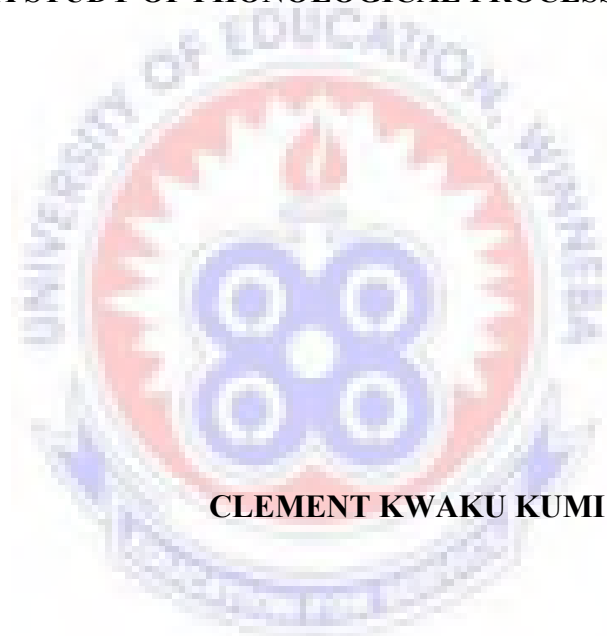**UNIVERSITY OF EDUCATION, WINNEBA**

A STUDY OF PHONOLOGICAL PROCESSES IN WASSA

CLEMENT KWAKU KUMI

2016

UNIVERSITY OF EDUCATION, WINNEBA

A STUDY OF PHONOLOGICAL PROCESSES IN WASSA

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A THESIS IN THE DEPARTMENT OF APPLIED LINGUISTICS,

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OCTOBER, 2016

DECLARATION

STUDENT'S DECLARATION

I, **Clement Kwaku Kumi,** declare that this thesis, with the exception of quotation 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 in 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.

NAME OF SUPERVISOR…………………………………..

SIGNATURE……………………………………………

DATE…………………………………………………………...

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Most of the time, when she needed me most, I was not there for her. To my father, my late mother, siblings and to the whole family.

Finally, I am thankful to all those who helped me in diverse ways in the course of my study, but whose individual names have not been mentioned here for the sake of space.

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DEDICATION

I dedicate this thesis to my family especially, my wife and children.

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GLOSSARY AND ABBREVIATIONS

Affricate: A phonetic segment which consist of a phoneme. Each segment has different realizations which are only partly distinguishable for speakers.

Alveolar: A classification of sounds which are formed at the alveolar ridge (the bone plate behind the upper teeth). Alveolar sounds are formed with the tip or the blade of the tongue.

Alveolo-palatal: A classification of sounds which are formed with the hard palate as passive articulator and the blade of the tongue as active articulator.

Bilabial: Any sound produce using both lips.

Consonant: On of the two main classes of sounds. Consonants are formed by a constriction in the supra-glottal trade.

Context: A term referring to the environment in which an element (sound, word, phrase) occurs.

Diachronic: Refers to language viewed over time and contrasts with synchronic which refers to a point in time.

Economy: A principle of linguistic analysis with demands that rules and units are to be kept to a minimum.

Fricative: A type of sound which characterized by air passing a constriction somewhere between the glottis and the lips.

Generative: A reference to a type of linguistic analysis which relies heavily on formulation of rules for the exhaustive description (generation) of the sentence of a language.

Glide: A sound which from the point of view of phonological classification lies between a vowel and a consonant. It is formed with little friction and has a high degree of sonority which accounts for why glides are formed near the undams of syllables, sometimes called a semi-vowel.

Homorganic: Any set of sound which are articulated at the same point in the vocal tract.

IPA: A system of transcribing the sounds of the languages which consists of some Latin and Greek letters and a variety of additional symbols and diacritics.

Labial: A reference to a sound which is formed at the lips. It encompasses both bilabials and labio-dentals.

Labio-dental: Describes a consonant which is formed by the lower lips making contact with the upper teeth.

Language: A system which consist of a set of symbols (sentences) – realized phonetically by sounds – which are used in a regular order to convey a certain meaning.

Manner of Articulation: One of the three conventional parameters (the others are place of articulation and voice) which are used to specific how a sound is produced.

Morpheme: the minimal grammatical unit of meaning. It is an abstract form.

Nasal: A sound, vowel or consonant, which is produced by opening the nasal cavity (through lowering of the velum).

Natural Class: A group of sounds which behave similarly.

Oral: Articulated in the mouth. The term usually implies that the nasal cavity is not involved.

Palatal: A place of articulation of the hard palate in the centre of the roof of the mouth.

Phoneme: In traditional phonology the smallest unit in language which a sound is produced.

Phonetic representation: the pronunciation of a word in speech.

Phonetics: The study of human sounds.

Phonological representation: the underlying form of a word.

Phonology: The study of the sound system of a language or languages.

Phrase: A linguistic unit made up of a word or words. The unit has a word whose word class determines the class of the phrase**.**

Place of Articulation: The point in the vocal tract at which a sound is produced.

Plosive: A sound which is produced with a complete blockage of the pulmonic airstream.

Productivity: A reference to the extent that a given process is not bound in its application to a certain input.

Prosily: A term which refers to all the suprasegmental properties of language such as pitch, loudness, tempo and rhythm.

Root: In grammar the unalterable core of a word to which all suffixes are added.

Segment: A unit of speech which is identifiable and separate from others. It contrasts with the term suprasegmental which refers to those aspects of phonetic structure above the level of individual sounds.

Speech: The production of sounds using the organs of speech; contrasts directly with writing which is a secondary medium for communication via language.

Supra-segmental: A reference to phenomenon which does not belong to the sound segments of language but which typically is spread over several segments, e.g. intonation, stress, tempo etc.

Syllable: The most important structural unit in phonology. A syllable consists of a series of sounds which are grouped around a nucleus of acoustic prominence (usually a vowel).

Synchronic: A reference to one point of a time in language.

Underlying Representation: A representation of what is assumed by the linguist to be the structure which lies behind or forms the initial stage in the generation of a surface structure item.

Underlying Structure: an initial structure of a phrase (spoken or unspoken), from which another sentence is derived.

Voiced: Spoken with simultaneous vibration of the vocal folds.

Voiceless: Spoken without the vocal folds vibrating, the folds can either be open (the normal state) or closed with the compression of air between them and the supra-glottal stop position producing sounds.
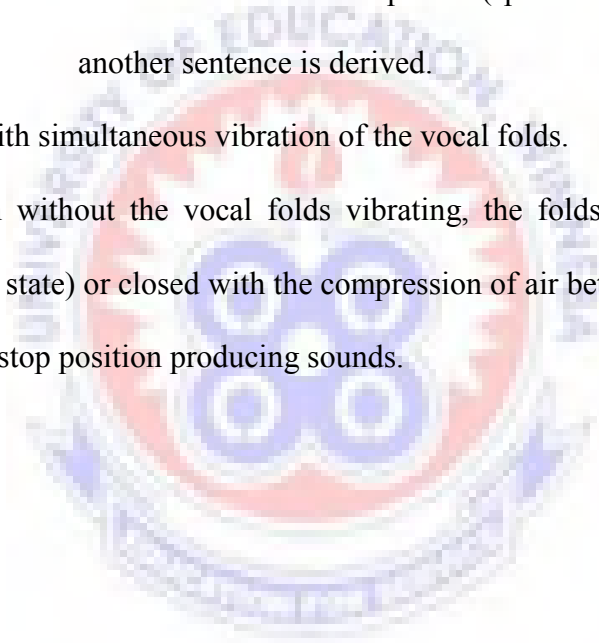
ABBREVIATIONS

1PL	First person plural
2PL	Second person plural
3SG	Third person singular
Affr	Affricate
Alv	Alveolar
Am	Amenfi
Ant	Anterior
ATR	Advanced tongue root
BA	Bachelor of Art
Bil	Bilabial
Bt	Both dialects
C	Consonant
Cons	Consonantal
Cont	Continuant
Cor	Coronal
CV	Consonant Vowel
CCV	Consonant Consonant Vowel
CVCV	Consonant Vowel Consonant Vowel
CVNV	Consonant Vowel Nasal Vowel
Fs.	Fiase
Fut	Future
H	High tone

IPA	International Phonetic Alphabets
L	Low tone
Lab	Labial
Lat	Lateral
M. A.	Manner of Articulation
MPhill	Master of Philosophy
N	Nasal
NEG	Negation
NV	Nasal Vowel
Obs	Obstruent
OCP	Obligatory Contour Principle
Pal	Palatal
P. A.	Place of Articulation
Perf	Perfect
PhD	Doctor of Philosophy
PL	Plural
Prog	Progressive
SG	Singular
SIL WL	Summer Institute of Linguistics African Area Word List
Son	Sonorant
SVO	Subject Verb Object
Syll	Syllabic
TBU	Tone Bearing Unit

UAC	Universal Association Convention
V	Vowel
WFC	Well Formedness Condition

SYMBOLS

	Low tone
	High tone
Ó	Syllable
/ /	Phonological Brackets
[ ]	Phonetic Brackets
( )	Brackets
#	Word boundary
+	Morpheme boundary
→	Becomes
!	Downstep
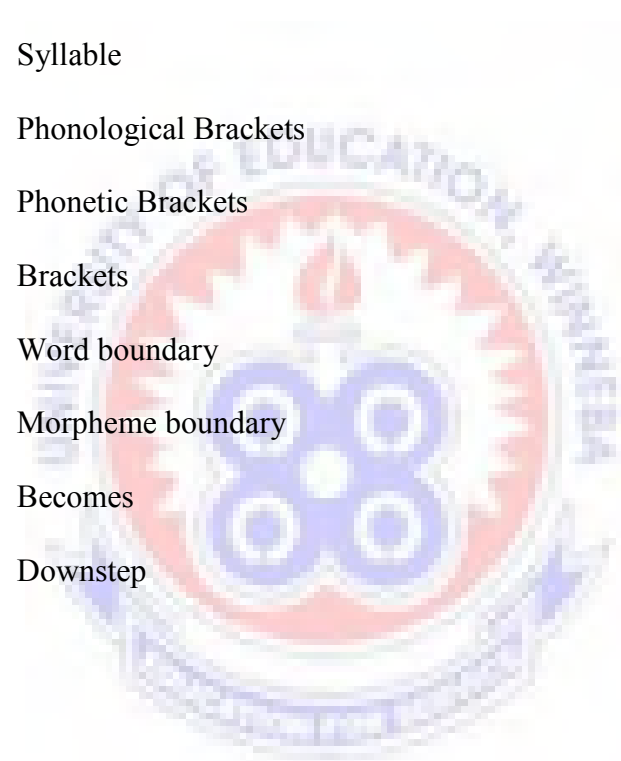
ABSTRACT

This thesis presents some phonological processes in Amenfi and Fiase dialects of Wassa. Wassa is one of the unwritten and least studied languages in Ghana. The language belongs to the Niger Congo language family. The study is cast within the theoretical framework of autosegmental phonology. The approach applied in this dissertation is qualitative. Data for the analyses are drawn from both primary and secondary sources. The phonological processes discussed in this work include vowel harmony, labialization, palatalization, elision, insertion, compensatory lengthening and consonant mutation. Both dialects of Wassa operate a limited stem-controlled Advanced Tongue Root (ATR) vowel harmony system. There is also evidence of raising of the low vowel /a/ to mid back vowel in the same compound name in Amenfi. The phenomenon where plosives and affricates change into a nasal is a similar process in Amenfi and Fiase. Also, the phenomenon of consonant mutation where obstruents becomes voiced in the environment of nasals is very productive in Wassa. Bilabial lenition where bilabial /b/ lenites to [m] is also a phonological process in Amenfi dialect. Future affix deletion in the environment of first personal pronoun and deletion of the future and progressive in the environment of the negative are all similar phonological processes shared by both dialects. Finally, the past and progressive affixes are lengthened in both dialects.

CHAPTER ONE

INTRODUCTION

1.1 Overview

The section gives; a background to the study; a brief history of the Wassa people and their language; the statement of the problem; the objectives; the research questions and the significance of the study. The limitation and delimitations to the study as well as the organization of the study are also presented in this chapter.

1.2 Background of the Study

According to Dophyne (1988), changes and adjustment in sounds are characteristics of the Akan language. However, not much work has been done on the description of changes that those sounds go through in the various dialect of Wassa.

Afful (2006), compared, aspects, of the sounds and tonal system of the Wassa Amenfi dialect to the Asante and Bono dialects of Akan. Her main aim was to find out whether the Wassa language is more related to the Asante or the Bono in terms of sounds and tonal structure. Her findings prove that Wassa shares some differences and similarities with both dialects.

Afful"s work gives a good general phonological overview of the Wassa Amenfi which is very helpful to major study as this. But her work could not point out some of the unique phonological processes in Wassa. According to Schane (1973), combination of morphemes to form words differs from one language to the other. One cannot use the phonological process of one language to represent the other. There is therefore the need to

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investigate and verify these tentative since some premilary observation proves some phonological processes in the dialects.

1.3 The Wassa People and their Language

Oral tradition indicates that Wassa takes it origin from the collapse of the Akwamu Kingdom. According Bassaw (1994), the families of Wassa migrated from Takyiman in the 17th century but other setters from Asante, Ahanta, Nzema and Fante later settled in the area.

Geographically, Wassa is spoken in the western region of the republic of Ghana. According to GSS (2014), their population is about six hundred and eighteen thousand from hundred and twenty one (618,421).There are five districts in the area. There are also two subdialects of the language namely, the Amenfi and Fiase subdialects. The Wassa Fiase traditional area cut across two districts namely, Wassa Fiase West and Wassa Mpohor East District. The traditional capital is Benso and that is where we the stool of the Omanhene. The Wassa Amenfi traditional area is also designated Wassa Amenfi Central, Wassa Amenfi East and Wassa Amenfi west district. The traditional capital of the Amenfi is Akropong.

There are three main types of religions in the area Traditional, Islamic and Christian religion. Traditional religion is the oldest but Christianity and Islamic is widely practice in the area. There are a number of economic activities that take place but Agriculture is the main productive activity engaged in by the majority of the people. Surface mining also known as „galamsey‟ is another economic activity which gives employment particularly the youth.

Linguistically, Wassa is an umbrella term from two dialects: Amenfi and Fiase. Speakers of the dialects understand each other. The wassa language forms a sub-group of the Volta-Comoe. Boadi (2009) indicate that the languages that form the groups are categorized into three: Western, Eastern and Central Comoe. Based on linguistics evidence Wassa could be classified with group B of the central Comoe. Figure (1) below from Boadi (2009) shows the classification of Volta-Comoe with few modifications.

Figure 1: Family Tree Diagram of the Volta-Comoe Language

Volta – Comoe

Western   Central   Eastern

Group A   Group B

1. Ahanta, Nzema 1. Akwapem, Akwamu 1. Akyem, Asante, Guan: Kyerepong

2. Aowin, Sehwi   2. Fante   Wassa   Larteh

3. Chakosi   3. Agona   2. Asen, Kwahu, Denkyira, etc
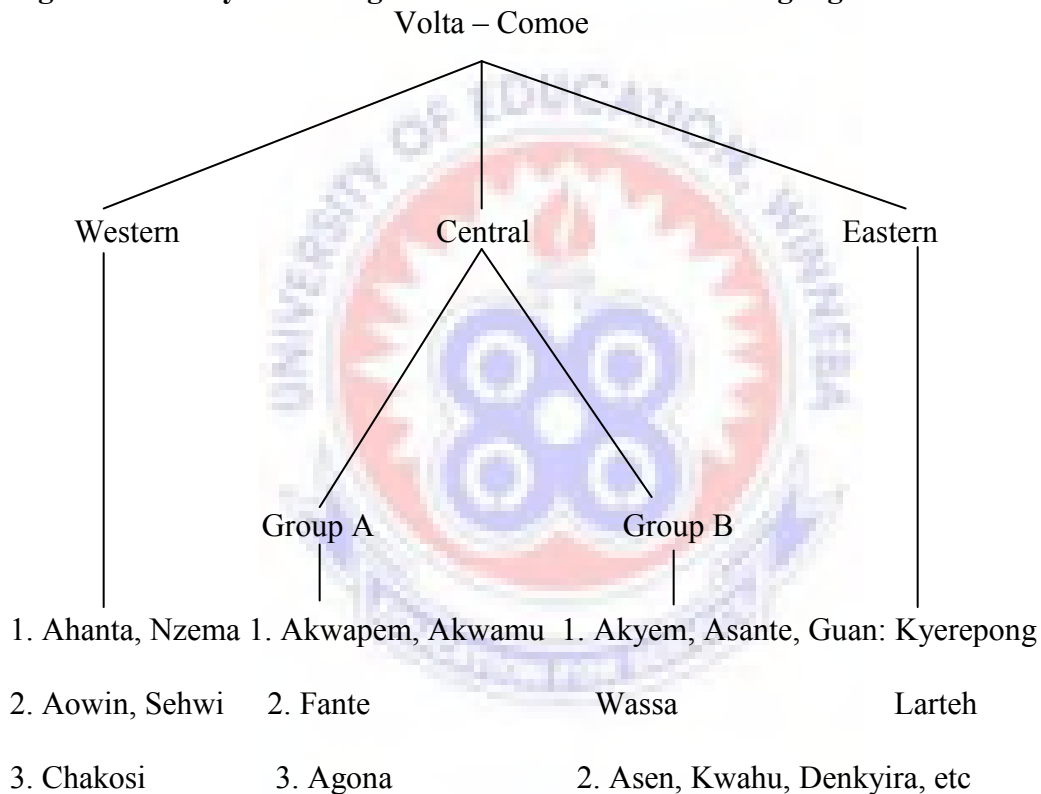
(Source: Boadi, 2009): Adapted and modified

Phonologically, ten (10) different vowel phonemes have been observed: /i, ɪ, u, ʊ, e, ɛ, o, ɔ, a, æ/. The chart in figure two shows the Wassa vowel chart.

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Figure 2: Wassa Vowel chart

Central
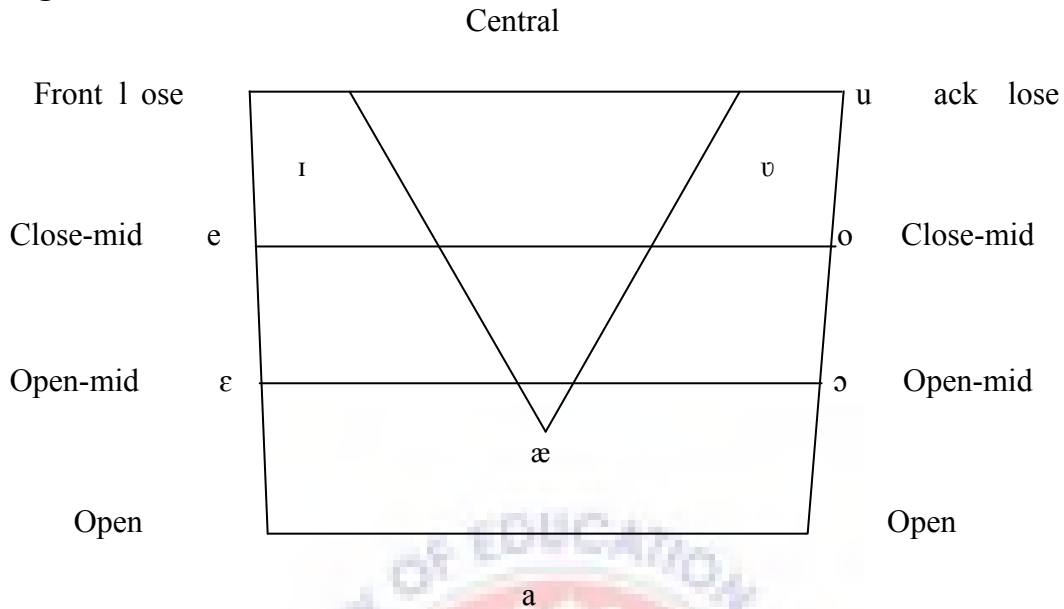
The following words in table 1 below show examples of words in which oral vowels occur.

Table 1 shows word examples of the oral vowels in Wassa.

Table 1: Oral vowel in word examples

Vowel	Example	Gloss
/i/	t l	head
/I/	ɕ	to smoke, to burn
/u/	t	uproot
/ʊ/	t	throw
/e/	d d	noise
/ɛ/		palm
/o/	dl	medicine
/ɔ/	w	cold
/æ/	d	name
/a/	bʊ	animal

Apart from the ten oral vowels, there are five nasal vowels in Wassa. These vowels are / ɪ,

u, ʊ and a/. Table 2 shows word examples of nasal vowels.

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Table 2: Nasal vowel in word examples

Vowel	Example	Gloss
	f	dirt
/ɪ/	ɛs	tooth
u/	fu	belly
/ʊ/	k	war
a/	m **a**	bed

There are twenty six (26) consonant phonemes /p, b, t, d, k, g, kw, ɕ, ɕɥ, tɕ, tɕɥ, dʑ, dʑɥ, j, f, s, h, m, n, ɲ, ɲw, ŋw ŋ l r w/.

