

CV-tier

phonemic tier



(b) $gɪ \# a\$tie\$no \longrightarrow gja\$tie\no 'with Atieno'

$nɪ \# o\$tie\$no \longrightarrow njo\$tie\no 'that / for Otieno'

$mɪ \# o\$tie\$no \longrightarrow mjo\$tie\no 'then Otieno'

$gɪ \# o\$tie\$no \longrightarrow gjo\$tie\no 'with Otieno'

$gɪ \# e\$ro\$ka\$ma:\$no \longrightarrow gje\$ro\$ka\$ma:\no 'with thanks'

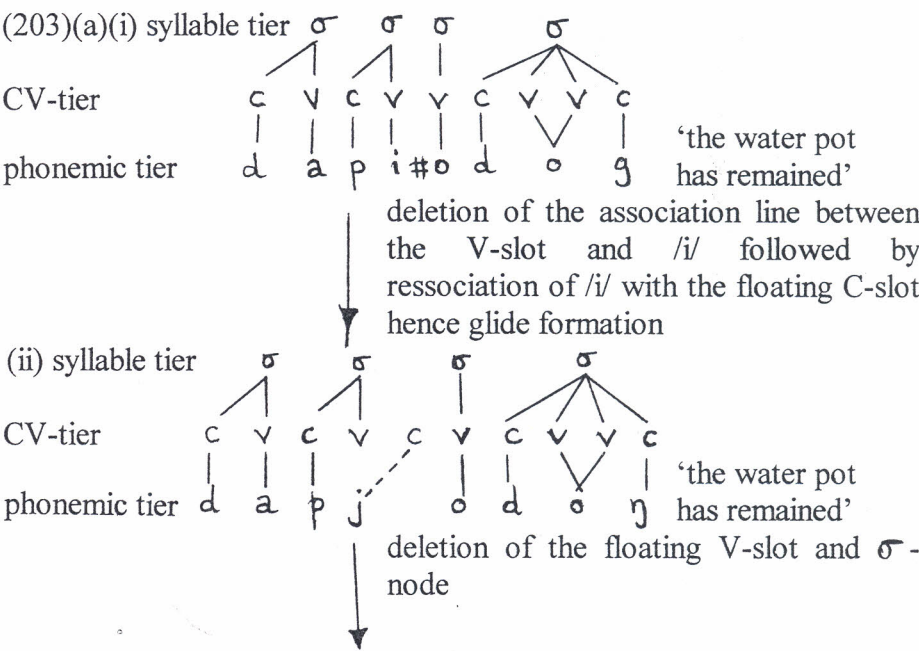
$gɪ \# u:\$me \longrightarrow gju:\me 'with his nose'

Some of the examples in (202b) are from Odhiambo (1981). Once again it can

be seen that the monosyllabic function words involved have a CV structure meaning that they are all in light syllables. It is also seen that most of the word initial vowels they precede at word boundary are in light syllables. Only one word initial vowel in (202b) forms a heavy syllable. Therefore /j/ formation is possible when a front high vowel is followed by a word initial vowel that is doubled.

6.3.2 /j/ Formation in Polysyllabic Words

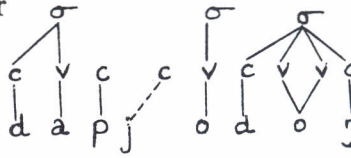
The obligatory /j/ formation occurs when a bisyllabic word (with a CV \$ CV structure as well as a low-high tone pattern) which ends in a high front vowel precedes a word beginning with a different vowel (Okombo, 1977). Just like Okombo (1977), it is observed that there are hardly more than three words in this group (see example (132g), in Group 9). The two examples in my data are similar to those Okombo (1977) gives. The example in (203) show /j/ formation in bisyllabic words with a low-high tone pattern.



deletion of the floating V-slot and σ -
node

(iii) syllable tier

CV-tier
phonemic tier

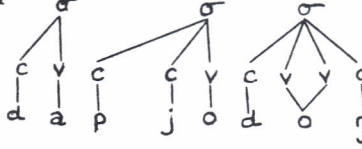


'the water pot
has remained'

resyllabification of
the non-syllabic
segments /p/ and /j/

(iv) syllable tier

CV-tier
phonemic tier



'the water pot
has remained'

(b) da\$pi # e\$co → da\$pje\$co 'there is the water pot'

da\$pi # o:\$nge → da\$pio:\$nge 'there is no water pot'

da\$pi # u\$wε:\$jɔ → da\$piu\$wε:\$jɔ 'you have left the water pot'

da\$pi # u\$ke:\$lo → da\$piu\$ke:\$lo 'you have brought the
water pot'

pa\$θɪ # a\$crɛl → pa\$θja\$crɛl 'one child'

pa\$θɪ # e:\$re → pa\$θje:\$re 'where is the child'

pa\$θɪ # ɔ\$ɾɪ:\$ŋgɔ → pa\$θjɔ\$ɾɪ:\$ŋgɔ 'the child has run away'

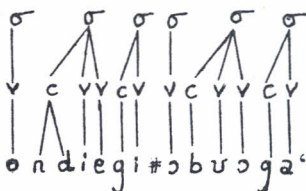
The examples in (203) show that the vowel initial syllable that is preceded by the high front vowel at word boundary can either be light or heavy. In a majority of utterances, the syllable is light.

In other polysyllabic words, including bisyllabic words not discussed in example (203), a glide is optionally formed when a word ending in a high front vowel is followed by words beginning with a different vowel. The examples of /j/ formation in polysyllabic words are given (204) below.

