

**UNIVERSITY OF EDUCATION, WINNEBA**

**SOME WORD FORMATION PROCESSES IN SISAALI**

**BUSHIRA GARIBA**

**2017**

**UNIVERSITY OF EDUCATION, WINNEBA**

**SOME WORD FORMATION PROCESSES IN SISAALI**



**BUSHIRA GARIBA**

**A THESIS IN THE DEPARTMENT OF APPLIED LINGUISTICS, FACULTY  
OF FOREIGN LANGUAGES EDUCATION AND COMMUNICATION  
SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES, UNIVERSITY  
OF EDUCATION, WINNEBA, IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR AWARD OF MASTER OF PHILOSOPHY OF  
APPLIED LINGUISTICS**

**JULY, 2017**

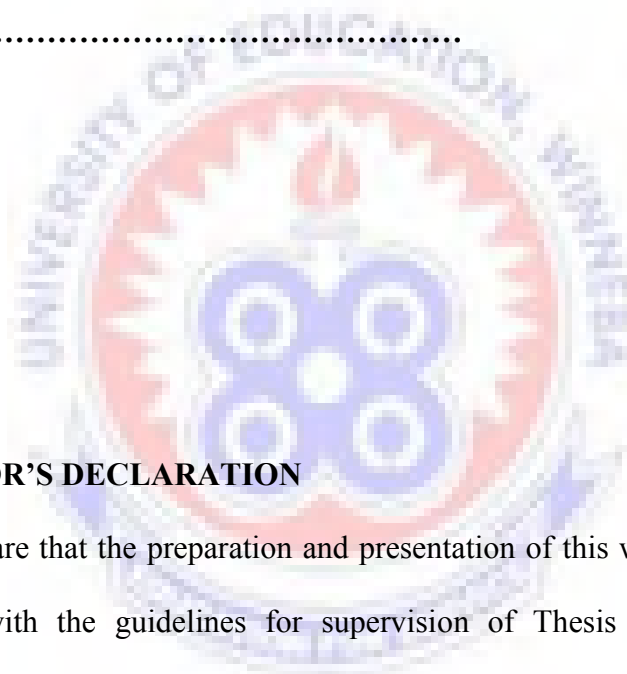
## DECLARATION

### STUDENT'S DECLARATION

I, Bushira Gariba, declare that this thesis, with the exception of quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole, for another degree elsewhere.

**SIGNATURE:**.....

**DATE:**.....



### SUPERVISOR'S DECLARATION

I hereby declare that the preparation and presentation of this work was supervised in accordance with the guidelines for supervision of Thesis as laid down by the University of Education, Winneba.

**SUPERVISOR'S NAME:** DR KWAKU OFORI

**SIGNATURE:** .....

**DATE:** .....

## ACKNOWLEDGEMENT

I am grateful to the almighty God for seeing me through this thesis. It is only for his mercies that this work became a success.

Profound gratitude is extended to my supervisor Dr. Kwaku Ofori for his patience, understanding, guidance and valuable comments that helped to shape this work.

Special thanks and appreciation are extended to the Head of Department of applied linguistics, Dr. Fofu Lomotey for her hospitality and providing me with valuable literature for the work. I say “may you never lack Doc.”

I am indebted to all the lecturers of the department of Applied Linguistics, more especially Dr. Rebecca Akpanglo-Nartey, Pof. Boadi and Prof. Esilfie.

Sincere gratitude is extended to the paramount chief of the Tumu traditional area, Kuoro Richard Kanton Babini VI for his immense contribution in making this research a success. Mɛ sɛ Wɪa jaŋ pɛ ŋ lɛ, a leŋ dɪ ŋ sɪ kuŋ chɛ ka.

To the entire Sɛsaala union, especially the union president, Dr. Kanton Roger, I say words are not enough to express my appreciation to you. Wɪa jaŋ leŋ dɪ Sɛsaala niŋ magɪ dɔgɔ muvu deŋ-deŋ.

Mr. Moses Dramani Luri, your immense contribution to the success of this work will forever be remembered.

To my friend and course mate, Irene Duma Basimaga, thanks for constantly putting me on my toes to prove my worth. I enjoyed both the good and bad times we shared together from the beginning to the completion of this thesis.

I am equally grateful to all my course mates especially Ida Asem and Fatawu Amidu for sharing ideas and learning materials with me to make this thesis a success.

To my lovely children Bapula and Nidjon, and my husband John Assan Nidjon, I say thank you for sacrificing your love for me to be able to complete this work.

Many more people have been instrumental in helping me complete this thesis whose names could not be captured especially every member of the CHIEMINA family. I say ‘wusi si pɛ ɪ wa wuu la’.



## **DEDICATION**

I dedicate this piece of work to the almighty Allah, my two adorable children, Bapula A. Nidjon and Khalid Nidjon, my husband, John Assan Nidjon, my kid sister, Gariba Saadia, my mum, Gariba Abibata, my late father Gariba Diyaka Chiemina and every member of the Chiemina family.



## TABLE OF CONTENTS

<b>Content</b>	<b>Page</b>
DECLARATION	ii
ACKNOWLEDGEMENT	iii
DEDICATION	v
TABLE OF CONTENTS	vi
LIST OF TABLES	viii
ABBREVIATIONS	x
ABSTRACT	xi
<b>CHAPTER ONE: INTRODUCTION</b>	<b>1</b>
1.0 Introduction	1
1.1 Background of the Language under Study	2
1.2 Statement of the Problem	3
1.3 Objectives of the Research	3
1.4 Research Questions	4
1.5 Significance of the Study	4
1.6 Methodology	4
1.7 Theoretical Framework	5
1.8 Organization of the Work	9
<b>CHAPTER TWO: RELATED WORKS / LITERATURE REVIEW</b>	<b>10</b>
2.0 Introduction	10
2.1 Word Formation	10
2.2 Borrowing	11
2.3 Compounding	17
2.4 Reduplication	21

2.5	Review of some Aspects of the Phonology of Sisaalt	26
2.6	Review of Some Aspects of the Phonology of Akan	32
2.7	Review of some Aspects of the Phonology of English	37
2.8	Conclusion	39
<b>CHAPTER THREE:METHODOLGY</b>		<b>40</b>
3.0	Introduction	40
3.1	Data Type and Data Collection Procedures	40
3.2	Instruments	43
3.3	Data Analysis	48
3.4	Summary	49
<b>CHAPTER FOUR:DATA ANALYSIS</b>		<b>50</b>
4.0	Introduction	50
4.1	Borrowing	50
4.2	Reduplication	58
4.3	Compounding in Sisaalt	78
4.4	Affixation in Sisaalt	93
4.5	Conclusion	107
<b>CHAPTER FIVE: CONCLUSION, SUMMARY, CONCLUSION, FINDINGS AND RECOMMENDATIONS</b>		<b>108</b>
5.0	Introduction	108
5.1	Summary and Conclusion	108
5.2	Findings	109
5.3	Recommendations	112
REFERENCES		114
APPENDIX A		117



## LIST OF TABLES

<b>Table</b>	<b>Page</b>
1: The consonant chart of Sisaalt	27
2: The vowel chart of Sisaalt	28
3: “Unified” Akan consonant chart	33
4: Akan vowel chart	35
5: The consonant chart of English	37
6: The vowel chart of English	38
7: OT analysis of English borrowed word class [klæs] in Sisaalt	54
8: OT analysis of the English borrowed word school [sku:l]	54
9: OT analysis of Akan loaned word kwaku [k <sup>w</sup> aku]	57
10: OT analysis of Akan borrowed word yaa	58
11: OT analysis of reduplicated adjectives	60
12: OT analysis of the reduplicated adjective mùà-mùà “very small”	61
13: OT analysis of reduplicated adverbs	62
14: An OT analysis of reduplication of numerals	64
15: An OT analysis of reduplication of numerals	66
16: OT analysis of CV verbs	71
17: OT analysis of data on CV verbs that end in long vowels	74
18: OT analysis of data on CV.C verbs	76
19: OT analysis of data on CV.CV syllable verbs	78
20: Noun-Noun Compounds	80
21: Noun-Adjective compounds	82
22: Noun-Verb compounding in Sisaalt	84
23: Verb-Verb compounding in Sisaalt	87

24: Noun-postposition compounding in Sisaalt	88
25: Noun-Adjective-Adjective compounding in Sisaalt	90
26: Verb-Verb-Verb compounding in Sisaalt	92
27: The plural suffix maker for some human animate nouns only (-ba)	96
28: The plural suffix maker (-á:) for common nouns that end in -l or -luɲ	97
29: The plural suffix maker for some non-human animate nouns (-siŋ)	98
30: The plural suffix maker (-suɲ) used for some inanimate nouns	100
31: The plural suffix maker (-niŋ) used for some non-human animate and inanimate nouns	101
32: The plural suffix maker (-é:) used for some non-human animate and inanimate nouns	103
33: The diminutive suffix makers -bié/-wié and mùá	104
34: The Identity Maker Suffixes -nu:/tu:na, -u/-ul/-ulu in Sisaalt	106

## ABBREVIATIONS

1. DEF            Definite Marker
2. FOC            Focus
3. GILLBT        Ghana Institute of Linguistics, Literacy and Bible Translation
4. NFED          Non-formal Education Division
5. OT             Optimality Theory
6. Pl              Plural
7. Ptl             Particle
8. RED            Reduplicant
9. SILDEP        Sisaala Literacy and Development Program
10. Suf.          Suffix



## ABSTRACT

The study investigates some word formation processes in Sisaalt, under the frameworks of Optimality Theory, propounded by Prince and Smolensky (1993) and Hockett's model of morphological analysis (IA approach). Four word formation processes were found, namely; borrowing, reduplication, compounding and affixation. The data on borrowing and reduplication were analyzed using OT and the data on compounding and affixation were analyzed using the IA. The study established that, words borrowed from Akan into Sisaalt will not be structurally constrained because both languages have similar syllable structures. But words borrowed from English into Sisaalt with consonant clusters and codas were structurally constrained and had to be repaired through vowel epenthesis and final consonant deletion because the syllable structure of Sisaalt does not permit consonant clusters and syllable codas. The study also revealed that, the reduplicant for verbs is reserved to be a CV ending in a short vowel, such that a CV verb ending in a long vowel will have to be shortened in the reduplicant. Also, verbs with structures larger than a CV will have to be elided to generate only CVs in the reduplicant. The vowel of the reduplicant for verbs was noted to be reserved for [+High] vowels, such that a [-High] base vowel will necessarily change to a [+High] vowel in the reduplicant. The study equally showed three types of compound words exist in Sisaalt; endocentric, exocentric and coordinate compounds. The suffixes **-bá**, **-á:**, **-niŋ**, **-siŋ** and **-é:** were identified as plural marker suffixes in Sisaalt. Audio recording, focused group discussions, direct elicitation and documents were the methods used to arrive at the data.



## CHAPTER ONE

### INTRODUCTION

#### 1.0 Introduction

Language is not static, but dynamic. As generations come and go, and technology keeps changing, language also changes to meet the lexicon of the new generations. Every language has the ability to build up its lexicon for specific functions in the language, such as to name a new concept or to perform a grammatical function. This however cannot be possible if speakers of the language do not follow the systematic morphological principles underlying word formation in the language. The processes that a particular language may employ to fill its lexical gap may be unique to that language and not universal to all languages. Word formation processes such as compounding, reduplication, suffixation, borrowing and coinage exist in Sisaali, and many words resulting from these processes are in daily use today. There is however, little or no known research giving a systematic description of these processes in the language. It is based on this, that, I propose to investigate into some word formation processes in Sisaali. The work is mainly going to be descriptive but I will employ Hockett's models of morphological analysis, Item and Arrangement (IA) approach as cited in Mathews, (1974) to help in the analyses of the data on compounding, derivation, and coinage in addition to Optimality Theory (OT) propounded by Prince and Smolensky (1993) to guide me in the analyses of the data on borrowing and reduplication.

### 1.1 Background of the Language under Study

Sisaalt belongs to the Gusi-sub group of Gur languages (Naden, 1988) spoken by the ethnic group called the Sisaala. Sisaalt is spoken as a first language in five major districts in the Upper West Region of Ghana namely; the Sisaala East District with its District Capital called Tumu, the Sisaala West District with its District Capital called Gwollu, Wa East District with its District Capital called Fonsi, Lambusie District with its District Capital called Lambusie and Daffiama-Busie-Issa with its District Capital called Issa. Sisaalt is also spoken in some communities in neighboring Burkina Faso.

According to Luri (2011), Sisaalt has seven different dialects namely: Tumuluŋ, Gbieni, Bosillu, Bɔwaalt, Pasaalt, Gelbagli and Kpatolie, which are mutually intelligible. The study will however use data from the Tumuluŋ dialect of Sisaalt because it is a dialect spoken by the speaker.

The meaning of words in Sisaalt are not just determined by the vowels and consonants that come together to form the words, but by the tone that accompany these vowels and consonants. In other words, tone distinguishes meaning between two words that have the same constituents. For example, the word **tɪá** ‘tree’ and **tɪà** ‘bring’ are different because the later ends in a low tone vowel while the former ends in a high tone vowel, though they both have the same vowels and consonants in the same order. The meaning of a grammatical sentence can also be changed depending on the tone on which it is said. For instance, if one intends to say **bá fá** ‘they have ran’ with a high tone on all the vowels in the verbs, but ends up saying it with a low vowel on all the verbs, different meaning is conveyed, as it becomes **bà fà** ‘they dare not’. Hence, Sisaalt can be said to be a tone language.

## **1.2 Statement of the Problem**

Sisaali, regarded as an under described Grusi- Gur language is widely spoken but lacks adequate literature compared to other Gur languages spoken in northern Ghana such as Dagaare, Dagbani, Gurene and Mampruli. Aside a few literacy works on the language such as the Sisaali Orthography guide by SILDEP and Sisaala Unioun edited by Atintono (2015), Sisaala-English/English-Sisaala Dictionary by Blass and Frempong (1975, 2002), Sisaali Nasaare tej –jinna by GILBT and SILDEP (2001), A Grammar of Sisaala – Paasale by McGill, Fembeti and Tuopin (1999), the language has received little linguistic investigations. Some works that sought to give a linguistic analysis to the language are Luri (2011), Tuopin (1995) and Blass (1990), but these works mentioned are in the areas of phonology and pragmatics respectively. The morphology aspect of the grammar of the language has however received little or no known linguistic investigation. It is based on this, that I decided to investigate into some word formation processes in Sisaali to fill this linguistic gap and contribute to the linguistic knowledge in the area of morphology.

## **1.3 Objectives of the Research**

The objectives of the research are:

1. To identify some word formation processes in Sisaali.
2. To identify certain phonological processes that occur in word formation in Sisaali.
3. Find out the phono-morphological processes that occur in Sisaali word formation.

#### **1.4 Research Questions**

This research seeks to address the following research questions:

1. What are some of the word formation processes in Sisaalt?
2. What phonological processes occur in the formation of words in Sisaalt?
3. What is the relationship between morphology and phonology in Sisaalt word formation?

#### **1.5 Significance of the Study**

The significance of the study are:

1. It will help in the description of the grammar of the language.
2. It will serve as a source of literature for the language.
3. The research will also serve as a basis for further research into the morphology of the language.

#### **1.6 Methodology**

Qualitative measures are employed in the collection of data, focusing on group discussions with the participants on various aspects of life such as health, agriculture, education, politics and football in the comfort of their homes. Direct elicitations are also used to collect data from the market as I interacted with the buyers and sellers in the market by bargaining with them and recording the conversation for analysis. Also, recordings of radio programs and social activities such as festivals, naming ceremonies, and funerals are taken and later played in a quiet environment and all the lexical items are identified and transcribed for analysis.

Data was also taken from available written texts such as the Sisaalt Orthography Guide edited by Atintono (2015), Sisaala-English/English-Sisaala Dictionary by Blass et. al (1975, 2002), Sisaalt Nasaare teŋ –jinna by GILLBT and SILDEP (2001)



and the translated version of the Old and New Testaments by the Ghana Institute of Linguistics, Literacy and Bible Translation (GILLBT) for analysis.

## 1.7 Theoretical Framework

The study would be mainly descriptive, but I will employ Hockett (1954) models of morphological analysis Item and Arrangement (IA) approach (cited in Mathews, 1974) to serve as a guide in the analysis of the data on compounding and suffixation and OT propounded by Prince and Smolensky (1993) would also be used as a guide to analyze the data on borrowing and reduplication.

### 1.7.1 Models of Morphological Analysis

The **Item and Arrangement (IA)** model analyzes word forms as a sequence or addition of morphemes. A morpheme in this sense can be a root, a stem or an affix. For instance, an English word like “faithfulness” is said to be made up of the morphemes ‘faith’, ‘-ful’ and ‘-ness’; faith is the root and the other morphemes are in this case derivational affixes. In a word like ‘dogs’ we say that ‘dog’ is the root and ‘s’ is an inflectional morpheme. This way of analyzing word forms is what Hockett (1954) cited in Mathews, (1974:225) refers to as “Item and Arrangement process (IA)”. This model is widely used in most Ghanaian languages in the formation of words, especially with compounding. For instance, the Sisaali compound word, **fùònà:ń** ‘valley’ is said to have been made up of two morphemes, **fùóń** ‘river’ and **nà:ń** ‘leg’ arranged sequentially to get the word **fùònà:ń** ‘valley’.

### 1.7.2 Optimality Theory (OT)

OT is a constraint-based theory propounded by Prince and Smolensky in 1993. It is widely used for phonological research, but now being adapted to analyze data on other areas of linguistics like syntax and morphology.

The theory seeks to counter two main assumptions made by the earlier Generative Phonology Theory as captured in the words of Prince and Smolensky (1993: 6)

*“Optimality Theory abandons two key presuppositions of earlier work. First, that it is possible for a grammar to narrowly and parochially specify the Structural Description and Structural Change of rules.....Second, Optimality Theory abandons the widely held view that constraints are language-particular statements of phonotactic truth”.*

What Prince and Smolensky sought to say in their words is that, OT tries to argue against the rule-based Generative Phonology theory, while proposing phonotactic constraints as the basis of assumptions.

The central idea of OT is that linguistic assumptions should be made based on only a set of universally present constraints. The constraints are simply instructions that tell us about the structure of a sentence, a word, a syllable, or a sound. Every language has a peculiar way of ranking these constraints, which helps in differentiating one language from the other.

OT assumes that all constraints (con) are violable (Oyebade, 1998). That is to say all constraints can be violated but the violation must be minimal. Violating a low ranked constraint according to Prince and Smolensky is referred to as minimal violation, indicated by an asterisk(\*), and violating a high ranked constraint is referred to as a fatal violation, indicated by an exclamation mark (!). It is however preferred to violate a low ranked constraint to violating a higher ranked constraint in a language.

The grammar of a language according to this theory, is hence, made up of a set of constraint hierarchies. The grammar then evaluates a set of potential surface forms called “candidates” and chooses an optimal candidate (indicated by the sign ↗) known

as the “output”. The optimal candidate is the one that does not violate the highly ranked constraint.

There are two main types of constraints according to this theory; faithfulness constraints, and markedness constraints: The faithfulness constraints require all outputs to be similar or equal to their inputs. In other words, all properties of the input must be preserved in the output. According to Katamba and Stonham (2006: 205), “two common types of faithfulness constraints are those that prohibit the deletion of segments (MAX-IO:- input segments must have correspondence in the output) or the insertion of segments (DEP-IO:- output segments must have correspondence in the input)”.

The markedness constraints on the other hand, require output forms to meet some structural conditions. Examples, No Coda (\*Coda) conditions (syllables must have no coda), Onset conditions (syllables must have onsets), No Coda Cluster (\*-σCC ) conditions (there should not be more than one consonant in the coda position), and No Onset Cluster (σCC-) conditions ( there must not be more than one consonant in the onset).

The two main types of constraints; faithfulness and markedness constraints then compete in a language to produce an optimal candidate known as the output, based on how the language ranks universally present constraints.

For instance, in analyzing borrowing as a word formation process in Sisaali using the faithfulness and markedness constraints of OT, it is realized that, when Sisaali borrows the English word, **book** [bɒk] into Sisaali, the faithfulness constraints requires that, all segments of the input which is **book** [bɒk] be preserved in the

output. That is to say, when the word **book** [bɔk] is borrowed into Sisaaltɩ, it should not be modified in any way, it should still be realized as [bɔk], but the markedness constraints requires that the input, which is **book** [bɔk] meets the structural condition of no coda because Sisaaltɩ places strong restrictions on coda consonants. This constraint therefore forces the input to be modified (termed as repaired in OT terms) to meet the structural condition of No Coda (\*Coda). To repair the unacceptable structure therefore, Sisaaltɩ decides to insert the vowel /ɔ/ after the coda consonant /k/ to allow the word, **book** [bɔk], which was just a one syllable word with a coda consonant /k/ to be resyllabified into two syllables [bɔ.kɔ] without a coda consonant, hence, resulting in differences between the input and the output. This means that, the markedness constraint is ranked higher over the faithfulness constraint when words are borrowed into the grammar of Sisaaltɩ.

This theory is chosen to guide the researcher in the analysis of the data on borrowing and reduplication because other researchers including Issah (2011) and Boakye (2015) as well as Adomako (2008) have been successful in using this theory to investigate reduplication and loanwords in other Ghanaian languages.

### **1.8 Limitations and Delimitations of the study**

Though there are other word formation processes in Sisaaltɩ such as tone, derivation and coinage, this study is limited to only borrowing, reduplication, compounding and affixation as word formation processes in Sisaaltɩ. The work is also delimited to only the Tumuluŋ dialect of Sisaaltɩ though Sisaaltɩ has seven different dialects because of limited time and resources.

### **1.9 Organization of the Work**

The work will be organized into five chapters; chapter one gives a general introduction of the study. It discusses the background of the language of study, the statement of the problem, the objectives of the study, the significance of the study, and the theoretical frameworks to be used in the analysis of my data. Chapter two reviews related works to the study and some aspects of phonology of Sisaali, Akan and English. In chapter three, the methodology used to collect the data is discussed, and a detail analysis of the data is presented in chapter four. The conclusion, summary, findings and recommendations to the study have also been discussed in chapter five.



## CHAPTER TWO

### RELATED WORKS / LITERATURE REVIEW

#### 2.0 Introduction

This chapter reviews works in relation to the present study. The literature is reviewed on word formation in general and under the following sub headings; borrowing, compounding, reduplication and some aspects of the phonology of Sisaalt, Akan and English.

#### 2.1 Word Formation Processes

Word formation is not a new area to researchers. Several renowned researchers have researched into word formation and have referred to the term differently. Word formation as defined by Sambian (2009), is a way of adding new words to a language's lexicon at will with the growth of civilization and technology. In the words of Levova (2012: 3), it is "a way of enlarging vocabulary". According to Gontsarova (2013: 13), "word formation is the way of how new different words are created and morphemes are combined with each other". Bauer (1983) cited in Haryati (2014), defines word formation as the formation of words. Taking into consideration the different definitions given to word formation, I refer to word formation as a way of filling a language's lexical vacuum, created by generational, cultural or technological change through the creation or adaption of new words into the language.

Yule (2010) identified ten types of word formation processes in English, namely; *coinage, borrowing, compounding, blending, clipping, backformation, conversion, acronyms, derivation and multiple processes*. In this research however, I am paying attention to borrowing, compounding and reduplication as word formation processes

in Sisaalt, but will briefly touch on other word formation processes like affixation because of inadequate time.

## **2.2 Borrowing**

Various scholars in the literature have defined borrowing as a word formation process differently. Adam (2007: 113) defines borrowing as “a natural process whereby one language adds new words to the lexicon by adopting those words from another language”. Yule (2010) sees it as the way a language takes over words from other languages. M-minibo (2013: 113), defines borrowing as “the adoption of individual words or even large sets of lexical items from another language or dialect”.

In this study, I define borrowing as the adoption of new lexical items from other languages that may receive some form of modification to become new words in a language.