Table 3: Consonant chart

	Bilabial	Labio-dental	Alveolar	Pre-Palatal	Velar	Glottal
Plosive	P b		t d		k g kʷ	
Affricate		f	s	tɕ dʑ tɕɥ dʑɥ		
Fricative				ɕ ɕɥ		h
Nasal	m		n	ɲ ɲw	ŋ ŋw	
Lateral			l			
Approximate	w		r	j		

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Table 4: Consonant sound in word examples

Vowel	Example	Gloss
/p/	**p**	break
/b/	**b**ɪpɔ	mountain
/t/	**t**	tear
/d/	**d**	no
/k/	**k**aɪ	read
/g/	ŋ**g** t dw	knee
/kw/	ɛ**kw**aɪ	road
/f/	**f**	home
/s/	**s** l d ɛ	fat
/r/	fʊf**ʊ**rɔ	new
/l/	ɲ ɲ ʥ l**ɛ**	scorpion
/w/	**w** l	mary
/j/	**j** lɛ	yam
/tɕ/	**tɕ tɕ**l	tie
/ʥ/	**ʥ** t	lion
/tɕɥ/	ɛnwɔ**tɕɥ**	eight
/ʥɥ/	e**ʥɥ**	louse
/ɕ/	**ɕ**	to smoke
/ɕɥ/	**ɕɥ**	to drain
/h/	ɛ̀**h**á	here
/m/	h ʊ**ma**	thread
/n/	m ɪ**n**a	hole
/ɲ/	**ɲ**inaa	all
/ɲw/	**ɲw**ɔŋgʊɔ	friend
ŋw	à**ŋw**á	cooking oil
/ŋ/	ɛ**ŋ**gʊnʊ	nine

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The language is tonal and use two basic tones of High and Low (dá „sleep‟ and d „never‟ .

Each syllable bears its own tone which is realized on vowels and syllabic consonants.

Wassa belongs basically to the language group of V, CV and C syllable typology. The syllable nucleus may stand alone as syllable as vowel (V) in Wassa. Every vowel constitutes a syllable. It occurrence is at all word position (initial, medial and final). Examples of this shape of syllables are given in table 4 below.

Table 5: The V syllable type

Word	Gloss
t	listen
s ʋ	car
p	lizard
ɛwʋɔ	Honey
s ɔ	hoe

The structural representation of V is shown below in figure 4 below:

Figure 3: Structural representation of V syllable shape

V Syllable Shape

Syllable Tier

CV Tier   v   c   v

Segmental Tier   s   ɔ
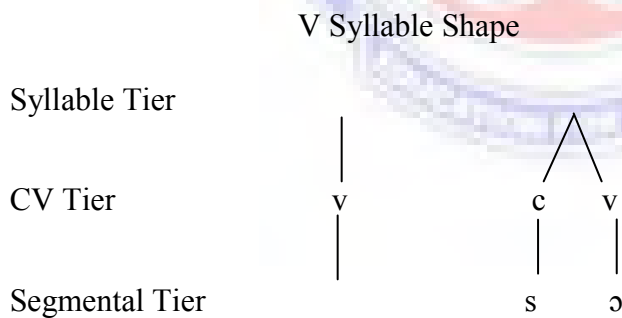
„ ‟ in „ sɔ‟ constitute the V syllable structure in Wassa.

The CV structure constitutes a consonant and a vowel. The occurrence of the structure is also at word initial, medial and final position. Examples of words of these syllable shape attest in Wassa are given in the tables below.

Table 6: The CV structure

Word	Gloss
tʊ	shoot
nʊ	Cook (v)
jɛ	do
s fʊɔ	leader
h n	employ

We should note that in the CV structure the syllable is placed on the vowel

Figure 4: CV syllable shape

Syllable Tier

CV Tier   c   v

Segment Tier   t   ʊ
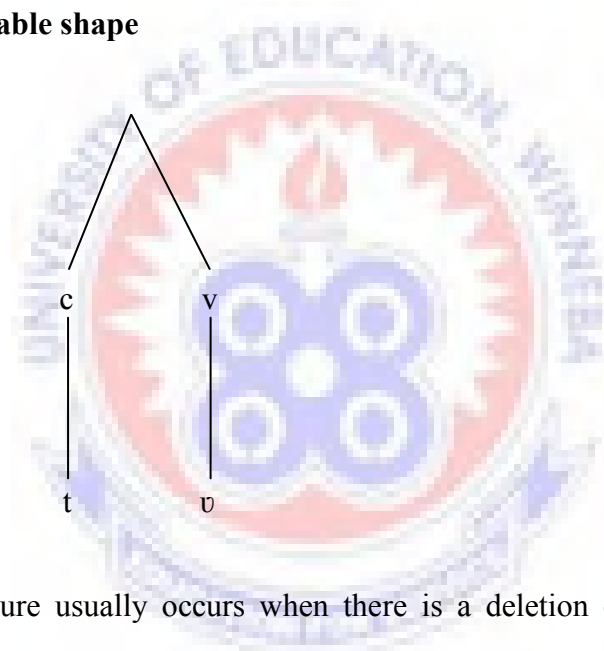
This structure usually occurs when there is a deletion of a word (Boadi, 2009) Consonants that are syllabic are liquids and nasals /**l**, r, n, m, ɱ ŋ . They also occur at word initial and media position.

Table 7: The C structure

Word	Gloss
ɛjli	wife
ŋgl ma Am	worm
ɱvl ma	wind
ŋgɔ	don''t go

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The phenomenon of consonant mutation rule in which obstruent become voiced is very common in all the language speaking area. The lenition of r to l is also common to ot h dialects. The second and third person plural is all Fiase speaking communities is [bɛ] but [mʊ] and [wɔʊ] are used in some part of the Amenfi dialect respectively. It is an SVO language.

Asante and Fante are widely spoken as a second language in all wassa speaking communities. They are used as a medium of instruction in the school.

1.4 Statement of the Problem

So far the only linguistic work on Wassa I have come across is a B.A. long essay by Afful (2006) on the phonology of Wassa in the Linguistics Department of the University of Ghana. Her main aim was to find out which of the two dialects of Akan, Asante and Bono is related to Wassa. Her findings indicated that Wassa shares some similarities and differences with both dialects in terms of sound system and tonal pattern.

Phonological processes in Wassa may have unique features that could contribute immensely to linguistic knowledge. However, the problem that exists is that these interesting features of Wassa have not been scientifically studied. We are unable to ascertain whether these tentative features actually exist in the Wassa language or not. It is therefore certainly motivating to carry out phonological analyses in both dialects of Wassa.

1.5 Objectives of the Study

Having taken cognizance of the problem identified above, this study would seek to:

1. Expose the reader to the phonological processes that exists in Amenfi and Fiase dialects of Wassa.

2. Find out the variations that exist in the two dialects.

3. Identify the unique phonological processes in Wassa.

1.6 Research Questions

In order to achieve the objectives set above, the following research questions are posed to guide the study:

1. What are the phonological processes in the Amenfi and Fiase dialects of Wassa?

2. What variations exist in the two dialects?

3. Does Wassa exhibit any unique phonological processes?

1.7 Significance of the Study

There is the need to document and preserve the grammar of a language so that it would be possible for everyone to read or engage in a discussion. Agyekum (2012) posits that every language should be will kept and saved for proper use and serve as a heritage for posterity. Ofori (2014) is also of the view that the documentation of a language goes a long way to ensure the sustenance of the language for posterity and for linguistic argumentation even if the language is no more spoken.

1. This study would be added to the body of literature on Wassa and Akan linguistic study in general.

2. Aside providing additional literature, it will also pave the way for a more thorough analysis of the phonology of Wassa.

1.8 Limitation

Getting the data from the two dialects constituted a great challenge considering the time available. This gave me much work to do when it came to transcription and glossing.

As the data collection process involved a lot of movements, much time was also needed for the study.

1.9 Delimitation of the Study

As a general rule, a research put boundaries to demarcate the extent of the study. This study limits itself precisely to the confines of the phonological process and not everything in phonology to be able to manage the data. Tone, for example, is not given much attention in this thesis due to time. Morphology is also excluded though some of these processes are related to morphology.

1.10 Organization of Thesis

The whole research is divided into four chapters. Chapter one serves as the introductory chapter. Chapter Two discusses the literature review, theoretical framework and phonological features used in the description of the data. We proceed to Chapter Three to look at the methodology. Under Chapter Four, we discuss the phonological processes which include: vowel harmony, nasalization, consonant mutation, labialization, palatalization, elision, insertion and compensatory lengthening. Chapter Five presents the summary of work done and

draws general conclusion.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview

This chapter looks at existing works of relevance to the area of study. First, it discusses the theoretical framework of some of the concepts and the motivation in relation to Auto-segmental Phonology. Though the mode of phonological representation is within Goldsmith‟s 1976 Auto-segmental Phonology a review of   homsky and Halle‟s linear generative approach to phonological representation is important since this theory generated from Generation Phonology.

2.2 Generative Phonology

The Generative phonology theory was a dependable theory for phonetic and phonological analysis before the emergence of autosegmental phonology. The theory espoused in Chomsky and Halle (1968) *Sound Pattern of English (SPE).* It characterized segment as unstructed homogenous matrices "where every segment has a specification for each of the two dozen distinctive features orderly ound to gether as unit" Odden 2005 .

Phonological representations of segments in generation phonology, therefore, consist of a string of segments arranged in a linear form like the serial arrangement of the orthography. For instance for the Wassa and [ŋ̀gá] ‗scent‗, each segment is broken down into their distributive features and arranged linearly with each representation of the entire word. Figure 6 below shows the linear generative phonology representation of the word ŋ̀gá.

Figure 5: Linear representation of segmental and suprasegmental features

ŋ	g	a
$\begin{bmatrix} + \text{cons} \\ + \text{nasal} \\ + \text{back} \end{bmatrix}$	$\begin{bmatrix} + \text{cons} \\ + \text{voiced} \\ + \text{back} \end{bmatrix}$	$\begin{bmatrix} + \text{sylla} \\ - \text{ATR} \\ + \text{high} \end{bmatrix}$
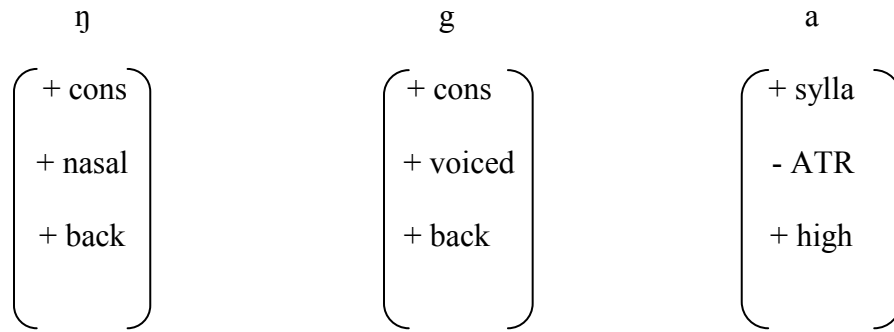
In this representation, the high tone is lumped up with other features and considered as part and parcel of the segment /a/. Viewing segments in this way implies that in the event of segment deletion, every distinctive feature goes with the segment in question.

However sometimes, tone and other suprasegmental phonemes which are neither vowels nor consonants resist the effect of deletion of a segment. Consequently, generation phonology could not succeed in explaining such facts about sounds. It indeed fails woefully in accounting for suprasegmental features of sounds such as tones in phonological analysis (Odden 2005), thus the emergence of new phonological theories.

2.3 Autosegmental Phonology

Autosegmental phonology was developed within the tradition of classical Generative phonological theory of Chomsky and Halle (1968), following the works of Williams (1971) and Leben (1973) on tone systems in West African language such as Margi, Igbo and Mende. But the principle and remarkable innovation of Autosegmental phonology are exemplified in Goldsmith (1976) in his dissertation to Massachusetts Institute of Technology (MIT). Autosegmental phonology is not a departure from the principle of Generative phonology codified in homsky and Halle"s Sound Pattern of

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English (SPE) in 1968. It is a non-linear version of phonological analysis of Generative Phonology while SPE is a linear version of phonological analysis.

Indeed Goldsmith 1990 confesses that Autosegmental phonology is a "direct confirmation of the traditional works in generative phonology codified in Chomsky and Halle"s Sound Pattern of English in 1968". The only difference e tween the SPE and Autosegmental theory is "the development of a multi-linear phonological analysis in which the various tiers are organized y the ,association lines" in Autosegmental phonology Goldsmith 1979 ". It can therefore best be viewed as an attempt to supply a more adequate understanding of the phonetic side of linguistic representation (Goldsmith, 1979).

Goldsmith 1979 further explained that autosegmental phonology is a "theory of how various components of articulatory apparatus, i.e. the tongue, the lips, the larynx and the velum are coordinated" in the process of sound production. It therefore implies that phonological features lead their own independent lives and not grouped together in ordered bundles (segments) as it is made to believe in generative phonology.

In this vein therefore, Autosegmental phonology places segments and suprasegmentals (especially tones and other prosodic features) on different tiers parallel to each other with the suprasegmentals being linked to the segments by association lines. Every segment on each tier is specified for a set of features specific and unique to that tier and segment on each tier are associated with segment on another tier by association lines. The Autosegmental phonological representation of the Wassa word ŋ̀gá will therefore take the form as in figure 6 below.

Figure 6: Autosegmental representation of segmental and suprasegmentals

       features

Tone tier	L		H
	|		|
Skeletal tier	X	X	X
	|	|	|
Segmental tier	ŋ	g	a
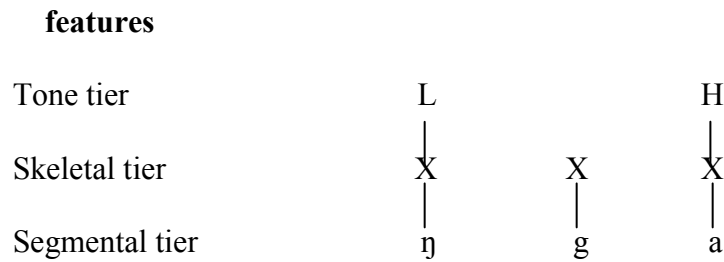
In figure 6 above, the segments are arranged on multiple separate and independent tiers and each relates to the other tier by the association lines. The low tone and the segment [ŋ̀] relate to each other via the skeletal tier signifying the simultaneous coordination of the segment and the suprasegmental at the point of articulation. The same applies to the high tone and the segment [á].

2.4 Basic Tenets of Autosegmental Phonology

The application of Autosegmental phonology is based on some fundamental principles and conditions. These principles and conditions though originally meant for tone analysis apply to all other phonological representations. They include the following principles and conditions: the Skeletal Tier, Linkage Condition, Universal Principles of Association, Obligatory Contour Principle and Well-Formedness Condition.

2.4.1 Skeletal tier

The skeletal tier play a crucial role in the organization of the entire phonological structure.it is the mediating point on which the elements on the different tiers anchor. A segment which is not linked to a position in the skeletal tier is not phonologically realized. The skeletal tier hold units represented by consonants and vowels, hence they are sometimes represented as C-slots, V-slots or X-slots. The skeletal tier can relate with other

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tiers on one-to-one, one-to-many or many-to-many basic. Figure 8 below illustrate the position or relation of the skeletal tier to other tiers in autosegmental representation of the word kùsù „cat‟ and   ɛ „palm tree‟.

Figure 7: Skeletal tier

a. Tonal tier

Skeletal tier

Segmental tier

b. Tonal tier

Skeletal tier
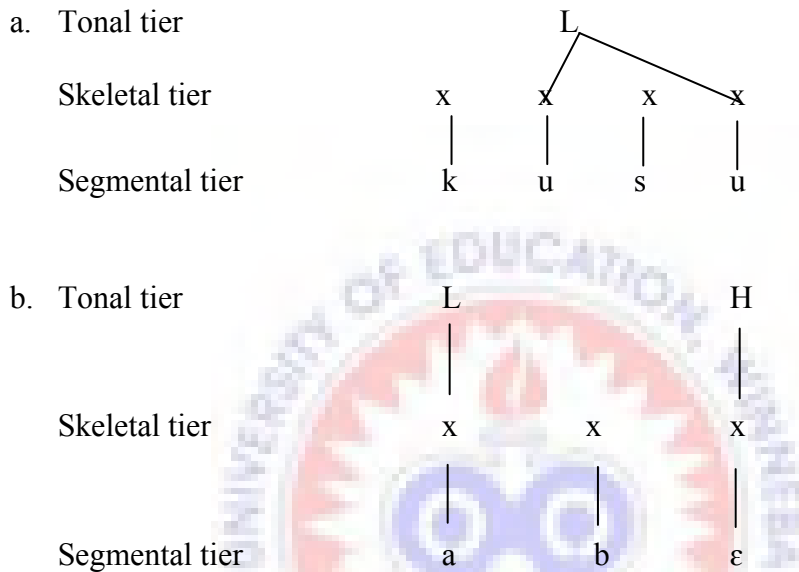
Segmental tier

In 7(a) above, the Low tone on the tonal tier relate to /u/ on the segmental tier via the V on the skeletal tier on one-too-many fashion. In 7(b), the Low tone on the tonal tier relates to /a/ on the segmental tier on one-to-one fashion so as the High tone also relates to /ɛ/ on the segmental tier via the V on the skeletal tier on one-to-one fashion.

2.4.2 Universal association convention (UAC)

These principles indicate the relationship between tones and Tone Bearing Units (TBUs) and guide the assignment of a tone to TBUs as outlined by Durand (1990) below:

Mapping: Associate vowels with tones in a one-to-one fashion from left to right until we run out of tones or vowels.

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Dumping: If after applying (mapping) some tones are still free (that is unassociated), link the to the last vowel of the right.

Spreading: if after applying (mapping) some vowels are still free, link them to the last tone on the right.

Line Crossing: Lines are not allowed to cross each other. The following data on Margi (a Chadic language in Northern Nigeria) adopted from Oyebade (1998) best illustrate these principles in Figure 8.

Figure 8: Universal Association Convention.

		Tone tier		H	L	HL	H	L
		Segmental tier		sa	dla	bdlu	sa-na	dla-na
a.	Mapping	Tone tier		H	L	HL	H	L
		Segmental tier		sa	dla	bdlu	sa-na	dla-na
b.	Dumping	Tone tier		H	L	HL	H	L
		Segmental tier		sa	dla	bdlu	sa-na	dla-na
c.	Spreading	Tone tier		H	L	HL	H	L
		Segmental tier		sa	dla	bdlu	sa-na	dla-na

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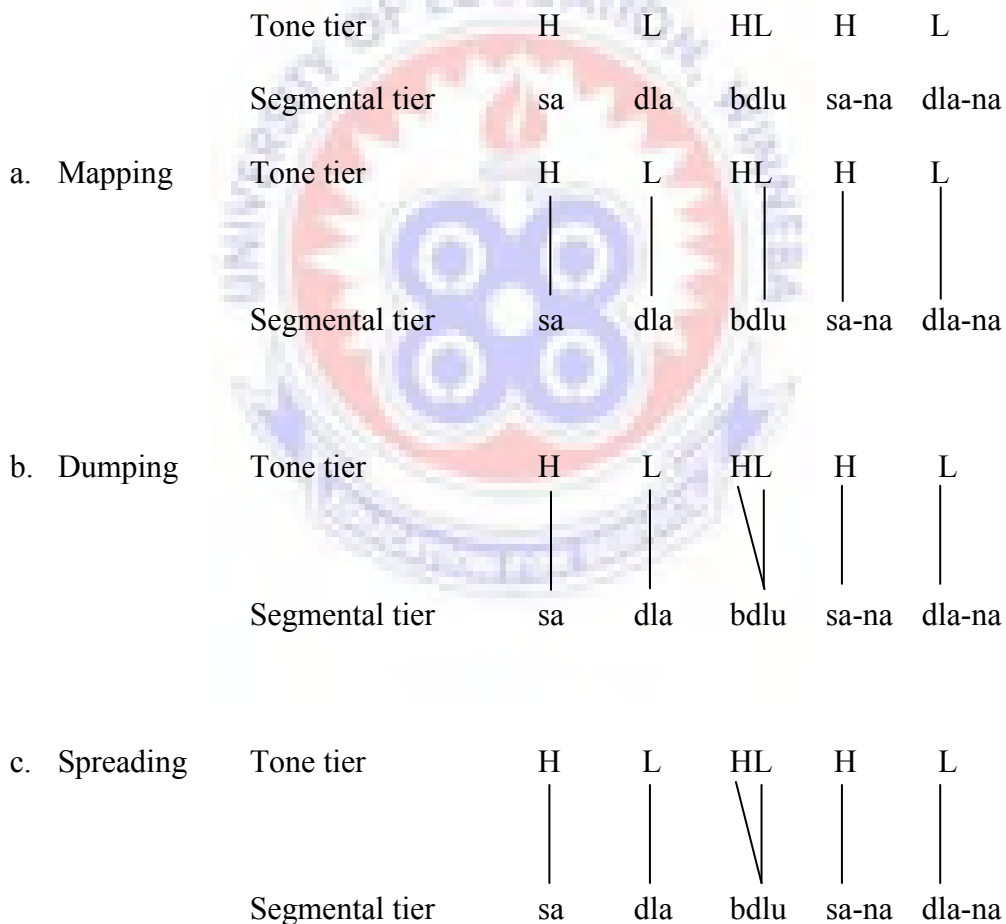
2.4.3 Linkage condition

Though segments are represented on autonomous tier, they are not phonologically realized if they are not linked to other tiers. This condition thus demands each tonal feature and tone bearing segment on the separate parallel tiers be linked to each other via the skeletal tier by association lines before it can be phonologically realizes (Goldsmith, 1990).

Association has represented concurrent articulations so that when tone is linked to the segment thus it means that both tone and segment are articulated simultaneously. This condition actually caters for the phenomenon of floating tone and tone stability.