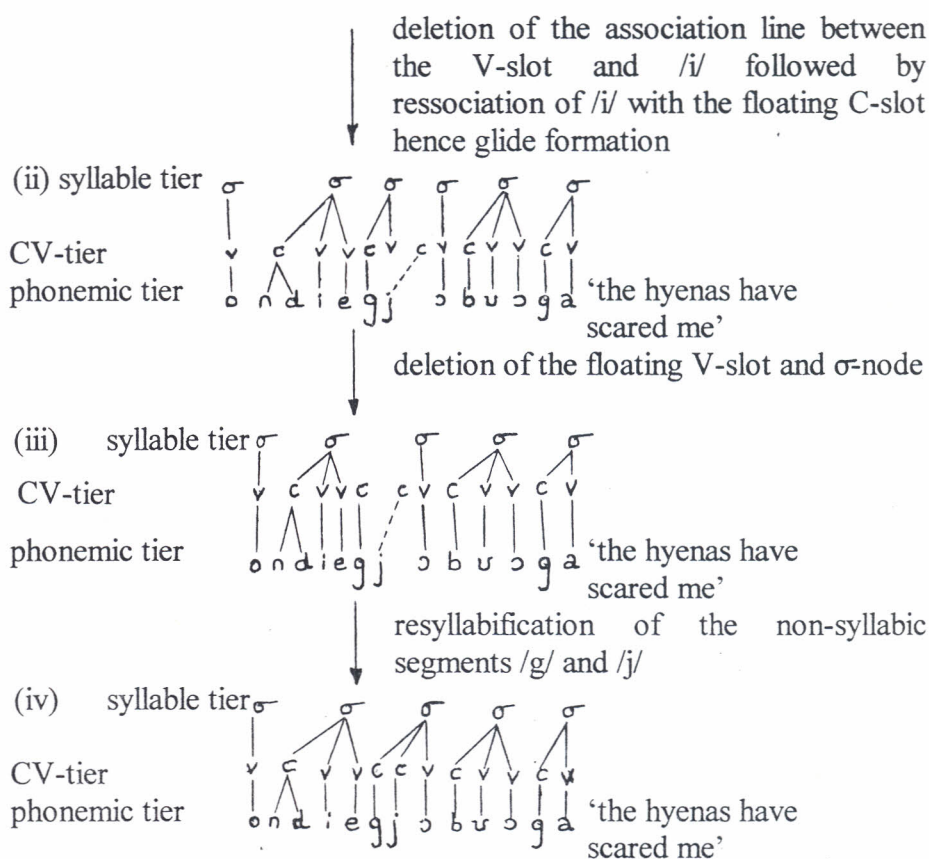
(204)(a)(i) syllable tier

CV-tier

phonemic tier



'the hyenas have
scared me'



(b)(i) o\$ndie\$gi # e:\$re → o\$ndie\$gje:\$re ‘where are the hyenas’

lue\$ti # ɔ\$tv:r → lue\$ɔ\$tv:r ‘your hand is broken’

pel\$ni # ɔ\$la:l → pel\$njɔ\$la:l ‘the knives are lost’

pi\$ri # a\$de:k → pi\$ɾja\$de:k ‘three girls’

we\$ndi # o\$duo\$go → we\$ndjo\$duo\$go ‘your visitors have
come back’

(ii) pi\$guo\$gi # a\$ɾɾ:\$jɔ → pi\$guo\$gja\$ɾɾ:\$jɔ ‘two puppies’

o\$si\$ki # ɔ\$wa:ŋ → o\$si\$kjɔ\$wa:ŋ ‘the bush has burnt’

o\$ri\$ndi # ɔ\$tv:r → o\$ri\$ndjɔ\$tv:r ‘the stool is broken’

θɔ\$məɾ\$nr # ɔ\$ka:\$ja → θɔ\$məɾ\$njɔ\$ka:\$ja ‘the safari ants
have bitten me’

(iii) mɾ\$lr\$mr\$lr # a\$ɦɾ:\$pa → mɾ\$lr\$mr\$lrja\$ɦɾ:\$pa ‘very sweet’

The process of /j/ formation is blocked when a word is composed of the high front vowel only (Okombo 1977). This is also observed in this study as seen in example (204c) below.

i # o\$mo:\$ndi $\longrightarrow$ *jo\$mo:\$ndi ‘Omondi’s stomach’

6.3.3 /w/ formation in Monosyllabic Words

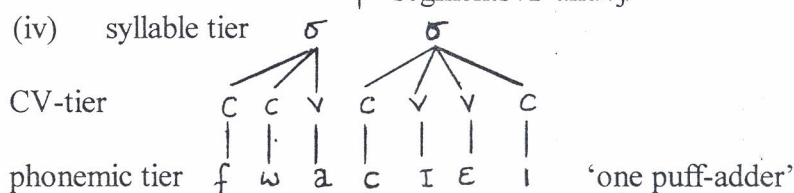
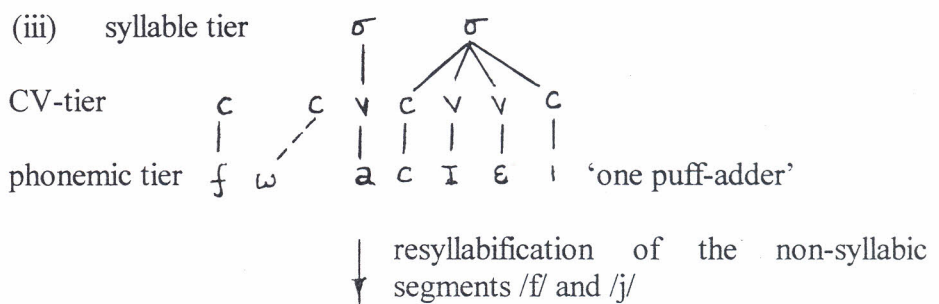
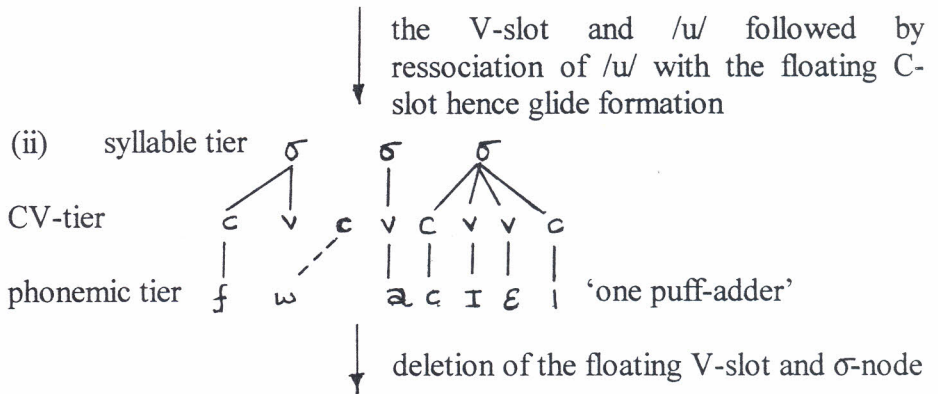
(205)(a)(i) syllable tier

CV-tier

phonemic tier

f u # a c t e l 'one puff-adder'

deletion of the association line between



(b) fu # e\$co → fwe\$co ‘there is the puff adder’

fu # i\$ne:\$go → fwi\$ne:\$go ‘the puff adder is being killed’