Akpanglo-Nartey (2002) cited in Al-hassan (2006: 9), and Adam (2007: 113) refers to borrowed words as “loanwords”. In line with them, I also refer to words borrowed into a language as loanwords or borrowed words.

M-minibo (2013), argues that, when words are borrowed from other languages into the borrowing language, they are integrated into the phonology of the borrowing language.

In this research, I argue that, it is only when words that are borrowed from other languages that do not have the same or similar sound inventory and syllable structure of the borrowing language, that, the borrowed words are constrained and hence modified to fit into the sound inventory and syllable structure of the borrowing

language. This may trigger some phonological processes like substitution of pure vowels, epenthesis, vowel deletion, and substitution of consonants.

### **2.2.1 Studies on borrowing**

Al-hassan (2006) investigated into English loanwords in Dagbani. The aim of the study was to identify English borrowed words in Dagbani, and find out the phonological and morphological processes that occur when English words are borrowed in order to be accepted into Dagbani. He contended that the work will help people to understand the processes Dagbani employs in accommodating loanwords.

In his work, he compared the phoneme inventory of Dagbani to English and argued that Dagbani has more consonants compared to English while English has more vowels compared to Dagbani. He observed that Dagbani makes use of double articulated sounds such as /**kp**/ and /**gb**/, which are not in English. He also compared the syllable structures of English and Dagbani and contended that the syllable structures are not similar. Al-hassan also observed that Dagbani has eight syllable types while English has about sixteen syllable types. The study established that English has consonant clusters that can occur at word initial and word final positions while Dagbani does not have. It was argued also that Dagbani has syllable codas that are limited to the sounds /**l**/, /**b**/ /**y**/ and all nasal consonants. He argues further that, because of the differences in the syllable structure of the two languages, when English words are loaned into Dagbani, they will be constrained.

The analysis of his data revealed that, English words that have consonant clusters and were borrowed into Dagbani were separated because the syllable structure of Dagbani does not permit consonant clusters. The study also revealed that English words that



had closed syllables were opened up when they were borrowed into Dagbani because the syllable structure of Dagbani does not also allow closed syllables.

Al-hassan's work is relevant to the current research in that the current research seeks to also investigate the phonological processes that are likely to occur when words are borrowed from other languages into Sisaalt. This study like Al-hassan's will also review the sound inventories of Sisaalt and the languages it borrowed from, and see if there are any similarities and differences between them. The difference between this study and Al-hassan's however, is that, Al-hassan's work was merely descriptive while this study will analyze its data on borrowing using Optimality theory by Prince and Smolensky (1993).

Another related study is Adam (2007), which treated borrowing under some word formation processes in Dagbani. He defined borrowing as a natural process by which one language adds new words to the lexicon by adopting those words from another language. He refers to the words borrowed as loanwords or borrowed words. He identified semantic 'gap' in a language's lexicon as one of the reasons for borrowing words, citing the term *sim* as an English borrowed word in Dagbani referring to *cinema* because there is no pre-existing synonym of the word in Dagbani. Adam referred to Wilton's (2004) argument as cited in his work that, a less dominant culture is more likely to borrow from a dominant culture, arguing that Dagbani including many Ghanaian languages are borrowing from English and Akan because of their dominance. Adam also identified prestige as one of the reasons why words are borrowed referring to Wilton's (2004) argument as cited in his work that 'people use foreign words to show a sophistication and worldliness', arguing that is what is responsible for Muslim clerics of Dagbani using words of Arabic or Hausa in speech.

In Adam's concluding remarks on borrowing, he contends that, "looking at borrowing in general, it is observed that most of the loans are in the language, not because of necessity but for the mere fact of prestige". Then he gives a percentage figure of 78 of the borrowed words as having no synonyms in the language and argues that they "can be considered necessary". This, I think is somehow contradictory, because if the percentage of the borrowed words in his data that can be considered necessary in the language is 78, then saying that most of the loanwords are in the language "not because of necessity, but for mere fact of prestige" is difficult to comprehend.

Adam's work was also merely descriptive as his data was not analyzed using any linguistic theory. The work is relevant to the current research as the current research investigates some word formation processes in Sisaalt and postulates borrowing as one of the most productive ways of bringing into Sisaalt new words. The current research unlike Adam's will however not focus on the motivation for borrowing but the phonological processes that are likely to take place when words are borrowed into Sisaalt.

Also, M-minibo (2013)'s study which investigated into "Polytechnic Skills and Competences for National Development, the Role of Loan Word Integration in Northern Region of Ghana" is also worth discussing. The paper discussed borrowing as a word formation process in Dagbani, a Gur- language spoken in the Northern Region of Ghana. M-minibo discussed the processes that speakers of Dagbani use to accommodate new words borrowed from different languages and the reasons for borrowing.

M-minibo's study revealed that, Dagbani borrowed words from other languages such as Arabic, Hausa, Akan and English, and the borrowed words are modified to fit into the phonology of Dagbani through pure vowels substitution, vowel lengthening, vowel and consonant elision among others. It was also noted that Dagbani speakers borrow for two main reasons: One, they borrow to fill a lexical gap, and two, they borrow for the sake of prestige, because some of the words they borrow have synonyms in Dagbani.

This literature is of relevance to the current research because I am investigating into some word formation processes in Sisaalt and I postulate that borrowing is one of the word formation processes. The findings in M-minibo's study are therefore of interest to me because they serve as potential testing grounds for the current research questions, and the findings in the current research will either go to prove or disprove M-minibo's findings. I also intend to compare my findings to M-minibo's findings to see how similar or different they are since both Dagbani and Sisaalt are Gur-languages.

The current research is however slightly different from M-minibo (2013) in that, his work was merely descriptive. That is to say, he did not employ any linguistic theory in the analysis of his data. In the current research however, I intend to employ Optimality Theory (OT) in the analysis of my data.

Another work worth discussing is Apenteng and Amfo (2014), which discusses the form and the roles of English loanwords in Akan. In the paper, they sort to find out the morphological and phonological processes that are employed to accommodate English borrowed words in Akan. They also wanted to find out the various domains of English that Akan borrows from. Their findings reveal that phonological processes

such as syllable structure change, vowel harmony, deletion, nasalization, and vowel change occurred in the English loanwords in Akan. For instance, they observed that, some short vowels in English such as /ə/, /ɒ/, and /ʌ/ are replaced with other vowels when English words containing those vowels are borrowed into Akan. They also noted that English words borrowed into Akan that have consonant clusters are separated by either inserting a vowel between the consonants or by deleting one of the consonants.

Also, the findings of the study show that, English words that are borrowed into Akan are made to obey Akan's inflectional rules. That is to say, English loanwords in Akan take Akan prefixes and suffixes to inflect for number, tense and aspect. Apenteng and Amfo (2014) cited "-ni" as an Akan singular suffix that is suffixed to some English loanwords to indicate singularity (e.g Togo-ni), and **-fɔ̃** or **-nom** as Akan plural suffixes attached to nouns to indicate plurality as in **wédà-fɔ̃** 'welders' or **rɛfiree-nom** 'referees'.

Apenteng and Amfo's work is of interest to the current research in that the study came out with many interesting revelations, which I think are likely to pertain in Sisaali. One of which is their findings that phonological processes such as syllable structure change, deletion, and vowel simplification occur when English words are borrowed in to Akan, this may also happen in Sisaali when words are borrowed from other languages. The difference between the current research and that of Apenteng and Amfo's study however is that, this current study intends to analyze its data using OT, while Apenteng and Amfo's study was merely descriptive.

### **2.3 Compounding**

Scholars who delved into compounding as a word formation process have given different definitions to the concept. Bauer (1988: 239) refers to the term compounding as the “the formation of new lexemes by adjoining two or more lexemes”. Bauer (1983) defines it as the process of putting two words together to derive a third. Yule (1996) defines compounding as the process of combining two separate words to get a single form. In the words of Luri (2011), compounding as a word formation process is the fusing together of two stems. According to Anggraeni (2011), compounding is the joining together of two different words to form a new meaning. Omachonu and Abraham (2012) refer to compounding as a word formation process where two or more words are put together to form another word in a language. Abdul-Rahman (2013: 221), sees compounding as “the putting together of two or more lexical items to form a new word”. Adejumo and Osunbande (2014) define compounding as the process of forming words, which involves the combination of two or more words.

Words formed out of compounding are in the literature referred to as compounds or compound words. Bauer (1988: 102) defines compounds as “sequences of lexemes”. Katamba and Stonham (2006) defined a compound as “a word which contains more than one root”. Katamba (1993) argues that compounds may be formed by joining together pre-existing words that rhyme. I also refer to words generated through compounding as compounds.

Incorporating the various definitions in the literature, I define compounding in this work as the bringing together of two or more words to generate a new word whose meaning may or may not be derived from the individual words that have been put together to form the new word.

Many contemporary morphologists, including Williams (1981), Selkirk (1982), Owolabi (1995), Fabb (2001) and Ogunkeye (2002) assume complex words (compound words) have heads (cited in Taiwo, 2009). Selkirk (1982: 13) and Fabb (2001: 66-67), also cited by Taiwo (2009), classified compounds into two categories, based on whether they have heads or not. They termed compound words that have heads as endocentric compounds, and compounds that do not have heads as exocentric compounds. Fabb (2001: 67) (cf Taiwo, 2009) however identified a third type of compound and refers to it as a co-ordinate compound where he argues that, the two words put together to form the compound share “head-like characteristics”.

I opine in this research that, Sisaali compound words may belong to the three types propounded by Fabb (2001) as cited in Taiwo (2009): endocentric, exocentric and co-ordinate compounds.

The head of a compound has been defined both semantically and syntactically in the literature. Semantically, the head of a compound carries the meaning of the compound word, and syntactically, the head of a compound can occur at the left-hand or right-hand side of a given word.

Williams (1981: 248) cited by Taiwo (2009), proposes the Right-hand Head Rule (RHR) for morphology, where he argues that, the head of a morphologically complex word (compound word) will be the right-hand member of the word. Taiwo (2009) argues that the Right-hand Head Rule to morphology proposed by Williams does not hold for Yorùbá, arguing that, in Yorùbá the head is the left-hand member of the compound word and goes on to suggest a new rule for morphologically complex words. He refers to the head of a morphologically complex word as “that part of the

word which belongs to the same syntactic category as it; it represents the core meaning of the complex word and is one level lower in the XI hierarchy”.

I also see Williams’ argument as not adequately representative of all languages, so, I argue in this research that, this rule may not be adequately applicable in the formation of compounds in Sisaalt, as I argue we may have both left-headed and right-headed compound words in Sisaalt as will be revealed in the data. Hence, in line with Taiwo, I refer to the head of a compound as one that carries the semantic meaning of the compound, and it can occur syntactically at the left-hand or right-hand side of the compound depending on the language in question.

### **2.3.1 Studies on compounding**

Abdul-Rahman’s (2013) study on Elision in Dagbani is worth discussing in this study. The aim of the study was to project elision as a prominent syllable structure process in compound word formation in Dagbani. The data for the study was analyzed under the framework of auto-segmental phonology. He argued that, noun-noun compounds, noun-adjective compounds and a few verb-verb compounds cause elision in Dagbani. He mentioned also that elision occurs in plural formation in Dagbani. He contended that, the environment in which elision occurs is always at word boundaries and that the elision in Dagbani is a leftward one. He identified the vowels [**a**, **o**, **u**], the nasals [**m**, **ŋ**] and syllables as segments that are mostly affected by the elision process in Dagbani.

I argue in this thesis that, elision is likely to also take place when words are compounded in Sisaalt, and that the elision that occurs in Sisaalt is similar to the one in Dagbani with slight differences. I contend in this work that, elision in Sisaalt may be triggered by three types of compounds; noun-noun, noun-adjective and noun-verb.

The non-verb elision in Sisaali that occurs on the left hand element of the compound word however motivates some morphological processes like suffixation. For example, when the noun **li:ŋ** ‘water’ and the verb **ɲà** ‘drink’ are compounded (**li:ŋ+ɲà**), the final segment of the left element (**li:ŋ**), which is a nasal [**ŋ**] is deleted. The deletion of the nasal then motivates the right hand element of the compound to attract the suffix -**liŋ** to become **li:ɲàliŋ** ‘drinking water’. I also argue that, the elision in Sisaali is a leftward one and it occurs at word boundaries as Abdul-Rahman argues is the case of Dagbani.

Omachonu and Abraham (2012) analyzed compounding in Igala, a West Benue-Congo language spoken in north central Nigeria. They identified compounding and derivation as the major word formation processes in Igala. They focused on the criteria used to define a compound, the forms and the functions of compounds. They acknowledged it is very difficult to define compounding in some African languages. The study sought to address two main research questions: what features help to define compounding in Igala? And how productive is compounding as a word formation process in the language? They noted that compoundhood has been defined in the literature using phonological, syntactic and semantic means. They contended that, defining compoundhood in Igala however demands a semantic approach than the phonological and syntactic approaches employed by most of the world’s languages.

The analysis reveals among other things that, compounding is a very productive way of bringing in new words into Igala. It also shows that compounding in Igala is used in the naming of new concepts and ideas that were originally not in the language.

Omachonu and Abraham’s work is of relevance to the current study in that the current study also investigates into compounding as one of the word formation processes in



Sɪsaalt, and will want to find out how productive the process is in Sɪsaalt. The current study however differs slightly from Omachonu and Abraham's as it does not only employ the semantic criteria in defining compounds but also the syntactic criteria.

## **2.4 Reduplication**

There are widely divergent views regarding the definition of reduplication in the literature. Some of the various definitions of the phenomenon in the literature are as follows: Katamba and Stonham (2006: 180) defined reduplication as “a process whereby an affix is realized by phonological material borrowed from the base”. In the words of Issah (2011: 40) reduplication is a “morphological process by which a root or stem of a base, or part of it is repeated”. Dolphyne (2006) sees reduplication as a way of forming compounds by repeating part or the whole of a stem. Russel (1997: 107) cited in Boakye (2015) refers to reduplication as a phenomenon of copying all or part of the stem to mark certain meaning in a language.

My working definition of reduplication in this thesis is that, it is a technique used in creating words from already existing ones by copying all or part of the original word for specific functions in the language.

### **2.4.1 Types of reduplication**

The term reduplication has been categorized into two main types in the literature; partial reduplication and full/complete reduplication. Katamba and Stonham (2006) contend that full reduplication occurs when the entire word is copied while partial reduplication occurs when just part of the word is copied. I contend in this thesis that Sɪsaalt may employ both the full and the partial reduplication in the formation of words as shown in the examples 1 and 2 respectively;

**Example 1, full reduplication in Sisaalt**

- a. **dé:** ‘fast’ → **dé:-dé:** ‘very fast’
- b. **mùá** ‘small’ → **mùá-mùá** ‘very small or little or gently’

A close examination of example (1) reveals that, Sisaalt reduplication copies the entire word in the reduplicant.

Examples of partial reduplication in Sisaalt are shown in example (2)

**EXAMPLE 2, partial reduplication**

- a. **tù:sí** ‘insult’ → **tù-** tù:sí ‘continue to insult’
- b. **yìgí** ‘push’ → **yì-** yìgí ‘continue to push’
- c. **lì:sí** ‘remove’ → **lì-** lì:sí ‘continue to remove’

A critical look at the examples on partial reduplication reveals that the reduplicant copies the first CV syllable from the base.

**2.4.2 Some works on reduplication**

Issah’s (2011) study on the phonology of Dagbani verbal reduplication is worth discussing in this thesis. The objective of the paper was to describe reduplication of verbs in Dagbani under the framework of Optimality Theory. He claimed there are three types of verbal reduplication in Dagbani- epenthetic reduplication, partial reduplication and complete reduplication. He argues that, the reduplicated segment in Dagbani reduplication is required to have two moras. That is to say, the reduplicant must have a long vowel (CVV), two light vowels (CV.CV) or a (CVN) syllable.

Issah’s work further claims that, a complete copying of the base of /CVV/, /CV.CV/ and /CVN/ syllables will yield complete reduplication because a full copying of the base produces the required number of moras needed by the reduplicant. He cited the word **púí** ‘to select’, reduplicated to become **pùì- púí** ‘to select repeatedly’ and the word

**dám** ‘to shake’ reduplicated to become **dám-dám** ‘to shake repeatedly’, as examples because, a complete copying of their bases produced enough moras to fulfill the size requirement of the reduplicative stem.

He however argues that, a complete copying of the base of /CV/ syllable words will not produce enough moras to satisfy the requirement of the reduplicated segment. This he noted then calls for an additional segment (epenthesis), and the additional segment is always a homorganic nasal. He refers to this type of reduplication as epenthetic reduplication citing **kpé** ‘to enter’ reduplicating to become **kpèn- kpé** ‘to enter repeatedly’ and **gbí** ‘to dig’ reduplicating to become **gbìn- gbí** ‘to dig repeatedly’ as examples.

Issah further claims that, in CVV.V stems, a complete copying of the base will yield a size that will be larger than the size required by the reduplicative stem. This he said will result in a deletion of the second syllable, turning the CVV.V stems into CVV in the reduplicant. He termed this type of reduplication as a partial reduplication, citing **sáái** ‘to price’ reduplicating to become **sàà-sáái** ‘to price repeatedly’ and **dééí** ‘to receive’ reduplicating to become **dèè-dééí** ‘to receive repeatedly’ as examples.

Also, Issah’s work reveals that, the reduplicants in Dagbani verbal reduplication do not copy the tonal features of the base since the data shows the reduplicant has always have a low tone. He however called on future researches to delve more in to the tone to unravel any relationship tone in the language and reduplication as his work did not deal with it into detail.

I tentatively argue in this thesis that, the reduplication in Sisaalt is likely to be similar to the reduplication in Dagbani as discussed by Issah with slight differences. The

reduplication in Sisaalt and the reduplication in Dagbani may be similar in the sense that, some of the reduplicants in Sisaalt reduplication are likely to copy the entire base (complete reduplication), for instance monosyllabic verbs with a CV syllable structure ending in short vowels will copy the entire base of the word when reduplicated. Examples, **mú** ‘go’ reduplicates to become **mù-mú** ‘be going’ whilst other reduplicants will copy some segments of the base (partial reduplication). For instance, disyllabic verbs with a CV.C and CV.CV syllable structure will copy just part of the base. Examples, **vèḡ** ‘walk’ will reduplicate to become **vì-vèḡ** ‘be walking’ and **yìrɛ́** ‘call’ becomes **yì- yìrɛ́** ‘be calling’.

The reduplication in Sisaalt is however slightly different from that of Dagbani in that, there may not be segment epenthesis in Sisaalt reduplication as Issah argues is the case for Dagbani. I opine that, In Sisaalt, partial reduplication may occur to fulfill a size requirement of the reduplicant stem.

Issah’s work however was limited to only verbal reduplication, as did not account for reduplication in other word classes such as adjectives, adverbs and numerals. It is this gap, that, the current research seeks to fill, as I intend to treat reduplication on other word classes such as adjectives, adverbs and numerals, but like Issah’s, I will also not account for the impact of tone on the reduplicant because of inadequate time.

Another work worth discussing is Boakye (2015) which treated reduplication in Akan under the frameworks of optimality theory and autosegmental phonology. The aim of the thesis was to identify the role that reduplicated words play in the Akan language, and to find out the morphophonological characteristics of reduplicants in Akan, a Kwa language. The author argued that, reduplicated nouns and adjectives copy the entire base of the word without any sound change in the reduplicant. Boakye cited the

noun **nsɛm** reduplicating to be **nsɛm- nsɛm** ‘issues’ and the adjective **nkɔkɔɔ** ‘plural adjective – red’ reduplicates to be **nkɔkɔɔ- nkɔkɔɔ**. Boakye however argues that, verbs in Akan behave slightly differently because not all verbs copy the entire base without any sound change in the reduplicant as the verb reduplicants require a [+ High] vowel, and so any base with a [- High] when reduplicated will be changed to a [+ High] vowel that agrees with it in terms of ATR and or rounding harmony.

Boakye argues in the analysis of his data under the autosegmental phonology that, the reduplicant copies the base elements because the autosegmental phonology puts forward a template, which has an empty slot that has to be filled by copying the base elements. On the issue of tone, Boakye concurs that, the autosegmental phonology gives room for Akan reduplication to copy tonal features, but this does not cut across all word classes. He contends that, in the reduplication of nouns in Akan, the reduplicant does not copy the tonal features of the base rather it has an underlying low tone. He also noted that, in the reduplication of adjectives, the reduplicant copies the tonal features of bases that have tone, whilst bases that do not have tones have their reduplicants taking a high tone.

Regarding the functions of reduplication in Akan, Boakye argues that, reduplicated forms can change the word class or meaning of a word, they can also be used to indicate plurality, as well as show emphasis and imitation.

I contend in this thesis that, there are likely to be some similarities between the reduplication in Sisaalt and the reduplication in Akan, in that, nouns and adjectives are likely to also undergo a full reduplication as Boakye reported for the case of Akan. Some verbs with a CV syllable structure in Sisaalt may also undergo a full reduplication with their reduplicants receiving some vowel sound modifications. An

example is the verb **fá** ‘run’ reduplicated to be **fi-fá** ‘be running’. I also opine that, reduplicated forms in Sisaalt may be used to show repeated actions or to show emphasis or imitation as is the case of Akan.

## **2.5 Review of some Aspects of the Phonology of Sisaalt**

This sub-section reviews some aspects of the phonology of Sisaalt that will help in a better analysis of the data on the various word formation processes in Sisaalt. Some of the aspects of Sisaalt phonology to be discussed are; the consonants and vowels sounds, vowel harmony and syllable structure as has been reported in the literature.

### **2.5.1 The consonants of Sisaalt**

The Sisaalt orthography guide by SILDEP and Sisaala Unioun edited by Atintono (2015) argues Sisaalt has a total of twenty-four (24) consonant sounds with nineteen (19) of the consonants being single articulated consonants and the remaining five being double articulated consonants. The nineteen single articulated consonants the orthography guide put forward are [**b, d, f, g, h, j, k, l, m, n, ŋ, p, r, s, t, v, w, y, z**], and the five double articulated consonants are [**gb, kp, ch, ny, ŋm**]. I will however not consider [**ch, and ny**] as double articulated consonants but rather single articulated consonants represented by [**tʃ** and **ɲ**] respectively. This is because /**tʃ**/ is the voiceless counterpart of consonant /**j**/ which the orthography treats as a single articulated consonant, so if /**j**/ is a single articulated consonant then /**tʃ**/ should also be a single articulated consonant. I will also represent the consonant /**j**/ with the symbol /**dʒ**/ and the consonant /**y**/ with the symbol /**j**/. This will result in an increase in the number of single articulated consonants from nineteen (19) as put forward by the orthography guide to twenty-one (21), while the number of double articulated consonants will reduce from five (5) to three (3).

All the single articulated consonants according to the Sisaalt orthography guide by SILDEP and Sisaala Unioun edited by Atintono (2015) can occur at word initial, and word medial positions, but it is only [l, m, ŋ] that can occur at word final position. All the double articulated consonants have also been argued to have the ability of occurrence word initially and word medially but not word finally. I adapt these consonants from the orthography guide with the slight modifications I made and put them in a table form based on the parameters used in describing consonants, that is, the place and manner of articulation with insights from Luri (2011). Table 1 shows the consonant inventory of Sisaalt.