Figure 9: Linkage condition
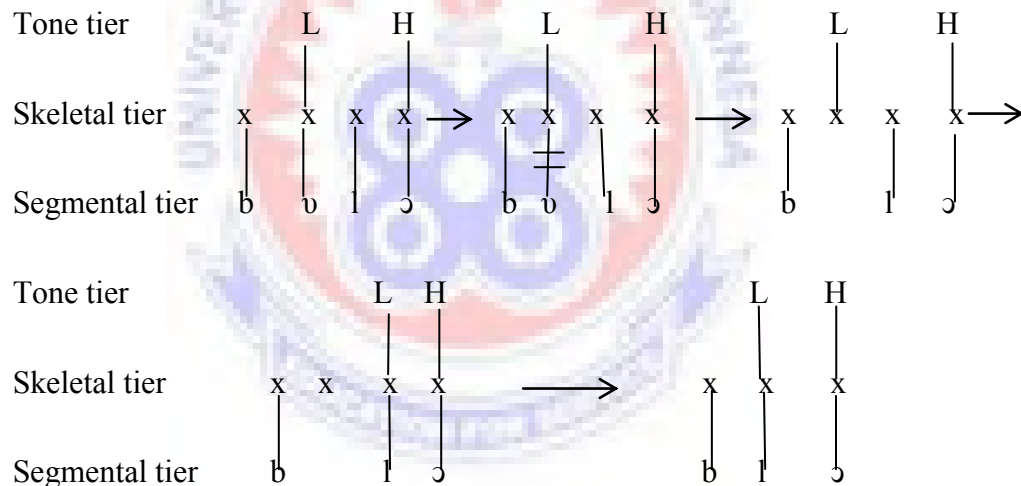
In figure 10 a ov e the segment ʋ is linked to the skeletal tier in the underlying form but it is delinked during fast speech and for that matter it is not realized phonetically in the pronunciation of the word. The ʋ therefore remains silent while its Low tone docks onto the following sound /l/ hence the resultant is the syllabic consonant formation in the language. The word therefore suffices as [b`lɔ`] rather than [bʊ́lɔ`] during past speech.

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2.4.4 Obligatory contour principle (OCP)

This principle spells out categorically that concentration of two or more adjacent, identical tones are fused into a single tone e fore they are "mapped onto" their corresponding vowels. What this means is that, a word with more than one High tone vowel such as ἐρύνύ „door‟ have to e mapped onto one High tone that is one-to-many)

instead of a one-to-one mapping of the two high tones. The principle also applied perfectly to other segments on the other tiers. The representation in Figure 11a is in consonance with the OCP whilst 11b is a violation of the principles as shown below.

Figure 10: Obligatory contour principles

a. Tone tier   L   H

    Skeletal tier   x   x   x   x   x

    Segmental tier   ɛ   p   ʊ   n   ʊ

b. Tone tier   *   L   H   H

    Skeletal tier   x   x   x   x   x

    Segmental tier   ɛ   p   ʊ   n   ʊ
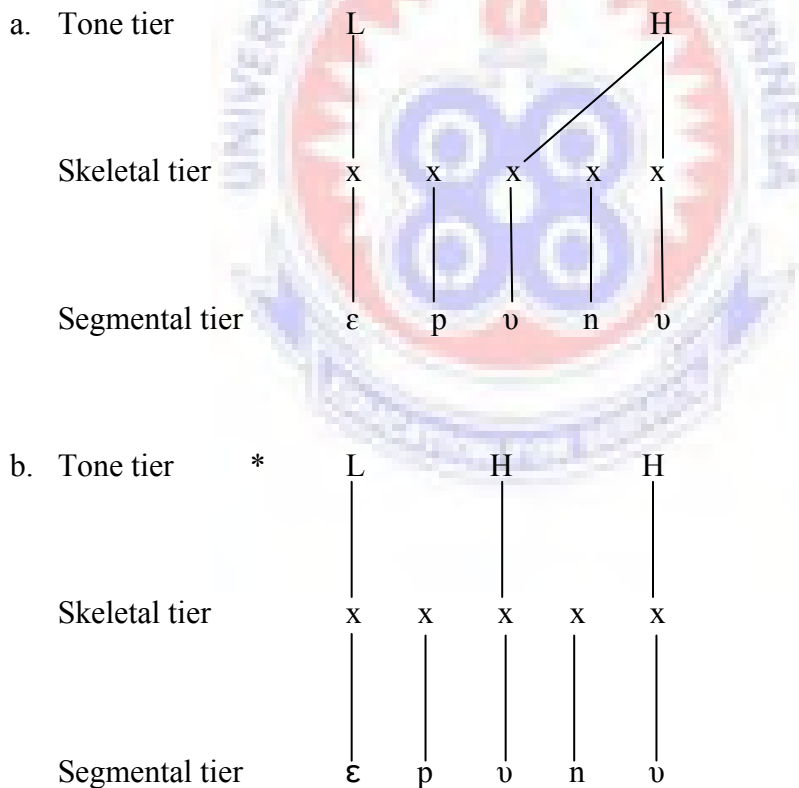
From the illustration above in Fig 11a, the OCP permits the two High tones to be merged into just a single Low tone (one-to-many) representation.

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2.4.5 Well formedness condition (WFC)

Well formedness conditions are the universal principles which govern the multi-tier structure of autosegmental representation. These conditions actually determine the way tone and vowels are associated on the parallel tiers and allow the addition or deletion of association lines at any point throughout a phonological derivation. These are stipulated in Goldsmith (1979:207) as follows:

1. Each vowel must be associated with (at least) one toneme.

2. Each toneme must be associated with (at least) one vowel.

3. Association lines may not cross.

By the Well Formedness Condition, all the tiers remain independent throughout the derivation with association lines linking them. At no point should the derivation with association lines cross in the course of derivation.

The representation in figure 12a is a violation of the Well Formed Condition because the High tone has crossed the Low tone to map onto the last tone bearing unit via the skeletal tier, even though the two are not adjacent. The current configuration which conforms to the Well Formedness Condition is 12b.

Figure 11: Well formedness condition

a. Tone tier   *   L   L   H

      Skeletal tier   x   x   x   x   x   x

      Segmental tier   ɔ   t   a   ŋ   v   o

b. Tone tier   L   H   L   H

Skeletal tier   x   x   x   k   x   x

Segmental tier   ɔ   t   a   ŋ   v   o
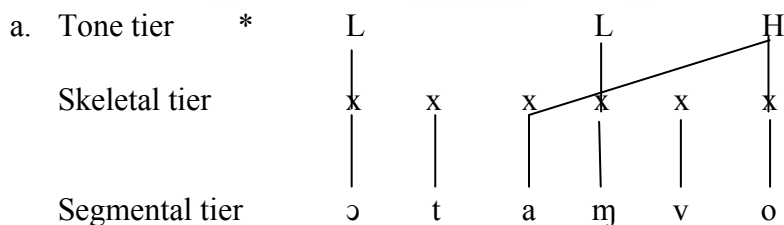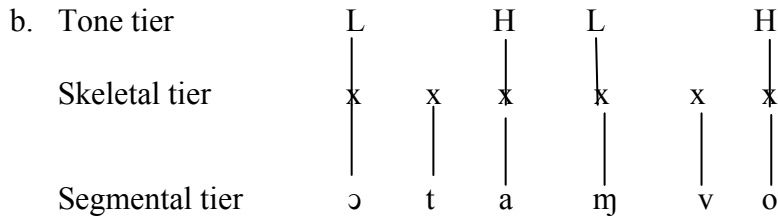
2.5 Motivation for Autosegmental Phonology

The motivation for the use of autosegmental framework in this thesis is based on its ability and flexibility in representing complex segments such as Contour tone, Tone stability, Floating tones among others and also in providing explanations for their occurrences which were otherwise problematic to deal with in linear generative phonology. Since Wassa is a tonal language and also has floating tones, autosegmental phonology is the best option for the phonological representation in this analysis.

2.6 Tiers Used in this Thesis

Tiers are the multi-levels at which the different phonological features are arranged in non-linear generative phonology. They usually consist of sequences of features which differ from one tier from one tier to the other. There are various kinds of tiers that can be specified for various phonological analyses. In this thesis the following tiers are applicable to the phonological representation:

i. Skeletal / CV Tier

It is the mediating point on which the elements on the different tiers anchor. The skeletal / CV tier holds unit representation by consonants and vowels; hence they are sometimes represented as C-slots and V-slots or X-slots. The skeletal / CV tier can relate with other tiers on one-to-one or one-to-many basis.

ii.   Segmental Tier

This is the level at which phonetic representation relevant to the description are arranged. In other words, the underlying phonetic segments occupy this tier.

iii.   Place / Manner of Articulation Tier (P.A / M.A Tier)

This tier specifies the Place or Manner of articulation features of the segment that are significant to the phonological analysis. This implies in the formalization of phonological process such as Homorganic Nasal Assimilation, Labialization and Palatalization.

iv.   Tonal Tier

The tonal tier specifies whether the underlying tone on the segment is high (H) or low (L).

v.   Tongue Root Tier

This tier spells out the tongue root position features of the phonological segments whether it is an Advanced Tongue Root features [+ATR] or Un-advanced Tongue Root features [-ATR]. This tier is very relevant in the discussion of vowel harmony as a phonological process in Wassa.

vi.   Syllable Tier

This tier indicates the units of sounds that make up a word. It is applicable in the discussion of the syllable structure processes such as elision, insertion and compensatory lengthening.

2.7 Distinctive Features

Distinctive features are a set of articulatory and acoustic features sufficient to define and distinguish, one from the other, the great majority of the speech sounds used in the languages of the world (Halle & Clements, 1983).

The search for which distinctive features are really significant linguistically and how these features combine is a sub theory in self. This theory of phonological features is concerned with the discovery and explanation of the generalization about the phonological behavior of phonological segments both in isolation, in sequence or as a member of a system.

Generative Phonology proposes twenty features which are loosely classified in terms of major class features, place of articulation features, manner of articulation features, tongue body features, lip features, acoustic features, state of the glottis features and other.

2.7.1 The major class features

2.7.1.1 Syllabic / Non-syllabic: [+Syll]; [-Syll]

Syllabic sounds constitute a syllabic peak. The vowels are [+Syll]. All other sounds are non-syllabic [-Syll . Some contextual variants of nasals and laterals are [Syll especially where a vowel would normally occur. For example the velar nasal [ŋ in [ŋgʊkɔ] „fowls‟ is sylla i c.

2.7.1.2 Consonantal / Non-consonantal: [+Cons]; [-Cons]

Consonantal segments are produced with a radical obstruction in the mid-saggital region of the vocal tract (Chomsky & Halle, 1968). Segments implemented in this way in

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the Wassa languages are the plosives, affricates, nasal consonants and liquids. The vowels and glides are non-consonantal.

2.7.1.3 Sonorant: [+Son]; [-Son]

Obstruent or non-sonorants [-Son] are sounds produce with a cavity configuration that makes spontaneous voicing impossible (Chomsky & Halle, 1968). Plosives, affricates and fricative are [+Obs] or [-Son]. Non-obstruent or sonorants are sounds produced with a vocal tract shape which makes spontaneous voicing possible. The vowels, liquids, nasals and glides are sonorant or non-obstruent.

2.7.2 Cavity features

2.7.2.1 Anterior / Non-anterior: [+Ant; -Ant]

According to Chomsky and Halle (1968), a consonant is anterior if it is produced with an obstruction located in front of the palate-alveolar region of the mouth. No vowel is [+Ant] on this definition since none involves obstruction. The [+Ant] consonants in Wassa are the labials and alveolars. The palatals and velars are [Ant].

2.7.2.2 Coronal / Non-coronal: [+Cor]; [-Cor]

We shall use the term Coronal to refer to Wassa underlying alveolars /t d s n/, their reflexes as well as their palatals and palatalized consonant. The velars and labials are non-coronal.

2.7.2.3 Back / Non-back: [+Back]; [-Back]

Back sounds are produce with the back of the tongue retracted. Non-back sounds are produces with no such retraction of the tongue. In Wassa [+Back] segments include the

back vowels [u ʊ o ɔ], and velars [k g kʷ gʷ h hʷ w]. The front vowels are [-Back], and so are the palatal and palatalized consonants, the alveolars and labials.

2.7.2.4 Rounded / Non-rounded: [+Round]; [-Round]

Rounded segments are produced with a protrusion of the lips. Non-rounded ones are produced with lip-spread. In Wassa the back vowels are redundantly [+Round].

2.7.2.5 High / Non-high: [+High]; [-High]

High segments are those which are produced with body of the tongue raised towards the roof of the mouth above the neutral position. In Wassa, they include the high vowels, [i u ɪ ʊ], the glides, the velars, palatal and palatalized consonants. The non-high segments are mid and low vowels [e ɛ o ɔ], [a] and [æ] as well as anterior consonants like labials and alveolars.

2.7.2.6 Advanced and non-advanced tongue root: [+ATR]; [-ATR]

Advanced tongue-root vowels are produced by drawing the root of the tongue forward and raising the body of the tongue with a resulting expansion of the pharyngeal cavity. The [+ATR] vowels are [i u e o æ], Non-Advanced Tongue Root ([-ATR]) vowels are produced by retracting the tongue root and narrowing the pharynx. The Wassa [-ATR] vowels are [ɪ ʊ ɛ ɔ a].

2.7.3 Manner feature

2.7.3.1 Continuant / Non-continuant: [+Cont]; [-Cont]

Continuant refers to the vowels, glides, liquids and fricatives. Non-continuant sounds are the oral and nasal stops (plosives, nasal and affricates). In producing non-

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continuants, the air-flow through the mouth is effectively blocked. This is true of all nasal consonants and oral stops, but not of laterals, fricatives, glides and vowels.

2.7.3.2 Lateral / Non-lateral: [_Lat]; [-Lat]

Lateral are produced with partial closure at some point in the mouth with the result that the air-stream is allowed to escape on one or both side of the contact. In Wassa, the only lateral sound, [l], is non-fricative and is alveolar, [+Cor, +Ant].

2.7.3.3 Nasal / Non-nasal: [+Nas]; [-Nas]

Nasal segments are produced with a lowered velum to allowed air to escape through the nasal cavity. They include all the nasalized vowels, the nasalized glides as well as the nasal consonants. The non-nasals are the oral vowels, oral liquids, glides and consonants and produced with a velic closure or raised velum.

Table 8 (a): Presents the distinctive feature matrix for vowel sounds of Wassa

	i	ɪ	u	ʊ	e	ɛ	o	ɔ	æ	a	ĩ	ɪ	u	ʊ	a
round	-	-	+	+	-	-	+	+	-	-	-	-	+	+	-
back	-	-	+	+	-	-	+	+	-	-	-	-	+	+	-
high	+	+	+	+	-	-	-	-	-	-	+	+	+	+	-
low	-	-	-	-	-	-	-	-	+	+	-	-	-	-	+
ATR	+	-	+	-	+	-	+	-	+	-	+	-	+	-	-
Son	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Cont	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Syll	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
nasal	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+
	i	ɪ	u	ʊ	e	ɛ	o	ɔ	æ	a	ĩ	ɪ	u	ʊ	a

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Table 8(b): Presents the distinctive feature matrix of consonant sounds in Wassa

	p	t	k	kʷ	b	d	g	ɕ	f	s	tɕ	dʑ	h	tɕɥ	dʑɥ	m	n	ɲ	ŋʷ	ɲʷ	r	l	w	j	ɕɥ	ŋ
Syll	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cons	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Son	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	-	+
Ant	+	+	-	-	+	+	-	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	-
Cor	-	+	-	-	-	+	-	+	-	+	-	-	-	-	-	-	+	-	-	-	+	+	-	-	-	-
labial	+	+	-	-	+	+	-	+	+	+	+	+	-	+	+	+	+	+	-	-	-	-	+	-	-	-
round	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-
back	-	-	+	+	-	-	+	-	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-	-	+
high	-	-	+	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	+
cont	-	-	-	-	-	-	-	+	+	+	+	+	+	+	+	-	-	-	-	-	+	+	+	+	+	-
lateral	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
nasal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	-	-	-	-	-	+
del.rel.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

2.8 Literature Review

The Wassa languages have not seen a lot of developmental or research work. The only study we have come across so far has e en done   y Afful 2006 . "A   loser look at the Phonology of Wassa" – A B.A long essay in the linguistics Department of the University of Ghana. Afful (2006), in this work gives a good insight into the sound system and some aspects of tones. Her main aim was to find out whether the Wassa language is more related to the Asante or the Bono dialects of Akan. Her findings indicate that Wassa shares some differences and similarities with both dialects.

The work identifies ten oral vowels, five nasal vowels and fourteen. She noted that the Wassa sound system is not different from the other Akan dialects. It is the same as Asante but has a slight difference with the Jaman subdialect of Bono and this difference is the fact the /f, s/ have allophones, which are [v, z] respectively.

Afful further discusses types of tones, functions of tones and tonal patterns of verbal forms. She identifies two basic tones (high and low). She identifies lexical and grammatical as the two basic functions of tones in Wassa. Also in discussing tonal patterns of verbal forms, she looks at progressive, past, perfect and future. She finds that the tonal pattern of the progressive and past tense verbal forms in Wassa and Bono are similar. Asante differs from Wassa in this area. Wassa and Bono have high tone on the progressive marker but Asante has a low tone on it. The TBU of monosyllabic verb in Wassa and Bono also carries a high tone whereas that of Asante carries a low tone.

Afful"s work didn"t do much work on the phonological processes which is very unique to both dialects.

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Bota (2002) discusses aspects of Bono phonology within the autosegmental phonology. She looks at the sound system, some of it phonological processes and tonal structure. She looks at homorganic nasal assimilation, voicing assimilation, consonant mutation, vowel harmony, compensatory lengthening, deletion and some reduplication forms are looked at as the main phonological processes.

According to her, a nasal consonant adopts the same place of articulation of the following consonant. She also points out voicing assimilation where the voicing on the nasal also spreads to the preceeding consonant. Bota (2002), also points out both labial toungue root harmony in the Atebubu sub-dialect of Bono. She identifies a situation where the perfect affix is lengthened after a pronoun. According to her study, front vowels are deleted in compound words where they preceed the second word.

This study is very useful to the present one since one of the processes and theory is similar.

Owusu (2002) investigated some phonological processes in Asante, Akuapem and Fante within the framework of autosegmental phonology. He discusses some assimilatory processes, syllable structure.

Under assimilatory processes, he looks at vowel harmony, nasalization and palatalization. He describes the vowel harmony in Akan as regressive assimilation where advanced vowel assimilates un-advanced once that precedes them. According to him, Akan has a type of vowel harmony in which the ten vowels fall into two set of five, each distinguish by the advancement verses reaction of the tongue root where the two set of vowel do normally occur together in the same word. He also claims that vowel harmony rule also apply between words in sentences and in compound. He finds that in addition to

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the ATR vowel harmony in all the three dialects, Fante and Asante dialects also have an additional type of vowel harmony called rounding harmony.

His study further probes five nasal vowels which occur independently nasalized after non-nasal consonants. From the data he presented these vowels contrast with their oral counterparts. The high vowel becomes nasalized when they occur before the nasal consonant in all the dialects. In the Fante dialect, the non-high vowels become nasalized when they occur before nasal consonants which do not, however, occur in the Akuapem and Asante dialects. Owusu claims that glide in Akan, [w] and [j], can occur only with oral vowels but due to this phenomenon in the Fante dialect, the nasalized vowel assimilates the preceding glide into a nasal. Asante and Akuapem will, however, have glide in the position.

Also, in Asante and Akuapem dialects, when a voiced plosive or affricate is preceded by a nasal that has the same place of articulation as the voiced plosive or affricate, the oral consonant becomes nasal. This assimilation of a voiced plosive and affricates into nasal does not, however, affect the vowels that follow the assimilated consonant. He holds that homorganic nasal assimilation is a regular process in Akan.

His discussion on palatalization came across two types of palatalization in Akan, one which is superimposition of high front tongue position on the initial non-palatal consonant, and the other in which a non-palatal consonant becomes a complete palatal consonant. The first type of palatalization (plural) occurs mainly in the Fante dialect, where labial and alveolar consonants are palatalized when they occur before front vowels. Total palatalization is when the non-palatal consonant that is affected by this assimilatory process becomes a complete palatal consonant. The non-labialized back consonants in Akan

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become completely palatalized when they occur before front vowels. These consonants occur mainly before back vowels and [a].

In Akan, when a word that ends in a vowel is followed by another that begins with the mid-vowels such as [e], [ɛ], [o] or [ɔ] (all dialects) or [i], [ɪ] (Fante), the initial mid-vowel or [i], [ɪ] (Fante) of the second word is generally deleted. High vowels after nasals in word final position in Akan also get deleted. When this happens, the final nasal becomes syllabic and, therefore, carries the tone of the deleted high vowel. This vowel does not, however, get deleted in the Asante dialect when the speaker is speaking slowly or emphatically.

The work therefore provides information on some phonological processes and theoretical framework in my discussion.

Ofori (2014) investigates a synchronic study of the grammar of Anum, one of the Hill-Guan languages in Ghana in a PhD thesis in the Applied Linquistics Department in the University of Education, Winneba. He combines the basic linguistic theory, autosegmental and functional-typological theories to provide explanations for the structure of the language.

The phonology of Anum identifies the language as having some resemblance with some related Kwa languages in Ghana like Akan, Ga, Gonja and Larteh. The phonological processes discussed include vowel harmony, vowel mutation, vowel deletion, consonant deletion, compensatory vowel lengthening and labialization.

According to Ofori (2014), the language operates a limited stem-controlled Advanced Tongue Root (ATR) vowel harmony system with limited infractions. In his discussion on consonant deletion and vowel mutation which occurs mainly with the second

person singular pronoun subject wu/wʊ, he posits that the approximant /w/ is deleted and the vowel mutates from the high back vowel to its variant mid vowel in completive construction. Also, vowel deletion occurs with the first person singular subject pronoun mi/mɪ where the vowel of the pronoun is deleted leaving the consonant which becomes syllabic. Again he claims that vowel lengthening in Anum occurs when the vowel of an aspect marker is deleted but its tone stabilizes and dumps on the vowel of the pronominal. In his labialization process, a consonant is rounded when it is followed by a rounded vowel. This type of labialization is mainly found in CV and some CVV stemss

The observations made by Ofori (2014) on Anum phonology have great implications for the study of Wassa since they are all Kwa related languages.