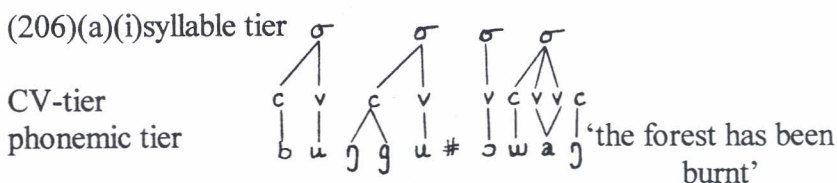
fu # ɔ\$θɔ → fwɔ\$θɔ ‘the puff adder is dead’

ju # a\$ɫɔ:t → jwa\$ɫɔ:t ‘tear the vegetable’

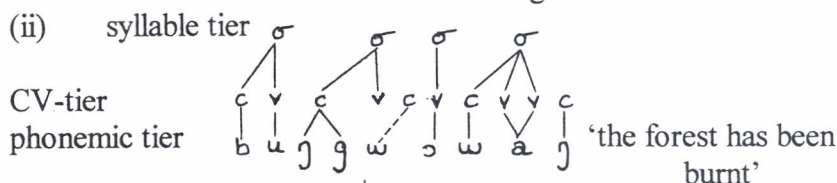
Most of the examples in (205) are from Okombo (1977).

6.3.4 /w/ formation in Polysyllabic Words

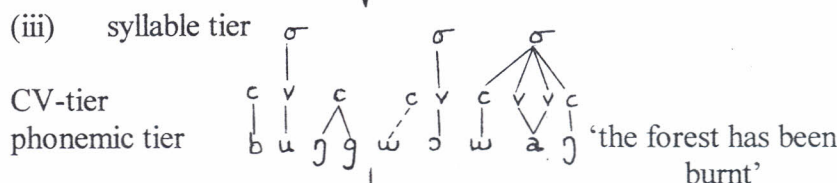
Just like Odhiambo (1981), it is observed that optional /w/ formation occurs when words of two or more syllables that end in a high back vowel precede words beginning with a different vowel. The examples in (206) show /w/ formation.



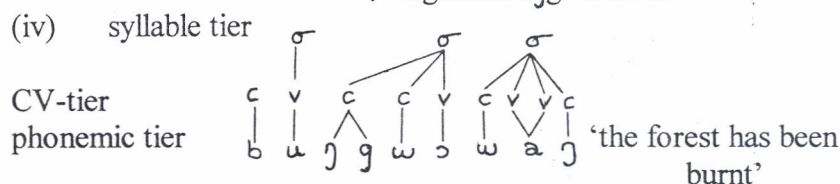
deletion of the association line between the V-slot and /u/ followed by ressociation of /u/ with the floating C-slot hence glide formation



deletion of the floating V-slot and σ -node



resyllabification of the non-syllabic segments /ɟg/ and /w/



(b)(i) bu\$ngu # e:\$re → bu\$ngwe:\$re 'where is the forest'

nu\$mu # a\$hr:\$pa → nu\$mwa\$hr:\$pa 'very raw'

bu\$ru # o\$ru:\$mo → bu\$rwo\$ru:\$mo 'ash is finished'

kua\$ru # o\$bi:\$ro → kua\$rwo\$bi:\$ro 'your grandfather has come'

(ii) a\$gu\$lu # ɔ\$tv:r → a\$gu\$lwɔ\$tv:r 'the pot is broken'

a\$ku\$ru # ɔ\$la:l → a\$ku\$rwɔ\$la:l 'the dove is lost'

a\$lu\$ru # ɔ\$θɔ → a\$lu\$rwɔ\$θɔ 'the quail is dead'

a\$wa\$si\$gu # e\$co → a\$wa\$si\$gwe\$co 'there is the enemy'

The examples in (206) show that the vowel following the glide can

either be in a light syllable or a heavy syllable. The glide is mostly formed before a light syllable.

In section 1.7.2.2.1 above, the rule that Okombo (1982) gives to describe the process of glide formation in Dholuo is stated. The rule is given as follows:

$$(207) \begin{bmatrix} +\text{syllabic} \\ +\text{high} \\ \alpha \text{ back} \end{bmatrix} \longrightarrow \begin{bmatrix} -\text{syllabic} \end{bmatrix} \begin{matrix} \diagup \\ \text{---} \end{matrix} \begin{bmatrix} \text{V} \\ -\text{high} \end{bmatrix} \begin{bmatrix} \text{V} \\ +\text{high} \\ \alpha \text{ back} \end{bmatrix}$$

The rule implies that a high vowel is transformed into a glide when it precedes a non-high vowel or a high vowel with the opposite value for the feature [back]. This rule can be slightly reformulated to include the fact that a short high vowel must be the only segment in the nucleus of the syllable. It can also be rewritten to show that the vowel following the glide can be either in a light or heavy syllable, as seen in (216).

6.4 Summary

The analysis in this chapter has shown that there is a relationship between syllable weight and the three Dholuo vowel processes, namely deletion, compensatory lengthening and glide-formation. The relationship is summarised in this section. The symbols 'l' and 'h' before or after a word boundary represent a light and heavy syllable, respectively. The two symbols (l and h) are also used after the arrow ($\longrightarrow$). The arrow shows or points at

the type of syllable that emerges after a particular vowel process has taken place. The summary includes the last syllable of a word at word boundary and the first syllable of a word after the word boundary. The two dashes (--) before a syllable indicate that the word has more than one syllable.

In the summary, the syllables that provide an environment for each process are given on the left, while the weight structure of each syllable is indicated on the extreme right. The relationship between syllable weight and vowel deletion can be summarised as in (208) below.

(208)(a) Deletion in monosyllabic function words.

$C\mathbf{V} \# V \longrightarrow CV$ $l \# l \longrightarrow l$

(b) Deletion in monosyllabic content words.

$C\mathbf{V} \# V \longrightarrow CVV$ $l \# l \longrightarrow h$

(c) Deletion in polysyllabic words.

(i) $--C\mathbf{V} \# V \longrightarrow CV$ $l \# l \longrightarrow l$

(ii) $--C\mathbf{V} \# V \longrightarrow CVV$ $l \# l \longrightarrow h$

All the vowels that are deleted at word boundary are in bold type, as seen in (208) above. In (208a), after the word final vowel is deleted, the remaining consonant combines with the word initial vowel to form a syllable. The same applies to (208ci). In (208b) and (208cii), after the word final vowel is deleted, the word initial vowel doubles to occupy the space left by the deleted vowel. The doubled vowel forms a syllable with the remaining consonant. The doubled vowel is a result of the process of compensatory doubling. It rarely occurs in polysyllabic words except in cases where the word initial vowel at word boundary is similar to the word final vowel that

indicating the possessor, as seen in (195) above.