**Table 1: The consonant chart of Sisaalt**

	Bilabial	Labial- velar	Labio- dental	Alveolar	Alveo- palatal	Palatal	Velar	Glottal stop
Plosives	p, b	kp, gb		t, d			k, g	
Fricatives			f, v	s, z				h
Affricates					tʃ (ch), dʒ (j)			
Nasals	m	ŋm		n		ɲ (ny)	ŋ	
Lateral				l				
Trill				r				
Glides/ approximants	w					j (y)		

The Sisaalt orthography guide by SILDEP and Sisaala Unioun edited by Atintono (2015) did not however treat labialization which “involves a marked protrusion of the lips, and is represented by w after the consonant that is labialized” (Dolphyne, 2006: 28). Luri (2011) briefly touched on it by arguing that labialization results in roundness. He did not however specify the kinds of consonants that can be labialized or the conditions that result in labialization in Sisaalt. I however, argue all consonants

in Sisaalt except the labio-dental fricatives [f, and v] can be labialized if they precede round vowels. For example, **kùwié** ‘small thing’ is realized as [kʷùwié], **bù:ná** ‘goat’ is realized as [bʷù:ná], **mɔ́ŋ** ‘laugh’ is realized as [mʷɔ́ŋ] and **tòŋ** is realized as [tʷòŋ]. I will however not mark labialization on all the consonants occurring before round vowels unless to illustrate a constraint in the language because it is a redundant feature and native speakers of Sisaalt have knowledge of this.

### 2.5.2 Sisaalt vowel sounds

Both Luri (2011) and the Sisaalt orthography guide by SILDEP and Sisaala Union edited by Atintono (2015) posit Sisaalt has nine (9) vowel sounds which are [a, e, ε, i, ɪ, o, ɔ, u, v] and each of the vowels has a long counterpart which brings about meaning difference in the language. For example, [a:, e:, ε:, u: ]. Luri (2011: 37) argues each of the vowels “can occur at the end of a syllable, middle of a syllable and the beginning of a syllable”. Each of the vowels except /ɔ/ could occur as an independent syllable without occurring with other consonants. Orthographically, the long counterpart of each vowel is represented with a repetition of the vowel. It is however noted that Sisaalt has ten vowels. The tenth (10<sup>th</sup>) vowel is the [+ATR] central low vowel /æ/. These vowels are represented in table 2 with insights taken from Luri (2011).

**Table 2: The vowel chart of Sisaalt**

	Front	Centre	Back
High	i ɪ		u ʊ
Mid	e	ε	o ɔ
Low		æ a	



### 2.5.2.1 Vowel harmony in Sisaali

Vowel harmony has been defined as a phonological process that will permit only one set of vowels to appear in a word having more than one vowel (Boakye, 2015). Luri (2011) argues there is vowel harmony in Sisaali which has grouped all Sisaali vowels into two groups based on advanced tongue-root (ATR) features, so that every Sisaali word with more than one vowel will have to select all its vowels from the same group.

The two groups of vowels according to Luri (2011) are:

- a. Advanced Tongue Root vowels /+ATR/ - [i, e, o, u]
- b. Unadvanced Tongue Root vowels /-ATR/ - [v, ɔ, ɪ, ɛ]

Luri (2011) noted however that the central low vowel in Sisaali /a/ does not conform to the vowel harmony rule since it can occur with vowels from the two groups. He concluded by stating that the central low vowel /a/ harmonizes with the –ATR vowels about 80% and harmonizes with the +ATR vowels about 20%. I argue in this thesis that, the central low vowel /a/ is a –ATR vowel and has its +ATR counterpart /æ/ which co-occurs with other +ATR vowels in the language as seen in the words **bælu:** ‘personal name’ and **bætori** ‘three’. A regrouping of the vowels of Sisaali in terms of vowel harmony has been done below;

- i Advanced Tongue Root vowels /+ATR/ - [i, e, o, u, æ]
- ii Unadvanced Tongue Root vowels /-ATR/ - [v, ɔ, ɪ, ɛ, a]

It is further argued by Luri (2011) that there is also rounding harmony in Sisaali which he refers to as “back harmony”. That is where all vowels in the language have also been categorized into two based on rounding and unrounding features such that only vowels with rounding features can co-occur with each other and only vowels

with unrounding features will also co-occur with each other. The categorization of the vowels into rounding and unrounding has been done below:

- a. Rounding – [o, ɔ, u, v]
- b. Unrounding – [a, æ, e, ε, i, ɪ]

Luri (2011) further noted that rounding harmony is restricted to only one syllable (monosyllabic) stems as the rule may not work for words with more than one syllable. He also noted that rounding harmony is always accompanied by ATR harmony. That is to say if all the vowels in a stem must be [+Round], then they must also agree in terms of ATR. Examples of rounding and unrounding harmony in Sisaalt are given below:

- c. **tvɔŋ** *inside*
- d. **die** *ate*

In example (c), it is observed that the vowels in the word **tvɔŋ** *inside* are all [+Round] and [-ATR], whilst in example (d) the vowels in the word **die** *ate* are all [-Round] but [+ATR]. This confirms Luri (2011) argument that rounding harmony is always accompanied by ATR harmony.

I however argue in this thesis that the rounding harmony rule is not restricted to only monosyllabic words as argued by Luri (2011). This is because every vowel in Sisaalt forms a syllable and so for vowels to harmonize it must be across syllable boundaries and not restricted to one syllable stems. Hence, I consider the examples stated above not as monosyllabic words, but trisyllabic and disyllabic respectively. The vowel harmony rule I also think may be broken only in the formation of compound or complex words. For example, **tɪá** ‘tree’+ **ɲùŋ** ‘top’ = **tɪáɲùŋ** ‘top of a tree’.

### 2.5.3 Syllable structure of Sisaali

Luri (2011) argues that it is possible for all 25 consonant phonemes in Sisaali to occur as syllable onsets while only 5 (b, l, m, and n) can occur as syllable codas. He argues further that “the closed long vowel syllables are not common in the Buwaali and Paasaali dialects... However it has been found to be common in Tumuluŋ dialect” (Luri, 2011: 40). He dedicated the whole of table 15 for what he referred to as closed syllables citing **jini:ŋ** ‘hen’, **nɛ:ŋ** ‘cattle’, **nutɔ:ŋ** ‘bad person’ and **to:ŋ** ‘pig’ as closed syllables from Tumuluŋ dialect of Sisaali. I however have a contrary view to this claim. I opine Sisaali Tumuluŋ does not permit consonant codas. So any final consonant in a word forms a syllable on its own. So the consonant /ŋ/, ending the examples he cited from the Tumuluŋ dialect of Sisaali are not acting as syllable codas but syllables on their own. It must also be noted that, **nɛŋ** as he refers to it as ‘cattle’ is a cow, **nɛsuŋ** is the plural form of **nɛŋ** referred to as cattle and the vowel used in its transcription is not a long vowel but a short vowel. Also, **nutɔ:ŋ** is not a bad person as he calls it but a ‘useless person’.

#### 2.5.3.1 Syllable types in Sisaali

Luri (2011) identified CV, CVC, V and CVV as syllable types in Sisaali. The table below illustrates some of the data he provided on the various types of syllables in Sisaali.

V syllable type	CV syllable type	CVC syllable type	CVV syllable type
1. <b>i</b> ‘you (s) (pl)’	<b>la</b> collect	<b>tàŋ</b> ‘become deaf’	<b>diè</b> ‘yesterday’
2. <b>à</b> ‘we’	<b>ta</b> ‘leave it’	<b>lul</b> ‘born’	<b>biè</b> ‘child’
3. <b>v</b> ‘he/she/it’	<b>mv</b> go	<b>ton</b> ‘bow’	<b>nɛ</b> ‘people’
4. <b>ó</b> ‘exclamation’	<b>di</b> eat	<b>peŋlɛ</b> ‘form seeds’	<b>bvó</b> ‘hole/time’

I am however of the view in this thesis that, Sisaalt has three syllable types, namely; the CV type made up of a consonant and a vowel, the V type, made up of only a vowel and the C type, made up of only a liquid, a lateral or a nasal consonant, and that the vowel or the consonant on which the syllable is marked carries a tone. I see the CVC and CVV syllable types presented by Luri (2011) as disyllabic arguing that the final C and the final V in the CVC and CVV syllable types are syllables on their own which should carry tone. The table below presents data on the three types of syllables which I argue Sisaalt has. All the data has been taken from the Tumuluŋ dialect.

CV syllable type	V syllable type	C syllable type
1. fá run	v ‘he/she/it’	ŋ ‘you (s)’
2. tó ‘close’	final á in mùá ‘small’	l, in bà.í ‘big’
3. bà ‘they’	é in wì.é ‘small’	m, in sò.m ‘gentle’
4. má ‘you’ (pl)	final á in tì.á tree	ŋ, in vè.ŋ ‘walk’

## 2.6 Review of Some Aspects of the Phonology of Akan

This sub-section reviews some aspects of the phonology of Akan that will help in the analysis of the data. Some of the aspects of the phonology of Akan to be discussed are; the consonants and vowels sounds, vowel harmony and syllable structure as has been reported in the literature.

### 2.6.1 The consonants of Akan

Boakye (2015) notes that, Akan seems not to have a definite number of consonants as agreed by scholars who investigated the Akan sound inventory. Schachter and Fromkin (1968: 35) as cited in Abaka (2005) identified just eight (8) consonants /p, b, d, f, s, t, k and g/ as the ‘true’ consonants in Akan and Dolphyne (2006) identified about twenty-eight consonants, but for the purpose of this study, I am going to adopt the

“unified” Akan consonant chart proposed by Adomako (2008). Table 3 is the “unified” Akan consonant chart from Adomako (2008).

**Table 3: “Unified” Akan consonant chart**

	Bilabial	Labio-dental	Alveolar	Pre-palatal	Palatal	Velar	Glottal
Stop	p, b		t, d			k/k <sup>w</sup> , g/g <sup>w</sup>	* ʔ
Fricative		f	s	ɕ (hy)			h
Labialized fricative (voiceless)				ɕ <sup>w</sup> (hw)			
Affricate				tɕ (ky) dz(gy)			
Labialized affricate				tɕ <sup>w</sup> (tw) dz <sup>w</sup> (dw)			
Lateral (voiced)				l			
Nasal (voiced)	m		n		ɲ (ny)	ŋ (n)	
Labialized nasal (voiced)					ɲ <sup>w</sup> (nw)	ŋ <sup>w</sup> (nw)	
Glide (voiced)			r		y	w	

Dolphyne (2006) argues that, all consonants in Akan can occur in word-initial position, but it is only /m/, /n/, /ɲ/, /w/ and /r/ that can occur in word-final position. She argues further that labialized palatal consonants such as tɕ<sup>w</sup> (tw), ɲ<sup>w</sup> (nw) occur

mostly before front and back vowels and are in complementary distribution with the velar consonants **k<sup>w</sup> (kw)**, **g<sup>w</sup> (gu)**, **ŋ<sup>w</sup>** and the glottal fricative **hu** which mostly occurs before the central low vowel **a**. She also argues that nasals in Akan can precede other consonants that share the same place of articulation with them.

Comparing the consonant chart of Akan to that of Sisaaltɔ, it is observed that there is similarity between it and the consonant chart of Sisaaltɔ discussed earlier in section (2.5.1). The difference between them is that, Sisaaltɔ has the voiced counterpart of the labiodental fricative /f/ which is /v/ and the voiced counterpart of the alveolar fricative /s/ which is /z/ which Akan does not have. Akan also has a glottal stop in the unified Akan consonant chart which is not in the consonant chart of Sisaaltɔ, but Dolphyne (2006) thinks it is not part of the consonants of Akan as she argues it only “occurs in spoken Akan”. Also, Akan has labialized pre-palatal fricatives and affricates, labialized palatal-nasal and labialized velar stops which are not shown in the Sisaaltɔ consonant chart. As I contended earlier in section (2.5.1), labialization is a prominent feature in Sisaaltɔ as all consonants apart from the labio-dental fricatives /f/ and /v/ can be labialized if they occur before round vowels. Hence, a word borrowed from Akan into Sisaaltɔ will only be constraint if the word has a labialized consonant that is followed by a [-Round] vowel.

### **2.6.2 The vowels of Akan**

Akan is reported to be distinguishing between nine (9) and ten (10) vowels (Boakye, 2015). Four (4) or five (5) of the vowels (**i, e, \*æ, o, u**) are +ATR and five (5) of them (**ɪ, ɛ, a, ɔ, ʊ**) are -ATR. This is because some scholars treat the +ATR vowel **\*æ** as part of the vowels of Akan while other scholars leave it out because they think it has a restricted occurrence. For the purpose of this study however I am going to adopt the

ten (10) vowels which have been put in the table below because I argue Sisaalt also has the +ATR vowel which has limited occurrence.

**Table 4: Akan vowel chart**

	Front	Back
High	i ɪ	u ʊ
Mid	e ɛ	o ɔ
Low	*æ a	

An analysis of the vowel chart above shows similarity between it and that of Sisaalt. This is because they all have equal number of vowel sounds with the same vowel quality. It can therefore be said that the vowels will not pose a challenge to any word borrowed from Akan into Sisaalt in terms of its pronunciation.

### 2.6.3 Akan vowel harmony

Dolphyne (2006) argues there is vowel harmony in Akan as all vowels in Akan can be grouped into two based on their qualities. She categorized the ten vowels of Akan into two sets based on advanced tongue root features. The categorization by Dolphyne has been done below. It must be noted however that the symbols used by Dolphyne to represent the + ATR central low vowel and the -ATR high back vowel have been changed to the current IPA symbols /æ/ and /ʊ/ respectively.

Set i (ATR) **i, e, \*æ, o, u**

Set ii (-ATR) **ɪ, ɛ, a, ɔ, ʊ**

Dolphyne further argues there is rounding harmony in Akan as vowels with rounding features can co-occur with each other in a word and vowels with unrounding features can also co-occur with each other.

Dolphyne's arguments about the vowel harmony of Akan suggest the vowel harmony of Akan is similar to that of Sisaalt as discussed in section (2.5.2.1). This means that words borrowed from Akan into Sisaalt will not be constrained in terms of the vowel harmony.

#### 2.6.4 Akan syllable structure

Dolphyne (2006) argues that there are no syllables in Akan ending in consonants. That is to say Akan does not permit codas. She is of the view that every final consonant in Akan forms a syllable on its own and has a tone marked on it. Dolphyne also argues that Akan does not permit CCV syllables, that is, there are no consonant clusters in Akan. She further argues that

*“every vowel in Akan constitutes a syllable, and each vowel in a vowel sequence belongs to a different syllable, whether the vowels are said on different pitches or not, and whether the vowels are of the same quality or not”* (Dolphyne, 2006: 53-54)

She identified V, CV, and C as the consonant types in Akan, where the V syllable type is made up of only a vowel, the CV syllable type is made up of a consonant and a vowel and the C syllable type is made up of only a consonant (nasal, or a glide consonant (n, m, ŋ, r)). Below are examples Dolphyne (2006) provided on the various types of syllables in Akan.

##### **V syllable type**

1. **ɔ́** in **ɔ́-fà** / **ɔ-fá** ‘he takes it’
2. **è** in **tì-è** ‘listen’

##### **CV syllable type**

- kɔ́go**  
**tì** in **tì-è** ‘listen’

##### **C syllable type**

- ɲ** in **ɲ-sú** ‘water’  
**m** in **sò-m** ‘hold it’



The arguments Dolphyne made about the syllable structure of Akan are similar to the arguments I made about that of Sisaalt. Thus, a word borrowed from Akan to Sisaalt will not be constraint in terms of its structure because they have similar syllable structures.

## 2.7 Review of some Aspects of the Phonology of English

This sub-section reviews some aspects of the phonology of English that will help in the analysis of the data on the various word formation processes in Sisaalt. Some of the aspects of the phonology of English to be discussed are; the consonants and vowels sounds and the syllable structure as has been reported in the literature.

### 2.7.1 The Consonants of English

Yule (2010) identified twenty-four (24) consonants as the consonants of English. They are [b, d, f, g, h, j, k, l, m, n, ŋ, r, s, t, v, w, y, z, θ, ð, ʃ, ʒ, tʃ, dʒ] which have been put in the table below.

**Table 5: The consonant chart of English**

	Bilabial	Labio-dental	Dental	Alveolar	Alveo-palatal	Palatal	Velar	Glottal
Plosives	p, b		θ, ð	t, d			k, g	
Fricatives		f, v		s, z		ʃ, ʒ		h
Affricates						tʃ, dʒ		
Nasals	m			n			ŋ	
Lateral				l				
Trill				r				
Glides/ approximants	w					J		

Comparing the consonant chart of English to that of Sisaalt, one will say there are similarities and differences between them. They both have the same number of

consonants, that is 24 each, but their compositions vary. English has dental sounds /θ, ð/ while Sisaalt does not have. It also has palatal fricatives /ʃ, ʒ/ which are not in the consonant chart of Sisaalt. Likewise, Sisaalt has double articulated sounds /kp, gb, ŋm/ which English does not have. Hence, I am of the view that, a word borrowed from English to Sisaalt with consonant sounds that are not in the consonant chart of Sisaalt will be constraint and have to be modified to fit into the phonotactics of Sisaalt.

### 2.7.2 The vowels of English

Yule (2010) identified thirteen pure vowels of English. They are /i, ɪ, e, æ, ʌ, ɒ, ɔ, ɔ, u, ʊ, ʌ, ɜ, ə, /. He also identified /eɪ, ou, aɪ, aʊ, ɔɪ/ as diphthongs that are realized in English. Roach (2009) also identified /eɪə, aɪə, ɔɪə, əʊə, aʊə/ as triphthongs in English. The pure vowels have been put in the chart below for easy identification.

**Table 6: The vowel chart of English**

High	i			u
	ɪ			ʊ
Mid	e		ə	o
	ɛ		ʌ	ɔ
Low	æ		a	ɑ

Comparing the vowel chart of Sisaalt to that of English, it can be said that there are some similarities and some differences between them. All the ten (10) vowels in Sisaalt can be found in the English vowel chart, but the vowels /ə, ʌ, ɑ/ that are in the vowel chart of English are not in the vowel chart of Sisaalt. It can then be said that any word borrowed from English to Sisaalt with the three vowels identified as vowels in English but not in Sisaalt will be constrain phonemically in Sisaalt and will have to

be modified before it is accepted into the language. For instance, if the word **butter** [bʌtə] is borrowed into Sisaalt, it will be realized as [bata]. Also, words borrowed from English with diphthongs and triphthongs will be constrained in Sisaalt and will have to be modified before they are accepted into the language because Sisaalt does not have diphthongs and triphthongs. For instance, **ear** [eə] will be pronounced as [eja] in Sisaalt.

### 2.7.3 The syllable structure of English

Yule (2010) argues that English permits more than one consonant in both the onset and coda positions. In other words English allows consonant clusters in both onset and coda positions. In the (1996) edition, Yule cited (CCVC) as in *green*, (VCC) as in *eggs*, (CVC) as in *harm*, and (CCCVC) as in *stress* as some of the consonant clusters that are permitted in English. He also noted (V) as in *I*, (CV) as in *do*, and (VC) as in *am* as other syllable types in English.

Taking the English syllable structure into consideration therefore, I opine that a word borrowed from English to Sisaalt with a consonant cluster will be constrained as Sisaalt does not permit consonant clusters, hence, will have to be modified to fit into the syllable structure of Sisaalt by inserting a default vowel in between the clusters. Also, it is observed that English permits syllable codas, which are not permitted in Sisaalt, so a word borrowed from English to Sisaalt with a coda will have to be deleted or a default vowel will have to be placed after it to resyllabify it before it will be accepted into the language.

### 2.8 Conclusion

This chapter reviewed works of other scholars related to the study, such as Bauer (1983), Dolphyne (2006), Luri (2011), Issah (2011) and Yule (1996, 2010).

## CHAPTER THREE

### METHODOLOGY

#### 3.0 Introduction

Methodology is one of the crucial factors in determining the success of every research. It simply refers to the processes and procedures used in collecting and analyzing data. This section therefore discusses the procedures used in collecting and analyzing the data for the study. The section has been divided into two parts; the data collection part and the data analysis part. The data collection part discusses the types of data collected, the design that was used for the study, the sample population, the sampling procedures and the instruments that were used in collecting the data. The data analysis part discusses the procedures used to analyze and interpret the data collected.

#### 3.1 Data Type and Data Collection Procedures

Two main types of data were collected; primary data and secondary data. Data is called primary if it is collected by the researcher himself or herself for the first time under controlled conditions, and it is called secondary data when the data is already collected by a third party other than the researcher himself or herself which the researcher relies on for his/her analysis.

The primary data was collected through recordings from free speech such as radio programs, advertisements, songs, funerals, marriage and naming ceremonies as well as focused group discussions.

Secondary data was sourced from available written texts such as the Sisaalt Orthography Guide edited by Atintono (2015), Sisaala-English/English-Sisaala

Dictionary by Blass et. al (1975, 2002), Sisaalt Nasaare teŋ –jinna by GILLBT and SILDEP (2001) and the translated version of the Old and New Testaments by the Ghana Institute of Linguistics, Literacy and Bible Translation (GILLBT).

### **3.1.1 Research Design**

The research design used in the study is the qualitative approach. This kind of research design according to Dörnyei (2007: 129), “involves data collection procedures that result primarily in open-ended, non-numerical data which is then analyzed primarily by non-statistical methods”. By this, Dörnyei means the qualitative research design is mainly descriptive in nature. Chambers (1985) cited in Ochieng (2013) contends that, to get a detail information on a particular phenomenon, the qualitative approach is the most appropriate option. Common data collection procedures used in this kind of research includes elicitation, focus group discussions, observations, and one-on-one interviews. In this study, I employed elicitation, focus group discussions, and recordings, as well as relying on published materials as methods in collecting the data. I think these methods are the most suitable for this study because they elicit data naturally and hence help minimize bias from the researcher. That is to say it prevents the researcher from going to the field with a preconceived mind on the type of data to be collected.

### **3.1.2 The Study Population**

Dörnyei (2007: 96) refers to population as “the group of people whom the study is about”. In other words, population is the group of persons the researcher intends to generalize the findings of his or her research to. Anggraeni (2011) defines population as the group of persons with determined characteristics. The population for the study is all Sisaalt speakers. The subjects were drawn from five indigenous Sisaalt

Tumulun speaking communities, namely; Tumu, Chunchan, Bojan, Tafesi, and Nabugvbele because these communities are indigenous homes of the Tumulun speakers of Sisaali, the dialect of choice of the researcher. Tumulun is predominantly spoken in these communities and the right way of speaking Tumulun without any distortion is believed to be got from those communities.

### **3.1.2 The Sample and Sampling Procedure**

Arikunto (1997) cited in Anggraeni (2011) refers to a sample as the portion of the population to be analyzed in the research. Dörnyei (2007) defines a sample as the group of participants that are actually examined in a study.

A sample of thirty (30) participants was used as subjects for the study comprising 15 males and 15 females with ages ranging from 18 to 70 years. The subjects were purely indigenous monolingual speakers of the Tumulun dialect of Sisaali who have stayed in the indigenous Tumulun speaking communities most of their entire lives. They speak Tumulun fluently without the interference of other Sisaali dialects and other languages because Tumulun is dominant over the other dialects and other languages in the selected communities. I decided not to include persons above 70 years as subjects because they were used as language consultants to help me verify some of the data I got from the field. I also decided not to include persons less than 18 years because it is difficult to get persons less than 18 years that are monolinguals because of the compulsory basic education policy now in Ghana.

Purposive sampling method was employed in the selection of subjects for the study.

Purposive sampling is a sampling procedure used in selecting subjects with the purpose of the study in mind. That is to say participants are not chosen at random, rather, they are chosen at the discretion of the researcher because he /she believes they possess special qualities such as having expert knowledge on the subject being investigated, and including them in the sample will enable them provide the right information needed by the researcher.

### **3.2 Instruments**

In this study, four (4) data collection instruments were used: direct elicitation, focus group discussions, documents, and audio.

My decision to use more than one instrument in collecting the data was informed by the data collection principle which states that “inclusion of multiple sources of data collection in a research is likely to increase the reliability of the observation” (Ochieng, 2013:36).

#### **3.2.1 Direct elicitation**

Ochieng (2013) refers to elicitation as the way of gathering data by asking native speakers of a language to produce words, sentences and phrases to be used as data for analyzing a particular linguistic phenomenon. In this study, I refer to direct elicitation as a way of getting data by interacting with native speakers in a natural environment such as the home, market, or workplace.