Essien (2015) studies some word-formation processes that occur in Nzema. He discusses derivation, compounding, reduplication and some phonological processes that occurred during the word-formation processes.

The phonological processes discussed are vowel harmony, consonant alternation, loss if final syllable, loss of vowels or nasal prefix, homorganic nasal assimilation and vowel lengthening. From the data, Nzema operates on a stem controlled vowel harmony system. Vowels and nasals occurring at morph initial position are deleted for the effortless use of the organ of speech. Also, a nasal consonant adops the same place of articulation of the following consonant and voicing on the nasal also spreads to the preceeding consonant. From the data, it is observed that in Nzema, it is possible for two or more phonological processes to occur in one morphological derivation.

The observations present quite interesting similarities and differences in respect to the phonological processes in Wassa which needs attention and discussion.

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Abakah (2004) describes elision in Fante using the autosegmental phonology as a theoretical framework. His discussion focused on elision of vowels, consonants and syllables in the three major subdialects of Fante namely. Iguae, Anee, and Boka. He also compared them to the Akuapem and Asante and concluded that these subdialects share some similarities and differences with some dialects of Akan. He demonstrated that vowel elision involving the truncation of one of two contiguous vowels at word boundary is very productive process in Fante. Where it has been difficult to determine which of the two identical vowels in a sequence at a word or a morpheme boundary is deleted in the combinative style, he resorted to tonology to resolve the difficulty. He holds that to determine which one of the two identical vowels in a sequence is deleted at word or morpheme boundary is a near impossibility. He therefore demonstrated that it is not an uphill task to place linguistic fingers on which one of the two identical vowels in question is the likely candidate for elision.

However, the elision of post sonorant word-final [High] V has been noted to operate differently in the various subdialect of Fante. The subdialect differences as well as the differences between the three major dialects of Akan have been duly noted.

As regards the elision of consonants, he observes that any consonant that is deleted in any of the varieties of Fante has to occur intervocalically at the underlying level of representation. He also explains the elision of syllables. According to him, syllable elision takes place word-internally and in imperative clauses containing associative phrases.

O'keefe 2003 looks at the vowel harmony of Asante Akuapem and Fante dialects of Akan using the optimality theory. He argues that Akan has two varieties of harmony: *tongue root position and rounding harmony* where both systems are well-attested and

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highly consistent. He claims that all three dialects are clearly harmonic for the tongue root position with infrequent and potentially explainable cases. Harmony for lip rounding does not apply to stems but within affixes and is a persistent enough pattern that Asante and Fante can be said to be harmonic for it as well. Akuapem, however, has no rounding harmony.

O˴keefe looks at the pattern of the harmony and demonstrates that it is easily understood when its different domains – stems, prefixes and suffixes are examined independently. From the data he presented, there is certainly good cause to accept the existence of tongue root harmony in stems. He examines two consistent violators of harmony within stems. The first is the low vowel /a/ which occurs at the right edge of the word and violates harmony with the first syllable. The other harmony violator is /ɛ/ which only appears to occur after palatalized consonants. He however could not identify rounding harmony in stems.

According to him, Akan stems are generally quite short, and words often have a large number of affixes. For this reasons he consider some verbal and nominal affixes since they will provide valuable information. Verbal prefixes include: pronominal, future, progressive, perfect, ingressive and regressive. For the verbal suffixes, he considered the past and nominalizing. He also looks at singular for the nominal prefix and Asante nominal, person, diminutive plural and kingship plural for nominal suffixes. He noted a clear harmonic behavior with the most of the domains with minor exception in all three dialects. This paper is very helpful to my thesis since vowel harmony in these dialects is related to Wassa.

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Boadi (2009) does a comparative description of the phonology of the affixes that co-occur with the finite in seven of the Central and Western dialects of Volta-Comoe using generative phonology. He outlines their general phonological properties, the fact that they are all vowel harmony and operate common processes like labialization and palatalization under similar conditions.

oadi‟s description of the phenomenon of vowel harmony in all dialects shows that of a cross-height type where only members of one set can co-occur in a root morpheme of two or more syllables and across word boundary with minor but systematic exceptions. According to him, Volta-Comoe had the following ten-vowel system [i, ɪ, e, ɛ, æ, a, ɔ, o, ʊ, u].

He discusses labialization and to him consonants could be rounded before a back rounded vowel. His discussion also shows that some consonants may be fronted if followed by a high front vowel. He also discusses consonant mutation where obstruents become voiced if followed by a nasal consonant.

A look at the literature review above indicates that no studies have been made on the phonological processes in Wassa. The work of Afful (2006) concentrates mainly on comparing aspects of the sounds and tonal system of the Wassa language to the Bono and Asante. Other works reviewed all discuss aspects of the phonology of related Kwa languages. A major gap is therefore left and this is what this work attempt fills.

CHAPTER THREE

METHODOLOGY

3.1 Overview

To conduct research on the phonological processes in Wassa and to ensure that the results are generalized, scientific methodology based on verifiable data must be used. This chapter entails the research design, selected site, population and sampling, data collection and data analysis.

3.2 Research Design

The research adopts a qualitative approach. Under qualitative research there are several approaches. This study will make use of the inductive approach to qualitative data analysis. Thomas (2006) stated the characteristics of qualitative research more clearly. According to him the inductive approach can e st e defined as "approaches that primarily uses detailed readings of raw data to derive concepts, themes or a model through interpretation made from the raw data   y an evaluator or researcher". He further explains that the primary purpose of the inductive approach is to allow research findings to merge from the frequent dominant or significant themes inherent in raw data, without the restraints by structured methodologies. He identifies the following purpose of an inductive approach.

a. To condense extensive and varied raw text data into brief summary format;

b. To establish clear links between the research objectives and the summary findings derived from the raw data to ensure that these links are both transparent and

c. To develop a theme, model or theory about the underlying structure of experiences or processes that is evident in the text data.

In the sense of the first purpose of inductive analysis, the language data represents the extensive and varied raw data that is mentioned whilst the underlying language structure that will be realized represents the condensed brief summary of the data. In the context of this study, the research intends to seek the phonological processes that exist in Wassa.

The second purpose of the inductive approach is to establish clear links between the objectives and the summary of the findings gotten from the data. In this light the objectives stated in the first chapter of this report are in direct correlation with the findings in the chapter four (4). The findings represent the underlying patterns concerned with the phonological processes exist in Wassa.

The third purpose of the induction approach is for the formulation of themes, model and theories. In our context the current study seeks to contribute to the identification of the grammar of Wassa.

3.3 Selected Site

Data for this study was collected through six trips to Wassa each lasting for three days. This researcher visited two towns from each sub dialect. Data was elicited from Damase and Anakom in the Amenfi Sub dialect. In the Fiase sub dialects, Nsuaem and Benso were also selected. The reasons are that, these four villages have the indigenous speakers, who speak the Wassa language. The trips also helped to ascertain the linguistic differences that exist between the dialects and answer one of the research questions.

3.4 Population and Sampling

Purposive sampling was used for this research as the subjects were selected according to the purpose of the study. Purposive sampling is a type of non-probability sampling. In non-probability sampling, participants are not chosen randomly. They are selected through special procedures. They were selected through special procedures because they can speak the language, hence they can provide the requisite information needed by the researcher.

Eight (8) native speakers were sampled to represent the whole population due to time, how to time, how to manage the population and accuracy. Two (2) native speakers from each dialect were chosen within the age range of 40-70. The people below forty (40) were left out in order to limit the language influence from other languages. The people above seventy (70) were also left out because people at that age might begin to lose their proper articulation due to teeth loss or some physiological factors.

In this study, a language consultant from each sub-dialect was selected. All the two language consultants are native speakers of the Wassa born of wassa parentage who have stayed there for a long time. The first is Mr. Kofi Abakah, a forty year old graduate teacher who, hold a first degree in Akan from the Kwame Nkrumah University of Science and Technology and is resident in Nsuem. The second consultant is Mr. William Andoh, a retired teacher of Wassa Dunkwa D/A Junior High School (JHS). He is sixty five years old and is currently the society steward of the Calvary Methodist Church in Wassa Dunkwa and resident in Wassa Dunkwa. The selection of the consultant helped in the transcribing and glossing since they have some basic linguistics background. The choice was to ensure credibility and reliability of the results since the data that was collected from both dialects

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were cross-checked with consultants. These consultants also helped in the history of the people and language since not much work has been done.

Further interactions were also made with two level 400 male students (native speakers of Wassa Fiase dialect) of the University of Education, Winneba studying English. These native speakers have some basic knowledge in linguistics and they helped in some of the analysis.

3.5 Data Collection

The researcher took part in storytelling sessions. These were mostly short stories. The storytelling was chosen so that the researcher will be able to pick the data from a natural setting since it is a form of entertainment. Four (4) stories were recorded from different story tellers. Two stories were transcribed from both dialects. Conversation were also recorded and transcribed. Out of the four conversations recorded, two were transcribed from both dialects. Also, elicitations were done using the summer institute of linguistics West African Area Wordlist 1 (SILWL 1), through unstructured interviews with the native speakers. The word list was also distributed to the individuals" consultants and other assistants. The elicitations were recorded using an audio recorder.

3.6 Data Analysis

The data was analyzed with the inductive approach by focusing on rule identification. The analysis was in line with the autosegmental phonology which gave the researcher the chance to observe the data and summarize the observation into phonological rules.

CHAPTER FOUR

RESULTS AND FINDINGS

4.1 Overview

Phonological processes refer to changes that take place in sounds when segment are justaposed. According to Oyebade (1998) phonological processes are sound modifications motivated by the need to maintain euphony in a language or to rectify violations of well-formedness constraints in the production of an utterance. This section describes some common phonological processes in the Wassa language. The phonological processes that will be discusses in this dissertation are divided into assimilatory and syllable structure processes.

4.2 Assimilation Process

A phonological process is called assimilation, if as a result of its application two or more segments in form agree in their value for some phonological feature(s) or feature class (es) (Bakovi, 2007:335). Katamba (1989: 80) further explains that, assimilation is the modification of a sound in order to make it more similar to some other sound in its neighbourhood, with the aim of making a smoother, more effortless, more economical transition from one sound to another.

When a sound is modified to look more like the sound that precedes it, the assimilation is in a progressive direction. On the other hand, when the sound is modified to look more like the sound that follows it, the assimilation is in a regressive direction. Assimilatory process will focus on vowel harmony, nasalization of consonants, consonant mutation, labialization and palatalization.

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4.2.1 Vowel Harmony

Wassa, like many Volta-Comoe languages apply the vowel harmony rule. It is one of the most important rules to observe in the pronunciation of words. Okeefe (2003) defines it as a set of systematic co-occurrence restrictions. The vowels are divided into two main sub-groups with regard to the advance tongue root specification. This type of harmony would have the following harmonizing sets:

SET I   [+ ATR]   i   u   e   o   æ

SET II [- ATR   I   ʊ   ɛ   ɔ   a

4.2.1.1 Vowels sequence within root morphemes

The ATR rule in both dialects of Wassa requires that, only the members of one set can co-occur in a root morpheme of two or more syllabus. This is in line with (Bota, 2002; Owusu, 2002; Okeefe, 2003; Boadi, 2009; Ofori, 2014). The examples in (8) below illustrate the harmony patterns in Wassa.

SET I   [+ ATR]

[èmʷú]   „inside‟

[èkʷúnʷú]   „hus a nd‟

[èkʷlʷó]   „sore‟

[èpʷlʹʷó]   „squirrel‟

[dʷlʹʷó]   „medicine‟

[kw dʷú]   „ a nana‟

[nĩ]   „eye‟

[b ŋgʷú]   „a kind of food made with maize‟

[zʷúó]   „water‟

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[ētū́]   (fs)   „ uttoc ks‟

The representation is in (13) below explains it:

Figure 12: [+ ATR] vowels within root morpheme

ATR Tier   [+ ATR]

Skeletal Tier   x   x   x

Segmental Tier   è   m   ú

SET II   [- ATR]

[dɔ̀kʷá]   „quarreling‟

[ŋgɔŋgɔ zá́]   „gossip‟

[mʷɔwlɛ́]   „nails‟

[bɔlàm̀mɔ]   „ ott le‟

[ɛ́ʝlÍ]   „wife‟

[ɛ́tʷlá]   (Am)   „ utt ocks‟

[ɛ́kʷlá]   „ ɟala a sh‟

[ŋgátɪ]   (Fs)   „groundnut‟

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[ásɪɛ́]   „under‟
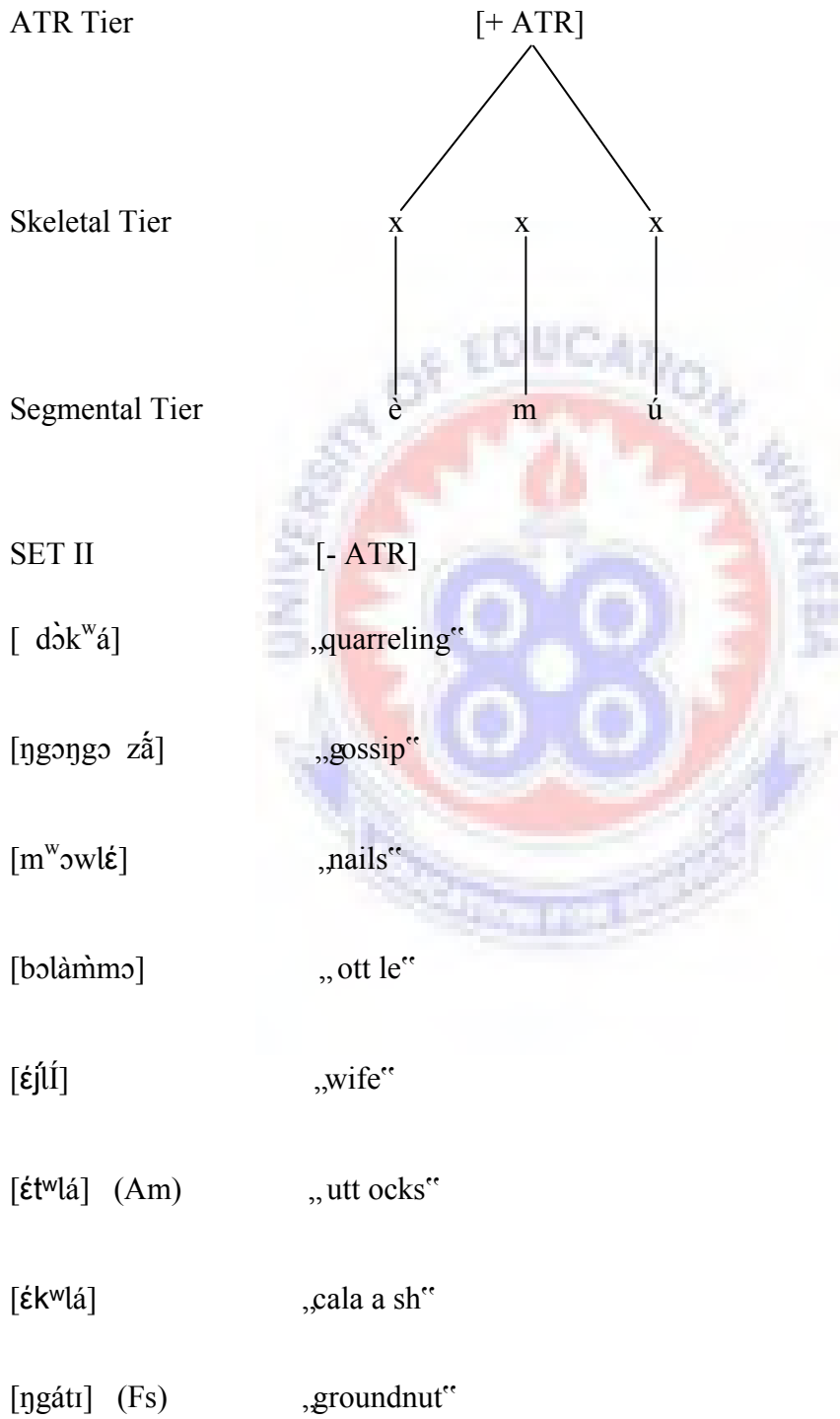
[ánʷʋ]   „mouth‟

Figure 13: [- ATR] vowels within root morpheme

ATR Tier   [- ATR]

Skeletal Tier   x   x   x

Segmental Tier   ɛ   m   ʋ
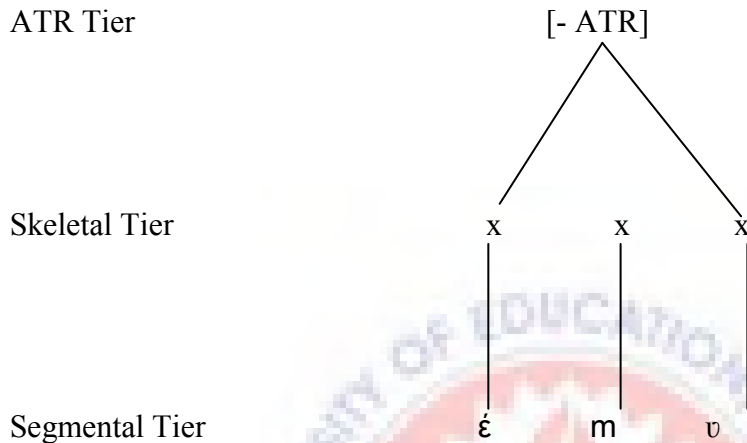
As observed in the data and representation above [e] and [u] which are advanced

vowels occur in the same word whereas the un-advanced [ɛ] and [ʋ] also follow similar

rule. This means that there is a restriction on the distribution of these vowels in both

dialects of Wassa, which does not allow the vowels of Set I to occur in the same word with

the vowels of Set II.

4.2.1.2 Vowels sequence across morpheme boundaries

The occurrence of the vowels across morpheme boundaries is restricted in a similar

manner in both dialects. Reduced pronominal forms as well as noun and verb prefixes have

at least two alternates each, and their selection is condition by the feature specifications of

the vowels in the stem. This process also sometimes trigger vowel sequence where vowels

are sometime undefined. A very common context in which this occurs is when the

progressive aspect follows any subject pronoun in both dialects. The perfect vowel in the

Fiase dialect is also lengthened. The examples in (9) below attest to this.