From the summary in (208), it can be concluded that deletion only takes place where the word final vowel is in a light (CV) syllable and the word initial vowel at word boundary is in a light (V) syllable. Where there is just deletion, as in (208a) and (208c,i) a light (CV) syllable emerges and where there is deletion followed by doubling, as in (208b) and (208c,ii), a heavy (CVV) syllable emerges. The deletion rules that are given in (173) and (174) above can be modified, as seen in (209), in order to include the weight of the syllables involved.

(209)

V

+ syllable

-heavy

→

Ø

V

+syllable

-heavy

In (209), a vowel that is in a light syllable is deleted when followed by a vowel which is also in a light syllable.

Using autosegmental notation, the rule of vowel deletion can be expressed as in (210).

(210) CV-tier

V

≠

a

≠

V

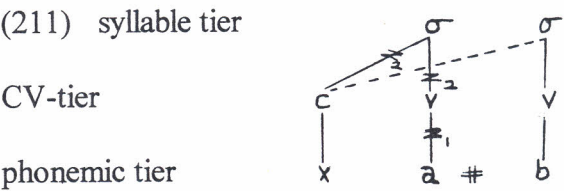
|

b

phonemic tier

‘a’ and ‘b’ are used to represent any vowels found at word boundary. ‘a’ represents a word final vowel, while ‘b’ represents a word initial vowel at word boundary. The ‘z’ across the association line between the V-slot and ‘a’ shows that the line is deleted. This means that ‘a’ is not realised phonetically. In other words, it is deleted. The same autosegmental notation in (210)can be

expanded to include the syllable tier, as seen in (211).



‘x’ represents any consonant that occurs with a word final vowel at word boundary. In (211), ‘z₁’ across the association line shows that the vowel is deleted first. ‘z₂’ on the two association lines from the σ -node shows that the V-slot and syllable node are consequently deleted. The broken association line then shows that resyllabification takes place. As seen in (211), the two syllables involved are light and the syllable created is also light.

The relationship between compensatory doubling and syllable weight can be summarised as follows.

(212)(a)Compensatory doubling in monosyllabic content words.

$$C\mathbf{V} \# V \longrightarrow CVV \qquad l \# l \longrightarrow h$$

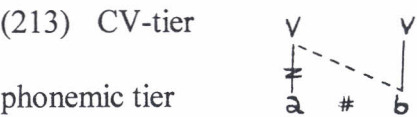
(b) Compensatory doubling in a few polysyllabic words

$$--C\mathbf{V} \# V \longrightarrow CVV \qquad l \# l \longrightarrow h$$

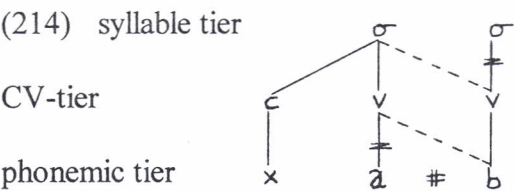
In (212a) and (b) vowel deletion has taken place. The word initial vowel doubles in order to fill the space left by the deleted vowel. The consonant previously forming a syllable with the deleted vowel is resyllabified and therefore it becomes the onset of the doubled vowel. In compensatory doubling, the vowel that deletes in a light (CV) syllable and the word initial vowel that doubles are in light (V) syllable. The syllable that emerges is a heavy (CVV) syllable.

Just like Okombo (1982), it is my view that since compensatory

doubling always occurs after deletion and deletion does not always lead to compensatory doubling, it is not possible to formulate a rule that adequately describes the process for Dholuo. The rule is possible in deletion, as seen in (209). However, it is possible to use autosegmental notation to describe the process, as seen in (213).



In (213), the ‘z’ across the association line shows the vowel that is not realised phonetically as a result of deletion. It is also possible to omit the association line altogether so that nothing links the V-slot to ‘a’, as seen in Section 6.2 and 6.3 Since the V-slot is left floating, ‘b’ is associated with it. ‘b’ therefore doubles. The same notation in (213) can be expanded to include the syllable tier as follows.



(215)(a) Glide formation in monosyllabic function words.

(i) $C\mathbf{V} \# V \longrightarrow CCV$ $l \# l \longrightarrow l$

(ii) $C\mathbf{V} \# VV \longrightarrow CCVV$ $l \# h \longrightarrow h$

(b) Glide formation in monosyllabic content words.

(i) $C\mathbf{V} \# V \longrightarrow CCV$ $l \# l \longrightarrow l$

(ii) $C\mathbf{V} \# VV \longrightarrow CCVV$ $l \# h \longrightarrow h$

(c) Glide formation in polysyllabic words.

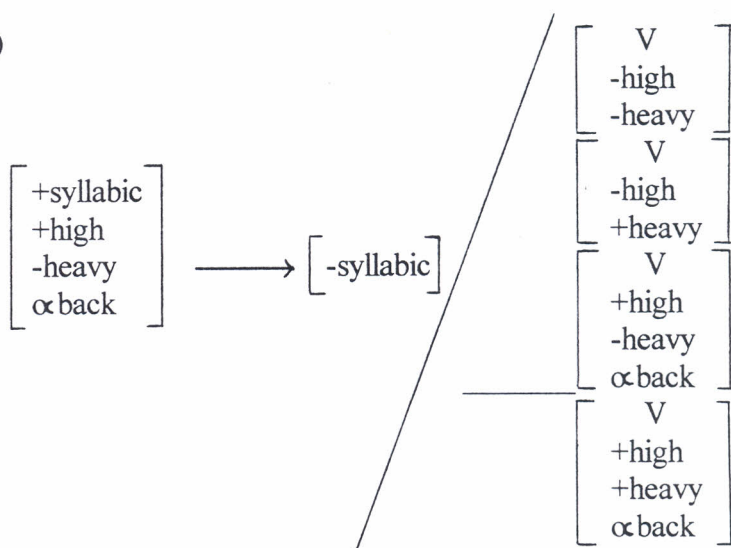
(i) $--C\mathbf{V} \# V \longrightarrow CCV$ $l \# l \longrightarrow l$

(ii) $--C\mathbf{V} \# VV \longrightarrow CCVV$ $l \# h \longrightarrow h$

All the vowels that glide at word boundary are in bold type. (215a,i), (b,i) and (c,i) show that when glide formation takes place at word boundary, before a word initial vowel that is in a light syllable, a light syllable emerges. When a word final vowel glides at word boundary before a doubled vowel, the syllable that is created is heavy. Whereas the word final vowel is always light, the word initial vowel can either be light or heavy. If the word initial vowel is heavy, the syllable that emerges from glide formation is also a heavy (CCVV) syllable.