As this study investigates some word formation processes in Sisaalt, I went to the market to interact with the buyers and sellers by bargaining the prices of goods and recorded the conversation with a digital recorder with verbal permission sought from the buyers and sellers. The recordings were done to enable me capture all the details

of the participants' speech as it will be unlikely for me to capture all the participants speeches in my field notes and also because it grants me the opportunity to play back should I miss anything. This helps to give a better analysis of the data.

### **3.2.2 Focus group discussions**

Focus group discussion according to Kombo and Tromp (2006) cited in Ochieng (2013:36) is “a qualitative research in which a group is identified and involved in a discussion that will elicit their perceptions, opinions, and beliefs towards certain issues”. Dörnyei (2007) refers to focus group interviews as interviews involving a small group of members usually between six (6) and twelve (12) where the interviewer asks the members questions and records their responses.

With this kind of data collection method, the participants are made to engage in spontaneous narrations such as sharing personal experiences, discussing topical issues such as politics, education, health, agriculture and sports, and description of activities and events while the researcher served as a moderator to ensure that the discussions are not dominated by a few people. That is to say the researcher ensures that every participant including those who are shy have equal opportunity to speak.

In this study, the sample of 30 subjects was divided into five (5) groups of six (6) members each. One group was found in each of the five communities under investigation. Each group was made to tell stories, describe activities and events in their community, as well as discuss social issues such as agriculture, education, health, sports and marriage. The focus group discussions lasted for an hour each. A digital recorder was used to record the discussions. The recordings were then played later in a quiet environment and all lexical items were identified and transcribed for



analysis. I employed this data collection method because it is more natural and the data is got directly from the participants and not through a third party.

### **3.2.3 Documents**

This is a way of getting data by picking information from existing written documents. Arikunto (1998) cited in Anggraeni (2011) refers to it as a “method of data collection by studying books, transcriptions, newspapers, advertisements, magazines etc.”

The written documents I sourced information included the Sisaalt Orthography Guide by Sisaalt Literacy and Development Program (SILDEP), Sisaala-English/English-Sisaala Dictionary by Blass et. al (1975, 2002), A Grammar analysis of Sisaalt Tumuluj by Frempong (1980) and the translated version of the Old and New Testaments by the Ghana Institute of Linguistics, Literacy and Bible Translation (GILLBT).

It must be noted however that, there was no unified orthography, at the time that most of the written works I employed in getting the data were documented, so different organizations such as NFED, SILDEP and GILLBT and individuals such as Frempong and Blass had different writing systems until the new orthography was put forward in 2015 by SILDEP and the Sisaala union.

For the purpose of this study however, all the examples taken from the existing documents are made to conform to the rules of the new orthography put forward by SILDEP and Sisaala union.

### **3.2.4 Audio**

I took audio recordings of radio programs in Sisaalt from a local radio station in Tumu after a verbal consent of management of the station and the participants. The

radio programs I recorded are; **Haalaa dɔnɛ** ‘women’s world’, **Wa:fele wia** ‘youth issues’, **Nunyusuŋ bɔŋ** ‘time for key people’, **Ma sie** ‘good morning’, **Sɔnsɔgɔbɔ bɔŋ** ‘story telling time’ and **Pɛruŋ bɔŋ** ‘farming time’. These programs were recorded over a period of two months from November 5<sup>th</sup> to January 5<sup>th</sup>. Four recordings were made for each program making it a total of four hours per each program as each program lasted for an hour.

I also took recordings of social activities such as the annual general meeting of the Sisaala union, the paartgiele festival and funerals.

**Haalaa dɔnɛ** ‘women’s world’, is a radio program for women in the district, aired on Radford FM (a community radio station in Tumu) between the hours of eleven and twelve o’clock noon every Thursday. Various renowned women are invited to the community radio station called ‘Radford FM to discuss issues that pertain to women. They discuss issues such as marriage, women in politics, child labour, girl child education, child marriage and child trafficking. The language for the discussion is Sisaali, but no specific dialect is chosen. It all depends on the participants. I took part in this radio discussion program as a non-participant observer each time women who spoke the Tumuluŋ dialect were invited for the discussion, with permission verbally sought from the management of Radford FM, and recorded the discussion (also with the verbal consent of the participants) with a digital recorder. I recorded this program four times within a period of two months.

**Waafɛle wia** ‘youth issues’, is a youth program meant to inspire the youth. This program is aired on Radford FM every Sunday from 1: 30 pm to 2: 30 pm. During this program, two to four youth who have excelled in various aspects of life such as education, business or politics are invited to the station to share their experiences on

how they managed to excel in their fields of endeavors so as to serve as a source of inspiration for other youth. Serving as a youth leader for some youth groups in the community, I was invited with some other youth who have excelled in other areas of life to come and share our experiences and advice the youth on how to succeed in life. I took this as an opportunity and sought permission from management of the radio station and the other youth I went to the studio with, who were also Tumuluj speakers of Sisaali and recorded the discussion as a participant observer with a digital recorder.

**Ninyusuŋ bɔŋ** ‘time for key people’ is also a radio program where elderly people who have distinguished themselves in one way or the other are invited to the radio station to share their experiences with the public. So I sought verbal consent from management of the radio station and joined the participants as a non- participant observer each time they invited any key person who spoke the Tumuluj dialect to the program and with the consent of the key person also, I recorded his conversation with a digital recorder. Three recordings of this program were also taken.

**Sunsɔsɔ bɔŋ** ‘story telling time’ is as well a radio program aired on the community radio station every evening from eight o’clock to nine o’clock where people are made to come to the radio station and tell stories and the lessons to be learnt from those stories. With verbal permission taken from management of Radford and those who told the stories, I took part as a non-participant observer and recorded the program four times within the two months.

**Pɛruŋ bɔŋ** ‘farming time’ is one of the programs also aired on the community radio station every Wednesday morning from nine o’clock to ten o’clock. Two to three experienced farmers or people who have expert knowledge in farming or agriculture in general are always invited to the community radio station to discuss issues about

farming. They discuss how to prepare the land before planting various crops, how and where to get good seeds for planting, how to take good care of the plants when they are germinating till they mature, how to prevent bush fires from destroying farms and how to harvest and store the produce from the farm. The language of discussion during the program is also Sisaalt, but in no specific dialect, it depends on the dialect of the participants. So I negotiated verbally with management of the community radio station who called me to sit in as a non-participant observer and recorded the discussion when people who spoke the Tumuluṅ dialect were invited for the discussion. This program was recorded four times within two months.

The annual general meeting of the Sisaala union comes off on the 27<sup>th</sup> of December every year in Tumu. This meeting is supposed to be attended by all Sisaala of different caliber and opinion leaders in the community. During this meeting, issues that pertains to the development of the Sisaala such as the standard of education in the land, health and agricultural issues, unemployment, how to maintain our culture among others are discussed. The language of communication during the meeting is Sisaalt, but in no specific dialect, so you get various people speaking the different dialects of Sisaalt during this meeting. As a Sisaal, I attended the 2016 annual general meeting, sought permission from the leadership of the union and recorded with a digital recorder the voices of those who spoke the Tumuluṅ dialect. This program was only recorded once because it is a yearly event.

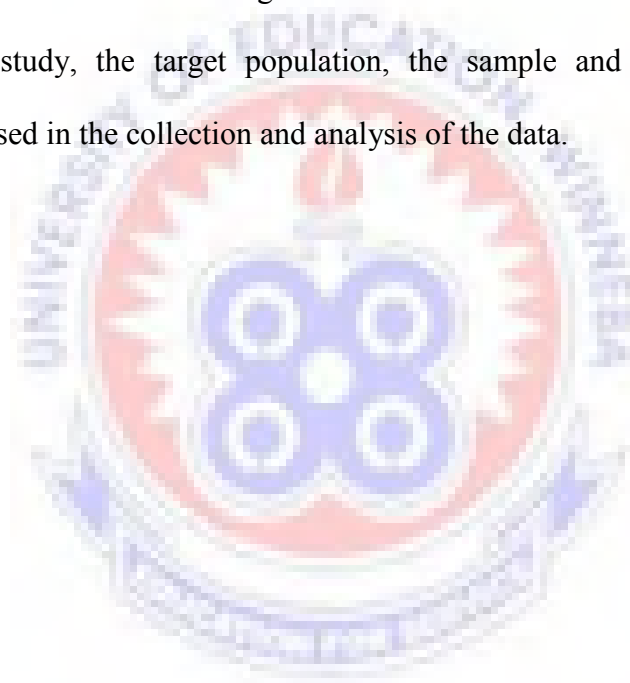
### **3.3 Data Analysis**

After collecting the data using the data collection procedures mentioned earlier, the voluminous data was categorized into groups based on the various morphological processes, that is, borrowing, reduplication, compounding and affixation.

The data was then analyzed after they have been put into groups using OT by Prince and Smolensky (1993) and Hockett's (1954) models of morphological analysis, Item and Arrangement approach cited in Mathew's (1974), as have been explained in chapter one of this thesis. The data on borrowing and reduplication were analyzed using the OT whilst the data on compounding and affixation were analyzed using Item and Arrangement of models of morphological analysis.

### **3.4 Summary**

This chapter focused on describing how the data was arrived at. It explains the design used in the study, the target population, the sample and sample size, and the instruments used in the collection and analysis of the data.



## CHAPTER FOUR

### DATA ANALYSIS

#### 4.0 Introduction

In this chapter, an analysis of the data collected is presented. As mentioned earlier in chapter one, I analyzed data on the various word formation processes in Sisaalt with data from the Tumuluŋ dialect. The data on various word formation processes which have been classified into four categories of word formation, namely; borrowing, reduplication, compounding and affixation have been analyzed. The data on borrowing and reduplication have been analyzed under the framework of Optimality Theory (OT) by Prince and Smolensky (1993) and the data on compounding and affixation have been analyzed using the Item and Arrangement Process of morphological analysis by Hockett (1954) as cited in Mathews, (1974).

#### 4.1 Borrowing

New concepts, ideas, inventions and products have found themselves into the culture of Sisaalt as a result of generation, technological and cultural change among others. It is observed that, though the language has the choice to create new names for these new concepts, ideas, inventions and products, it decided to adopt the names of some of these inventions, products, ideas and concepts from the languages that they originated from. It has been observed from the data that, Sisaalt borrowed words from Arabic, Housa, English and Akan and these words have been integrated into the phonology of Sisaalt. But because of inadequate time and space, only the data on English and Akan have been analyzed. Below are some of the English and Akan words borrowed into the language which have been grouped under the sub headings English and Akan.

#### **4.1.1 English loanwords in Sisaalt**

It has been observed that Sisaalt employs borrowing as one of the ways of getting words in the language, and English language has been identified as one of the major languages Sisaalt borrows from. It must be noted however that, there is no evidence of direct contact between the Sisaala and English, but it was revealed by some of the participants in the data collection process that, the possible explanation to what might have occasioned the borrowing is as a result of the introduction of formal education in the area where English is used as a medium of instruction and the few privileged native speakers of Sisaalt to have had some level of formal education and wanted to distinguish themselves from those who did not get any formal education used some of these words in their speeches. This motivated some of the native speakers who have not had any formal education to adapt some of these words into the phonology of the language. Also, as there is evidence in the history of Ghana that there has been direct contact between the Akans and English, which resulted in the Akans borrowing heavily from English, and there is evidence that Sisaalt borrowed some words from Akan through trade, it is also possible that some of these English loanwords in Sisaalt were borrowed via Akan.

It is observed that, when Sisaalt borrows a word from English, the word is constrained structurally in Sisaalt because of the differences in the syllable structure of Sisaalt and English. The borrowed English word is then phonologically integrated into the phonology of Sisaalt and is realized differently in Sisaalt. The data below exemplifies this phenomenon. Transcriptions of the English words have been done using the longman pronunciation dictionary by Wells (2000).

English word		As in Sisaali
1. cup	[kʌp]	[kɔpu]
2. school	[sku:l]	[suku:]
3. bucket	[bʌkət]	[bokiti]
4. condemn	[kəndem]	[kəndemɪ]
5. belt	[bɛlt]	[beliti]
6. class	[klæs]	[kilæsi]
7. business	[biznəs]	[bizɪnɛsɪ]
8. office	[ɒfis]	[ɔfisɪ]
9. cabbage	[kæbɪdʒ]	[kabedʒi]
10. college	[kɒlɪdʒ]	[koledʒi]

Analyzing the data above using OT, it is argued that Sisaali places strong restrictions on closed syllables, and so any word borrowed into the language which is closed has to be opened. In order to open the closed structure, Sisaali employs epenthesis and deletion as repair strategies to get an acceptable structure, which mostly result in the resyllabification of the word. For instance, the word *kick* [kɪk], a one syllable word with a coda consonant /k/ when borrowed into Sisaali is open by inserting a default vowel /ɪ/ after the consonant and is realized as a two syllable word [kɪ.kɪ].

It is also argued that Sisaali equally places strong restrictions on consonant clusters, be it word initial, medial, or word final, and so any word borrowed into the language with a consonant cluster is not allowed in the language and has to be repaired. To repair this, Sisaali employs epenthesis, which is the insertion of segments in-between the consonant clusters to allow the word to be resyllabified. For example, the one syllable word in English **belt** [bɛlt], with a consonant cluster ending it, when



borrowed into Sisaalt is resyllabified by inserting a default vowel in between the consonant cluster **[lt]** and another default vowel is inserted after the final consonant to make it open, **[belt]** in English then becomes **[beliti]** in Sisaalt changing the one syllable word to a three syllable word **[be.li.ti]**.

This seems to suggest the existence of the markedness constraint in the language that seeks to ensure that output segments meet some structural conditions, that is, the no coda condition and no consonant cluster (\*complex) condition. The markedness constraints are therefore ranked higher than the faithfulness constraints that require correspondence between inputs and their outputs when words are borrowed into the language. So I adopt the two common types of faithfulness constraints first used by McCarty and Prince (1995) that is MAX-IO and DEP-IO and two other common markedness constraints No coda and \*complex constraints also first used by McCarty and Prince (1995) and set the ranking schema as follows:

No Coda >>\*complex >>MAX-IO >>DEP-IO


- a. No Coda:- syllables must have no codas
- b. \*complex:- no consonant clusters
- c. MAX-IO:- input segments must have corresponding segments in the output
- d. DEP-IO:- output segments must have corresponding segments in the input

According to McCarthy and Prince (2004) as cited by Katamba (2006), given two strings A and A1, correspondence is a relation R from elements of A to the elements A1. In other words, there must be a one to one matching of elements of A to that of A1. For example, if A is a set of consonants and vowels and A1 is also a set of consonants and vowels, the consonants and vowels in A should be able to match up to the consonants and vowels in A1 on one on one basis. This is illustrated below; R=




The constraints stated above have been used in the derivation of data number 4 [kilæsi] from the original English word *Class*[klæs] and data number 2 [suku:] from the original English word *school*[sku:l] as seen in the table below:

**Table 7: OT analysis of English borrowed word class [klæs] in Sɪsaalt**

/klæs/	No Coda	*Complex	MAX-IO	DEP-IO
a. /klæs/	*!			
b. /klæsi/		*!		
c.  /kilæsi/				**

From table 7 above, it is observed that, candidate (a) failed to emerge as the optimal candidate because it has fatally violated the two most highly ranked constraints, which are the No Coda and \*Complex constraints. Candidate (b) also failed to emerge as the most preferred candidate because it has violated the second most highly ranked constraint which is the no consonant cluster constraint and thus, is knocked out of contention. Candidate (c) then emerges as the optimal candidate, that is, the most preferred candidate because it does not violate any of the two most highly ranked constraints, though it has violated the least ranked constraint.

**Table 8: OT analysis of the English borrowed word school [sku:l]**

/sku:l/	No Coda	*Complex	MAX-IO	DEP-IO
a. /sku:l/	*!			
b.  /suku:/			*	
c. /sku:/		*!		

It is observed from the table 8 above that candidate (a) fatally violated the two most highly ranked constraints, that is the No coda and \*Complex constraints, and thus is eliminated from the competition. Candidate (c) is also observed to have fatally violated the second most highly ranked constraint, which is the \*Complex constraint and hence is eliminated from the competition giving chance to candidate (b) to emerge as the optimal candidate because though candidate (b) has violated two of the constraints, that is the MAX-IO and the DEP-IO, these constraints are the least ranked constraints and the violation is minimal.

#### **4.1.2 Akan loanwords in Sisaalt**

Data collected for this study also revealed Akan as one of the languages Sisaalt borrows from. These borrowed words came about as a result of trade and migration, as it was reported that Sisaala who engaged in trade travelled to some of the Akan speaking communities such as Kumasi and Techiman to transact their businesses, and so had to learn some of the basic words for easy communication, which were later adopted into the phonology of Sisaalt. It was also reported that some Akans migrated to settle in some Sisaalt communities for trade, and so the interaction between the immigrants and the community members lead to the Akan loanwords in Sisaalt. It was further revealed that, some Sisaala in search of greener pastures also migrated to settle in some of the Akan speaking communities such as Techiman, Obuasi and Kumasi, and so adopted some of the Akan names for their children.

The data gathered reveal that, when Sisaalt borrows a word from Akan, the word will not be structurally constrain in Sisaalt but may be phonetically constrain because the two languages are observed to have similar syllable structures, that is to say they all have open syllable structures and they do not have consonant clusters. The difference

between them however is in their consonants. Akan has labialized consonants such as **k<sup>w</sup> (kw)**, **g<sup>w</sup> (gu)**, **ŋ<sup>w</sup>** which can occur before the central low vowel /a/ while in Sisaalt these consonants will not be realized as labialized consonants if they are preceding unround vowels such as /a/, unless they precede round vowels. It is then argued that, words borrowed from Akan may not be structurally constrained, but may be constrained phonemically. In other words, if a word is borrowed from Akan and the word has labialized consonants that are preceding round vowels, the word will not be constrained, and hence will not need any modification, but if it is made up of labialized consonants that are preceding unround (open) vowels, the word will be constrained and hence will be modified by substituting the labialized consonant with a non-labialized consonant or the unround (open) vowel will be changed to a round vowel. Below is the data exhibiting this phenomenon.

Akan word	gloss	As in Sisaalt
1. mɔli [Mɔli]	corn dough	[mɔli]
2. yaa [yaa]	personal name	[yaa]
3. bɔɔdiɛ [bɔ:diɛ]	plantain	[bɔ:diɛ]
4. bankye [bɛnɸi]	cassava	[bɛnɸi]
5. kwaku [k <sup>w</sup> aku]	personal name	[kaku]
6. kojo [kodʒo]	personal name	[kodʒo]
7. afia [afia]	personal name	[afia]
8. kwadu [k <sup>w</sup> adu]	banana	[k <sup>w</sup> odu]

In analyzing the data above using OT, it is argued that words borrowed from Akan into Sisaalt may not be structurally constrained because they have similar syllable structures. They both prefer open syllables to closed syllables and they do not allow consonant clusters. But because Akan has labialized consonant that can occur before


unround vowels, words borrowed from Akan into Sisaali with these types of labialized consonants may be constrained phonemically. For instance, words borrowed from Akan with labialized consonants such as **k<sup>w</sup> (kw)**, **g<sup>w</sup> (gu)**, **ŋ<sup>w</sup>** preceding unround (open) vowels will be constrained phonemically. So I adopt two of the constraints that were used earlier in the analysis of English loaned words, that is No Coda and MAX-IO and introduce a new constraint \*[labialized C/ unround V] and that will ensure that there are no labialized consonants preceding unround vowels in the outputs, in the analysis of the data on Akan loaned words in Sisaali. The new constraint introduced \*[labialized C/ unround V] is however ranked high above the other constraints. Below is the ranking schema:

\*[labialized C/ unround V] >>MAX-IO >> No Coda

- a. \*[labialized C/ unround V]:- no labialized consonants preceding unround vowels.
- b. MAX-IO:- input segments must have corresponding segments in the output
- c. No Coda:- syllables must have no codas


The constraints above have been used to arrive at the borrowed words **[kaku]** (data number 4) and **yaa [ya:]** (data number 2). This is shown in the tables below:

**Table 9: OT analysis of Akan loaned word kwaku [k<sup>w</sup>aku]**

/k <sup>w</sup> aku/	*[labialized C/ unround V]	MAX-IO	No Coda
a. /k <sup>w</sup> aku/	*!		
b. /k <sup>w</sup> ak/	*!		
c.  /kaku/			

From table 9 above, it is observed that candidate (a) failed to emerge as the optimal candidate because it has fatally violated the most highly ranked constraint, which is the \*[labialized C/ unround V] constraint. Candidate (b) equally failed to emerge as the optimal candidate because it fatally violated the most highly ranked constraint, that is the \*[labialized C/ unround V], hence giving chance to candidate (c) to emerge as the most preferred candidate because it does not violate any of the constraints.

**Table 10: OT analysis of Akan borrowed word yaa**

/yaa/	*[labialized C/ unround V]	MAX-IO	No Coda
a.  /yaa/			
b. /ya/		*!	
c. /yap/		*!	

From table 10 above, it is observed that candidate (a) emerged as the most preferred candidate because it does not violate any of the constraints. Candidate (b) failed to emerge as the most preferred candidate because it fatally violated the second highly ranked constraint by failing to copy all the segments of the base in the reduplicant, and candidate (c) failed to emerge as the optimal candidate because it also violated the second highly ranked constraint because it also failed to copy all the segments of the base but rather inserted a consonant which is not allowed.

#### 4.2 Reduplication

Treating reduplication as a word formation process in Sisaali, it is observed that word classes such as adjectives, adverbs and verbs reduplicate to form other words belonging to the same word classes with different meaning, while some nouns (some common nouns) reduplicate to form adverbs. That is to say adjectives reduplicate to form adjectives, adverbs reduplicate to form adverbs, and verbs reduplicate to form

verbs. This section therefore presents and analyzes data on reduplication from the word classes' adjectives, adverbs, nouns and verbs.

#### 4.2.1 Reduplication of adjectives

Some adjectives in Sisaalt undergo a full reduplication. That is to say, whatever feature or segment is in the base of the adjective is repeated in the reduplicant. In other words, adjectives in Sisaalt will as much as possible maintain some similarity between the base and the reduplicant. A reduplicant is the reduplicated segment or element resulting from a reduplication process. This type of reduplication is what has been referred to in the literature (Issah, 2011) as complete reduplication. This is evident in the data presented below;

Base	Reduplicated	Gloss
1. <b>mùà</b> 'small'	<b>[mùà-mùà]</b>	very small
2. <b>fiáṅ</b> 'fair'	<b>[fiáṅ -fiáṅ]</b>	very fair
3. <b>dòlí</b> 'tall'	<b>[dòlí-dòlí]</b>	very tall
4. <b>pùlá</b> 'white'	<b>[pùlá-pùlá]</b>	very white
5. <b>báì</b> 'big'	<b>[báì-báì]</b>	very big
6. <b>bìné</b> 'black'	<b>[bìné-bìné]</b>	very black
7. <b>pèì</b> 'free'	<b>[pèì-pèì]</b>	very free

Analyzing the data above using OT, it is assumed that the similarity between the base of the adjective and the reduplicant is the result of the interaction of constraints in the language. A critical examination of the data above tells us that the faithfulness constraint (MAX-BR) used by McCarthy and Prince (1995) exists when adjectives are being reduplicated in the language which ensures that every segment of the base has a correspondent in the reduplicant. This constraint is highly ranked as violating the

faithfulness constraint will be considered a fatal violation in the language. To be able to fully account for the similarity between the base and the reduplicant, we need to introduce another constraint DEP-BR also used by McCarthy and Prince (1995) which makes sure every segment of the reduplicant has a correspondent in the base and hence prohibits segment insertion in the reduplicant. This constraint seeks to ensure that the reduplicant and the base are identical as much as possible, and is also highly ranked as violating it is also considered fatal in the language. A third constraint is also introduced to ensure that the reduplicant meets some structural conditions, which is the No Coda constraint. So I set the ranking schema as follows:

MAX-BR >>DEP-BR >> No Coda

- a. MAX-BR:- every element of the base has its correspondent in the reduplicant (and prohibits segment deletion)
- b. DEP-BR:- every segment of the reduplicant has a correspondent in the base (and prohibits segment insertion)
- c. No Coda:- syllables must have no codas

The three constraints stated above have been used in the derivation of the word [bál-bál] ‘very big’ as seen in the table 5 below;

**Table 11: OT analysis of reduplicated adjectives**


/RED + bál/	MAX-BR	DEP-BR	No Coda
a.  /bál-bál/			
b. /bá-bál/	*!		
c. /bálá-bál/		*!	