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9a. **Amenfi**

/mɪ/ + /bɛ́/ + /dí/ ⟶ [médí]

„1SG" „Fut" „eat" „I will eat it"

/wɔ/ + /rɪ/ + /bá/ ⟶ [wɔɓá]

„3PL" „Prog" „come" „They are coming"

/jɛ/ + /rɪ/ + /tú/ ⟶ [jèètʷú]

„1PL" „Prog" „fly" „We are flying"

/mɪ/ + / w ⟶ [m w

„1SG" „Perf" „die" „I have died"

/ɔ/ + /bɛ/ + /tùm ⟶ [tʷùm

„3SG" „Fut" „e a le " „He will e a le to "

m t ⟶ [m tʷ]

„1SG" „Perf" „uproot" „I have uprooted it"

/ɔ r d ⟶ [d

„3SG" „Prog" „eat" „He is eating it"

/wɔ/ + /bɛ f ⟶ [wɔbɛf

„3PL" „Fut" „take" „They will take it"

/wɔ/ + /bɛ h ⟶ [w hù

„3PL" „Fut" „low" „They will low it "

/jɛ/ + f ⟶ [jɛfʷʋ]

„1PL" „dim " „We clim it "

/bɛ/ + w ⟶ [w

„3PL" „die" „They die"

9b. **Fiase**

/mɪ/   +   /bɛ́/   **+**   /dí/   ⟶   [médí]

„1SG"   „Fut"   „eat"   „I will eat it"

/bɛ/   +   /rɪ/   +   /bá/   ⟶   [bɛɛbá]

„3PL"   „Prog"   „come"   „They are coming"

/jɛ/   +   /rɪ/   +   /t   ⟶   [jè t ʷú]

„1PL"   „Prog"   „fly"   „We are flying"

/mɪ/   +   /   w   ⟶   [m   w

„1SG"   „Perf"   „die"   „I have died"

/ɔ/   +   /bɛ/   +   /tùm   ⟶   [tʷùm

„3SG"   „Fut"   „e a le "   „He will e a le to "

m   t   ⟶   [m   tʷ]

„1SG"   „Perf"   „uproot"   „I have uprooted it"

/ɔ/   r   d   ⟶   [d

„3SG"   „Prog"   „eat"   „He is eating it"

/bɛ/   +   /bɛ   f   ⟶   [ɛbɛf

„3PL"   „Fut"   „take"   „They will take it"

/wɔ/   +   /bɛ   h   ⟶   [h

„3PL"   „Fut"   „ low"   „They will low it "

/jɛ/   +   f   ⟶   [jɛfʷʋ]

„1PL"   „clim "   „We clim it "

/bɛ/   +   w   ⟶   [w

„3PL"   „die"   „They die"

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Figure (15) shows the autosegmental representation of vowel harmony across morpheme boundaries in the Fiase dialect:

Figure 14: Vowel harmony across morpheme boundaries
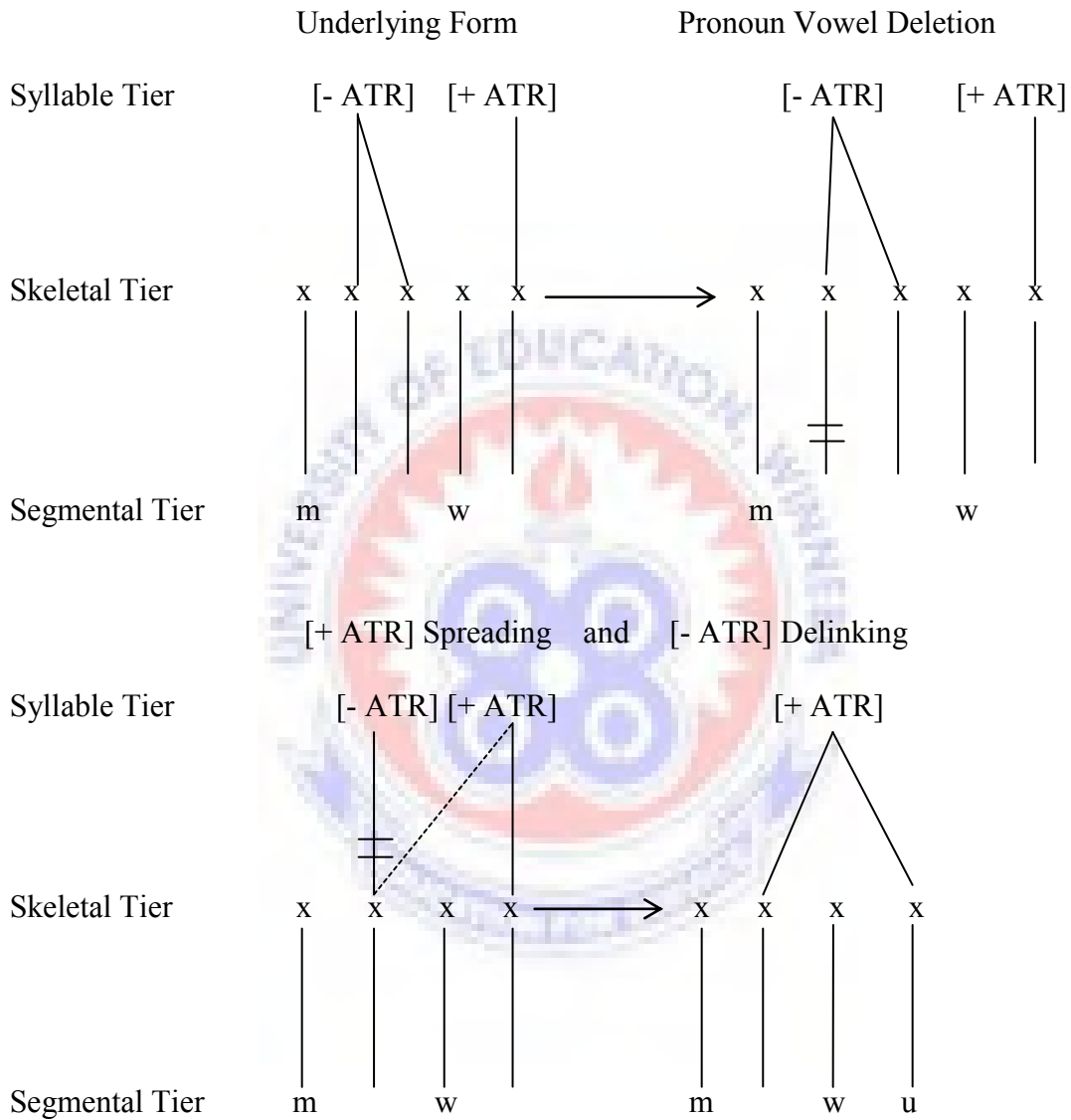
As can be seen from (14) above, the underlying form of the vowel in the first person singular is deleted. After this deletion the [+ATR] value of the vowel in the verb /u/ spread leftwards to delink the perfect affix /a/ to /æ/ causing it to value the quality of its vowel in accord with the ATR value of the vowel in the stem. It is important to note that

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affixes in both dialect have two different pronunciations depending on whether they occur with a verb stem that has a [+ATR] or [-ATR].

4.2.1.3 Vowels sequence between words

Sequences of two stem morphemes forming a compound also follow the ATR rule in the Amenfi and Fiase dialects. ATR harmony is not limited to only vowels in the stem but operates in words and across word boundary (Abakah, 2005). Vowel(s) in the second word transmits its ATR feature to those in the first word. This situation describe so far is found in example (10) below:

10. s   ɛjɛ   ⟶   [z jɛ   t

  „hand‟   „stomach‟   „palm‟

    s   k   ⟶   [z   ŋg   Am

  „hand‟   „left‟   „left hand‟

The representation in figure (15) below describes the phonological process above.

Figure 15: Vowel harmony across word boundaries

Underlying Form:

ATR Tier   [-ATR]   [+ATR]

Skeletal Tier   x   x   x ⟶ x   x x   x   x x

Segmental Tier   z   b e   k

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[+ATR] Spreading:

ATR Tier   [-ATR]   [+ATR]

Skeletal Tier   x   x   x   →   x   x x x x x

Segmental Tier   z   b   ŋ   g

[-ATR] Feature Delinking:

ATR Tier   [-ATR]   [+ATR]

Skeletal Tier   x   x   x   →   x   x x x x x

Segmental Tier   z   b   ŋ   g

Output Form:

ATR Tier   [+ATR]

Skeletal Tier   x   x   x   x   x x x x x

Segmental Tier   z   æ   b   ŋ   g

4.2.1.4 The low vowel and the raising rule in Amenfi dialect

The low vowel /a/ is a central vowel (Dolphyne, 1988; Marfo 2013). In the Wassa Amenfi dialect however, /a/ may be raised to the next higher mid-back vowels [o] or [ɔ] in some compound names. The alternation of this low vowel is accounted for by the feature specification of the vowel in the second word. That is, if the second word has a [+ATR] word. /a/ will be raised to [o], if it is [-ATR], it moves to the next higher [ɔ]. Examples in (11) illustrate this point.

Amenfi

11.   j :   f   ⟶   [j : f

       j :   m r   ⟶   [jɔ:ml

      /bʊ   nù   ⟶   [:n

       k   sʉ́   ⟶   [k   s ʉ́

       f   n m   ⟶   [f   m

       m   t ùt   ⟶   [m : t

       j :   ʊ   ⟶   [jɔ:bʊ

       j   kumi   ⟶   [j : kù

Figure 16 the autosegmental representation of the above data

Figure 16: Vowel harmony and raising in Amenfi

A. ATR Tier   [-ATR] [+ATR]   [-ATR] [+ATR]   [+ATR]

    Skeletal Tier   x   x   x   x   x ⟶ x   x   x   x   x   x x   x x

    Segmental Tie   j   a: k   u   m   j   a: k   u   m j æ: k   u   m
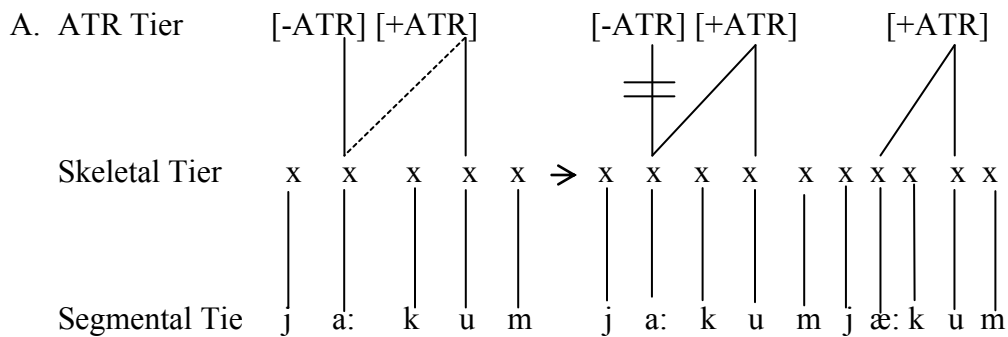
B. æ ⟶ o

From the above, the ATR value of the vowels in the second word spread leftwards and raises the vowel /a/ to [o]. Boadi (2009), however identifies the raising of /a/ to the next higher [+ATR] vowel [e] in some Fante dialects of the Volta-Comoe in certain environment of a verb containing a [+ATR].

4.2.1.5 Some infractions of the vowel harmony rule

The low vowel [a] in both dialects violates the ATR harmony rule. This is similar to the claim made by (Dolphyne, 1988; Bot, 2002; Owusu, 2002; Okeefe, 3003; Afful, 2006; Boadi 2009; Ofori, 2014). Examples in (12) are:

[d f   „talisma‟   [s k   „money‟

[it n   „deep hatred‟

Boadi (2009) argues with evidence from some of the Fante dialects that the two low vowels were distinct in most of the dialects of the Volta-Comoe. He claims that in the course of historical development, the opposition between them has disappeared from most varieties in favor of [a].

Another violation could also be found in the direction of harmony flow of those vowels. In nearly all cases, the vowel in a morpheme or a word on the immediate right of the boundary transmits its [+ATR] feature specification to the vowel of the morpheme or word on the immediate left of the boundary as seen in some of the example above. However, if a vowel occurs in suffix and is not protected by a consonant (Boadi, 2009) it assimilates to the root vowel. The direction of assimilation could be rightward (progression) in some limited cases. These are usually seen in the past affirmative suffix and perfect negative suffix in both dialects. The examples in (13) illustrate this point.

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13. di $\longrightarrow$ [d

„eat‟   „past‟   „ate‟

w $\longrightarrow$ [wù

„die‟   „past‟   „died‟

di $\longrightarrow$ [n

„NEG‟   „eat‟   „past‟   „have not eaten‟

w $\longrightarrow$ [ŋ^{w}ùù

„NEG‟   „die‟   „past‟   „have not died‟

4.2.2 Consonant nasalization

Nasalization is the perceived nasal resonance heard on speech sounds that are not originally nasal. Consonant nasal assimilation is the process whereby an oral consonant acquires nasality from a neighboring nasal consonant (Annan, 2009). Since a lowered velum determines the production of a nasal segment, an adjacent oral sound found in the environment of the nasal may adopt the feature of nasality. This is a common feature in the Wassa language.

Phonetically, all the Wassa dialects have [m], [ɱ], [n], [ɲ and [ŋ . However oadi (2009) recognizes two underlying nasal consonants: /m n/ where /m/ is [-Cor] and /n/ [+Cor] in which both are redundantly [-High, -Back]. This means that the labiodental [ɱ], palatal [ɲ and velar [ŋ are conditioned variants: They adopt the place of articulation of the initial consonant.

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4.2.2.1 Nasalization of voiced plosives and affricates

In both dialects, when a voiced plosive or an affricate is preceded by a nasal that has the same place of articulation as the voiced plosive or affricate, the oral consonant becomes nasal. The following examples in (14) below attest to this:

14. /m-/   +   /bɔ ⟶   [mmɔ]

„NEG‟   „kick‟   „don‟t kick‟

/m-/   +   /ɔ   ⟶ [mm

„PL‟   „female‟   „females‟

n-   d   ⟶   [n

„NEG‟   „eat‟   „don‟t eat it‟

s ɛm   s   ⟶   [sɛmm s

„matter‟   „ask‟   „question‟

Figure 17 illustrates this phonological process in both dialects.

Figure 17: Nasalization of voiced plosives

Underlying Form: [+Nasal] Feature Spreading Rightwards:

M. A. Tier   [+Nasal] [-Nasal]   [+Nasal] [-Nasal]

Skeletal Tier   x   x   x ⟶   x   x   x

Segmental Tier   m   b   ɔ   m   b   ɔ

<table>
<tr><td></td><td>[+Nasal] Feature Delinking:</td><td>Output Form:</td></tr>
</table>

	[+Nasal] Feature Delinking:	Output Form:
M. A. Tier	[+Nasal] [-Nasal]	[+Nasal]

Skeletal Tier   x   x   x   ⟶   x   x   x

Segmental Tier   m   b   ɔ   m   m   ɔ
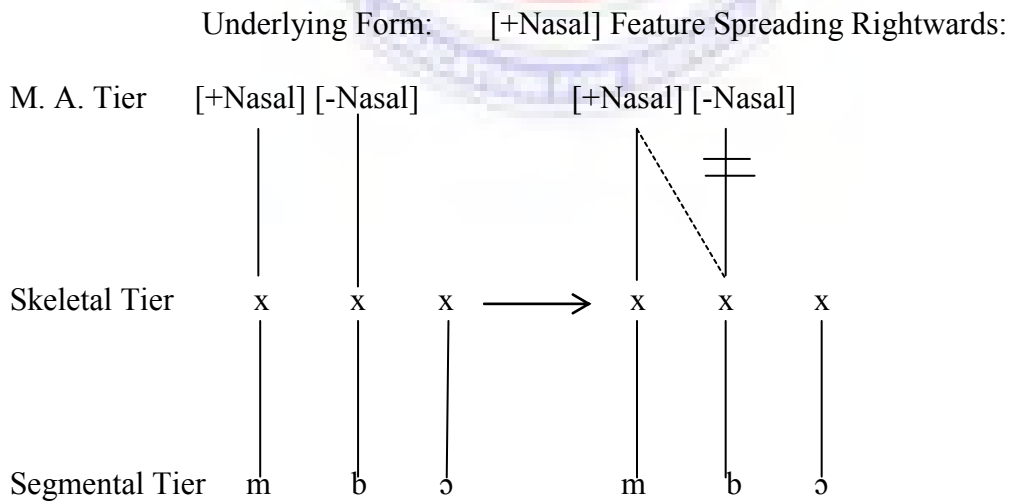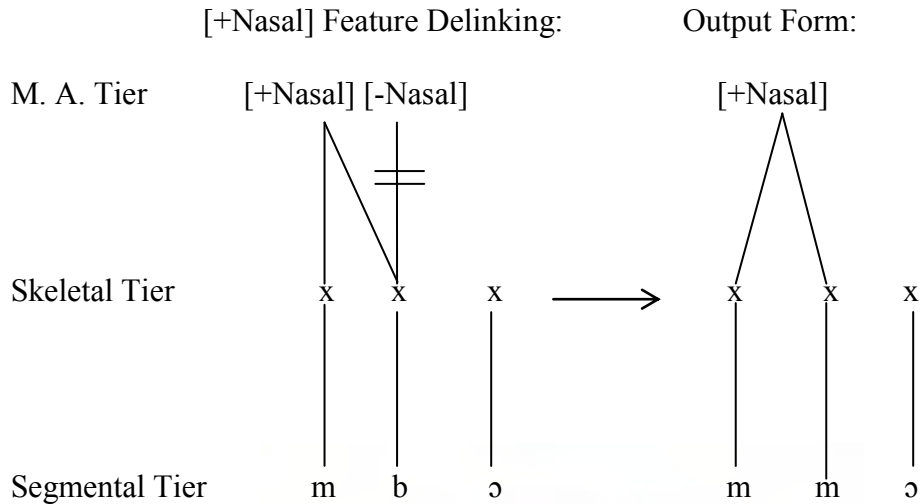
Since the negative nasal /m/ has the same place of articulation as the plosive /b/, the nasal quality spreads to the following consonant for it to be nasalized.

4.2.2.2 Bilabial lenition

Bilabial /b/ lenities to [m] in the Amenfi dialect. Examples are illustrated in data (15) below:

15.   **Fiase**   **Amenfi**

[ɲdʑ   [m ɲdʑ   „cassava‟

[m   [mm   „shoe‟

[t   [m t   „a piece of‟

[bʊtɕ   [mʊtɕ   „three stoned stove cooker‟

[bl   ʊɔ]   [ml   ʊɔ   „liver‟

[bɔɔdʊw]   [mɔɔdʊw   „plantain tu e r‟

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Below is the autosegmental representation:

Figure 18: Bialabial b/m lenition

P. A. Tier   [+Bil] [+Alv] [+Vl]   [+Bil] [+Alv] [+V1]

Skeletal Tier   x   x   x   x   x ⟶ x   x   x   x   x

Segmental Tier   ɲ   ʤ   m   ɲ   ʤ
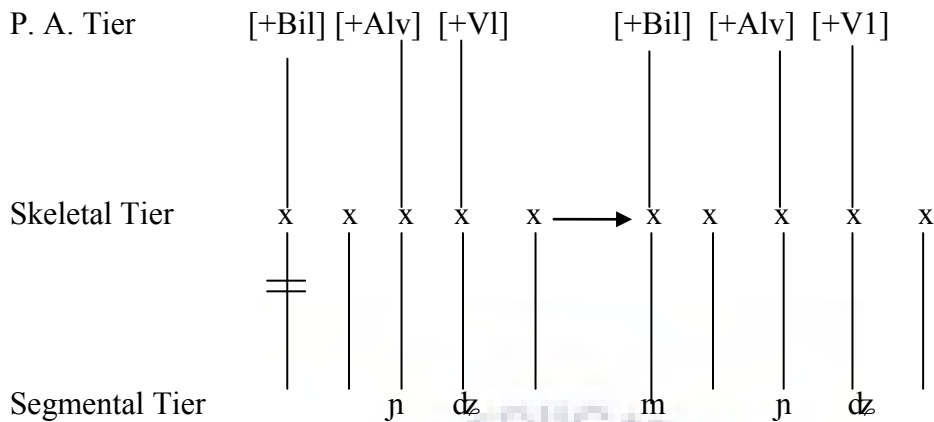
4.2.3 Consonant Mutation

Boadi (2009) defined consonant mutation under the general umbrella of consonant alternation where morph-initial obstruents become voiced after a nasal or vowel which is part of a specifiable grammatical affix. In wassa, obstruents become voiced if preceded by a nasal in every environment. It applies more consistently and in large portions of stems morphemes and across word boundaries. This rule is similar to Bono and Nzema but does not operate in many of the Akan languages. This can be illustrated by the following examples:

16. s   [z   „ħands‟

   k mf ʋɔ   [ŋg ɱvʋɔ   „a kind of food‟

   kùr ùm   [ŋglùm   „okro‟

   t   [d   „e cause‟

  mf r m   [ɱvl m   „wind‟

  n-   k r   [ŋgl

  „PL‟   „send‟   „spoken message‟

m-   fidi   [ɱv d

„PL"   „machine"   „machines"

/n-/   +   /kɔ   [ŋgɔ]

„NEG"   „go"   „don"t go"

/n-/   +   /kɛn/   [ɲʤɥɛn   Fs

„NEG"   „wait"   „don"t wait"

 n-   k   [ŋg

„NEG"   „say"   „don"t say it"

  ɛ   k   n   [ɛŋgʷ n   Fs

„palm"   „soup"   „palm-nut soup"

The phonological process above can be represented in autosegmental representation as in Figure 19 below.

Figure 19: Cosonant mutation

[+Voiced] Feature Rightward Spreading: [-Voiced] Feature Delinking:

M. A. Tier   [+Voiced]   [-Voiced]   [+Voiced]   [-Voices]

Skeletal Tier   x   x   x   ⟶   x   x   x

Segmental Tier   ŋ   k   ŋ   k

        Output Form:

M. A. Tier   [+Voiced]

Skeletal Tier   x   x   x

Segmental Tier   ŋ   g
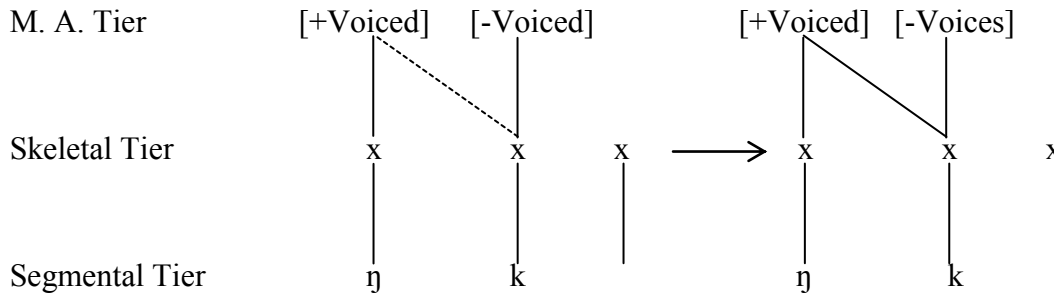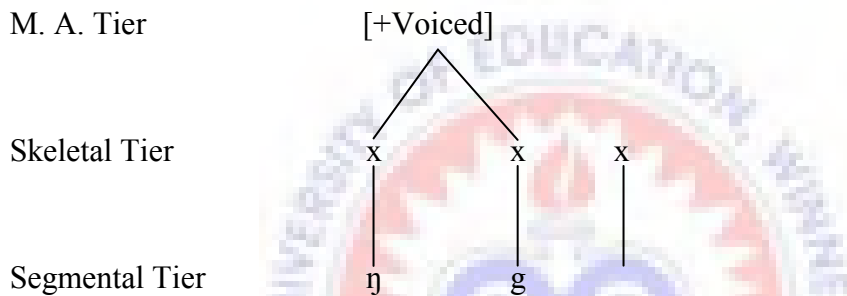
From the representation above, two processes occur at the same time. Both progressive and regressive assimilation occur under this phenomenon in Wassa.In the context where the underlying nasal has lost its vowel, the nasal /n/ assimilates to the following velar consonant in the point of articulation. This follows a consonant alternation rule by which velar stop /k/ changes to voiced [g].