The rule given in (207) can be rewritten to include the weight of the syllables involved in the process of glide formation, as seen in (216).

(216)

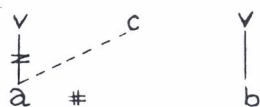


The rule in (216) means that a high vowel which is in a light syllable becomes a glide when it is immediately followed by either a non-high vowel or a high vowel with the opposite value for the feature [back]. The vowel following the high vowel can be either in a light or heavy syllable.

The process of glide formation can be stated using autosegmental notation, as seen in (217).

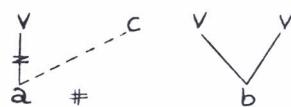
(217)(a) CV-tier

phonemic tier



(b) CV-tier

phonemic tier

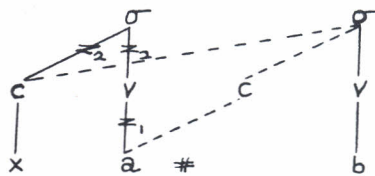


In (217a), the V-slot is delinked from the high vowel that it is dominating. The high vowel is then ressociated with the floating C-slot hence transforming it into a glide. The same applies to (217b). (217a) shows that a glide can be formed before a light (V) syllable, while (217b) shows that a glide can be formed before a heavy (VV) syllable. The same notation can be expanded to include the syllable tier, as seen in (218).

(218)(a) syllable tier

CV-tier

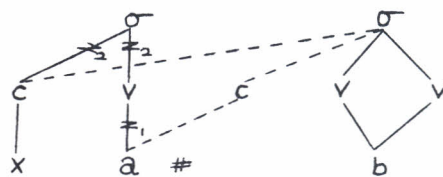
phonemic tier



(b) syllable tier

CV-tier

phonemic tier



In (218), 'z₁' shows that the association line is deleted so that the high vowel does not associate with a V-slot on the CV-tier. The high vowel is transformed into a glide by being associated with the floating C-slot. 'z₂' on the two association lines from the syllable node shows that the syllable node and V-slot are consequently deleted. The two broken association lines from the floating C-slots to the syllable node then show that resyllabification has taken place. The syllable that is created in (218a) is light, while that of (218b) is heavy.

CHAPTER 7

CONCLUSION AND RECOMMENDATIONS

7.0 Summary and Conclusion

This section is brief because a summary is given at the end of every chapter. The study demonstrates that there is a relationship between syllable weight and phonological processes in Dholuo. The study therefore validates the hypothesis that a wide range of phonological processes in Dholuo involving especially stress, tone and vowels are influenced by syllable weight (section 1.4). The findings of the study, as seen in Chapter 4, 5 and 6, show that phonological processes in Dholuo involving especially stress, tone and vowels are influenced by syllable weight.

The study defines syllable weight in Dholuo. As pointed out in Chapter 4, there are both light and heavy syllables in Dholuo. A heavy syllable must have a branching nucleus (cf 4.5: example (115)), while a light syllable must have a non-branching nucleus (see example (117)). In other words, a heavy syllable in Dholuo must have two vowel positions in the nucleus, while a light syllable must have one vowel position. The onset and coda do not matter in the determination of syllable weight in Dholuo.

The stress pattern of Dholuo words shows that there is a close relationship between syllable weight and stress. The concept of syllable weight in Dholuo is defined in terms of its close relationship with stress. In almost all Dholuo words, syllables that are stressed are heavy, while those that are not stressed are considered to be light. Light syllables can only be stressed

if they occur as the first syllables of words with light syllables only (see Category 11,12,21, 23 and 36). A heavy syllable can generally be defined as a syllable which has a branching nucleus and is characteristically stressed. A light syllable can generally be defined as a syllable which has a non-branching nucleus and is characteristically unstressed. This then is the language specific definition of syllable weight in Dholuo.

According to Clements and Keyser (1983:13), the nucleus of a heavy syllable consists of a long (or doubled) vowel, a diphthong or a sequence of a vowel and a consonant (i.e. VC sequence). The present study shows that a VC sequence in Dholuo is a light syllable (see example 117d). The C in the VC sequence, in this study, is considered as part of the coda and not the nucleus because it does not count in the determination of syllable weight. The definition of syllable weight given by Clements and Keyser (1983) is therefore not universal. Languages may regroup the representations given by Clements and Keyser (1983:13) to suit their own definition of syllable weight (see the representations in example (10) above). For example, in Dholuo (10a) and (10d) are light syllables, while (10b) and (10c) are heavy syllables. According to Clements and Keyser, only (10a) is a light syllable. Their analysis of a light / heavy syllable forms a basis from which languages may be described.

The theory of Metrical Phonology states that a heavy syllable has a branching rhyme and a light syllable has a non-branching rhyme (Goldsmith 1990). The rhyme includes the nucleus and the coda. In Dholuo, a syllable with a branching rhyme is not necessarily heavy, but one with a branching nucleus is always heavy. Therefore, a syllable with a branching rhyme is

heavy if the nucleus it is immediately dominating is also branching (see the examples in (115) and (117)).

From the analysis of the stress pattern of Dholuo, there are both inherent and derived heavy syllables. The derived heavy syllables have a doubled vowel, while the inherent heavy syllables have a sequence of two different vowels. The derived heavy syllables occur in positions where stress is easily detected in Dholuo. Stress therefore has the effect of doubling vowels. It is realised through vowel doubling. The doubled vowels occur in the penultimate syllable in a vowel final word and in the last syllable in a consonant final word. In a vowel final word, the main word stress is on the penultimate syllable which also has a doubled vowel and in a consonant final word, stress is on the last syllable which also has a doubled vowel. This vowel doubling or stress pattern, in my view, is what Okombo (1982) refers to as root-lengthening. According to him, the last vowel of a word undergoes root-lengthening in a word ending in a consonant, in utterance final position. The penultimate vowel of a word undergoes root-lengthening in a word ending in a vowel, in utterance final position. In Dholuo therefore, duration is an effective cue of stress. The syllables that are heavy as a result of vowel doubling are realised as light syllables in the positions that do not attract stress.