From table 11, candidate (a) emerged as the optimal candidate that is the most preferred candidate because it does not violate any of the constraints. Candidate (b)



failed to emerge as the optimal candidate because it violates the most highly ranked constraint as it failed to copy all the segments of the base in the reduplicant. Candidate (c) equally failed to emerge as the winning candidate because it violated the second highly ranked constraint which prohibits the insertion of segments in the reduplicant as a default vowel was inserted in the reduplicant.

**Table 12: OT analysis of the reduplicated adjectivemúà-múà“very small”**

/RED + múà/	MAX-BR	DEP-BR	No Coda
a. /múàa-múà/		*!	
b. /mú-múà/	*!		
c.  /múà-múà/			

Analyzing the data on the table 12 above, it is observed that, candidate (a) failed to win as the optimal candidate because it has violated the second highly ranked constraint by inserting a default vowel in the reduplicant. Candidate (b) equally failed to emerge as the optimal candidate because it violated the most highly ranked constraint by deleting one of the base vowels in the reduplicant, which is a fatal violation. Candidate (c) then emerged as the preferred candidate because it does not violate any of the constraints.


#### 4.2.1 Reduplication of adverbs

Adverbs like adjectives in Sisaalt also involve a repetition of the entire base in the reduplicant. In other words, all the segments of the base of the adverb are repeated in the reduplicant, hence there is always a similarity or identity between the base and its reduplicant. It can therefore be said that adverbs in Sisaalt also undergo complete reduplication just as the adjectives do. This is evident in the data presented below;

Base		Reduplicated	Gloss
1. sòm	‘gently’	[sòm-sòm]	very gently
2. lìmá	‘quickly’	[lìmá-lìmá]	very quickly
3. dèí	‘fast’	[dèí-dèí]	very fast
4. bòt̩	‘slow’	[bòt̩-bòt̩]	slowly

In analyzing the data on the reduplication of adverbs above using OT, it is once again assumed that the semblance between the base and the reduplicant is enforced by the interaction of constraints in the language. As the adverbs are seen to be behaving in a similar way like the adjectives, I use the same constraints that were used to analyze the data on the reduplication of adjectives, thus MAX-BR, DEP-BR and the No Coda constraints. The MAX-BR constraint is once again ranked higher than the DEP-BR and the No Coda constraints as seen in the ranking schema – MAX-BR >>DEP-BR >> No Coda. An account of the derivation of the adverb sòm- sòm ‘very gently’ is seen in the table 7 below:

**Table 13: OT analysis of reduplicated adverbs**

/RED+ sòm/	MAX-BR	DEP-BR	No Coda
a. / sòmú- sòm/		*!	
b.  / sòm- sòm/			
c. / sò- sòm	*!		

From table 13 above, candidate (a) failed to emerge as the optimal candidate because it has violated DEP-BR, the second highly ranked constraint because of the insertion of the vowel after the bilabial nasal, which is a fatal violation and is therefore eliminated from the competition. Candidate (b) emerged as the optimal candidate that is the most preferred candidate because it did not violate any of the constraints. Candidate (c) is seen to have fatally violated the most highly ranked constraint by



Base	Reduplicated	Gloss
1. <b>kùbàlá</b> ‘one’	<b>[kùbàlá- kùbàlá]</b>	groups of one
2. <b>bàliá</b> ‘two’	<b>[bàliá-bàliá]</b>	groups of two
3. <b>bàndùǵ</b> ‘five’	<b>[bàndùǵ-bàndùǵ]</b>	groups of five
4. <b>fi:</b> ‘ten’	<b>[fi:-fi:]</b>	groups of ten
5. <b>màrá</b> ‘twenty’	<b>[màrá- màrá]</b>	groups of twenty
6. <b>zòlò</b> ‘hundred’	<b>[zòlò-zòlò]</b>	groups of hundreds
7. <b>bòí</b> ‘thousand’	<b>[bòí-bòí]</b>	groups of thousands

Analyzing the data on numerals above using OT, it is assumed that the similarity between the base of the numeral and its reduplicant is achieved by the interaction of the constraints MAX-BR, DEP-BR and No Coda constraints in the language. Since the numerals are observed to be behaving in a similar way like the adjectives and adverbs when they are being reduplicated, I will employ the same ranking schema that was used in analyzing the data on adjectives and adverbs in analyzing the data on numerals. I account for the derivation of the word **[fi:-fi:]** ‘groups of ten’ from the base **fi:** ‘ten’ in table 8 below:

**Table 14: An OT analysis of reduplication of numerals**

/RED+fi:/	MAX-BR	DEP-BR	No Coda
a.  / <b>fi:-fi:</b> /			
b. / <b>fi-</b> fi:/	*!		
c. / <b>fiá-</b> fi:/		*!	

From table 14 above, all the candidates do not violate the No Coda constraint which is the least ranked constraint, but candidates (b) was knocked out of contention because it fatally violates the most highly ranked constraint, which is the MAX-BR constraint because of the shortening of the base vowel in the reduplicant. Candidate (c) did not

also emerge as the winning candidate because it violates fatally the second highly ranked constraint by inserting a default vowel in the reduplicant, thus, giving chance to candidate (a) to emerge as the winner because it does not violate any of the constraints.

#### 4.2.4 Reduplication of nouns

Nouns are rarely reduplicated in Sisaali. The types of nouns that can be reduplicated are mostly common nouns such as weeks, months and years, and numerals that are functioning as nouns, as indicated earlier in example (3 b) of section (4.2.3). When the common nouns are reduplicated in Sisaali, the resultant words become adverbs, but when the numerals functioning as nouns are reduplicated, the resultant words remain as nouns. It is observed that when these types of nouns are being reduplicated, they behave like the adjectives and adverbs as they try to maintain phonological identity between the base and the reduplicant. To maintain this phonological semblance between the base and the reduplicant, the nouns will often copy all the segments of the base in the reduplicant. Their ability to do this is given in the OT analysis of the data below. All the data in this section are common nouns. I did not include the numerals functioning as nouns here again because the whole of section (4.2.3) was devoted for numerals.

Base	Reduplicated	Gloss
1. <b>yòbó</b> ‘week’	<b>[yòbó-yòbó]</b>	weekly
2. <b>ʦɛné</b> ‘month’	<b>[ʦɛné-chɛné]</b>	monthly
3. <b>dʒíná</b> ‘year’	<b>[dʒíná-dʒíná]</b>	yearly

An OT analysis of the data above treats the phonological identity between the base of the noun and its reduplicant as the interaction between the constraints MAX-BR,

DEP-BR and No Coda constraints. As was done with the adjectives, adverbs and numerals, the ranking schema ranks MAX-BR constraint higher than the DEP-BR, which is also ranked higher than the No Coda constraint. I give an account of the derived word **ʃɛ̀nɛ̀-ʃɛ̀nɛ̀** ‘monthly’ from the base **ʃɛ̀nɛ̀** ‘month’ in table 9 below:

**Table 15: AnOT analysis of reduplication of nouns**


/RED+ ʃɛ̀nɛ̀/	MAX-BR	DEP-BR	No Coda
a. /ʃɛ̀n-ʃɛ̀nɛ̀/	*!		
b. /ʃɛ̀nɛ̀ɛ̀-ʃɛ̀nɛ̀/		*!	
c.  /ʃɛ̀nɛ̀-ʃɛ̀nɛ̀/			

Table 15 above projects candidate (c) as the winning candidate as it does not violate any of the constraints. Candidate (a) failed emerging as the optimal candidate because it has fatally violated the highly ranked constraint which requires that the reduplicant maintains all the segments of the base in the reduplicant, but this constraint was violated by candidate (a) as the last vowel segment of the base which is /ɛ̀/ was deleted in the reduplicant. Candidate (b) is also knocked out of contention because it violated the second highly ranked constraint by inserting the vowel /ɛ̀/ in the reduplicant.

#### 4.2.5 Reduplication of Verbs

This section presents comprehensive data on reduplicated verbs. It is observed that this is a very productive way of forming words in Sisaalt as verbs with various structures are observed to be reduplicated to show progression.

##### 4.2.5.1 Verbs with CV syllable structure that end in short vowels

Verbs with CV syllable structure that end in short vowels in Sisaalt undergo a complete copying of the base segments with some instances of vowel sound change to

the base vowel. This is because the height of the verb base vowel per the data is seen to be playing a critical role in determining whether the base vowel will be modified or not in the reduplicant. It is observed from the data that, a [-High] base vowel changes to a [+High] vowel in the reduplicant. This creates differences between the base and the reduplicant. Similar findings have been reported by Boakye (2015) for verb reduplication in Akan. Below is the data exhibiting this phenomenon.

Base		Reduplicated	Gloss
1. <b>mó</b>	‘go’	[mù-mó]	be going
2. <b>fó</b>	‘bath’	[fù-fó]	be bathing
3. <b>fá</b>	‘run’	[fì-fá]	be running
4. <b>kó</b>	‘come’	[kù-kó]	be coming
5. <b>pé</b>	‘help’	[pì-pé]	be helping
6. <b>hé</b>	‘put’	[hì-hé]	be putting
7. <b>ché</b>	‘search’	[chì-ché]	be searching
8. <b>ɲé</b>	‘shit’	[ɲì-ɲé]	be shitting

The data above shows differences between the base vowels and the vowels of their reduplicants. I attempt to give an explanation to why the base vowel changes when it is reduplicated by using data number 2 /fó/ ‘bath’ reduplicated to be [fù-fó] ‘be bathing’ and data number 5 /pé/ ‘help’ reduplicated to be [pì-pé] out of the data. It is observed that the vowel of /fó/ , /o/ which is a [-High] vowel changed to /u/ a [+High] vowel in the reduplicant and the vowel of /pé/, /ɛ/ which is also a [-High] vowel changed to /i/ a [+High] vowel in the reduplicant. This suggests that the vowel of the reduplicant for verbs is reserved for a [+High] vowel, so that a [-High] base vowel will always change to a [+High] vowel when it is reduplicated. What we still need to be curious about however is why /o/ in /fó/ changed to /u/ a [+High] vowel and not /i/

or /**u**/ which are also [+High] vowels and why /**ε**/ in /**pé**/ changed to /**u**/ a [+High] vowel and not /**u**/ or /**v**/ which are also [+High] vowels.

As it is argued that the vowel of the verb reduplicant is reserved for [+High] vowels then the base vowel of /**fó**/ which is /**o**/ a [-High] vowel should be able to change /**i**/ or /**u**/ which are also [+High] vowels and the base vowel of /**pé**/ which is /**ε**/ also a [-High] vowel should also be able to change to /**u**/ or /**v**/ which are also [+High] vowels. But it is not so because of the vowel harmony rule in Sisaali as has been discussed in the literature which helps in deciding the type of vowel to be in the reduplicant. That is to say if the vowel of the base verb is [-High] and has to change to a [+High] vowel in the reduplicant, then it has to change to a [+High] vowel that agrees with it in terms of ATR and or rounding features. This accounts for why /**o**/ in /**fó**/ changed to /**u**/ and not /**i**/ or /**u**/ in the reduplicant because /**o**/ and /**u**/ are both [+back] vowels and have [+Round] features, and also have [-ATR] features, while /**i**/ or /**u**/ are front vowels and therefore cannot harmonize with /**o**/.

Similarly, the base vowel of /**pé**/, /**ε**/ which is also a [-High] vowel changed to /**u**/ a [+High] vowel in the reduplicant and not /**u**/ or /**v**/ which are also [+High] vowels because /**ε**/ harmonizes with /**u**/, in terms of ATR and Fronting. That is to say they are both [-ATR] and [+Front]. But /**ε**/ does not harmonize with /**u**/ in terms of ATR and fronting as /**ε**/ is [-ATR] and [+Front] while /**u**/ is [+ATR] and [+Back]. Also, /**ε**/ failed to change to /**v**/ though both sounds are [-ATR] because /**ε**/, is a front vowel while /**v**/ is a back vowel.

Therefore, in analyzing the data on Verbs with CV syllable structure using OT, there will be a modification in some of the constrains as well as the ranking of the



constraints that were earlier used for adjectives, adverbs, nouns and numerals since new constraints are going to be introduced.

In the analysis of data on adjectives, adverbs, nouns and numerals, it was said that Sisaalt maintains a similarity between the base and the reduplicant by copying all segments of the base in the reduplicant. This suggested that there were the faithfulness constraints in the language, that is MAX-BR and DEP-BR constraints which make sure that every element of the base has a correspondent in the reduplicant and that there was no segment insertion in the reduplicant respectively.

We did not encounter the reduplicant's preference for any particular feature, but what is happening so far with the data on CV syllable verbs shows the verb reduplicant has special preference for high vowels, such that a non-high base vowel will have to change to a high vowel in the reduplicant.

Once the verb reduplicant prefers high vowels, it suggests the existence of another constraint in the language; MAX-BR [+High]:- every element of the base has a correspondent in the reduplicant with preference to [+High] vowel features. This constraint ensures that any candidate with a [+Low] vowel is knocked out of the competition.

As it has also been observed that vowel harmony in the language is crucial in determining the type of vowel to be in the reduplicant, there is therefore the need to introduce an agreement constraint that makes sure that the vowels in the reduplicant and base agree with each other in terms of ATR and or rounding features.

I then employ Bakovic's (2003: cited in Boakye (2015: 46)) general agreement constraint AGREE [ $\pm$ hf] to represent the agreement constraint in Sisaalt, with hf

standing for homorganic features. This agreement constraint will ensure that vowels of the verb base and the verb reduplicant agree in ATR and or rounding features. Thus, in satisfying the reduplicant's preference for [+High] vowels, any verb base with a [-High] vowel will necessarily change to a [+High] one that agrees with it in ATR and or rounding features.

Examining the data above, and as was demonstrated with the verbs / **fó**/ 'bath' and /**pé**/ 'help' it is observed that, any verb base with a [-High] distorts the identity between the base and the reduplicant, because the [-High] necessarily changes to a [+High] in the reduplicant. Hence, the constraint, MAX-BR which was ranked as the highest constraint when we were analyzing the data on adjectives, adverbs, and numerals will not adequately account for this phenomenon, because if the base of a verb has a [-High] vowel and is completely copied, it will be constraint, hence, the MAX-BR constraint has to be slightly modified to MAX-BR [+High]. This tells us that, the language ranks the new constraint introduced MAX-BR [+High] higher than the MAX-BR. Also, because a verb base with a [-High] vowel does not just change to any [+High] vowel but one that agrees with it in terms of ATR and or rounding features suggest the agreement constraint, AGREE [ $\pm$ hf] also introduced in this section is ranked higher than MAX-BR constraint. This then calls for a modification of the ranking schema that was used earlier for the analysis of adjectives, adverbs, and numerals. The new ranking schema is as follows:


MAX-BR [+High] >> AGREE [ $\pm$ hf] >> DEP-BR

- a. MAX-BR [+High]:- every element of the base has a correspondent in the reduplicant with preference to [+High] vowel features

- b. AGREE [ $\pm$ hf]:- vowels of the verb base and the verb reduplicant must agree in ATR and or rounding features.
- c. DEP-BR:- every segment of the reduplicant has a correspondent in the base (and prohibits the insertion of segments in the reduplicant)

I employ the new constraint ranking schema in the analysis of the word **kù-kó** ‘be coming’ shown in table 16:

**Table 16: OT analysis of CV verbs**

/RED +kɔ/	MAX-BR [+High]	AGREE [ $\pm$ hf]	DEP-BR
a.  / <b>kù-kó</b>			
b. / <b>kó-kó</b> /	*!		
c. / <b>ki-kó</b>		*!	

From table 16, it is observed that, candidate (a) did not violate any of the constraints, thus making it emerge as the optimal candidate. Candidate (b) is seen to have violated one of the most highly ranked constraints, as it has a [-High] vowel in the reduplicant, thus is a fatal violation and hence is eliminated from the competition. Candidate (c) is also eliminated from the competition because it is also observed to have violated the second most highly ranked constraint by not conforming to the vowel harmony rule in the language. That is to say, though it has a [+High] vowel in the reduplicant, the [+High] vowel does not agree with in base of the verb in rounding and ATR features.

#### 4.2.5.2 Verbs with CV syllable structure that end in long vowels

This section presents data on CV mono syllabic verbs that end in long vowels. It is observed that this set of verbs when reduplicated often leads to a shortening of the base vowel, turning the long vowel into a short vowel. This suggests that underlyingly the vowels of verbs are short vowels and that there is an empty slot that is created for

the verb reduplicant which is reserved to be occupied by CVs only ending in short vowels. This argument is confirmed by the fact that there was no vowel shortening observed when we analyzed the data on verbs with CV structures that end in short vowels in section (4.2.5.1) because the CV structures meet the CV pre-specification requirement for verb reduplicants. It is however observed that, the vowel of the CV structure after the shortening of the long vowel if it is [-High] must then necessarily be changed to a [+High] one that agrees with it in ATR and or rounding features. This also goes to confirm an earlier argument in section (4.2.5.1) that, the vowel of the reduplicant for verbs is reserved for [+High] vowels only. The data below exemplifies this phenomenon.

Base		Reduplicated	Gloss
1. <b>ɲà:</b>	‘fetch’	<b>[ɲì-ɲà:]</b>	be fetching
2. <b>dà:</b>	‘watch over’	<b>[dì-dà:]</b>	be watching over
3. <b>sà:</b>	‘build’	<b>[sì-sà:]</b>	be building
4. <b>gà:</b>	‘steal’	<b>[gì-gà:]</b>	be stealing
5. <b>vò:</b>	‘tie’	<b>[vù-vò:]</b>	be tying
6. <b>là:</b>	‘take’	<b>[lì-là:]</b>	be taking
7. <b>yì:</b>	‘sing’	<b>[yì-yì:]</b>	be singing
8. <b>dì:</b>	‘eat’	<b>[dì-dì:]</b>	be eating
9. <b>pà:</b>	‘pick’	<b>[pì-pà:]</b>	be picking

Examining the data above, it is observed that there is no similarity between the base and the reduplicant. This is as a result of the shortening of the base vowel in the reduplicant. I attempt to give an explanation to the phenomenon by picking data number (7) **yì:** ‘sing’ reduplicated to be **yì-yì:** ‘be singing’ and (5) **vò:** ‘tie’ reduplicated to be **vù-vò** ‘continue to tie’ out of the data. It is observed that, there is a

shortening of the vowel of the verb base  $y\grave{i}$ : turning it to  $y\grave{i}$  in the reduplicant. No other change was observed. What accounts for this shortening is because of the short vowel pre-specification requirement for verb reduplicants. This is because a complete copying of the base of a CV verb that end in long vowels will yield a structure with a long vowel which will not be accepted by the empty slot that is created for verb reduplicants. It is however observed that, in some instances the vowel that is left after shortening, if it is [-High] changes to a [+High] one in the reduplicant. An example is the verb base  $v\grave{o}$ . It is observed that, there is a shortening of the base vowel, changing  $v\grave{o}$ : to  $v\grave{o}$  in the reduplicant. But because the vowel is a [-High] vowel, it had to be changed to a [+High] one that agrees with it in ATR and or rounding features, that is why / $\text{ɔ}$ / changed to / $\text{ʊ}$ / in the reduplicated form of  $v\grave{o}$ : which is  $[v\grave{u}-v\grave{o}]$ . This further confirms my earlier argument that, the vowel of the reduplicant for verbs is reserved for [+High] vowels.

Analyzing the data on verbs with CV structures that end in long vowels therefore using OT, I will introduce a new constraint called RED-FT which will ensure that the reduplicant copies just enough features from the base to meet the pre-specification requirement for verb reduplicants which will be ranked higher than all other constraints. Another new constraint \*[-High] will be introduced to ensure that there are no [-High] vowels in the reduplicant and AGREE [ $\pm$ hf] constraint will also be used here to ensure there is harmony between the vowels of the base and the reduplicant. Per the evidence in the data, it is argued AGREE [ $\pm$ hf] and \*[-High] are equally ranked in the language. To show that the two constraints are equally ranked, they are only separated by a comma and in the ranking schema, while in the table, they will be distinguished by dashed lines, showing that they are equally ranked. The constraints used and their ranking are:

RED-FT >> \*[-High], AGREE [±hf]>> MAX-BR

- a. RED-FT:- a reduplicant must be CV with a short vowel
- b. \*[-High]:- no [-High] vowels in the reduplicant
- c. AGREE [±hf]:- vowels of the verb base and the verb reduplicant must agree in ATR and or rounding features.
- d. MAX-BR:- every element of the base has a correspondent in the reduplicant

I employ this ranking schema in the derivation of the word [vò-vò] ‘continue to tie’ that is data number 5 on the CV verbs that end in long vowels. This is shown in the table 17;

**Table 17: OT analysis of data on CV verbs that end in long vowels**

/RED+gva/	RED-FT	*[-High]	AGREE [±hf]	MAX-BR
a. /vò:-vò:/	*!			
b. ↗/vò-vò:/				*
c. /vù:-vò:/			*!	

From table 17, it is observed that, candidate (a) failed to emerge as the optimal candidate because it has fatally violated the most highly ranked constraint by copying all the segments of the base in the reduplicant, hence producing a structure that does not fulfill the reduplicant feature requirement for verb reduplicants. Candidate (b) emerged as the optimal candidate because it satisfies all the higher ranking constraints though it minimally violated the least ranked constraint. Candidate (c) also failed to emerge as the optimal candidate because it has also violated one of the highest ranking constraints because the vowel of its reduplicant does not harmonize with the vowel of the base in ATR.

#### 4.2.5.3 Verbs with CV.C syllable structure

The data in this section presents us with Sisaalt verbs with a CV.C syllable structure. These types of verbs are disyllabic in nature as the final consonant is functioning as a syllabic consonant and hence is a syllable on its own. It is observed from the data that there is always a deletion of the second syllable which is always a nasal or a lateral, and the vowel of the verb base if it is [-High] is changed to a [+High] one in the reduplicant. The data below exhibits this phenomenon.

Base	Reduplicated	Gloss
1. vèḡ ‘walk’	[vì-vèḡ]	be walking
2. sùl ‘beg’	[sù-sùl]	be begging
3. hḡ ‘sit’	[hḡ-hḡ]	be sitting
4. pìḡ ‘sleep’	[pì-pìḡ]	be sleeping
5. bḡ ‘say’	[bḡ-bḡ]	be saying
6. mḡ ‘laugh’	[mḡ-mḡ]	be laughing
7. mìl ‘hold firm’	[mì-mìl]	continue to hold firm

A critical analysis of the data above show there is no similarity between the base and the reduplicant because the base is disyllabic while the reduplicant is monosyllabic. This is as a result of the elision of the second syllable, and the differences between some of the base vowels and the vowels of their reduplicants. This is because some of the vowels of the verb bases which are [-High] are observed to have changed to [+High] ones in the reduplicants.

The deletion of the second syllable leaving only the first syllable which is a CV in the reduplicant goes to support my earlier argument that, the reduplicant slot for verbs is pre-specified to be CV only. Also, the fact that some of the verb base vowels which


are [-High] are observed to have changed to [+High] ones in the reduplicants also affirms my earlier argument that the vowel of the reduplicant is reserved for a [+High] vowels, so that a [-High] base vowel will always change to a [+High] vowel that agrees with it in terms of ATR and or rounding features when it is reduplicated as was explained in section (4.2.5.1) and (4.2.5.2). I will use the same constraints that were used in analyzing verbs with CV structures that end in long vowels in analyzing the CV.C verbs.