4.2.4 Labialization of consonants

Labialization refers to the phonological case where a sound which is not normally rounded is articulated with a degree of lip rounding. It is phonetically marked with a superscripted „w‟ on the speech sound to e la ia lized. In Wassa a consonant is rounded when it is followed by a rounded vowel. Such consonants are said to be labialized. The following in (17) are some examples:

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17. /dʊ/ ⟶ [dʷʊ ,,to ripe‟

/kɔ p ɔ/ ⟶ [kʷɔ ʷɔ ,,goiter‟

pù ɛ ⟶ [pʷù ɛ ,,east‟

/kʊsɛ/ ⟶ [kʷʊsɛ ,,sorry‟

/bɔkɔɔ/ ⟶ [bʷɔkʷɔɔ ,,calm‟

kùr ⟶ [kʷĺʷ ,,city center‟

d ʊm ⟶ [d ʷʊm ,,cloth‟

d ʊndʊ ⟶ [d ʷʊndʷʊ ,,mosquito‟

k ⟶ [ŋ gʷ ,,left‟ Am.

Figure 20 shows an illustration of the consonant labialization assimilation process in the auto segmental representation.

Figure 20: Consonant labialization

Underlying Form: [+Round] Leftward Spreading

M. A. Tier [-Round] [+Round] [-Round] [+Round]

Skeletal Tier x x ⟶ x x

Segmental Tier d ʊ d ʊ

	[-Round] Feature Delinking:	Output Form:
M. A. Tier	[-Round] [+Round]	[+Round]
Skeletal Tier	x x $\longrightarrow$	x x
Segmental Tier	d ʊ	dʷ ʊ
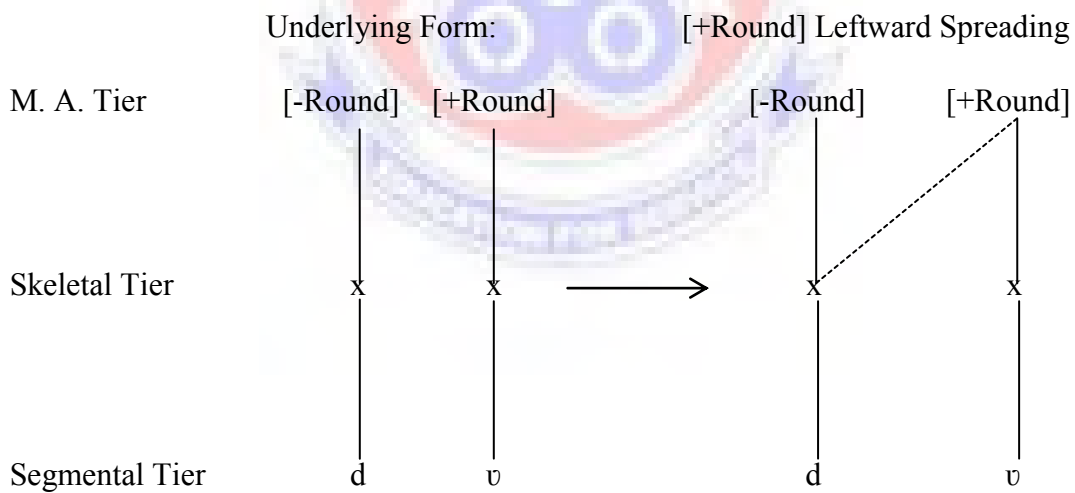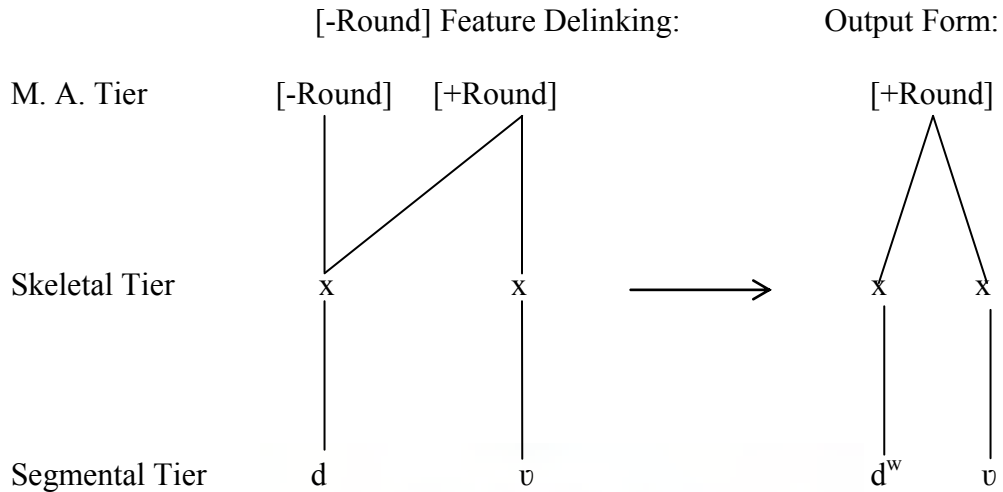
The alveolar /d/ is unrounded in the underlying form but it is however rounded in the environment of a following back vowel /ʊ/ as can be seen in the representation above.

However, there is evidence that shows that the back stop consonant is labialized before non-rounded vowels in Wassa. This is in line with ˌoadi ˌ2009ˌ who claims that we interpret every laˌializˌed consonant as a sequence of a simple consonant and a ˌack vowel in the underlying phonology. For instanceˌ in slow speechˌ the word [ŋgʷ ˌ is pronounced [ŋgʊ ˌ with some prominence on the back vowel. Examples are in (18) below:

18. ŋkʊ $\longrightarrow$ [ŋgʷ   „life‟

     /kɔ s $\longrightarrow$ [kʷ s   „foolish‟

     /kʊ $\longrightarrow$ [kʷ   „polish‟

     k ʊ t / $\longrightarrow$ [ŋgʷ d   „junction‟

     /ɛkʊ n $\longrightarrow$ [ɛkʷ n   „ɪoad‟   Fs

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Figure 21: Autosegmental representation of consonant labialize before non-

rounded vowels

Underlying Form: Deletion of [ʊ]:

M. A. Tier   [-Round] [+Round] [-Round]   [-Round] [+Round] [-Round]

Skeletal Tier   x   x   x ⟶   x   x   x

Segmental Tier   k   ʊ   k   ʊ

[+Round] Leftward Spreading   [-Round] Feature Delinking

M. A. Tier   [-Round] [+Round] [-Round]   [-Round] [+Round] [-Round]

Skeletal Tier   x   x ⟶ x   x

Segmental Tier   k   k

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Output Form:

M. A. Tier	[+Round]	[-Round]

Skeletal Tier   x   ⟶   x

Segmental Tier k^w
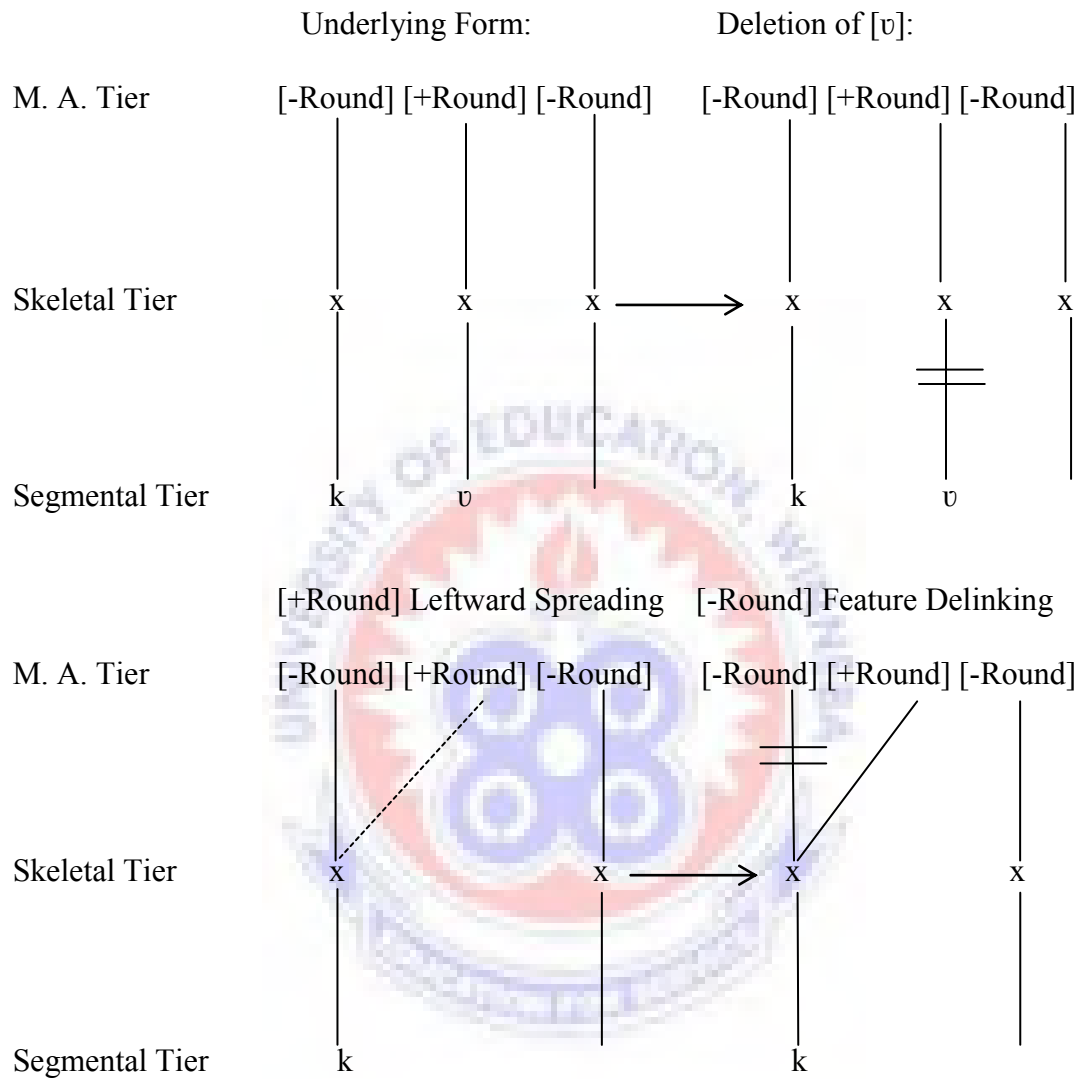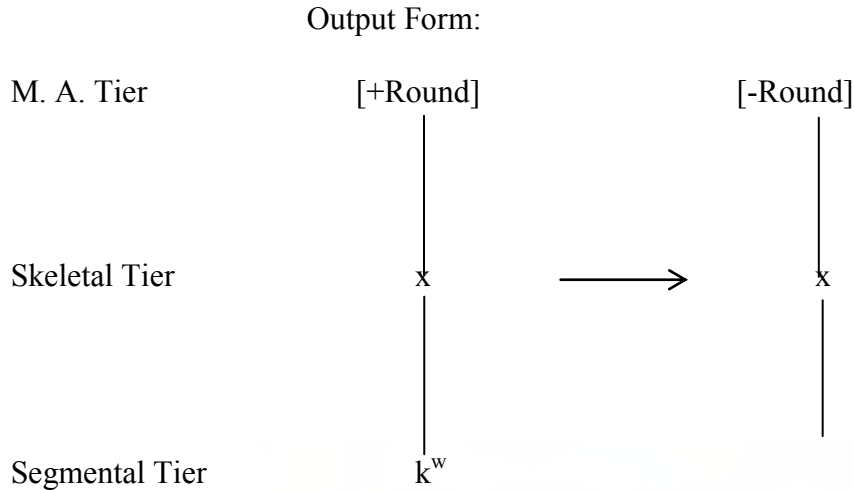
Indeed in the examples above, the high back vowel /ʊ/ becomes weakened in the development of such morpheme until it finally loses its resonance, leaving a reflex on the adjacent consonant /k/ as labialization.

4.2.5 Palatalization

Palatalization is another regressive assimilatory process in Wassa. Katamba (1989) describe it as a process where a velar consonant which is followed by front vowel, attains some slight anticipatory fronting of the part of the tongue that makes contact with the roof of the mouth. It is the simultaneous raising of the front part of the tongue towards the hard palate during the production of a non-palatal sound.

Even though distinction is made between back and non-back consonants is applied in both dialects. The back consonants are /k g h w/ and in the environment of the following underlying non-back non-low back consonants are fronted. That is, they are pushed forward to the palatal region. It should be noted that the stops among these consonants could be further affricated. Examples are:

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19. /kɛ/   ⟶   [tɕɛ   „present as gift"

    k   ⟶   [tɕɛ   „catch"

    k n   ⟶   [ɲdʑ n   „salt"

    /kɛns   ⟶   [tɕɛnz   „silver for cooking"

    /hɛ/   ⟶   [ɕɛ]   „wear"

Below shows the autosegmental representation:

Figure 22: Palatalization of consonants

Underlying Form: [+Front] Feature Leftward Spreading:

M. A. Tier   [-Front] [+Front]   [-Front]   [+Front]

Skeletal Tier   x   x   ⟶   x   x

Segmental Tier   k   k

[-Front] Feature Delinking: Affrication Accompanying Palatalization:

P. A. Tier   [-Front] [+Front]   [+Round]

Skeletal Tier   x   x   ⟶   x   x

Segmental Tier   t   t

M. A. Tier   [+Affr]

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Output Form:

P. A. Tier   [-Front]

Skeletal Tier   x   x

Segmental Tier   tɕ   ɪ

M. A. Tier   [+Affr]

4.3 Syllable Structure Process

Syllable structure processes are those processes that lead to the lost or addition of a sound in the word for morphophonological reasons. For instance, morphological process of compounding, and also some times in fast speech, sometimes results in segments lost. Similarly, the adaption of loan words into a language also results in segments insertations. These processes affect the basic syllable structure of words in a language by altering syllable shape of words. The syllable structure process that will be discussed here will include elision, insertion, and compensatory lengthening.

4.3.1 Elision

Elision is a phonological process through which a sound is lost. Abakah (2004) defines it a sed on how it operates in Fante as "a phonological process y which a vowel a consonant and sometimes a syllable, which is an intrinsic property of morpheme in the

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isolative style is dropped in the com ination style." In Wassa, the vowel, consonant or the whole syllable may be elided for economic use of speech.

4.3.1.1 Vowel elision

4.3.1.1.1 Deletion of high vowel preceded by a lateral

High vowels are deleted if they are preceded by [1] in the surface realization in both dialects. In fast speech one will conclude that, this language involves a consonant cluster following Dolphyne (1988), who made an attempt to discuss the elision of high vowels before [r] with the claim that Akan does not have a basic CCV structure, but only at the surface realization of it. Marfoh (2013) also argues that it should be analysis into CVCV because of application of economy-motivated process of vowel elision that results in syllable reduction. In a bid to ascertain that the elision of high vowel before [1] in Wassa ensues from a basic CVCV structure, there is the need to explore data from both dialects to give some piece of evidence. The data in (20) below illustrates this in both dialects.

20.   r $\longrightarrow$ [Í   „come‟

     k r $\longrightarrow$ [kÍ   „ask permission to leave‟

      kùr ùm $\longrightarrow$ [ŋglùm   „okro‟

     /bʊrɔ $\longrightarrow$ [l ɔ   „ eatings‟

     /pɪr $\longrightarrow$ [pl   „sweep‟

The representation in 23 represents this phenomenon:

Figure 23: Deletion of high vowels

Underlying Form: Deletion of Low Vowel

Syllable Tier

Skeletal Tier

Segmental Tier
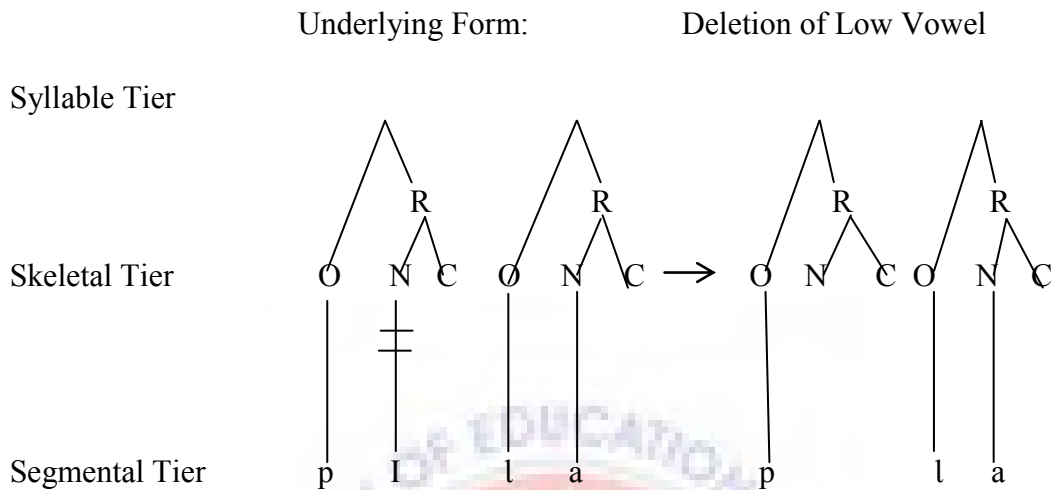
It is evidence in the above representation that the deletion of the High vowel does not affect the tone. The tone spreads to re-syllabify the [r] which also lenite to [l].Marfo (2013), identifies [l], [w], [y] in Anyi and Nzema which occur in the same environment but the vowel before it is never elided for the succeeding syllable has to be only a labio-dental approximant, [r] for the realization of CCV. According to him, [l] is not a traditional speech sound in Akan but [l] and [r] are free variants due to the strong influence of English on Akan. We take the position here that all high vowels are elided between two consonants where the sound consonant is [l] in the surface form.

Dolphyne (1988) also identified that [r] carries the tone of the deletion vowel preceding it in Akuapem and Asante while Fante it carries the tone of the deleted vowel following it.

4.3.1.1.2 Negative vowel deletion

The negative affix is a nasal segment homorganic with the following initial consonant. It leaves its voicing reflex on the o st ruent that follows it in all environments in almost all Wassa speaking towns. According to oadi 2009   the nasal segment is a reduce

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form of its full NV form as appears in Sehwi and Aowin. The negative is [n or [nɛ] in the context of command and perfect. For example: [nɛ! „don't come" or [n di „don't eat it". The alternation of the vowel is accounted for y the ATR Vowel Harmony Rule. The autosegmental representation illustrates this point:

Figure 24: Negative vowel deletion

Underlying Form: Syllabic Vowel Deletion: Negative Consonant Syllabicity: Output Form:

Syllable Tier:

Skeletal Tier   x   x   →   x   x   →   x   x   →   x

Segmental Tier   n   ɛ   n   ɛ   n
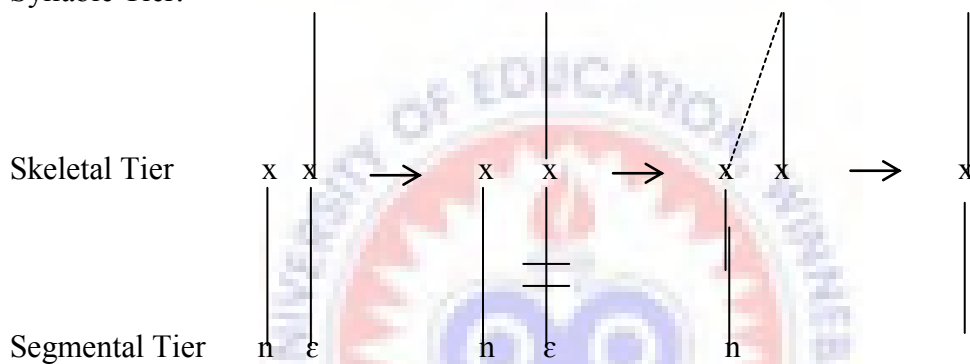
As can be seen from the representation above, the vowel [ɛ] is deleted through the historical development of a language (Boadi, 2009). The nasal therefore absorbs the syllabicity by an assimilatory process. We should note that in the present of a vowel, this negative nasal segment is non-syllabic because there is already a [+syllabic] segment in the syllable.

4.3.1.1.3 Deletion of high vowels after nasals in word final position

High vowels after nasals in word final positions in Wassa also get deleted. When this happen, the finial nasal become syllabic and, therefore, carries the tone of the deleted high vowel. The following examples illustrate this:

21. /tɪa   m   →   [tɪ

   „shout"   „inside"   „shout"

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/ɔm n   n   t   m   ⟶ [m d

„ɔountry‟   „PL‟   „twin‟   „inside‟   „region or state‟

4.3.1.1.4 Deletion of final mid vowels in fiase

Final mid vowels are elided in words in the Fiase dialect. Below we attempt to account for this deletion process in the Fiase dialects.