The inherently heavy syllables mostly appear in positions where stress is also detected, for example, in Category 2,3,4,6,9,15 and 17, just to mention a few. In some cases, the inherently heavy syllables are stressed because of their structure rather than position, as seen in Category 10. In words of more than one heavy syllable, it is the last heavy syllable that is stressed, as seen in

Categories 4,7,20,24,26,27,28,30 and 35. Since stress in almost all words falls on a heavy syllable, it is concluded that Dholuo is a Quantity-Sensitive language as far as stress placement is concerned.

Since the inherently heavy syllables are stressed and stress has the effect of doubling vowels, thus creating derived heavy syllables, the relationship between syllable weight and stress is mutual. In other words, syllable weight affects stress and stress affects syllable weight. Stress is therefore very important in any discussion of syllable weight in Dholuo.

The study reveals that among the tones existing in Dholuo words (see the end of section 5.1). The downstepped high tone and the high-falling tone do not occur in monosyllabic words. The low-rising tone does not occur in words with more than one syllable.

In almost all cases, the high-falling tone is found on heavy syllables. As already stated in Section 5.6, the high-falling tone is found in the position where stress is easily detected in Dholuo words, that is , on the penultimate or the last syllable of a word. This is seen in Group 4, 5, 6, 13, 14, 15, 16, 17, 26, 27, 28, 29 and 31. It is therefore concluded that Dholuo is partially Quantity-Sensitive in tonal assignment because the high-falling tone is mostly found on heavy syllables.

As already stated in section 5.5, the high tone has the effect of making the duration of each syllable quite clear. The weight structure of a syllable with a high tone is easier to detect than one with a low tone.

There is a close relationship between syllable weight and the three vowel processes discussed in this study. The three vowel processes are

deletion, compensatory doubling and glide-formation.

As seen in Section 6.1 and example (208), deletion takes place at word boundary. Deletion takes place where both the word final and word initial vowels are in light syllables. The word final vowel must be in a light CV syllable (Type A syllable), while the word initial vowel must be in a light V syllable (Type B syllable). It is the vowel in the word final syllable that is deleted. This deletion results in the formation of yet another light CV syllable. The floating C at word boundary combines with the word initial V to form a CV syllable (see (211) above). This is a case of deletion without compensatory doubling.

Deletion is in some cases followed by compensatory doubling. In such cases, the word final vowel at word boundary is in a light CV syllable, while the word initial vowel is in a light V syllable (see section 6.2 and example (212) above). The word final vowel is first deleted, the word initial vowel then doubles to occupy the space left by the deleted vowel, as seen in section 6.2 and example (214). The consonant left floating after vowel deletion is resyllabified to become the onset of the doubled vowel. A heavy syllable is therefore formed from two light syllables.

Whereas deletion without the concomitant doubling takes place in monosyllabic function words, compensatory doubling takes place in monosyllabic content words and in polysyllabic words whose final vowels indicating the possessor is similar to the word initial vowel at word boundary, as seen in (195) above.

Glide-formation also takes place at word boundary (see section 6.3).

The weight of the syllable also matters in glide formation. The vowel that glides must be a word final vowel in a light CV syllable (Type A syllable) and must precede a word initial vowel of either the structure V (Type B syllable) or VV (Type D syllable). This means that the vowel that glides can precede a light or heavy syllable at word boundary. Therefore unlike the word initial vowel that can either be light or heavy, the word final vowel that undergoes glide-formation must always be light (see example (215) above). In utterances where the word initial vowel is light, the syllable that emerges as a result of glide-formation is always a light CCV syllable. A heavy CCVV syllable emerges from a glide formed in the environment of a word initial heavy VV syllable (see (218) above).

Dholuo is therefore a Quantity-Sensitive language as far as vowel processes are concerned. Deletion alone, deletion followed by compensatory doubling and glide-formation all directly affect word final light CV syllables. The three processes do not affect word final heavy syllables.

7.1 Recommendations

In this section suggestions for further research in areas related to this study are given. A method of teaching that should be emphasised in the light of the findings in this study and in Ngala (1994) is also recommended.

After using autosegmental representation in the study, it is seen that Dholuo has floating segments. Floating low tones exist in certain words, thus leading to the occurrence of the downstepped-high tone as seen in Group 7, 8, 18 and 23. Floating skeletal positions also exist, as seen in the analysis of glide

formation in section 6.3. I believe this is an important area of Dholuo phonology where further research should be done. A study of the nature of floating segments in Dholuo should be carried out. To elaborate further by giving more examples, when a word such as ɔ̌ɪ ‘go (command)’ is used emphatically, it ends with the typical verb final -o/ɔ . It then becomes $\text{ɔ̌ɪ}:\text{\$jɔ}$ ‘go (command used forcefully or emphatically)’. It possibly becomes $\text{ɔ̌ɪ}:\text{\$jɔ}$ because of the existence of a floating C position. A consonant is therefore inserted between the two vowels. The consonant inserted in this case is /j/.

The existence of floating segments in Dholuo is further supported by the results of a reading test I gave to secondary school students during my Master of Philosophy research (see Ngala 1994). When students, who use Dholuo as their first language, were asked to read RP (Received Pronunciation) English words with diphthongs ending in the schwa /ə/, there were those who made errors and those who did not. The three diphthongs include /ɪ ə/, /ɛ ə/ and /ʊ ə/. All those who made errors inserted either the glide /j/ or /w/, as seen in (219).

(219) No error	error
(as in beer)	$\text{ɪ}\text{\$ja}$
(as in hair)	$\text{ɛ}\text{\$ja}$
(as in poor)	$\text{ʊ}\text{\$wa}$

I then observed that:

The vowels forming the diphthongs were separated by the intrusion of the semi-vowels /j/ and /w/. This separation made the V-nodes of the CV-tier dominate only an individual sound segment unlike in RP English where the V-node branches in the articulation of words containing diphthongs. It should be noted that the intrusion of either the semi-vowel /w/ or /j/ seems to depend on the nature of the first

vowel in the diphthong. For the front vowels it is the glide /j/ that intrudes while for the back vowel it is the glide /w/ that intrudes (Ngala, 1994:209).

It is now apparent to me that students must have made this error because of the existence of floating Cs in their first language, which is Dholuo. They transferred their use of floating Cs to the seemingly appropriate environment in English language. This is then an area of Dholuo Phonology that should not be ignored.

As already pointed out in Ngala (1994), this is one of the errors that can be eliminated by giving students the 'comprehensive input' suggested by Krashen and Terrell (1983). 'Comprehensive input' here refers to the using of the problematic structures (such as the centering diphthongs discussed in the preceding paragraph) correctly in many novel sentences without making learners aware of the problem or error being corrected. Those who develop English language learning resources should therefore ensure that they develop teaching materials that provide learners with a comprehensive input.