I explore this phenomenon by choosing data number (1) **vɛ̃ɲ** ‘walk’ from the CV.C data using the constraints below:

RED-FT >> \*[-High], AGREE [±hf] >> MAX-BR

- a. RED-FT:- a reduplicant must be CV with a short vowel
- b. \*[-High]:- no [-High] vowels in the reduplicant
- c. AGREE [±hf]:- vowels of the verb base and the verb reduplicant must agree in ATR and or rounding features.
- d. MAX-BR:- every element of the base has a correspondent in the reduplicant

**Table 18: OT analysis of data on CV.C verbs**

/RED+ vɛɲ/	RED-FT	*[-High]	AGREE [±hf]	MAX-BR
a. / <b>vɛ̃ɲ</b> -vɛ̃ɲ/	*!			
b. / <b>vɛ̃</b> -vɛ̃ɲ/		*!		
c.  / <b>vɪ</b> -vɛ̃ɲ/				*

From table 18, it is observed that, candidate (a) fatally violated the most highly ranked constraint as it copied all the segments of the base, resulting in a structure that is larger than the pre-specification requirement of the reduplicant, and hence, is knocked out of contention. Candidate (b) is also observed to have been eliminated from the competition because it violated the second highly ranked constraint.



Candidate (c) then emerged as the winner, that is, the most preferred candidate as it does not violate any of the highly ranked constraints.

#### 4.2.5.4 Verbs with CV.CV syllable structure

This section presents data on disyllabic verbs with CV.CV structure. The data exhibits the phenomenon of always deleting the second syllable in the reduplicant, and the vowel of the first syllable if it is [-High] is changed to a [+High] one that agrees with it in ATR and or rounding features. This further affirms my argument that there is an empty slot created for the reduplicant in a verb reduplicated segment which is pre-specified for CV only and must end in a short vowel, and that the vowel of the reduplicant for verbs is reserved for [+High] vowels that agree with the base vowel in ATR and or rounding features. The data below exhibits this phenomenon.

Base	Reduplicated	Gloss
1. <b>yìré</b> ‘call’	<b>[yì-yìré]</b>	be calling
2. <b>pèré</b> ‘farm’	<b>[pì-pèré]</b>	be farming
3. <b>yìgí</b> ‘push’	<b>[yì-yìgí]</b>	be pushing
4. <b>dàgí</b> ‘teach’ or ‘show’	<b>[dì-dàgí]</b>	be teaching or be showing
5. <b>hùgí</b> ‘bury’	<b>[hù-hùgí]</b>	be burring
6. <b>gbèré</b> ‘wait’	<b>[gbì-gbèré]</b>	be waiting
7. <b>kpèsí</b> ‘shake’	<b>[kpì-kpèsí]</b>	be shaking

Analyzing the data above, it is observed that there is no identity between the base and the reduplicant because of the elision of the second syllable. Also, the dissimilarity between the base and the reduplicant is because the verb base vowels which are [-High] are observed to have changed to [+High] ones in the reduplicants. This further affirms my argument throughout my analysis of verb reduplication that, the vowel of

the reduplicant is reserved for [+High] vowels. A critical analysis of this data reveals what is happening in this data is similar to what happened to the data on CV.C verbs in section (4.2.5.3). Hence, the same constraints and the same ranking that were used to analyze the data on CV.C verbs would be used to analyze the data on CV.CV verbs.

**Table 19: OT analysis of data on CV.CV syllable verbs**

/RED+ pɛɛ/	RED-FT	*[-High]	AGREE [±hf]	MAX-BR
a. /pɛ̀ɛ̀-ɛ̀ɛ̀/	*!			
b. /pɪ̀-ɛ̀ɛ̀/				*
c. /pù-ɛ̀ɛ̀/			*!	

From table 19, it is observed that, candidate (a) failed to emerge as the winning candidate because it has fatally violated the most highly ranked constraint by copying all the segments of the base in the reduplicant, hence producing a structure larger than what is required in the reduplicant. Candidate (c) did not equally emerge as the optimal candidate because it fatally violated one of the second highest ranked constraints as the vowel of its reduplicant does not agree with the vowel of its base. This gave chance to candidate (b) to emerge as the winning candidate because, though it violated one constraint, it is the least ranked constraint it violated which is not a fatal violation.

### 4.3 Compounding in Sisaalt

This section presents data on compound words. Compounding, which I refer to as the bringing together of two or more words to generate another word whose meaning may or may not be derived from the individual words that have been put together to form the new word is observed to be one of the most productive ways of forming words in

Sisaalt. There are words from the same word class put together to form another word or words from different word classes put together to form other words. For instance, we have two nouns (Noun+Noun) put together to form a nominal compound, we have noun and adjective (Noun+Adjective) put together to form a nominal compound, we have noun and verb (Noun+Verb) put together to form a nominal compound and we can have two verbs (Verb+Verb) put together to form a verbal compound in Sisaalt. We can also have complex compounds where about three words are put together to form a compound word. We have Noun+Adjective+Adjective producing a nominal compound and Verb+Verb+Verb given us a verbal compound in Sisaalt.

It is argued then that when these categories of words are compounded, some phonological processes like consonant, vowel or syllable elision as well as assimilation takes place.

#### **4.3.1 Noun-Noun compounding**

In Sisaalt it is possible for two nouns to be put together sequentially to form a compound noun. However, when this happens, assimilation, as well as deletion of some segments such as laterals, nasals, vowels or even syllables takes place. Similar findings have been reported by Abdul-Rahman (2013) for the case of Dagbani. The resultant compound noun can either be exocentric (headless) or endocentric (have heads). The data in table 20 exhibits this phenomenon.

**Table 20: Noun-Noun Compounds**

<b>A</b> (Noun)	<b>B</b> (Noun)	<b>C</b> (A+B)	<b>Gloss</b>	<b>Type of compound</b>
<b>nɛ́ɣ</b> ‘cow’	<b>díá</b> ‘house’	<b>nɛ́díá</b> ‘cow house’	kraal	Endocentric (right-headed)
<b>ɲùɣ</b> ‘head’	<b>ɲùná:</b> ‘hair’	<b>ɲùɲùná:</b> ‘head hair’	hair	Endocentric (right-headed)
<b>vìlìɣ</b> ‘well’	<b>lì:ɲ</b> ‘water’	<b>vìlì:ɲ</b> ‘well water’	water from the well	Endocentric (right-headed)
<b>há:í</b> ‘female’	<b>bàgá</b> ‘farm’	<b>há bàgá</b> ‘female born in the farm’	female personal name	Endocentric (left-headed)
<b>bù:ɲ</b> ‘goat’	<b>díá</b> ‘house’	<b>bùdíá</b> ‘goat house’	Den	Endocentric (right-headed)
<b>hò:ɲ</b> ‘metal’	<b>jà:bá</b> ‘horse’	<b>hò:ɲjà:bá</b> ‘metal horse’	bicycle	Exocentric (headless)
<b>dùóɲ</b> ‘rain’	<b>síá</b> ‘knife’	<b>dùònsíá</b> ‘rain knife’	rainbow	Exocentric (headless)

Considering the data in table 20 above, it is observed that, when the words in column **A** and **B** were put together per the IA model, to form the compounds in column **C** (**A+B**), it resulted in the elision of some segments of the nouns in the column **A** data. This is demonstrated in example 4 below.

**EXAMPLE 4**

- a. **nɛ́ɣ** + **díá** = **nɛ́díá**  
cow + house = kraal
- b. **vìlìɣ** + **lì:ɲ** = **vìlì:ɲ**  
well + water = well water
- c. **dùóɲ** + **síá** = **dùònsíá**  
rain + knife = rainbow

An analysis of the data reveals a deletion of the velar nasal /ŋ/ serving as a final segment of the first noun of example (4a) above, which is a disyllabic word with CV.C syllable structure. This resulted in a resyllabification of the noun in the final compound word as the CV.C word became a CV in the derived compound word. The resultant compound noun is an endocentric (right-headed) compound.

It is also observed in example (4b) above that the last two segments of the first noun **vliŋ** ‘well’ which is a trisyllabic word with a CV.CV.C structure has been deleted, turning the CV.CV.C structure to a CVC, and when the second noun **li:ŋ** ‘water’ with a CV.C structure was attached to it per the IA model deriving a nominal compound with a CV.C.CV.C. The derived compound noun is a right-headed endocentric compound as the right-hand element of the resultant compound noun carries the core meaning of the derived compound noun.

Also, the final segment of the first noun of example (4c) which is a velar nasal /ŋ/ is observed to have assimilated to the place of articulation of the first consonant of the second noun which is an alveolar fricative /s/ and became an alveolar nasal /n/. The resultant compound noun of example (4c) is an exocentric compound as the meaning of the derived compound noun cannot be derived from the meaning of the individual words put together to form the compound noun.

It is then argued that Noun+Noun compounding in Sisaalt derive endocentric and exocentric compounds.

#### **4.3.2 Noun - Adjective compounding in Sisaalt**

Nouns and adjectives are combined to form compound nouns in Sisaalt and when this happens, the noun always functions as the *head* and the adjective the *modifier*, just as

is the case in English. But contrary to the English language norm of placing adjectives first before the nouns they co-occur with, in Sisaali, the adjectives come after the head nouns they modify. When these nouns and adjectives are therefore put together to form compound nouns per the IA model, some phonological processes like vowel elision, nasal, lateral or even syllable truncation take place in the head noun while the adjective remains the same. The realized compound words are always nominal compounds. Abdul-Rahman (2013) reported similar findings for Dagbani.

It is argued that the resultant noun-adjective compound nouns in Sisaali have heads which are always the left-hand members of the compound words and hence are said to be endocentric compounds. The data in table 21 exemplifies this phenomenon.

**Table 21: Noun-Adjective compounds**

<b>A</b> (Noun)	<b>B</b> (Adjective)	<b>C</b> (A+B)	<b>Gloss</b>	<b>Type of compound</b>
<b>bìé</b> ‘child’	<b>bòmòh</b> ‘bad’	<b>bì:bòmòh</b> ‘child bad’	bad child	Endocentric (right-headed)
<b>tíá</b> ‘tree’	<b>dùdùóh</b> ‘tall’	<b>tì:dùdùóh</b> ‘tree tall’	tall tree	Endocentric (left-headed)
<b>nèh</b> ‘cow’	<b>pòròh</b> ‘young’	<b>nèpòròh</b> ‘cow young’	young cow	Endocentric (left-headed)
<b>vàhá</b> ‘dog’	<b>bìné</b> ‘black’	<b>vàbìné</b> ‘dog black’	black dog	Endocentric (left-headed)
<b>ɲímmá</b> ‘father’	<b>bìé</b> ‘small’	<b>ɲímmìé</b> ‘father small’	uncle	Endocentric (left-headed)
<b>gèrɲ</b> ‘dress’	<b>pùlá</b> ‘white’	<b>gèpùlá</b> ‘dress white’	white dress	Endocentric (left-headed)
<b>bà:í</b> ‘man’	<b>lòrí</b> ‘ugly’	<b>bàlòrí</b> ‘man ugly’	ugly man	Endocentric (left-headed)

Analyzing the data in table 21 above using IA, it is observed that, there is an elision of the final syllable of some of the nouns in the column A data after they were compounded with the adjectives in column B per the IA model. This resulted in a change in the syllable structures of such nouns in the derived compound nouns, and causing consonant assimilation in some instances. The phenomenon is best explained in the example 5.

**EXAMPLE 5**

a. **ɲìrú má** + **bìé** = **ɲìrú mié**

father + small = uncle

b. **vàhá** + **bìné** = **vàbìné**

dog + black = black dog

Critically examining the examples above, the noun of example (5a), **ɲìrú má** ‘father’ which has a CV.C.CV syllable structure, is observed to have lost its last syllable –**ma**, turning it into a CV.C (**ɲìm**) when the adjective **bìé** ‘small’ with a bilabial stop /b/ as its onset was attached to it. The bilabial stop /b/ that forms the onset of the adjective is then observed to have acquired the nasal features of the bilabial nasal /m/ that ends the noun after the elision of the final syllable –**ma**, to become a bilabial nasal /m/ deriving the compound noun **nyìrú mié** ‘uncle’ which is a left-headed endocentric compound.

Also, an analysis of the data in example (5b) above reveals a deletion of the second syllable of the noun **vàhá** ‘dog’ which has a CV.CV syllable structure when the adjective **bìné** ‘black’ was attached to it, changing the syllable type to a CV in the resultant compound noun **vàbìné** ‘black dog’. There was no deletion however observed in the adjective which is the right-hand element of the derived compound

noun. The derived compound noun is a left-headed endocentric compound as it the left-hand element that carries the core meaning of the derived compound noun.

It is argued also per the data in table 21 that, Noun+Adjective compounding in Sisaalt produce endocentric compounds.

### 4.3.3 Noun - Verb compounding in Sisaalt

When nouns are combined with verbs to form nominal compounds, the noun will always appear at the left hand side while the verb will be to the right. The verb is then nominalized by adding a nominal suffix to it, and the resultant word becomes a nominal compound. Examples are indicated in table 22.

**Table 22: Noun-Verb compounding in Sisaalt**

A (Noun)	B (Verb)	C (nominal suffix)	D (A+B+C)	Gloss	Type of compound
dǎá ‘house’	dʒù: ‘live’	-lǐǐ ‘suffix’	dǐ:dʒù:lǐǐ ‘house living’	living room	Coordinate
yǎbǎ ‘market’	dà: ‘keep’	-ró ‘suffix’	yǎ:dà:ró ‘marketkeeper’	business person	Coordinate
hà:í ‘woman’	ʒé ‘search’	-ró ‘suffix’	hàʒé:ró ‘woman searcher’	womanizer	Coordinate
lǐ:ǐ ‘water’	ɲùá ‘drink’	-lǐǐ ‘suffix’	lǐ:ɲùá:lǐǐ ‘water drinking’	drinking water	Endocentric (left- headed)
fùóǐ ‘river’	tù: ‘enter’	-ró ‘suffix’	fùótù:ró ‘river entering’	Someone who fetches water	Exocentric
tò:ǐ ‘pig’	ʒǎǐ ‘chew’	-ró ‘suffix’	tò:ʒǎǐ:ró Pig chewer	Someone who eats pork	Coordinate
yǐ:lǐǐ ‘song’	yǐ: ‘sing’	-ró ‘suffix’	yǐ:yǐ:ró ‘song singer’	Singer	Coordinate



Analyzing the data in table 22, it is observed that there is an elision of the last syllables of some of the nouns in the column A data. This resulted in a compensatory lengthening of the vowels of the first syllables of some of the nouns. Below are some examples elaborating the phenomenon.

**EXAMPLE 6**

a. **dìá** + **dʒù:** + **-lìḡ** = **dì:dʒù:lìḡ**  
 house + live + suffix = living room

b. **tò:ḡ** + **ḡáḡ** + **-rú** = **tò:ḡaáḡnó**  
 pig + chew + suffix = someone who eats pork

A scrutiny of the example (6a) data above shows a deletion of the final vowel of the noun **dìá** ‘house’ which has a CV.V structure, turning it into a CV when the verb **dʒù:** ‘live’ was attached to it per the IA model to derive the compound word. The verb **dʒù:** ‘live’ is also observed to have attracted a nominal suffix **-lìḡ** ‘a living place’ turning the derived compound word into a nominal compound **dì:dʒù:lìḡ** ‘a living room’. The derived compound noun is a coordinate compound as the meaning of the compound word is derived from the meaning of the individual words put together to form the compound noun.

The data in example (6b) above is also observed to have undergone deletion, suffixation and assimilation processes. It is seen that, when the verb **ḡáḡ**, was attached to the noun **tò:ḡ** per the IA model, it resulted in the deletion of the final velar nasal /ḡ/ ending the noun **tò:ḡ**. The verb **ḡáḡ** is also seen to have attracted a nominal suffix **-rú** ‘person who does something (agenitive)’ turning the resultant compound word into a nominal compound **tò:ḡaáḡnó** ‘someone who eats pork’. A further examination of the example (6b) data reveals that, the velar nasal /ḡ/, ending the

verb **ɸàń** has assimilated to the place of articulation of the alveolar trill /r/ that begins the nominal suffix - **ró** and became an alveolar nasal /n/, and thus influenced the alveolar trill /r/ with its nasal features to also become an alveolar nasal /n/ in the derived compound noun **tò:ɸàńńó**. I argue then that, the two phonological processes that took place in the example (6b) data, that is, the homorganic nasal assimilation and nasalization are ordered as the assimilation will have to occur before the nasalization. The derived compound noun of example (6b) is also a coordinate compound.

It can be concluded per the data in table 22 that, Noun+Verb compounds in Sisaalt will yield coordinate, exocentric and endocentric compounds.

#### 4.3.4 Verb-Verb compounding in Sisaalt

Two verbs can be merged in Sisaalt to form a compound word. During the compounding of verbs however, the resultant compound word remains a verb. The resultant compound words are always co-ordinate compounds. Syntactically however, these types of verb compounds act as serial verb constructions or verb serialization. Verb serialization according to Foley and Olson (1985) is a phenomenon where two or more verbs are juxtaposed in a single clause without conjunctions. The individual words may have their individual meanings but when they are juxtaposed, a different meaning is derived. Examples,

- i.     **laa**       **dii**  
      collect   eat  
      “believe”
  
- ii.    **yòò**       **pá**    **v**  
      buy       give   him/her  
      “buy for him/her”

The data in table 23 exemplifies the phenomenon of Verb-Verb compounding in Sisaalt

**Table 23: Verb-Verb compounding in Sisaalt**

A (Verb)	B (Verb)	C (A+B)	Gloss	Type of compound
ɲà: 'fetch'	kò 'come'	ɲà:kò 'fetch come'	fetch and bring	Coordinate
là: 'collect'	kò 'come'	là:kò 'collect come'	collect and bring	Coordinate
yò: 'buy'	pá 'give'	yò:pá 'buy give'	buy for	Coordinate
fá 'run'	kò 'come'	fákò 'run come'	run and come	Coordinate
mò 'go'	pùŋ 'lie'	mòpùŋ 'lie sleep'	go and lie down	Coordinate

Analyzing the data in table 23 above using the IA model of morphological analysis, it is evident that, no deletion or assimilation occurred in any of verbs put together to form the verbal compound in the verb-verb data. This is exemplified in example 7:

**EXAMPLE 7**

a. ɲà:	+	kò	=	ɲà:kò
fetch	+	come	=	fetch come
b. fá	+	kò	=	fákò
run	+	come	=	run come

An analysis of examples (7a) and (7b) above reveals no segment elision or assimilation occurred when the verbs were put together per the IA model to form compound verbs. The resultant verbal compounds are all co-ordinate compounds as the words put together to form the compound words share head-like characteristics. It can therefore be said per the data in table 23 that, verb-verb compounding in Sisaalt will always derive coordinate compounds.

#### 4.2.6 Noun-Postpositions compounding in Sisaalɔ

What the English call prepositions are called post-positions in Sisaalɔ. That is, words that indicate location. They are so called because they come after the nouns they qualify. Nouns and these postpositions in Sisaalɔ can be combined to form compound words. I argue that, when nouns and postpositions are combined to form compounds in Sisaalɔ, the individual words will maintain their phonological features. That is to say no phonological change will occur in any of the words put together to form the compound word. The derived compound words are mostly postpositions. The data in table 24 clearly explain this phenomenon.

**Table 24: Noun-postposition compounding in Sisaalɔ**

<b>A</b> (Noun)	<b>B</b> (postposition)	<b>C</b> (A+B)	<b>Gloss</b>	<b>Type of compound</b>
<b>jé:ŋ</b> ‘wall’	<b>hàriŋ</b> ‘back’	<b>jé:ŋhàriŋ</b> ‘wall back’	Back of wall/ outside	Coordinate
<b>diá</b> ‘house’	<b>tùóŋ</b> ‘inside’	<b>diátùóŋ</b> ‘inside’	inside the room	Coordinate
<b>tía</b> ‘tree’	<b>bùbùóŋ</b> ‘under’	<b>tíábùbùóŋ</b> ‘tree under’	Under the tree	Coordinate
<b>bòró</b> ‘door’	<b>nì:ŋ</b> ‘mouth’	<b>bòróni:ŋ</b> ‘door front’	In front of the door	Coordinate
<b>dà:ŋ</b> ‘wood’	<b>ɲùŋ</b> ‘top’	<b>dá:ŋɲùŋ</b> ‘wood top’	On top of the wood	Coordinate

An analysis of the data in table 24 reveals that, all the words in column A and B that have been put together per the IA model to form the compounds in column C have maintained their phonological features in the resultant compound word. The phenomenon is further explained in the example 8 below;

**EXAMPLE 8**

**a. jé:ṅ + hàrìṅ = jé:ṅhàrìṅ**

wall + back = wallback

**b. bòró + nì:ṅ = bòró:ṅ**

door + mouth = front of door

A critical examination of the examples reveals no deletion or assimilation took place in any of the words put together per the IA model to generate the compound words in example 8 as was seen when we were analyzing the Noun-noun and the Noun-Adjective compounds. The derived compound words are all coordinate compounds as the meaning of the compound words are dependent on the meaning of the individual words put together to form the compound word.

**4.2.7 Complex compounds in Sisaalt**

It is possible to have more than two words coming together to form compound words in Sisaalt. For instance, you can have noun-adjective-adjective compounds in Sisaalt and verb-verb-verb compounding in Sisaalt. The noun-adjective-adjective compounding in Sisaalt may trigger some phonological changes like segment deletion and assimilation in the noun. The verb-verb-verb compounding may only trigger some vowel modifications to some of the base verb vowels in the resultant compound word.

**4.3.5.1 Noun-Adjective-Adjective Compounding in Sisaalt**

You can have one noun and two adjectives being combined to form a nominal noun in Sisaalt. This type of compounding may however trigger phonological processes like segment deletion and assimilation in the noun and one of the adjectives. The data in table 25 explains the phenomenon.

**Table 25: Noun-Adjective-Adjective compounding in Sisaah**

<b>A</b> (Noun)	<b>B</b> (adjective)	<b>C</b> (adjective)	<b>D</b> (A+B+C)	<b>Gloss</b>	<b>Type of compound</b>
<b>hà:í</b> 'woman'	<b>fíáḡ</b> "fair"	<b>kù:</b> 'short'	<b>hàfíáḡkù:</b> 'a woman, fair short'	a fair short woman	Endocentric
<b>bìé</b> 'child'	<b>dùdùsḡ</b> 'tall'	<b>zòmùḡ</b> 'beautiful'	<b>bì:dùdùsḡzòmùḡ</b> 'child, tall, beautiful'	a tall beautiful child	Endocentric
<b>tóló</b> 'girl'	<b>zòmùḡ</b> 'beautiful'	<b>bàlìḡ</b> 'fat or big'	<b>tólzòmùḡbàlìḡ</b> 'girl, beautiful, big'	a beautiful fat girl	Endocentric
<b>bàtòḡ</b> 'personal name'	<b>kù:</b> 'short'	<b>kùwíé</b> 'small'	<b>bàtòḡkù:wíé</b> 'baton, short small'	the small short baton	Coordinate

A critical analysis of the data in table (25) above reveals instances of final segment elision of some of the nouns in column A data when they were merged with the adjectives in column B and C to derive the compound nouns in column D. There were also some instances of vowel lengthening taking place in the noun after losing its final segment. Some of the adjectives were also found to have lost some word segments or word initial segments. Example 9 below gives a clearer picture of the phenomenon.