22. **Fiase**   **Amenfi**

[ŋg t   ⟶   [ŋg t ɛ   „groundnut‟

[tű   ⟶   [ɛtʋɔ   „ɔutt ocks‟

[d z   ⟶   [d z ɛ   „witness‟

The representation below proves this point:

Figure 25: Deletion of final mid vowels

                    Final mid vowel deletion:

Syllable Tier

Skeletal Tier   x   x   x   x   x   x ⟶

Segmental Tier   ŋ   g   t   ɪ   ɛ

Output Form:

Syllable Tier		
Skeletal Tier	x	x	x x x
Segmental Tier	ŋ	g	t ɪ
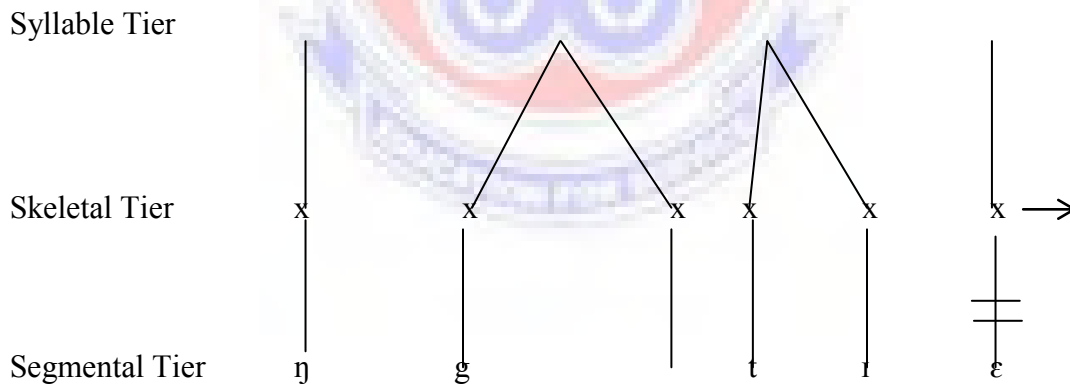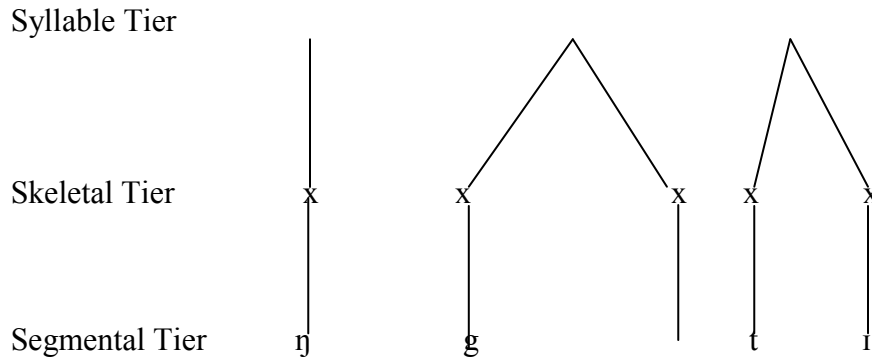
4.3.1.1.5 Deletion of intervocalic nasal in Amenfi

In the Amenfi dialect if a nasal realized as /n/ occur intervocalically as in CVNV, the nasal spread to the following vowel and is deleted. This nasalized vowel also assimilates to the preceding vowel of the deleted nasal. The examples below illustrate this point:

22. **Fiase**   **Amenfi**

   [ɔm n   ⟶   [ɔmaɪ   „country‟

   [k n   ⟶   [kaɪ   „ɾead‟

   [tɔn   ⟶   [tɔʊ]   „sell‟

   [dini   ⟶   [d   „name‟

   [m ŋg ni   ⟶   [m ŋg   „cocoyam‟

   [k n   ⟶   [kaɪ   „count‟

   [dini   ⟶   [d   „difficult‟

   [nd n   ⟶   [d   „veins‟

   [ɛkʷ n   ⟶   [ɛkʷ ɪ   „ɾoad‟

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The autosegmental representation illustrates this rule

Figure 26: Deletion of intervocalic nasal

[+Nasal] Feature Rightward Spreading: Deletion of Intervocalic Nasal:

Syllable Tier

Skeletal Tier   x   x   x   x   x ⟶ x   x   x   x   x

Segmental Tier   d   n   d   n

M. A. Tier   +Nas   -Nas
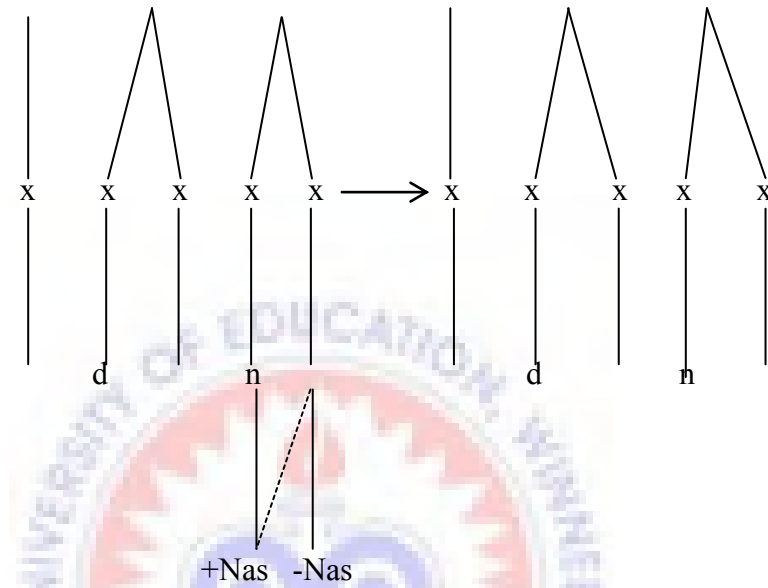
[+Nasal] Feature Leftward Spreading: Output Form:

Syllable Tier

Skeletal Tier   x   x   x   x ⟶ x   x   x   x

Segmental Tier   d   d

M. A. Tier   +Nas   -Nas
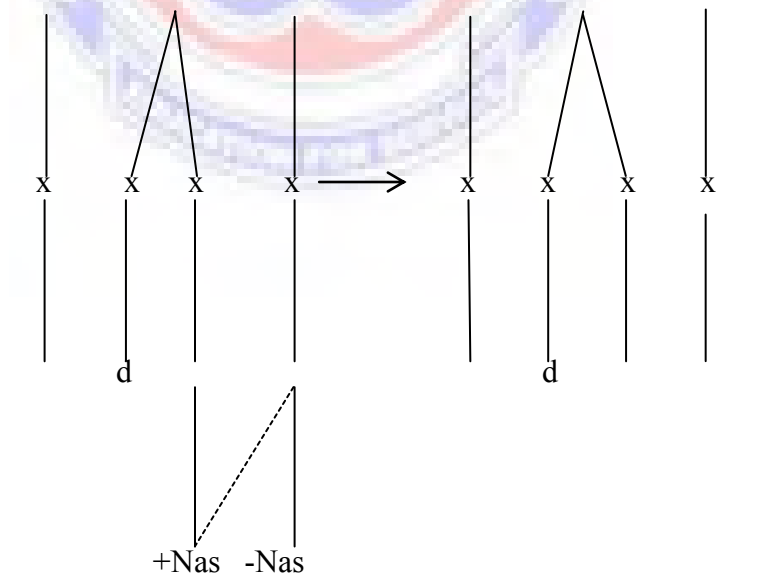
In the above, the consonant /t/ alternates to /d/ due to present of the voiced alveolar nasal. The intervocalic nasal /n/ also spreads to the final high vowel and deletes. This nasalized vowel also assimilates to the vowel preceded by the deleted nasal.

4.3.1.2 Consonant elision

4.3.1.2.1 Future consonant affix deletion

The future affix in the environment of the first person pronoun is deleted in both dialects.

Examples of this phenomenon are represented in (23) below:

23. m   ɛ/   +   /kɔ/ ⟶   [mɛkɔ]

   „lSG"   „Fut"   „go"   „I will go"

   m   +   /bɛ/   +   /fɪrɛ/ ⟶   [mɛflɛ]

   „lSG"   „Fut"   „call"   „I will call"

The representation below represents this point.

Figure 27: Future consonant affix deletion

a.   Deletion

Syllable Tier

Skeletal Tier   O N C   O N C   O N C → O N C   O N C   O N C

Segmental Tier   m ɪ   b ɛ   k ɔ   m _   _ ɛ   k ɔ

b.   Re-syllabification

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Syllable Tier

Skeletal Tier   O N C   O N C O N C → O N C   O N C

Segmental Tier   m   ɛ   k ɔ   m ɛ   k ɔ
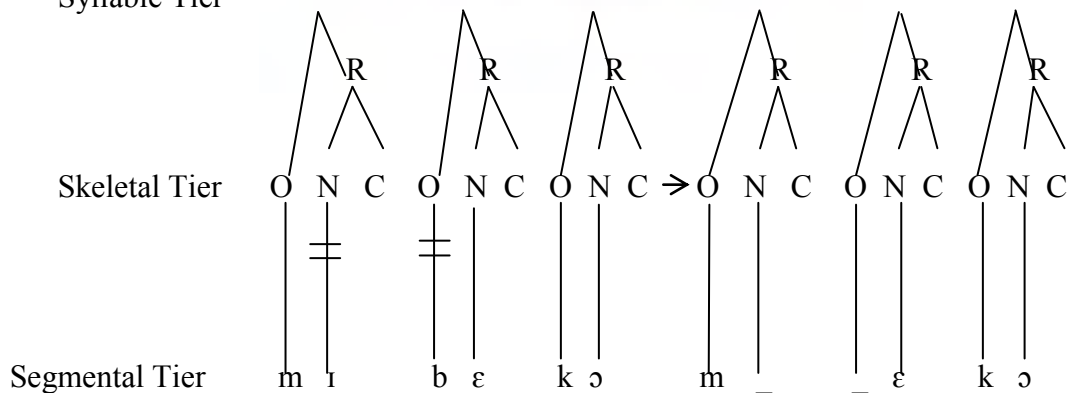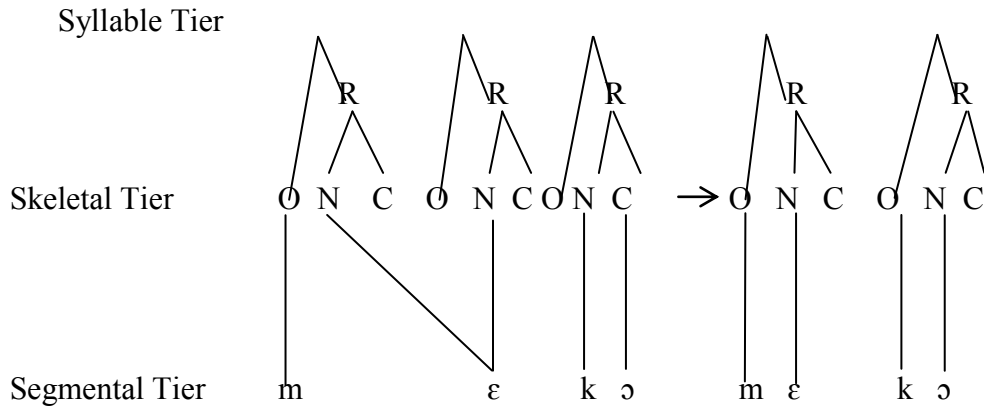
From the above representation, there are two process involves. The pronounce subject vowel [I] and the future consonant affix [b] is first deleted. The second process is re-syllabification where the pronoun subject [m] draws the vowel of the future affix [ɛ] to itself to produce [mɛkɔ].

4.3.1.2.2 The future and progressive affix deletion

The future and progressive affix deletes in the environment of a negative. They are identical in both dialects. Examples are seen below:

24. m   ɛ/   +   /n/   +   /di/ ⟶   [minni]

   „lSG"   „Fut"   „NEG"   „eat"   „I will not eat it"

     m   r   n   di   ⟶   [m nni

   „lSG"   „Prog"   „NEG"   „eat"   „I will not eat it"

   /m-/   +   /bɛ   ⟶   [mm

   „NEG"   „Fut"   „come"   „don"t come"

4.3.3 Insertion

Languages tend to simplify their syllable structure for ease of discourse or speech. Sapaty (2005), claims that insertion occurs when an extra consonant or a vowel find its way

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into the stem of a word when it originally have not been there. In Wassa when words are loaned from other languages, there is a tendency to resyllabify these words to suit it structure. The result is insertion and this marks such words which allow it to conform to the syllable structure of wassa. According to Owusu (2002), Akan does not have a constant cluster or word-final non-sonorant consonant, so consonant cluster in borrowed words are broken by insertion by usually, a high vowel. This phonological phenomenon is applicable in both dialects of Wassa. The data below support the claim:

25. /bʋk   [ùkù   „ook"

    /nɛɛs/   [nɛɛs   „nurse"

    sku:l   [sùk ù   „school"

    /mɪlk   [mlɪkɪ   „milk"

Figure 28: Insertion of High Vowels
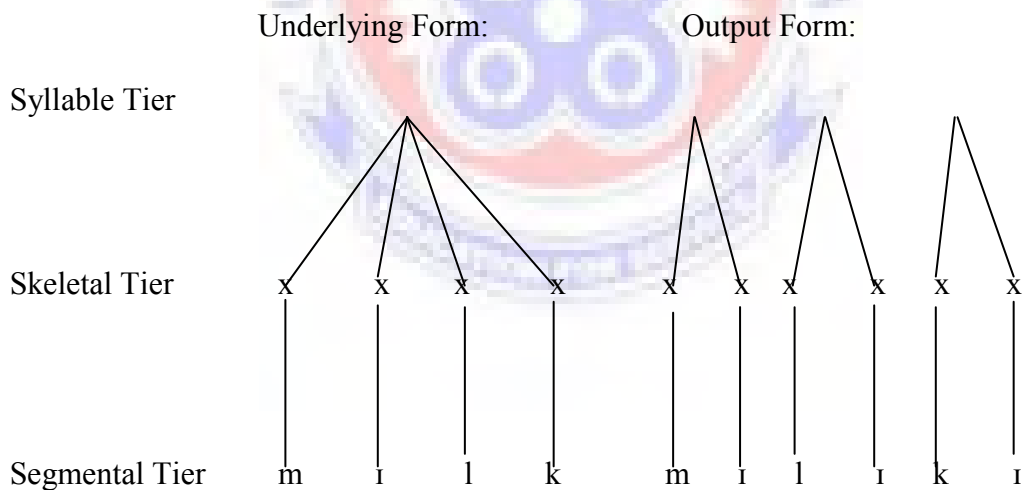
From the above, the consonant cluster is broken by inserting /ɪ/ between /l/ and /k/. The final vowel /ɪ/ is also inserted since /k/ does not end in a word in this language. It should be noted that most vowels involved in insertion are [+High] vowels and they follow the ATR rule.

4.3.4 Compensatory lengthening

Compensatory lengthening is an attested process in many languages including the Wassa languages. According to Hayes (1989), it is the lengthening of a segment triggered by the deletion or shortening of a nearby segment. When an underlying segment within a syllable is deleted, an adjacent syllable is lengthened to fill the gap created as a result of the deletion. Compensatory lengthening in Wassa is found with the realization of the past, progressive and perfect affixes.

4.3.4.1 The progressive affix lengthening

The progressive affix in it underlying form has a CV. According to Boadi (2009), the affix is represented in the central dialect of the Volta-Comoe language as [rɪ] derived from /dɪ/ by consonant lenition.

In both dialects, the derivation of the phonetic forms of the progressive underlying /rɪ/ is completely deleted to prepare the way for the realization of the various allomorphs. The progressive affix consonant is first deleted follow by the vowel. This follows the incorporation of another segment to fill the gap of the lost progressive affix. The choice of a particular allomorph of the progressive depends on the phonological segment immediately preceding it and the ATR value of the vowel(s) occurring in the verb on the right of the affix. In addition to the loss of the progressive affix and segment incorporation, the Fiase dialect incorporate segment pulls the high tone of the deleted progressive vowel onto itself.

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The data below provides evidence in both dialects:

26. **Amenfi**

/ɔ/ + /rɪ   d   ⟶   [d

„3SG"   „Prog"   „eat"   „he is eating"

/mɪ/ + /rɪ/ + /kɔ/   ⟶   [mɪɪkɔ]

„1SG"   „Prog"   „go"   „I am going"

/ɔ/ + /rɪ   ⟶   [ɔɔ

„3SG"   „Prog"   „come"   „he is coming"

Fiase

/ɔ/ + /rɪ   d   ⟶   [d

„3SG"   „Prog"   „eat"   „he is eating"

/mɪ/ + /rɪ/ + /kɔ/   ⟶   [mɪɪ!kɔ]

„1SG"   „Prog"   „go"   „I am going"

/ɔ/ + /rɪ   ⟶   [ɔɔ

„3SG"   „Prog"   „come"   „he is coming"

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The autosegmental phonology below accounts for the Wassa data

Figure 29: Progressive affix lengthening

Underlying Form: Progressive Affix Consonant Deletion:

Syllable Tier

Skeletal Tier

Segmental Tier

Progressive Affix Vowel Deletion: Segmental Incorporation

Syllable Tier

Skeletal Tier

Segmental Tier

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<table>
<tr><td></td><td>High Tone Dumping:</td><td>Output Form:</td></tr>
</table>

Syllable Tier

Skeletal Tier   x   x   x   x   ⟶   x   x   x

Segmental Tier   ɔ: ɔɔ: b

Tone Tier   [-High] [+High]
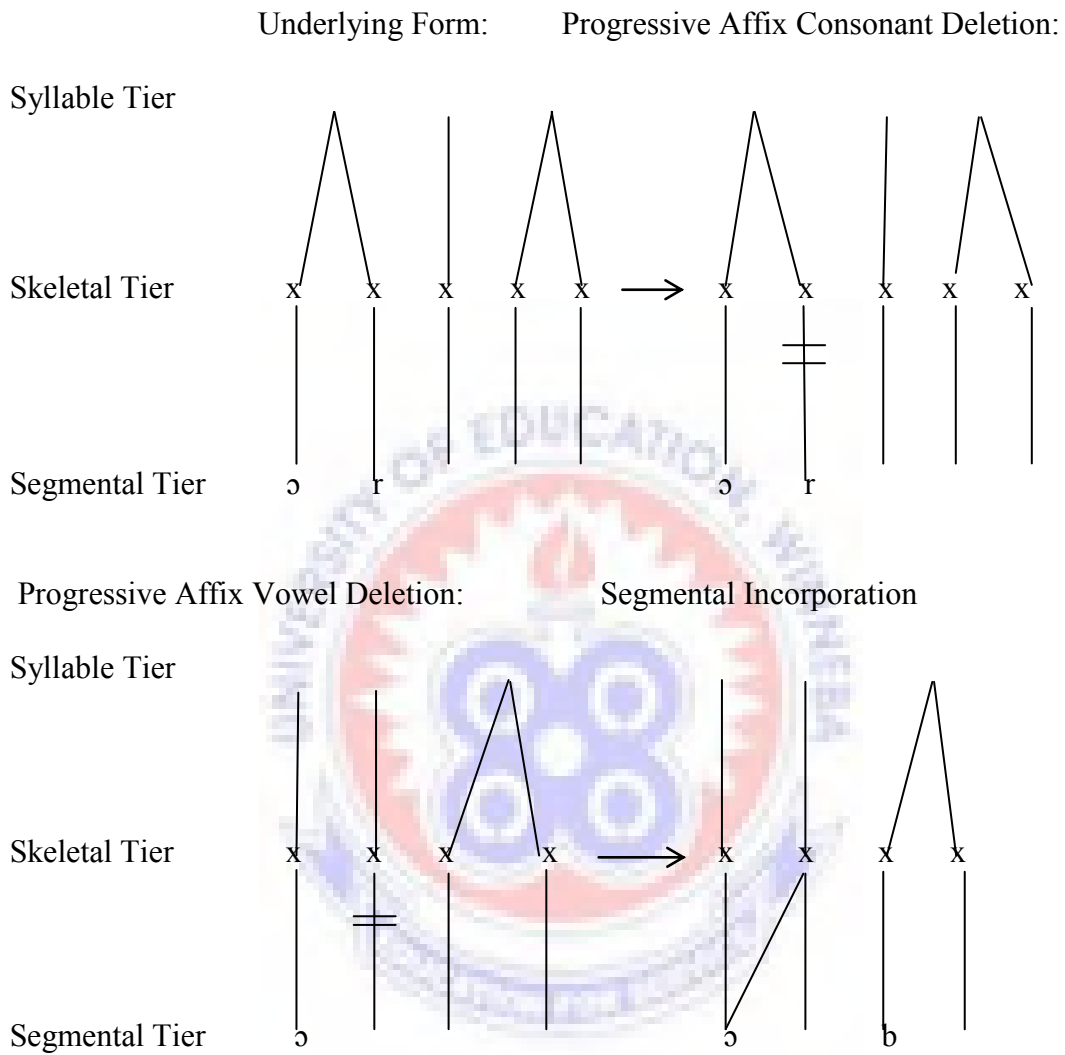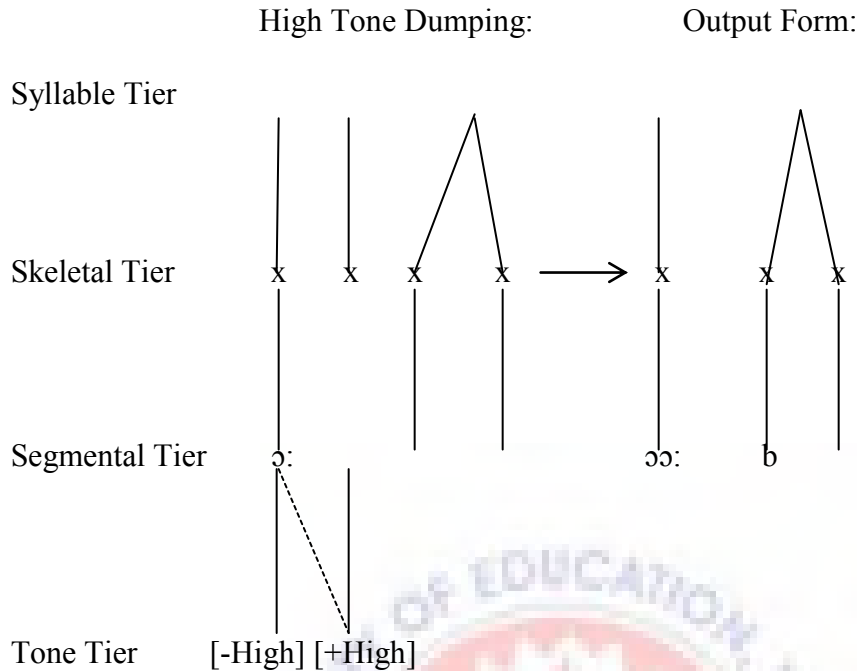
From the representation above, the progressive affix consonant /r/ is first deleted followed by the vowel /ɪ/. The third person plural vowel /ɔ/ incorporates another segment to fill the gap of the loss progressive affix.