The stress and tone pattern of English also differs very much from the Dholuo one. This is another area where a comprehensive input should be provided.

A study of stress and tone at sentence level in Dholuo should be carried out. This will show whether stress or tone placement at the sentence level is different from that of word level.

Studies of the relationship between syllable weight and phonological processes in other languages should be carried out using the same theories of phonology used in this study. This would test both the analytic and descriptive adequacies of these frameworks.

Further research on the same range of data found in this study should also be carried out using the emerging paradigms of research.

BIBLIOGRAPHY

- A Member of St. Joseph's Society (1938). Dholuo Grammar with Some Useful Phrases and Vocabulary of Common Words. London: Mill Hill Fathers.
- Abercrombie, D. (1967). Elements of General Phonetics. Edinburgh: Edinburgh University Press.
- Allen, W.S. (1973). Accent and Rhythm. Prosodic Features of Latin and Greek: A Study in Theory and Reconstruction. Cambridge Studies in Linguistics 12. Cambridge University Press.
- Ayot, H.O. (1979). A History of the Luo-Abasuba of Western Kenya A. D. 1760-1940. Nairobi: Kenya Literature Bureau.
- Chomsky, N. and M. Halle (1968). The Sound Pattern of English. New York: Harper and Row.
- Clements, G.N. (1979). The Description of Terraced-Level Tone Languages. Language 55: 536-558.
- Clements, G.N. and S.J. Keyser (1983). C.V. Phonology: A Generative Theory of the Syllable. Cambridge, Mass: MIT Press.
- Cohen, D.W. and E.S. Atieno Odhiambo (1989). Siaya: Historical Anthropology of an African Landscape. Nairobi: Heinemann Kenya Limited.
- DereK, A. (1982). The Rhythm of English Poetry. London: Longman Group Limited.
- Durand, J. (1986). Dependency and Non-Linear Phonology. London: Croom Helm.
- (1990). Generative and Non-Linear Phonology. London

Longman Group Limited.

Fudge, E.C. (1969). Syllables. Journal of Linguistics 5. 253-286.

Gimson, A.C. (1989). An Introduction to the Pronunciation of English
(4th ed). London: Edward Arnold.

Goldsmith, J.A. (1976). Autosegmental Phonology, Indiana Linguistics
Club. (Also published, 1979, by Garland Publishing,
New York).

----- (1990). Autosegmental and Metrical Phonology. Oxford:
Basil Blackwell.

Halle, M. and J.-R. Vergnaud (1980). Three-dimensional Phonology. Journal
of Linguistic Research I: 83-105.

----- (1982). On the Framework of Autosegmental
Phonology. In van der Hulst and Smith (1982, Part I).

----- (1987). Stress and the Cycle. LI 18:45-84.

Harris, Z.S. (1951). Structural Linguistics. Chicago: University of Chicago.

Haugen, E. (1956). Syllabification of Kutenai. International Journal of
American Linguistics. Vol. 21, No. 4, Part 1. Baltimore:
Waverly Press.

Hayes, B. (1980). A Metrical Teory of Stress Rules. Ph. D. Dissertation,
MIT; Circulated by the Indiana University Linguistics Club,
1981.

----- (1989). Compensatory Lengthening in Moraic Phonology.
Linguistic Inquiry 20. 253-306.

Hockett, C. F. (1947). Componential Analysis of Sierra Popoluca. IJAL
13:259-267.

- Hogg, R. and C.B. McCully (1987). Metrical Phonology. Cambridge: Cambridge University Press.
- Hooper, J.B. (1972). The Syllable in Phonological Theory. Language 48. 525-540.
- (1973). Aspects of Natural Generative Phonology. Unpublished Doctoral Dissertation, University of California, Los Angeles.
- Hornby, A. S. (1992). Oxford Advanced Learners Dictionary of Current English. Calcutta: Oxford University Press.
- Huang, C.-T. James (1985). The Autosegmental and Metrical Nature of Tone Terracing. Linguistics: Essays in Memory of M.W.K. Semikenke, e.d. by D. Goyvaerts, 209-238. Amsterdam: Benjamins.
- Hulst and Smith (1985). Advances in Non-Linear Phonology. Dordrecht: Foris.
- Huntingford, G. W. (1959). Elementary Lessons in Dholuo. School of Oriental and African studies, University of London.
- Hyman, L.M. (1975). Phonology Theory and Analysis. New york: Holt Rhinehart and Winston.
- Hyman, L.M. and R.G. Schuh (1974). Universals of Tone Rules: Evidence From West Africa. Linguistic Inquiry 5. 81-115.
- Kahn, D. (1976). Syllable-based Generalisations in English Phonology. Cambridge, Mass: MIT Ph.D. Dissertation. Distributed by Indiana Linguistics Club.
- Katamba, F. (1989). An Introduction to Phonology. London: Longman Group Limited.

Kenstowicz, M. (1994). Phonology in Generative Grammar. Oxford:

Blackwell.

Kenya Population Census 1989, Vol. 1. Central Bureau of Statistics, Office
of the Vice-President and Ministry of Planning and National
Development. Nairobi: The Government Printer.

Krashen, S. and T. Terrell (1983). The Natural Approach: Language
Acquisition in the Classroom. Oxford: Pergamon.

Ladefoged, P. (1975). A Course in Phonetics. New York: Harcourt Brace
Jovanovich Inc.

Lehiste, I. (1970). Suprasegmentals. Mass: MIT Press.

Lerdahl, F. and R. Jackendoff, (1983). A Generative Theory of Tonal Music.
Cambridge: MIT Press.

Liberman, (1975). The Intonational System of English. Cambridge, Mass:
MIT Ph D. dissertation. Distributed by Indiana University
Linguistics Club.

Malo, S. (1952). Dholuo Without Tears. Kenya: Nyanza Printing Works
Limited.

McCarthy, J. and A. Prince (1986). Prosodic Morphology. Waltham, Mass:
Brandeis University ms.

Newman, P. (1972). Syllable Weight as a Phonological Variable. Studies in
African Linguistics 3: 301-323.

Ngala, J. A. (1994). A Contrastive Analysis of the English (RP) and Dholuo
Syllable Structures. Moi University (M.Phil. Dissertation).
Unpublished.

Ochieng', W. (1985). A History of Kenya. Nairobi: East African Literature
Bureau.