**EXAMPLE 9**

<b>a. bìé</b>	+	<b>dùdùsḡ</b>	+	<b>zòmùḡ</b>	=	<b>bì:dùdùsḡzòmùḡ</b>
child	+	tall	+	beautiful	=	a tall beautiful child
<b>b. hà:í</b>	+	<b>fíáḡ</b>	+	<b>kù:</b>	=	<b>hàfíáḡkù:</b>
woman	+	fair	+	short	=	a fair short woman

An analysis of example (9a) reveals a deletion of the final segment of the noun / **bìé**/ when the two adjectives **dùdùsḡ** and **zòmùḡ** were added to it to form the nominal compound **bì:dùdùsḡzòmùḡ**. This resulted in a compensatory lengthening of the

noun base vowel that was left after the deletion. It is also observed that, the velar nasal /ŋ/ ending the adjective **zòmùŋ** has assimilated to the place of articulation of the alveolar fricative /z/ adjacent to it to become an alveolar nasal /n/. The resultant nominal compound is a left-headed endocentric compound as it is the left-hand element of the compound noun that carries the core meaning of the derived compound noun.

Also, a scrutiny of example (9b) data reveals a deletion of the final segment of the noun **hà:Í** which is a lateral, and a subsequent shortening of the base vowel /a:/ to /a/ when the two adjectives **fiáŋ** “fair” and **ku:** “short” were attached to it per the IA model to generate the nominal compound **hàfiáŋku:** “a fair short woman”. The derived nominal compound is also a left-headed endocentric compound as it is the left-hand element of the compound noun that carries the core meaning of the derived compound noun.

#### **4.3.5.2 Verb-Verb-Verb Compounding Sisaalt**

It is possible to also combine more than two verbs to form a compound word in Sisaalt. This type of compounding may or may not trigger any phonological change in any of the verbs put together to form the compound word. These types of verb compounds are also syntactically considered as serial verb constructions or verb serialization as explained in section 4.3.5. The data in table 26 explains the phenomenon.

**Table 26: Verb-Verb-Verb compounding in Sisaah**

<b>A</b> (verb)	<b>B</b> (verb)	<b>C</b> (verb)	<b>D</b> (A+B+C)	<b>Gloss</b>	<b>Type of compound</b>
<b>là:</b> ‘collect’	<b>fá</b> ‘ran’	<b>kò</b> ‘come’	<b>là:fàkò</b> ‘collect ran come’	collect and ran and come	Coordinate
<b>mó</b> ‘go’	<b>là:</b> ‘collect’	<b>kò</b> ‘come’	<b>mòlà:kò</b> ‘go collect come’	go and collect and come	Coordinate
<b>džòṅò</b> ‘take’	<b>kà:kó</b> ‘bring’	<b>dí:</b> ‘eat’	<b>džòṅòkà:kòdí:</b> ‘take bring eat’	take and bring and eat	Coordinate
<b>kìrí</b> ‘chase’	<b>ḡmó:</b> ‘beat’	<b>kpú</b> ‘kill’	<b>kìréḡmò:kpú</b> ‘chase beat kill’	chase, beat and kill	Coordinate
<b>fá</b> ‘ran’	<b>kò</b> ‘come’	<b>hòḡ</b> ‘sit’	<b>fákòhòḡ</b> ‘ran come sit’	ran and come and sit	Coordinate

A scrutiny of the data in table (26) above reveals some instances of vowel modification to some of the base vowels of the verbs that were put together per the IA model to generate the compound words. This is illustrated in example 10

**EXAMPLE 10**

<b>a.</b>	<b>kìrí</b>	+	<b>ḡmó:</b>	+	<b>kpú</b>	=	<b>kìréḡmò:kpú</b>
	chase	+	beat	+	kill	=	chase and beat and kill
<b>b.</b>	<b>fá</b>	+	<b>kò</b>	+	<b>hòḡ</b>	=	<b>fákòhòḡ</b>
	ran	+	come	+	sit	=	ran and come and sit

An analysis of examples (10a) and (10b) above reveals a change in the final vowel of the first verb of example (10a) as it changed from a [+High] vowel to a [-High] vowel



in the compounded word. That is /í/ changed to /é/ when **kírí** ‘chase’ and **ɲmó:** ‘beat’ and **kpú** ‘kill’ were put together per the IA model to form the compound word **kírɛ́mò:kpú** ‘chase, beat and kill’.

Also, an analysis of the data in example (10b) reveals a change in the base vowel of the second verb of example (10b) data as it changed from a [-High] vowel to a [+High] vowel in the derived compound verb. That is when **fá** ‘ran’ and **kò** ‘come’ and **hòɲ** ‘sit’ were brought together to form the compound verb **fákòhòɲ** ‘ran and come and sit’

#### 4.4 Affixation in Sisaali

Affixation has been defined by Liu<sup>1</sup> and Lui<sup>2</sup> (2014: 23) as “a word-formation process of attaching something to the base”. Alonso (2011) refers to affixation as the attachment of an affix to base”. Taking the two definitions into consideration, I refer to affixation as the attachment of affixes to already existing words to generate other words which may trigger phonological processes like deletion, assimilation, or vowel lengthening in the original word. This is a very common word formation process in many languages including Sisaali.

According to Katamba and Stonham (2006) affixes are morphemes attached to other morphemes such as roots, stems and bases. Yule (1996) calls them “small ‘bits’ which are not listed separately in the dictionaries. Affixes are categorized into three main types in the literature, namely, prefixes, infixes and affixes.

Prefixes are attached before a word such as re- (as in rewrite), in- (as in incorrect) and un- (as in unemployed). Suffixes on the other hand are attached after a word such as –s (as in pens), -er (as in baker) and –ly (as in friendly), while infixes are incorporated

inside the word. Prefixes and infixes are however rarely found in Sɪsaaltɪ as my data analyzed so far rarely revealed prefixes and infixes.

I argue in this thesis that, Sɪsaaltɪ employs suffixes in generating words as there are no known prefixes or infixes in the data collected so far, and that when these suffixes are attached to already existing words in Sɪsaaltɪ, they will either maintain or change the grammatical category or word class of the original words. When the attachment of the suffixes results in the generated words maintaining the word class or grammatical categories of the original words, the process is referred to as an inflectional process, but when the attachment of the suffixes results in a change in the grammatical category of the original word, the process is referred to as a derivational process. In this thesis however, only suffixes that are attached to words that will not change their word classes will be discussed because of time constraint. Differently put, only the inflectional process will be discussed in this thesis.

#### **4.4.1 Suffixation as an Inflectional Process in Sɪsaaltɪ.**

This section analysis data on suffixes that are attached to words not to change their word classes or grammatical categories but to perform grammatical functions such as to indicate number, show diminutiveness or show identity. For example, when the English suffix “-s” is added to the noun “**book**”, the resulting word is “**books**”, which is also a noun, but it indicates number as the original word is singular while the resultant word is plural. In a similar vein, if you add the number suffix **-sɪŋ** to the noun **bàgá** ‘farm’, you derive the word **bàgɪsɪŋ** ‘farms’, if you add the suffix **-a:** to the noun **hà:l** ‘woman’ you derive **hà:lá:** ‘women’ and if you add diminutive suffix marker **-wié** to the noun **vàhá** ‘dog’ you derive **vàwié** ‘small dog’ in Sɪsaaltɪ.

#### 4.4.2 Noun inflectional suffixes in Sisaalt

In Sisaalt suffixes are attached to nouns to show number, indicate diminutiveness or show location. For instance, the suffixes ‘-bá’, ‘-á:’, ‘-sìḡ’ ‘-é:’ and ‘-nìḡ’ are attached to nouns to indicate plurality, ‘-wìé’ and ‘-muá’ are attached to nouns to express diminutiveness and ‘-nú:/-niá:’ and “-tì:ná/-tìḡá:” are added to nouns (proper) to identify them per their places of origin.

#### 4.4.3 The Plural Marker Suffixes (-bá, -á:, -nìḡ, -sìḡ and -é:)

In Sisaalt, some animate (living beings, such as people and animals) and inanimate nouns (non-living beings) have both the singular and the plural forms. The suffix ‘-bá’ is strictly reserved for human animates, -á: is used for animate nouns (both human and non-human), and ‘-sìḡ’, ‘-é:’ and “-nìḡ” are strictly used for non-human animate nouns and inanimate nouns. For instance, it is grammatical to suffix ‘-bá’ to the noun ná:ḡ ‘mother’ to get ná:mámá ‘mothers’ but ungrammatical to suffix it to sù:ḡ ‘fowl’ to get \*su:mma or to suffix it to gèrìḡ ‘dress’ to get \*gèrìmmá because they form their plurals by taking the suffix ‘-nìḡ’. So, sù:ḡ ‘fowl’ becomes sù:nìḡ ‘fowls’ and gèrìḡ ‘dress’ becomes gèrìnìḡ. It will also be grammatical to suffix ‘-nìḡ’ to the noun kpàsá “chair” to generate kpàsìnìḡ ‘chairs’ but ungrammatical to suffix it to ñìmmá ‘father’ to generate \*ñìmánìḡ because ñìmmá ‘father’ is a human animate and takes the suffix ‘-ba’ to derive its plural ñìmmàbá ‘fathers’ . Tables 27, 28, 29 and 30 below show some animate and inanimate nouns and the various suffixes they take.

**Table 27: The plural suffix maker for some human animate nouns only (-ba)**

Word (singular)	Gloss	Word class	Inflectional suffix	Derived word form	Gloss of derived word
<b>nà:ń</b>	mother	Noun	<b>-bá</b>	<b>nà:m̀m̀à</b>	mothers
<b>ńìm̀á</b>	father	Noun	<b>-bá</b>	<b>ńìm̀àbá</b>	fathers
<b>Nahamá</b>	grandmother	Noun	<b>-bá</b>	<b>nàhàm̀àbá</b>	grandmothers
<b>nańzuá</b>	linguist	Noun	<b>-bá</b>	<b>nańzùàbá</b>	linguists
<b>ńìèrìm̀á</b>	uncle	Noun	<b>-bá</b>	<b>ńìèrìm̀àbá</b>	uncles
<b>nà:bàlìm̀á</b>	grandfather	Noun	<b>-bá</b>	<b>nà:bàlìm̀àbá</b>	grandfathers
<b>ńìlìm̀á</b>	aunt	Noun	<b>-bá</b>	<b>ńìlìm̀àbá</b>	aunts

From the table 27 it is observed that, when the plural suffix marker “-bá” was attached to the human animate nouns to derive their plural forms, we did not encounter segment final deletions as observed in some of the data on compounding. The suffixing of the plural marker to the nouns did not also cause a change in the word class of the original words. There were however some instances of assimilation. This is illustrated in the example 11;

**EXAMPLE 11**

<b>a. nà:ń</b>	+	<b>-bá</b>	=	<b>nà:m̀m̀à</b>
mother	+	pl	=	mothers

Analyzing example (11a) above, it is observed that, when the plural suffix maker –bá was attached to the noun per the IA model, it resulted in the velar nasal /ŋ/ ending the noun **nà:ń** ‘mother’ to assimilate to the place of articulation of the bilabial plosive /b/ that serves as the onset of the plural suffix –bá and became a bilabial nasal /m/, and as a result spread its nasalization features to influence the bilabial plosive /b/ to become a bilabial nasal /m/. The suffixing of the plural marker to the noun did not also cause a change in the word class of the original word.

**Table 28: The plural suffix maker (-á:) for common nouns that end in -l or -lu**

Word (singular)	Gloss	Word class	Inflectional suffix	Derived word form	Gloss of derived word (plu)
<b>hà:í</b>	woman	noun	<b>-á:</b>	<b>hà:lá:</b>	women
<b>bà:í</b>	man	noun	<b>-á:</b>	<b>bà:lá:</b>	men
<b>hàlùj</b>	egg	noun	<b>-á:</b>	<b>hàlá:</b>	eggs
<b>pà:r</b>	farmer	noun	<b>-á:</b>	<b>pà:rá:</b>	farmers
<b>pàlùj</b>	tent	noun	<b>-á:</b>	<b>pàl:á</b>	tents
<b>hàbàlùj</b>	lizard	noun	<b>-á:</b>	<b>hàbàlá:</b>	lizards

From table 28 above, it is observed that, all the nouns that received the plural suffix – **á:** end in either **-l**, **-ror** or **-luj**. If a noun ends in **-l**, or **-r** the plural marker suffix **-á:** is directly attached to the word without any deletion of the final segment, but if it ends in **-luj**, the last two segments are deleted before the suffix **-á:** is attached to it. This phenomenon is illustrated in the example 12.

**EXAMPLE 12**

- a.** **hà:í** + **-á:** = **hà:lá:**  
 woman + pl = women
- b.** **pà:r** + **-á:** = **pà:rá:**  
 farmer + pl = farmers
- c.** **hàlùj** + **-á:** = **hàlá:**  
 egg + pl = eggs

Scrutinizing example (12a) above, it is observed that when the plural suffix marker **-á:** was attached to the noun **hà:í** ‘woman’ per the IA model to derive its plural form **hà:lá:** ‘women’ there was no deletion of the final segment of the base noun.

Also, when the suffix /-á:/ was attached to the noun **pà:ń** ‘farmer’ in example (12b) to derive its plural form **pà:ńà**: ‘farmers’ there was no deletion of the final segment of the base noun. But a scrutiny of the data in example (12c) reveals a deletion of the last two segments of the noun **hàńń** ‘egg’ when the plural suffix marker /-á:/ was attached to it per the IA model to derive **hàńá**: ‘eggs’.

I argue then that during noun plural formation in nouns that end in either **-l**, **-r** or **-ń**, the plural suffix **-á:** will be attracted to form their plurals. If a noun ends in **-l**, or **-r** the plural marker suffix **-á:** is directly attached to the word without any deletion of the final segment, but if it ends in **-ń**, the last two segments are deleted before the suffix **-á:** is attached to it.

**Table 29: The plural suffix maker for some non-human animate nouns (-sìń)**

Word	Gloss	Word class	Inflectional suffix	Derived word form	Gloss of derived word
<b>vàhá</b>	dog	noun	<b>-sìń</b>	<b>vàsìń</b>	dogs
<b>nèń</b>	cow	noun	<b>-sìń</b>	<b>nèsìń</b>	cattle
<b>jà:bá</b>	horse	noun	<b>-sìń</b>	<b>jà:bìsìń</b>	horses
<b>nàńtfùdòń</b>	fly	noun	<b>-sìń</b>	<b>nàńtfùdòsìń</b>	flies
<b>kòkùmó</b>	donkey	noun	<b>-sìń</b>	<b>kòkúsìń</b>	donkeys
<b>tfùdómó</b>	rabbit	noun	<b>-sìń</b>	<b>tfùdònsìń</b>	rabbits

From the table above, it is observed that, when the plural suffix marker was attached to the nouns per the IA model, it resulted in the elision of the last syllables of some of the nouns. We also realized some word final vowel changes as well as some consonant assimilation in some other words. The phenomenon is demonstrated in the example 13;

**EXAMPLE 13**

<b>a. v`ah`a</b>	+	<b>s`i`j`</b>	=	<b>v`as`i`j`</b>
dog	+	pl	=	dogs
<b>b. j`a`:b`a</b>	+	<b>s`i`j`</b>	=	<b>j`a`:b`i`s`i`j`</b>
horse	+	pl	=	horses
<b>c. f`u`o`m`o</b>	+	<b>s`i`j`</b>	=	<b>f`u`o`n`s`i`j`</b>
rabbit	+	pl	=	rabbits

A critical analysis of the examples above indicates the last two segments of the noun of example (13a) **v`ah`a** ‘dog’ got deleted when the plural marker suffix **s`i`j`** was affixed to it per the IA model to generate the plural form **v`as`i`j`**.

In example (13b) however, we did not encounter any segment deletion, but the last vowel of the noun **j`a`:b`a** ‘horse’ which is a [-High] vowel /a/ is observed to have changed to a [+High] vowel /i/ in the plural form.

Also, in example (13c) we realized that the last vowel of the noun **f`u`o`m`o** ‘rabbit’ which is /o/ got deleted when the plural marker suffix **s`i`j`** was attached to it per the IA model to form **f`u`o`n`s`i`j`** ‘rabbits’. The consonant of the noun that is left after deletion which is a bilabial nasal /m/ is observed to have assimilated to the place of articulation of the alveolar fricative /s/ that begins the plural marker suffix and became an alveolar nasal /n/.

It is also observed that vowel harmony is playing a great role in plural formation as the vowel of the plural marker suffix which is -ATR is observed to have changed to a +ATR vowel when it was added to noun **f`u`o`m`o** ‘rabbit’ because its vowels are all +ATR vowels.

**Table 30: The plural suffix maker (-sùj) used for some inanimate nouns**

Word	Gloss	Word class	Inflectional suffix	Derived word form	Gloss of derived word
<b>gbàṅá</b>	bowl	Noun	<b>-sùj</b>	<b>gbàṅsùj</b>	bowls
<b>dà:ṅ</b>	wood	Noun	<b>-sùj</b>	<b>dà:sùj</b>	woods
<b>simé</b>	basket	Noun	<b>-sùj</b>	<b>sìṅsùj</b>	baskets
<b>dìá</b>	house	Noun	<b>-sùj</b>	<b>dì:sùj</b>	houses
<b>pìré</b>	hoe	Noun	<b>-sùj</b>	<b>pìrsùj</b>	hoes
<b>bàgá</b>	farm	Noun	<b>-sùj</b>	<b>bàgìsùj</b>	farms

An analysis of the data in table 30 also reveals phonological processes such as vowel and segment elision as well as assimilation taking place when inanimate nouns are being pluralized. Examining the data critically, it is observed that some of the words dropped their last syllables in order to receive the plural marker suffix this is evident in the example 14 below.

**EXAMPLE 14**

<b>a.</b>	<b>pìré</b>	+	<b>-sùj</b>	=	<b>pìrsùj</b>
	hoe	+	pl	=	hoes
<b>b.</b>	<b>dìá</b>	+	<b>-sùj</b>	=	<b>dì:sùj</b>
	house	+	pl	=	houses
<b>c.</b>	<b>bàgá</b>	+	<b>-sùj</b>	=	<b>bàgìsùj</b>
	farm	+	pl	=	farms

An analysis of the data in example (14a) reveals a deletion of the final vowel of the noun **pìré** ‘hoe’ which has a CVCV structure turning it into a CVC before allowing the plural marker suffix **-sùj** to be attached to it to derive **pìrsùj** ‘hoes’.



A critical examination of example (14b) data also reveals a deletion of the final vowel of the noun **diá** ‘house’ before attracting the plural marker suffix **-siń** to derive its plural form **di:siń** ‘houses’. It is observed that, the deletion of the final vowel resulted in a compensatory lengthening of the preceding vowel in the derived plural form. That is /i/ in the singular form became /i:/ in the plural form.

Also, an analysis of the data in example (14c) reveals a change in the last vowel of the noun **bàgá** ‘farm’ when the plural marker suffix **-siń** was attached to it per the IA model as /a/ became /i/ in the plural form.

From the examples presented above, it can be said that the vowel of the suffix harmonizes with the vowel of the base noun to which it is attached, as the vowel of the plural suffix **-siń** which is /u/ a –ATR vowel is seen to have changed to /i/ + ATR vowel in the plural form of the noun **pìré** ‘hoe’ which is **pìrsiń** ‘hoes’ in example (12a) because the base vowel of the noun is a +ATR vowel.

**Table 31: The plural suffix maker (-niń) used for some non-human animate and inanimate nouns**

Word	Gloss	Word class	Inflectional suffix	Derived word form	Gloss of derived word
<b>sù:ń</b>	fowl	Noun	<b>- niń</b>	<b>sù:niń</b>	fowls
<b>gèrùń</b>	dress	Noun	<b>- niń</b>	<b>gèrniń</b>	dresses
<b>kpàsá</b>	chair	Noun	<b>- niń</b>	<b>kpàsiniń</b>	chairs
<b>bòsò</b>	mat	Noun	<b>- niń</b>	<b>bòsòniń</b>	mats

A scrutiny of the data in table 31 also indicates a deletion in the last segment and last two segments of some of the nouns before allowing the plural marker suffix to be attached to them. It is observed from the data that, when the noun ends in /ŋ/ or /-ruń/, the last segment or last two segments are deleted before the attachment of the

plural marker suffix. If the noun ends in a vowel however, the last segment will not be deleted, but if the vowel in which it ends is a [-High] vowel, then it must be changed to a [+High] vowel before the attachment of the plural marker suffix. This phenomenon is illustrated in example 15;

**EXAMPLE 15**

<b>a. gèrìḡ</b>	+	<b>-nɪḡ</b>	=	<b>gèḡnìḡ</b>
dress	+	pl	=	dresses
<b>b. sù:ḡ</b>	+	<b>-nɪḡ</b>	=	<b>sù:nìḡ</b>
fowl	+	pl	=	fowls
<b>c. bḡsḡ</b>	+	<b>-nɪḡ</b>	=	<b>bḡsḡnìḡ</b>
mat	+	pl	=	mats

Analyzing the data in example (15a), it is observed that, the last two segments of the noun **gèrìḡ** ‘dress’ was elided before the attachment of the plural suffix - **nìḡ** to derive the plural **gèḡnìḡ** ‘dresses’. It is however observed that, after the deletion of the last two segments of the noun, the alveolar trill /r/ that ends the noun then acquired the nasal features of the nasal consonant /n/ that begins the plural marker suffix- **nìḡ** to become an alveolar nasal /n/. That is why **gèrìḡ** ‘dress’ became **gèḡnìḡ** ‘dresses’.

Also, an analysis of the data in example (15b) indicates an elision of the final velar nasal of the noun **sù:ḡ** ‘fowl’ which is a disyllabic word with a CV.C syllable structure, turning it into a CV in the derived plural form **sù:nìḡ** ‘fowls’.

A scrutiny of example (15c) indicates there was no deletion of any segment in the noun **bḡsḡ** ‘mat’. The last vowel of the noun /ḡ/ which is a [-High] vowel was

however observed to have changed to a [+High] vowel /ɔ̄/ in the plural form **bòsò̀nìḡ** ‘mats’.

**Table 32: The plural suffix maker (-é:) used for some non-human animate and inanimate nouns**

Word (singular)	Gloss	Word class	Inflectional suffix	Derived word form	Gloss of derived word (pl)
<b>gèliḡ</b>	cat	Noun	<b>-é:</b>	<b>gèlé:</b>	Cats
<b>chènfilìḡ</b>	fish	Noun	<b>-é:</b>	<b>ḡfènfilé:</b>	Fishes
<b>nàni:ḡ</b>	finger	Noun	<b>-é:</b>	<b>nànié:</b>	Fingers
<b>nà:ni:ḡ</b>	toe	Noun	<b>-é:</b>	<b>nà:nié:</b>	Toes
<b>piésú</b>	sheep(sing)	Noun	<b>-é:</b>	<b>piésé:</b>	sheep (pl)

Scrutinizing the data in table 31 above reveals all the words are non-human animate nouns and some parts of the human body that ends in the velar nasal /ŋ/ or the vowel /u/. It is observed that there is a deletion of the last two segments of the noun when it ends in a velar nasal /ŋ/ with /li/ preceding it. But if the noun ends in the velar nasal /ŋ/ that is not preceded by /li/, then just the velar nasal is deleted before the attachment of the plural maker suffix. Also, if the noun ends in the vowel /u/, the vowel is deleted before the suffix is attached to it. Example 16 clearly explains the phenomenon.

**EXAMPLE 16**

- a.** gèliḡ + -é: = gèlé:  
cat + pl = cats
- b.** nàni:ḡ + -é: = nànié:  
finger + pl = fingers
- c.** piésú + -é: = piésé:  
sheep + pl = sheep

An analysis of the data in example (16a) reveals a deletion of the last two segments of the noun **gèliń** ‘cat’ when the plural marker suffix **-é:** was attached to it per the IA model to derive its plural form **gèlé:** ‘cats’. In example (16b) only the last segment of the noun **nàni:ń** ‘finger’ is deleted before the plural marker suffix is affixed to it. In example (16c), the vowel /u/ that ends the noun **piésú** ‘sheep’ is deleted before the plural marker suffix is attached to it to derive the plural form of the noun.

#### 4.4.1.2.2 The Diminutive Marker Suffixes in Sisaali

Diminutive suffixes are simply suffixes that are added to nouns to show the smallness of the thing or how unimportant the thing is. In Sisaali, two diminutives are used, and both are used to show smallness either in size, age or position. The diminutives are – **wié/-bié** and **mùá**. The attachment of these diminutives to words may trigger the elision of some segments of the nouns. The data in table 33 explains the phenomenon.