Odhianmbo, J.H.A. (1981). Dholuo Phonology: A Study of the Major Vowel

- Processes. Nairobi University (M.A. Dissertation).
Unpublished.
- Oduol, J.H.A. (1990). Dholuo Dialects: Synchronic State and Some Historical Inferences. Nairobi University (Ph. D. Dissertation).
Unpublished.
- Okombo, D. (1977). Some Aspects of Form and Function of Tone in Luo. Nairobi University (B.A. Dissertation). Unpublished.
- _____ (1982). Dholuo Morphophonemics in a Generative Framework. Berlin: Dietrich Reimer Verlag.
- _____ (1986). Functional Paradigm and Dholuo Constituent Order. Nairobi: University (Ph. D. Dissertation). Unpublished.
- Omondi, L.N. (1982). The Major Syntactic Structures of Dholuo. Berlin: Dietrich Reimer Verlag.
- Pei, M. A. (1966). Glossary of Linguistic Terminology. New York: Harper And Row.
- Pike, K.L. (1948). Tone Languages: A Technique for Determining the Number and Type of Pitch Contrasts in a Language, with Studies in Tonemic Substitution and Fusion. University of Michigan Publications in Linguistics 4. Ann Arbor.
- Pulgram, E. (1970). Syllable, Word, Nexus, Cursus. The Hague: Mouton.
- Sethi, J. and P.V. Dhamija (1992). A Course in Phonetics and Spoken English. New Delhi: Prentice-Hall of India Private Limited.
- Stafford, R.L. (1967). An Elementary Luo Grammar with Vocabularies. Nairobi: Oxford University Press.

Stetson, R. H. (1951). *Motor Phonetics*. Amsterdam: North- Holland.

The New Encyclopaedia Britannica Vol. 22 (1993). London: Encyclopaedia
Britannica, Inc.

Tryon, D.T. (1970). *An Introduction to Maranungku*. (Pacific Linguistics
Monographs, Series B, No. 14.). Canberra: Australian National
University.

Williams E.S. (1976). 'Underlying Tone in Margi and Igbo', Linguistic
Inquiry 7, 463-484.

United Bible Societies (1976). Muma Maler. Bungay: Richard Clay Limited.

APPENDIX

Sample of Raw Data

A Narrative by Andrea Ogwel Okeyo.

Moro manyalo wacho e dier ma pod watindo mananeno kendo pod anyalo paro kendo awuoro kata kawuono ni naneno en mar ng'ielo. Kaka ng'ielo timo ekinde machon. Jomoko nenitiere ma ok ohero dwaro to jomoko ohero dwaro, nikech nitie mane ji jo kristo ok mor mondo nyithindgi odhi dwar. To mier moko nitie mane nyithindgi nyalo dhi dwar. To gimananeno notimore kamoro ni kotieno kwoyo kaendi e aoro moro ni Ageng'a.

To ne ji dwar, kaka sama ji dwar jodwar nayalo luwo ei aora kochiko mwalo tir. Kata ginyalo chiko malo. To seche mane gidhi e dwar niendi jamni matindo no nwang'o kwayo e aora nogono. Ero to kanegisekalo ka gidhi ka mwalo to thuol moro ni ng'ielo bende ne nia aora kanyo e bungu nogono. Ng'ielo niendi nodhi kwom chiaie, matin kwom rombo momako rombo. Kosemako rombo, to nochako nalo rombo. Onal kaka ng'ato mawito tol. Onalo nalo nalo nalo nalo nalo nalo nalo motweye. Koro eka aito oridogo oridogo oridogo morido chuth kabisa. Koro othung'e athung'a kamano. Ero kagino osetho koro oling' kanyo mondi.

To rombe gi eki ne mar jal moro ni okal, to nyathi mane kwayo nodhia luongo wuongi ni 'baba rombwa ng'ielo omako, ng'ielo omako'. Eka nobiro. To ka nobiro kamae nonwang'o ka ng'ielo omako rombo osetweyo mosenego. To penjo ni 'to erogo erogo' ... 'ni bi abiya en ka,en ka'. To kochopo kama to ne en gi beti mopiadhia mabith, mopaki mabith chuth, chuth kabisa. Ng'ielo ka beti ma ok bith ok ng'ol. Kigoyo to muoch ni pup, omuoch ni pup. Beti chikore kaduogo mana malo. To beti mopiadhi mabith chuth chuth e mang'olo go kendo ng'ade ni i. To ka nobiro kama, to penjo ni ero go, to nyise kama oninde, to kodonjo kama endi to okaw mana beti ogo ni chap chap chap chap ochadhe ochadhe ochadhe. To kochadho kama, ka ng'ielo winjo lit mar beti, to chako mana gonye ni hur hur hur hur. Ogoñyore.

Ng'ielo karingo okoring kaka thuonde moko nidhi tir, dhi kama e lum. Owitore e yo ka wiye gore kuchocho. Iwe bende chako gore kucho, wiye chako gore kuchocho. No gonyore mowe chiaa kanyo. Ero bas nodhi onindo kamaro, kodhi kamano.

Ero to kane wadhi ng'iyio rombo ni eri, wayudo ka rombo ni nonang'ogo madende otimo atima gima poth poth lilo lilo. Chalo gima oswag yien moro ni obolo mokete pii koka owir godo. Opoth apotha dende te.

Kama nodhi onindenii jal ni nodhie gi beti koro nochadhe ochadhe ochadhe monege. Kanyo ero ng'ielo ok chal kaka thuonde moko. Thuonde moko kwiny, odwa ni mondo obotre kata mondo oka ng'ato. Ng'ielo ok ka ng'ato. Ng'ielo en chikne odwa mana ni mondo onwang' gima onego kamano ero. Kosedolore monalo kamano ero, to kosetho tonang'o to mwonyo dhi eiye. Koro ka iye osekwot makoro oyieng' kamano ero koro kama oninde en koro ojok onindo. Oling' aling'a kanyo ero koro gini chieng' moro tow atowa eie kanyo ero mos mos mos. Bas ka gino osetop eka obiro chako ng'wech.

To gima awuoro kwom ng'ielo ni to en ni ka koro odenyo odwaro chiemo, to gino omwonye gi yier duto te kaka chalo mangima kamano, to en koro oling' ni osechiemo. Koro en to gini donjo e rembe nadi. Mano e gima na neno kendo e gima pod aparo, awuoro. Kanyo ema apenjo koro ka un joma osesomo gigi eki to koro en komwonye gi piengi tetete, gi yier te koro en to donje rembe nadi mondo owinj ni ochiemo oyieng' kaka ng'ato kochiemo to koro chiemo dhi tiye e dende. Koro mogik kamano, ero gino e gima aparo kendo awuoro nyaka kawuono.