**Table 33: The diminutive suffix makers –bié/-wié and mùá**

Word	Gloss	Word class	Inflectional suffix	Derived word form	Gloss of derived word
<b>gbàńá</b>	bowl	noun	<b>-bié/-wié</b>	<b>gbàńmié</b>	small bowl
<b>bié</b>	child	noun	<b>-bié/-wié</b>	<b>bi:bié</b>	small child
<b>ńùń</b>	head	noun	<b>-bié/-wié</b>	<b>ńùbié</b>	small head
<b>bàdùòń</b>	personal name for a male	noun	<b>-bié/-wié</b>	<b>bàdùòńmié</b>	personal name to a boy born after baduon
<b>bàdùòń</b>	personal name	noun	<b>mùá</b>	<b>bàdùòńmùá</b>	personal name to a second boy born after baduon
<b>nèń</b>	cow	noun	<b>-bié/-wié</b>	<b>nèbié/nèwié</b>	small chair

An analysis of the data in table 33 indicates an elision of the final vowel of some of the nouns before allowing the diminutive marker suffix to be attached to it. In

addition to the elision, some of the nouns that end in the velar nasal /ŋ/ after the elision are seen to have assimilated to the place of articulation of the bilabial consonant plosive /b/ that begins the diminutive suffix. This phenomenon is illustrated in example 17.

**EXAMPLE 17**

<b>a.</b>	<b>gbàŋá</b>	+	<b>-bié/-wié</b>	=	gbàmmié/gbàñwié
	bowl	+	small	=	small bowl
<b>b.</b>	<b>nèŋ</b>	+	<b>-bié/-wié</b>	=	<b>nèbié/nèwié</b>
	cow	+	small	=	small cow

Analyzing the examples above, it is observed that, there is a deletion of the final vowel of the base noun of example (17a) when the diminutive suffix marker **-bié** was attached to it to generate the diminutive form. This resulted in the velar nasal ending the base noun after deletion to assimilate to the place of articulation of the bilabial plosive /b/ that begins the diminutive suffix to make it a bilabial nasal /m/. The bilabial nasal /m/ then influenced the bilabial plosive /b/ with its nasal features to become a nasal too. If the diminutive suffix **-wié** is however attached to the base noun, the final vowel gets deleted and the velar nasal left after the deletion changes to become an alveolar nasal /n/. In the case of example (17b) however, we experience just a deletion of the final segment of the noun without any assimilation.

**4.4.1.2.3 The Identity Marker Suffixes in Sisaalt**

These are suffixes that are attached to proper nouns such as villages, towns, or countries to refer to the people that come from those places. For instance, in English Ghana is the name of a country, but when you attach the suffix **-ian** to it, it becomes Ghanaian referring to a person from Ghana. Similarly, in Sisaalt there are suffixes such as **-nu:tu:na**, **-u/-ul/-ulu** that are attached to names of places to refer to the

people who come from those places. For example, the suffix **-nú:/tì:ná** ‘person’ is attached to names of countries or towns such as Burkina Faso to derive **Bùròkinànú:/Bùròkinàtì:nà** ‘person from Burkina’ and the suffix **-ùl** is also attached to names of towns and villages such as Tumu to derive **Tùmù:l** ‘person from Tumu’. The data in table 34 gives a clearer picture of the phenomenon.

**Table 34: The Identity Maker Suffixes -nu:/tì:na, -u/-ul/-ulu in Sisaali**

Name of place	Identity suffix	Derived word	Plural form	Gloss
kòwié	-lú	kòwi:lú	kòwi:lé:	person from kowie
bùdzàḡ	-ú	bùdzàḡó	bùdzàḡilá:	person from bujan
nà:bùgàjàḡ	-ùlú	nà:bùgùlò	nà:bùgùlá:	person from nabugubelle
ḡìḡḡàḡ	-ú	ḡìḡḡàḡó	ḡìḡḡàḡilá:	person from chinchán
Kpàḡ	-ú	kpàḡó	kpàḡḡá:	person from kpan
tàfiási	-tì:ná/-nú:	tàfiàsìtì:ná	tàfiàsìtìḡá:	person from tafiasi

An analysis of the data in the table 34 above reveals that, some word final segments of some of the proper nouns gets deleted before receiving the identity suffix. Some of the nouns however remain unaltered when the identity suffix is attached to them. This is illustrated in the example 18 below:

**EXAMPLE 18**

- a.** **nà:bùgàjàḡ** + **-ùlú** = **nà:bùgùlò**  
 name of village + ID SUF = person from that village
- b.** **kpàḡ** + **-ú** = **kpàḡó**  
 name of village + ID SUF = person from that village

From the examples above, it is noted that the last two syllables of the noun of example (18a) **nà:bògàjàŋ** ‘name of village’ got deleted before the identity suffix -**ùlù** is attached to it to derive the identity noun. The identity suffix is seen to have harmonized with the vowels of the base noun as its vowel /**ú**/ a [+ATR] changed to a [-ATR] vowel /**ó**/ in the derived identity noun. We did not however experience any deletion in the final segment of the base noun of example (18b) when the identity suffix was attached to it per the IA model.

#### **4.5 Conclusion**

In this section, borrowing as a word formation processes in Sisaalt was discussed. I also discussed reduplication with regard to adjectives, adverbs, numerals and verbs. Various types of compounds such as noun-noun, noun-adjective, noun-verb, adjective-adjective, verb-verb and complex compounds were also discussed. Affixation as a word formation process was also briefly discussed as we limited ourselves to only the inflectional affixes because of time constraint.

## CHAPTER FIVE

### CONCLUSION: SUMMARY, FINDINGS AND RECOMMENDATIONS

#### 5.0 Introduction

This chapter is the concluding chapter of the thesis. It gives a summary of all the other chapters discussed and seeks to highlight specific findings of the study as well as suggest recommendations for future research.

#### 5.1 Summary of methodology

The study discussed some word formation processes in Sisaalt. Chapter one served as a general introduction to the study by briefly discussing the background of the language under study, with a focus on the dialects that make up the language, the geographical location of the people that speak the language and the major occupations of the people of the area. Farming was noted as the major occupation of the speakers of the language and the language was noted as a tone language. The statement of the problem, the research questions, objectives of the research, the significance of the research, the methodology used to collect the data as well as the theoretical frameworks used to analyze the data and the organization of the thesis were also discussed in chapter one.

Chapter two reviewed some related works to the study by other linguistic scholars under the sub-headings borrowing, reduplication, compounding, some aspects of the phonology of Sisaalt, some aspects of the phonology of Akan, and some aspects of the phonology of English. It was noted in the literature review that, there were great similarities in the sound inventory of Akan and that of Sisaalt, while there were major



differences in the sound inventory of English and that of Sisaalt especially in their consonants and syllable structures.

Chapter three of the study discussed the type of data collected, the sources of data, the design used in collecting the data, the study population, the sample and sampling procedures and the instruments used in the collection and analysis of the data. It was shown that most of the data collected was through recordings from natural settings, focus group discussions and radio programs.

Chapter four was devoted to analyzing the data on the various word formation processes in Sisaalt focusing on borrowing, reduplication, compounding, and affixation and reports the findings.

Chapter five gives a summary of chapter one to four and discusses the major findings of the study.

## **5.2 Summary of Findings**

The data collected were analyzed under two frameworks, Optimality Theory (OT) by Prince and Smolensky (1993) and Item and Arrangement Process (IA) of morphological analysis by Hockett (1954) as cited in Mathews, (1974). OT was used to analyze the data on borrowing and reduplication and IA was used to analyze the data on compounding and affixation.

It was revealed in the analysis of the data that Sisaalt borrowed words from English and Akan, and the borrowed words were analyzed using OT. In analyzing the data on borrowing using OT, it was found that if a word is borrowed from English into Sisaalt with a cluster of consonants or a consonant serving as coda, the word will be structurally constrained and will have to be resyllabified through the insertion of a

default vowel or deletion of the final coda. For instance, the English borrowed word *Class*[klæs] is realized as [kilæsi] in Sisaali as demonstrated in table 7 of section (4.1.1).

It was also found that, when words are borrowed from Akan into Sisaali, the words will not be structurally constrained because of the similarity between the syllable structures of Sisaali and Akan, but may be phonemically constrained if the borrowed words contain labialized consonants that precede unrounded (open) vowels because in Sisaali labialized consonants can only precede rounded vowels. For example, the Akan borrowed name 'yaa' is realized as [yaa] in Sisaali, but the name 'k<sup>w</sup>aku' is modified and realized as [kaku] in Sisaali because it has an unrounded vowel following the labialized consonant /k<sup>w</sup>/ which is not allowed in Sisaali. See table 9 and 10 of section (4.1.2) for a clearer picture.

An analysis of the data on reduplication using OT also revealed that adjectives, adverbs, numerals and nouns undergo a complete reduplication in Sisaali as all the segments of the base are copied in the reduplicant. For instance, **bál** 'big' when reduplicated is realized as [bál-bál] 'very big' **sòm** 'gentle' is realized as [sòm-sòm] 'very gentle'.

With verb reduplication however, some verbs were noted to have undergone a full reduplication with some instances of base vowel modification while others also underwent a partial reduplication with some base vowel modifications. For example, verbs with CV structures undergo a full reduplication with instances of base vowel modifications, such as a [-High] base vowel changing to a [+High] in the reduplicant and a long base vowel being shortened in the reduplicant. Verbs with CV.C and

CV.CV structures undergo a partial reduplication with some base vowel modifications.

It was noted from the analysis of data that words from the same word class or from different word classes could be put together to form compound words in Sisaalt. Noun+Noun, Noun+Adjective, Noun+Verb, Verb+Verb, Noun+Adjective+Adjective and Verb+Verb+Verb were identified as the various types of compounds in Sisaalt. Word final segment elision and homorganic velar nasal assimilation were found as prominent occurrences in Noun+Noun, Noun+Adjective, Noun+Verb and Noun+Adjective+Adjective compounds. With Verb+Verb and Verb+Verb+Verb compounds however, there were hardly any elisions, only few instances of base vowel modifications were noted.

The elision that takes place during compounding of words in Sisaalt is always a leftward one. That is to say it is always the left element of the compound that undergoes the elision. The segments that are mostly elided are nasals, laterals, vowels or last syllables. The assimilation that happens during compounding of words in Sisaalt is homorganic as a nasal consonant will always assume the same place of articulation of an adjacent consonant acting as an onset of the next syllable, and in turn affect that adjacent consonant with its nasal features to become a nasal. This phenomenon is illustrated in example, (5a) of section (4.3.2) **ɲùmmá** ‘father’ + **bié** ‘small’ = **ɲùmmié** ‘uncle’.

It was demonstrated in section (4.4.1.2.1) that Sisaalt employs the suffixes **-bá**, **-á:**, **-niŋ**, **-siŋ** and **-é:** to derive the plural forms of nouns. The suffix **-bá** is attached directly to human animate nouns to derive their plural forms without any elision of segments on the base noun, the suffix **-á:** is directly attached to nouns that mostly end

in a lateral or a trill without any segment elision to the base noun. For instance, the noun **pà:r** ‘farmer’ from table 28 is suffixed with **á:** to become **pà:rà:** ‘farmers. When the plural suffix **-á:** is attached to nouns that do not end in a lateral or a trill however, segment elision takes place in the base noun before the suffix is attached to it. For example, **hálúj** ‘egg’ in example (12c) of section (4.4.1.2.1) when attached with the plural suffix **a:** become **hàlà:**. The suffixes **-nùj**, **-sùj** and **-é:** are attached to base nouns that end in nasal consonant and vowels, and segment elision mostly takes place before they are attached to the base nouns. See tables 29, 30, 31 and 32 for a better understanding of the phenomenon.

The study also revealed that, **-wié/-bié** and **mùá** are used as diminutive suffixes and attached to nouns to derive their diminutive forms. Data in table 33 illustrates the phenomenon.

Throughout the analysis of the data in chapter four, it is evident that, there is a strong relationship between morphology and phonology as morphology which deals with the study of how words are formed in a language cannot be learnt in isolation without knowledge of the sound systems of the language which is phonology.

### **5.3 Recommendations to improve the current study and for further studies**

Sisaalt is an under researched language, and research on word formation in particular is very minimal as there is not known scholar who has studied word formation in the language. This study can therefore be said to be one of the major works on word formation in the language but the data was collected from only one dialect of Sisaalt out of seven dialects, this I think is not very good. To improve on the current study therefore, it will be good to include data from the other dialects of Sisaalt.

Not all the word formation processes in Sisaalt have been discussed in this study. There are certainly other word formation processes that have not been treated especially tone, derivation and coinage. It is hence recommended that future works treat the other word formation processes in the language that have not been treated in the current study.

In the course of the study, tone was identified to be performing multiple functions in the language. It brings about contrast in meaning and it performs other grammatical functions such as indicating tense but these areas have not been discussed in this thesis. I therefore urge future researchers to research into tone to unravel all its functions in the language.

All the affixes identified in the current study are suffixes, this I think is quite unique and interesting. Future works may therefore treat affixation to see if there are no prefixes and circumfixes in the language. The researcher in the course of the study also came across some affixes that when attached to words of one class produces words belonging to different word classes but these types of affixes have not been discussed in the study because of inadequate time. Future studies may thus delve into this area.

Other theories may also be used to discuss some of the word formation processes to see if there will be any significant difference between their findings and findings of the current research. Future studies may also have to look at vowel harmony again, to confirm or report other wise on the conclusions made about vowel harmony in Sisaalt by the current study.

## REFERENCES

- Abakah, E. N. (2005). Phonological analysis of word-final consonants in Akan. *Africa and Asia*. 5, 47-65
- Abdul-Rahman, F. (2013). Elision in Dagbani. *International Journal of Linguistics*. 1(5)219-230
- Adam, P.P. (2007). *Some Word formation processes in Dagbani*. MPhil Thesis. University of Education, Winneba.
- Adejumo, A.& Osunbande, N. (2014). A Practical approach to word formation Processes in English. *International Journal of Research in Humanities, Arts and Literature*. (2) 49-58
- Adomako, K. (2008). *Vowel epenthesis and consonant deletion in loanwords: A Study of Akan*. MA Thesis in Theoretical Linguistics. University of Tromsø.
- Al-hassan, I. (2006). *English loanwords in Dagbani: A Phonological and Morphological analysis*. MPhil Thesis. University of Education, Winneba.
- Alonso, R. T. (2011). *Morphological processes feeding in the formation of old English nouns: Zero-derivation, Affixation and Compounding*. PHD Thesis. University of La Rioja, La Rioja.
- Anggraeni, D. (2011). *Word formation processes in outdoor advertisement: A Case study of Billboard installed in Semarang*. MA Thesis. University of Diponegoro. Semarang.
- Apenteng, M. A. & Amfo, N. A. (2014). The form and function of English loanwords in Akan. *Nordic Journal of African Studies*. 23(4): 219-2040.
- Bauer, L. (1983). *English word-formation*. Cambridge: Cambridge University Press.
- Bauer, L. (1988). *Introducing Linguistic Morphology*. Edinburg: Edinburg University Press.
- Blass, R. (1990). *Relevance relations in discourse: A study with special reference to Sissala*. Cambridge: Cambridge University Press.
- Blass, R., & Frempong, M. (1975, 2002). *Sisaala-English /English-Sisaala Dictionary*. Tamale: GILLBT Press.
- Boakye, B. E. (2015). *Reduplication in Akan*. M.A. Thesis. Norwegian University of Science and Technology. Norwegia.
- Dolphyne, A. F. (2006). *The Akan (Twi-Fante) Language: Its sound systems and Tonal structure*. Accra: Woeli Publishing Services.

- Dörnyei, Z. (2007). *Research methods in Applied Linguistics: Quantitative, qualitative, and mixed methodologies*. Oxford: Oxford University Press.
- Frempong, M. (1980). *A Grammar analysis of SisaaliTumuluj*.  
<http://sisaala.webonary.org/language/grammar/>
- Foley, W. A. & Olson, M. (1985). Clausehood and verb serialization. In *Grammar inside and outside the clause: Some approaches to theory from the field*, eds. Johanna Nichols and Anthony C. Woodbury, 17-60. Cambridge: Cambridge University Press.
- GILLBT& SILDEP (2001). *Sisaali Nasaare teŋ-jinna*. Tamale: GILLBT Press.
- Gontsarova, J. (2013). *Neologisms in Modern English: Study of word formation processes*. Bachelor's Thesis. Tartu University Narva College, Narva.
- Haryati, C. (2014). A Study of word formation processes of food and beverage product names in Indonesia. *Language Horizon*. (2), 0-6.
- Issah, A. S. (2011). The Phonology of Dagbani Verbal Reduplication. *Journal of West African Languages*. XXXVIII, 1.
- Katamba, F. & Stonham, J. (2006). *Morphology*. New York: Palgrave Macmillan.
- Levova, V. (2012). *Word Formation Process in Czech and English*. Undergraduate Thesis. University of West Bohemia. Bohemia.
- Lui<sup>1</sup>, W. & Lui<sup>2</sup>, W. (2014). Analysis on the Word-formation of English Netspeak Neologism. *Journal of Arts and Humanities*. 3 (12)
- Luri, M. D. (2011). *Aspects of Sisaali Phonology*. M.A. Thesis. University of Ghana, Legon.
- MacCarthy, J. & Prince, A. (1995). Faithfulness and Reduplicative Identity, in Beckman et. al. (eds). *Papers in Optimality Theory. University of Massachusetts Occasional Papers 18*. Amherst, Mass.: Graduate Student Linguistic Association. pp. 249-384
- Mathews, H. P. (1974). *Morphology*. New York: Cambridge University Press.
- McGill, S., Fembeti, S. and Tuopin, M. (1999). *A Grammar of Sisaala-Paasaale*. Accra; Institute of African Studies.
- M-minibo, J.G.I. (2013). Polytechnic skills and competences for national development, the role of loan word integration in the Northern Region of Ghana. *International Journal of Linguistics*. (5) 112-124.
- Naden, T. (1988). The Gur Languages. In Dakubu, M. E. K. (ed.) *The languages of Ghana*. London: Kegan Paul International.

- Ochieng, L. A. (2013). *A Description of the Morphosyntactic Structure of the Suba Language*. MA Thesis. Egerton University. Egerton.
- Omachonu, S. G. and Abraham, A. D. (2012). Compounding in Egala: Defining criteria, forms and functions. *Unizik Journal of Arts and Humanities*. (13) 2.
- Oyebade, F. (1998). *A course in Phonology*. Ijebu Ode: Shebiotimo Publications.
- Prince, A. & Smolensky (1993). *Optimality Theory: Constraint Interaction in Generative Grammar*, Ms., Rutgers University, New Brunswick and University of Colorado, Boulder.
- Sambian, G. E. (2009). *Some aspects of the morphology of the Bimoba language "mɔɔr"*. MPhil Thesis. University of Education, Winneba.
- SILDEP & Sisaala Union, (2015). *Sisaali orthography guide*. Tamale: GILLBT Press.
- Taiwo, O. (2009). Headedness and the structure of Yoruba compound words. *Taiwan Journal of Linguistics*.7 (1).
- Tuopin, M. (1995). *The Phonology of Sisaale Pasaale*. Accra: GILLBT and Institute of African Studies.
- Wells, J. C. (2000). *Longman Pronunciation Dictionary* (New ed.). New York: Pearson Education Limited.
- Yule, G. (1996). *The Study of Language*. (2nd ed.). New York: Cambridge University Press.
- Yule, G. (2010). *The Study of Language* (4th ed.). New York: Cambridge University Press.





**nò: nàkàlà hà sí bí jìsìú fí: àrí ƣòrí** somebody who is not up  
person any yet is not years ten and eight to eighteen years old. If  
**yìé. Kà rínò: nà kò: yí: jìsìú** a person turns eighteen  
reached before person see comes reach years years and above, the  
**fí: àríƣòrí à mòmò, ùbìrìmì nìhìàǹ** person has become an  
ten and eight and going he/she turn adult adult’.

**né.**  
FOC.

**Hàyèǹ** **ù nì Hon. Felicia bǝ́l ǹí:** As already said by Hon.  
that is Hon. Felicia said that ‘Felicia, a child is a  
**bìé ní ǹà: nò: hà sí bí jìsìú fí:** person that is not up to  
child is do person has yet not years ten eighteen (18) years. It is  
**àrí ƣòrí yìé. ù ǹà: nò: hà sí hè** a person who is still  
and eight reach. He/she is person yet is with under the care of his or  
**ù nà:ǹ nì ù ǹìmmá nà:sìǹ** her parents. The parents  
he/she mother and he/she father legs direct him/her as to what  
**kpàrà bǝ́bǝ́ǹ né. Dí wì:** to do or what not to do’.  
nébetween under FOC. If something  
FOC

**ù ƣìƣè ù ǹà:, sé: rí ù**  
he/she want he/she do unless ptl he/she

**nà:ǹ ní ùǹìmmá dàǹǹí ú, àrí**  
mother and he/she father teach he/she as to

**ù ǹà: ǹ lá, ù ǹà: ǹ lá.**  
He/she do like this, he/she do like this.

**Host** **bè: kùǹ né ǹà: hèm̀m̀iè dǝ́ǹsìú?** ‘What is child  
what thing is do child abuse? abuse?’

**Hàyèǹ** **hèm̀m̀iè dǝ́ǹsìú l̀iààǹ kàp̀dǝ́ǹǹé.** ‘There are different  
child abuse come and give each other FOC types of child abuse.

**bìé jàǹ wòó hè ù nà:ǹ ní ù** We have children  
child may be with he/she mother and he/she who stay with their



**Felicia**    **tɔ:, lɛ́j m̀ì b̀l̀à p̀è ẁì: là s̀ìs̀ìt̀à sí b̀l̀à**    ‘Ok. Let me contribute  
ok, let me say    add issue that sister has said    to what sister has

**l̀è. b̀ìe d̀ɔ̀g̀ìs̀ìj̀ m̀à ǹì b̀ìr̀à ñ̀à: b̀ìe s̀ì**    already said. Child  
earlier child abuse also is again is child is    abuse is what a child is

**b̀í ẁì: ẁùó ñ̀á: k̀à ñ̀ j̀ f̀òk̀íú**    unable to do and you    force him/her  
not something able do and you force him/her    force him/her to do that

**b̀l̀í ù ñ̀à ú. K̀à:p̀ó, ù b̀í**    thing. May be a child is  
say he/she do it. May be he/she cannot    unable to carry a basin

**t̀à:s̀á ẁùó f̀ùf̀ùj̀ k̀à ñ̀ b̀l̀íù f̀ùj̀,**    and you force him/her to  
basin cannot carry and you ask him/her carry,    carry a basin, he/she is

**ùb̀ì k̀iá: ẁùó ỳìỳàńl̀í, k̀à ñ̀ b̀l̀í**    unable to sell and you    force him/her to sell,  
He/she not things able to selling and you ask    and if he/she is unable to

**ùỳàńl̀í k̀iá: d̀ì k̀iá l̀á ǹì b̀ìỳɔ̀ɔ̀ k̀à**    finish selling you refuse  
him/her sell things. If things are not bought and    to give him/her food.

**ùk̀òj̀ò: d̀iá, ùb̀í k̀òd̀ì:l̀é k̀à**    That is what we call  
he/she come enter house he/she will food not    child abuse’.

**ǹà d̀ì ù d̀í:**  
get to he/she eat.

**so, t̀ìńt̀ìm̀í: ǹàk̀à l̀á b̀ìe sí b̀ì ẁùó t̀ìńj̀ k̀à**  
so, work any child is not able to work and

**ñ̀ f̀òk̀í ú h̀è d̀í ù t̀j̀, b̀ìe**  
you force him/her to that him/her work, child

**d̀ɔ̀g̀ìs̀ìj̀ ǹì ñ̀í:**  
abuse is that.