4.3.4.2 Past affix lengthening

The past suffix in Wassa is realized as [ɪ]. In both dialects a segment becomes long if it is verb-stem final and is followed by the past suffix and another word. The past suffix vowel is elided and the elision process is compensated for by a lengthening of the stem-final vowel or consonant. Examples below illustrate the point:

26. /ɔ   h   ɪ/ # /nʊ   ⟶   [hùù

   „3SG‟   „see‟   „Past‟   „3SG‟   „he saw him‟

   /ɔ   k   ɪ/ # /nʊ   ⟶   [kùmm nʊ]

   „3SG‟   „kill‟   „past‟   „3SG‟   „he killed him‟

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Vowel Lengthening: Output:

Syllable Tier

Skeletal Tier   x   x   x   x   ⟶   x   x   x   x

Segmental Tier   h   h
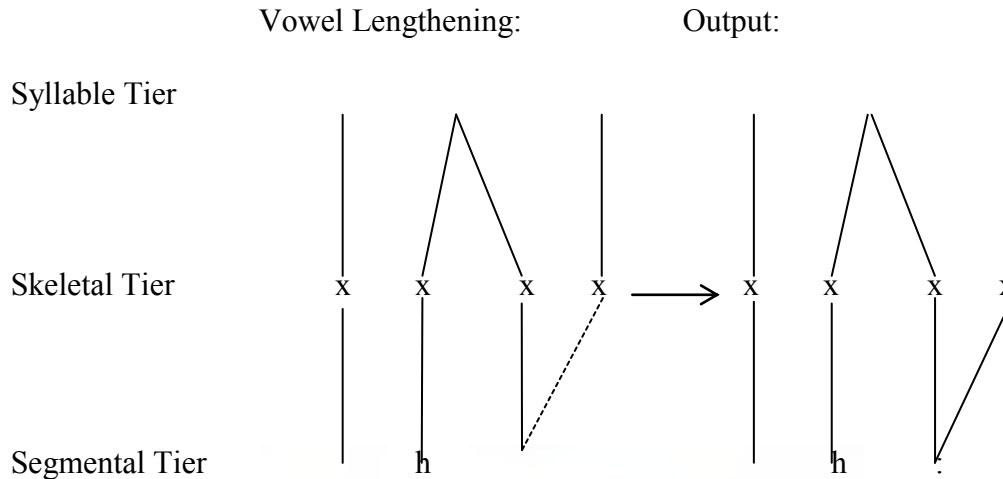
4.3.4.3 Perfect affix lengthening in fiase

Another difference between Fiase, on the one hand, and Amenfi on the other hand, is that whereas in the former the perfect in lengthened after the pronoun or noun vowel is deleted, there is no such lengthening in the latter. Examples below illustrate this point:

Amenfi

27. m   ⟶ [m

„lSG"   „Perf"   „come"   „I have come"

 /wɔ   t   ⟶   [w t

„3PL"   „Perf"   „ɲproot"   „They have uprooted"

Fiase

 /mɪ   ⟶   [m

„lSG"   „Perf"   „come"   „I have come"

/wɔ   t   ⟶   [w   t

„3PL"   „Perf"   „ɲproot"   „They have uprooted"

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The autosegmental phonology below represents this phenomenon.

Figure 30: Perfect affix lengthening0.

Underlying Form: Pronoun Vowel Deletion:

Syllable Tier

Skeletal Tier

Segmental Tier

Perfect Vowel Lengthening: [+ATR] Spreading:

Syllable Tier

Skeletal Tier

Segmental Tier

Tongue Root Tier   [-ATR]   [+ATR]   [-ATR]   [+ATR]

[-ATR] Delinking: [+High] Tone Dumping:

Syllable Tier

Skeletal Tier   x   x   x   x   x ⟶ x   x   x   x   x

Segmental Tier   b   t   b   æ: t

Tongue Root Tier   [-High]   [+High]

Output Form:

Syllable Tier

Skeletal Tier   x   x   x   x   x

Segmental Tier   b   æ: t

In both dialects, the vowel deletion rule applies to delete the morph-final vowel preceding the perfect prefix vowel. In the Fiase dialect, the prefix becomes long by incorporating another vowel unto itself. Tone formation rule copies the high tone of the verb on the right of the low of the perfect prefix to produce a compound gliding tone on the

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prefix. Finally, the automatic downstep rule applies to drop the tone on the verb from high to downstep.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATONS

5.1 Overview

The chapter summarizes the finding of the study; outline the conclusion drawn from the findings; states their contribution to knowledge; makes recommendations and suggests area for further study.

5.2 Summery of Findings

This thesis describes the phonological processes in the Amenfi and Fiase dialects of Wassa, The phonological processes discussed in this work include vowel harmony, nasalization, consonant mutation, labialization, elision, insertion, and compensatory lengthening.

1. The tongue root harmony is very consistent in both dialects. There is also evidence of raising of the low vowel /a/ to mid back vowel in the same compound name in Amenfi. We should remember that this raising rule depends on the ATR feature specification of the vowel in the second name.

2. The proces where plosives and affricates change to a nasal is one of the processes observed in both Amenfi and Fiase dialects of Wassa. Also, the phenomenon of consonant mutation where obstruents becomes voiced in the environment of nasals is very productive in Wassa. However, bilabial lenition where bilabial /b/ lenites to [m] is another difference within the Amenfi dialect and Fiase dialect.

3. A phonological process where a consonant is labialized is also similar to both dialects.

4. Palatalization where consonants are pushed forward to the palatal region is another phonological process shared by both dialects.

5. Elision of high vowels before a lateral, future consonant affix deletion in the environment of first person pronoun, deletion of future and progressive affix in the environment of negative and deletion of a high vowel after a nasal are seen as similar processes in both dialects. The deletion of a final mid vowel in Fiase and deletion of intervocalic nasal in Amenfi are the areas of differences.

6. Also, compensatory lengthening in the past and progressive is also similar in both dialects. However, lengthening of the perfect vowel in Fiase is different from Amenfi.

7. The insertion of high vowel in loan words to conform to the syllable structure of Wassa is similar in both dialects.

5.3 Conclusions Drawn from the Study

Based on the findings of the research we can conclude that;

8. Consonant mutation is a common phonological process to both dialects.

5.4 Contribution to Knowledge

The study contributes to knowledge in the following ways;

9. It is known in Akan linguistics that the low vowel is raised to the next front vowel (Dolpyne, 1988; Boadi, 2009) in Fante. But data in Amenfi dialect shows that the low vowel /a/ could be raised to the mid back vowel.

10. Bilabial lenition where /b/ lenites to [m] in Amenfi has not received attention in Akan.

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11. Also, lenition of /r/ to [I] is also very productive in both dialects of Wassa.

5.5 Suggestions for Further Studies

One study cannot exhaust everything that is worthy of being known. Based on this, the following areas for further studies are suggested. These areas include;

12. Further studies into the tonal structure of both dialects. The current study captured phonological processes at the segmental level.

13. A study into the morphology of Wassa. Such a study can take into consideration the claims made concerning the relation of phonology and morphology.

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APPENDIX

1.S/N	LIST ID	LIST GLOSS (ENGLISH)	AMENFI WORD	FIASE WORD
1	10	eye	n	n
2	20	ear	sũ	sũ
3	30	nose	ὲɕɥ n	ὲɕɥ n
4	40	mouth	ànũ	ànũ
5	43	tooth	ὲs	ὲs
6	45	tongue	tὲtɕìlὲma	tὲtɕìlὲma
7	48	lips	nũfafa	nũfafa
8	60	chin	àbɔʤɥ ɛ	àbɔʤɥ
9	70	jaw	pa da	pa da n
10	80	beard	àbɔʤɥ sɛ	àbɔʤɥ sɛ
11	90	cheek	àfʊnʊ	àfʊnʊ
12	100	face	n	n
13	110	forehead	mʊma	mʊma
14	120	head	t l	t l
15	150	hair (head)	t l ɲɥ	t l ɲɥ
16	160	hair (body)	hʊna ɲɥ	hʊna ɲɥ
17	170	fur	ɲɥ	ɲɥ
18	180	feather	t k l	t k l
19	190	horn	ὲmɛ	ὲmɛn
20	200	neck	ɛkɔʊ	ɛkɔʊ
21	210	throat	ɛm n	ɛm n
22	220	shoulder	t l	t l
23	230	armpit	m ɔtʊ	m ɔtʊ
24	236	the bush	ŋwùl	ŋwùl
25	250	breast	nŭfŭ	nŭfŭ
26	252	udder	nŭfŭ	nŭfŭ
27	262	milk animal"s	nŭfŭ z o	nŭfŭ z o
28	265	butter	s l d ɛ	s l d
29	280	chest	kʊkʊɔ	kʊkʊɔ
30	310	belly	fŭ	fŭ
31	320	navel	fùnùm	fùnùm
32	340	side of 89 body	ʤ	ʤ
33	342	rib	ɱv	ɱv
34	360	back	ætɛ	ætɛ
35	370	buttocks	ɛtʊɔ	ɛtʊɔ
36	380	tail	d ɥ	d ɥ
37	400	leg	naɪdɥ	naɪdɥ
38	420	thigh	ɛs lɛ	ɛs lɛ
39	440	knee	ŋg t dw	ŋg t dw
40	450	foot	ɛnaɪ	ɛnaɪ
41	500	arm	s	s

42	505	wing	t a ɪ	t a nɪ
43	550	hand	z	z
44	560	palm	z jɛ	z jɛ
45	580	finger	z t a	z t a
46	582	thumb	k kùl m t	k kùl m t
47	585	toe	n z ʊ	n z ʊ
48	590	fingernail	z mɔwɥ lɛ	z mɔwɥ lɛ
49	591	claw	mɔwɥilɛ	mɔwɥilɛ
50	600	body	n m dɥ	n m dɥ
51	610	skin (of man)	hʊn	hʊn
52	611	hide (animal skin)	ŋwʊma	ŋwʊma
53	620	wound	k l	k l
54	621	scar	t ɕɥ	t ɕɥ
55	630	bone	d m	d m
56	640	meat	ɛn	ɛn
57	650	fat	s l d ɛ	s l d ɛ
58	651	oil	ŋw	ŋw
59	660	vein	d	d n
60	680	egg	k s ɥ	k s ɥ
61	700	blood	m ʥ	m ʥ
62	710	saliva	d s	d s
63	720	tears	ni z	ni z
64	740	urine	ʥɥʊ z ɔ	ʥɥʊ z ɔ
65	750	sweat	ɱv fil	ɱv fil
66	760	feces / excrement		
67	800	heart	k ʊma	k ʊma
68	830	liver	m lɛbʊɔ	m lɛbʊɔ
69	860	guts / bowels	jɛm d ɛ	jɛm d ɛ
70	890	brain	ʥɥ n	ʥɥ n
71	1000	person	n m	n m
72	1050	children	ɔf l	ɔf l
73	1080	elder	p ɲini	p ɲini
74	1101	husband	k n	k n
75	1150	son	ɛ l m	ɛ l m
76	1151	boy	l ma	l ma
77	1200	woman	ɛ	ɛ
78	1201	wife	ɛj l	ɛj l
79	1250	daughter	ɛ a s	ɛ a s
80	1251	girl	s	s
81	1300	father	p p	p p
82	1310	mother	m m	m m
83	1320	brother	nɥ i l m	nɥ i l m
84	1321	elder brother	nɥ i l m p ɲ n	nɥ i l m p ɲ n
85	1322	young brother	nɥ i l m k t w	nɥ i l m k t w

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96	1330	sister	nu̧ b si	nu̧ b si
87	1331	elder sister	nu̧ b si p ɲ n	nu̧ b si p ɲ n
88	1332	younger sister	nu̧ b si k t w	nu̧ b si k t w
89	1340	friends	ɲwɔŋgʊɔ	ɲwɔŋgʊɔ
90	1350	mother"s r other	wɔf	wɔf
91	1355	father"s sister	s w	s w
92	1360	child (offspring)	ɛ	ɛ
93	1365	twins	d fʊɔ	d fʊɔ
94	1380	stranger	ɔhɔhʊɔ	ɔhɔhʊɔ
95	1390	enemy	ɔt m̧v	ɔt m̧v
96	1400	chief / king	ɛh n	ɛh n
97	1410	owner	wùl	wùl
98	1415	slave	k ʋ	k ʋ
99	1430	judge	t mm f ʋɔ	t mm f ʋɔ
100	1450	god	ɲ m	ɲ m
101	1460	spirit / ghost	s maɪ	s maɪ
102	1461	shadow	s nz	s nz
103	1470	name	d	d
104	1480	voice	ɛn	ɛn
105	1485	language	k s	k s
106	1490	story (tale)	n z sɛ	n z sɛ
107	1500	animal	ʋ	ʋ
108	1502	wild animal	wùl ʋ	wùl ʋ
109	1505	domestic animal	fi ʋ	fi ʋ
110	1508	sacrifice	fɔl ɔ	fɔl ɔ
111	1610	dog	k l maɪ	k l maɪ
112	1630	hyena	p t k	p t k
113	1650	cat	kùsù	kùsù
114	1660	lion	ʤ t	ʤ t
115	1670	leopard	s ɔ	s ɔ
116	1710	rat	kùsi	kùsi
117	1720	bat	paɪ	paɪ
118	1750	elephant	ɛsʊnʊ	ɛsʊnʊ
119	1790	baboon	k dùl m̧vi	k dùl m̧vi
120	1810	goat	p ɔ ʤɪ	p ɔ ʤɪ
121	1820	sheep	ʤɥaɪ	ʤɥaɪ
122	1850	pig	p l k	p l k
123	1890	horse	pɔŋgɔ	pɔŋgɔ
124	1900	cow (cattle)	n ʤɥ	n ʤɥ
125	1910	cow (female)	n ʤɥ ɪd ɛ	n ʤɥ ɪd ɛ
126	1920	bull	n ʤɥ ɲ n	n ʤɥ ɲ n
127	2000	bird	n ʋmaa	n ʋmaa
128	2010	chicken	k ʋkɔ	k ʋkɔ
129	2012	hen	k ʋkɔbɪd ɛ	k ʋkɔbɪd ɛ
130	2015	cock	k ʋkɔɲ n	k ʋkɔɲ n

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131	2020	eagle	kɔd ɛ	kɔd ɛ
132	2030	vulture	pɛtɛ	pɛtɛ
133	2040	guinea fowl	akɔŋvɛ	akɔŋvɛ
134	2050	dove	l	l
135	2060	pigeon	ʋlɔnʋma	ʋlɔnʋma
136	2110	tortoise	t ɕ tɕ d ɛ	t ɕ tɕ d ɛ
137	2120	lizard	p	p
138	2130	crocodile	dɛ ʥɛ	dɛ ʥɛ
139	2150	snake	ɛwɔ	ɛwɔ
140	2190	worm (earth)	ŋg l m	ŋg l m
141	2200	fish	nz n	nz n
142	2250	crab	kɔtɔ	kɔtɔ
143	2310	louse	edʑɥ	edʑɥ
144	2320	fly (house)	ŋw z n	ŋw z n
145	2330	honey	ɛwʋɔ	ɛwʋɔ
146	2332	honeybee	mɔbʋlɔ	mɔbʋlɔ
147	2340	grasshopper	ɛbɛ	ɛbɛ
148	2350	ant (soldier)	d ɛt	d ɛt
149	2360	termite	ɱvɔt ɛ	ɱvɔt ɛ
150	2370	spider	n z	n z
151	2380	scorpion	ɲ ɲ ʥ lɛ	ɲ ɲ ʥ lɛ
152	2500	tree	d ɥ	d ɥ
153	2510	bark (tree)	d ɥ t ɕi	d ɥ t ɕi
154	2520	leaf	ŋg mɔ	ŋg mɔ
155	2530	branch	ŋgʋl t	ŋgʋl t
156	2535	stick		
157	2540	root	nd	nd
158	2550	thorn	k s ɛ	k s ɛ
159	2580	fruit	dɥ	dɥ
160	2590	seed		
161	2620	millet	t ʋkʋɔ	t ʋkʋɔ
162	2640	maize	ùl	ùl
163	2650	rice	s k	s k
164	2660	banana	kw d	kw d
165	2665	plantain	bɔɔd ɛ	bɔɔd ɛ
166	2670	palm tree	ɛ	ɛ
167	2680	yam	j lɛ	j lɛ
168	2685	cassava	m ʥ	m ʥ
169	2690	groundnut	ŋg t ɛ	ŋg t ɛ
170	2710	tobacco	d	d
171	2720	grass	nz nzaɪ	nz nzaɪ
172	2750	forest	kw ɛ	kw ɛ
173	2760	"the ush"	ɱvʋfʋ	ɱvʋfʋ
174	2790	field (s)	ŋwùl	ŋwùl
175	2810	country	ɛmaɪ	ɛmaɪ

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176	2820	tribe / ethnic group	ùs ɥ k	ùs ɥ k
177	2830	village	kùl s	kùl s
178	2840	home	f	f
179	2850	house	ɛd	ɛd
180	2860	roof	ndʑɛnz d i	ndʑɛnz d i
181	2880	wall	ɛ a ɪ	ɛ a ɪ
182	2890	door	ɛpʊnʊ	ɛpʊnʊ
183	2900	gate	ɛpʊnʊkɛs ɛ	ɛpʊnʊkɛs ɛ
184	2910	fence	ɛ a ɪ	ɛ a ɪ
185	2930	path	n mɔʊ kwaɪ	n mɔʊ kwaɪ
186	2940	road	ɛkwaɪ	ɛkwaɪ
187	2970	well (water)	ɛ l	ɛ l
188	3000	thing (object)	d ɛ	d ɛ
189	3100	clothing	t l ɛ t d ɛ	t l ɛ t d ɛ
190	3120	shirt	t l ɛ t d ɛ	t l ɛ t d ɛ
191	3130	trousers	tʊlɔz	tʊlɔz
192	3150	shoe (s)	mm ʊ	mm ʊ
193	3180	ring (finger)	k w	k w
194	3200	rope	h ʊma	h ʊma
195	3210	string / thread	h ʊma	h ʊma
196	3220	mat (sleeping)	m	m
197	3310	chair	k ŋ w	k ŋ w
198	3320	stool	s s dʑɥ	s s dʑɥ
199	3350	drum (n)	tɕɥ n	tɕɥ n
200	3360	boat / canoe	ɕɛma	ɕɛma
201	3410	calabash / gourd	ɛkʊl	ɛkʊl
202	3420	basket	kɛndɛɪ	kɛndɛɪ
203	3430	load	d sʊ	d sʊ
204	3450	rubbish / garbage	bɔl	bɔl
205	3460	hole (in ground)	m ɪna	m ɪna
206	3510	mortar (grinding)	w d l	w d l
207	3520	pestle	dʑɥʊma	dʑɥʊma
208	3550	medicine	d l	d l
209	3555	poison	w d l	w d l
210	3570	salt	dʑ n	dʑ n
211	3600	pot (cooking)	k k	k k
212	3610	water pot (earthen)	h na	h na
213	3620	cooking pot (metal)	tɕɛ z ɪɪ	tɕɛ z ɪɪ
214	3700	iron (metal)	d d ɛ	d d ɛ
215	3710	knife	s kaɪmm	s kaɪmm
216	3720	bush-knife	s kaɪ	s kaɪ
217	3730	axe	kuma	kuma
218	3740	hoe	s ɔ	s ɔ
219	3750	arrow	dʑaɪ	dʑaɪ
220	3770	spear	p	p

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221	3775	fish-spear	d	d
222	3780	shield (n)	ŋg t sʊɔ	ŋg t sʊɔ
223	3799	war	k ʋ	k ʋ
224	3810	law	ɛm l	ɛm l
225	3910	charcoal	d	d
226	3920	fire	ʣ	ʣ
227	3940	smoke	ŋwùs	ŋwùs
228	3950	ash(es)	z ʋ	z ʋ
229	4010	night (time)	anaʣɥʋ	anaʣɥʋ
230	4011	darkness	s	s
231	4050	moon	bʊsʊmɪ	bʊsʊmɪ
232	4051	month	bʊsʊmɪ	bʊsʊmɪ
233	4050	star	z ʋlʊma	z ʋlʊma
234	4070	sun	æwɥ	æwɥ
235	4071	heat of day	ɛɕ ʋ	ɛɕ ʋ
236	4120	morning	n ɔap	n ɔap
237	4180	evening	æɲɥùm l	æɲɥùm l
238	4210	sky	w ɥi	w ɥi
239	4220	cloud (s)	m̰ń̰ńŋɡ̰ḿ	m̰ń̰ńŋɡ̰ḿ
240	4230	fog / mist	kùsùk k	kùsùk k
241	4250	wind	ɱvil ma	ɱvil ma
242	4260	storm	hɥ̰́	hɥ̰́
243	4300	water	z	z
244	4316	thunder	g l d	g l d
245	4340	dew	s	s
246	4460	sea	ɛpʋ	ɛpʋ
247	4510	mountain	p ɔ p pɔ	p ɔ p pɔ
248	4512	rock	ɔbʊtaɪ	ɔbʊtaɪ
249	4520	stone	bʊ	bʊ
250	4551	ground	ɛfɔm	ɛfɔm
251	4560	sand	ɛɲwaɪ	ɛɲwaɪ
252	4570	dust	ɱv t l	ɱv t l
253	4585	mud	atɛtɕɛ	atɛtɕɛ
254	4600	year	f	f
255	4610	rainy season	z ùtɔ l ɛ	z ùtɔ l ɛ
256	4620	dry season	ɛpɛ l ɛ	ɛpɛ l ɛ
257	5000	how many	ɛjɛ sɛɪ	ɛjɛ sɛɪ
258	5010	one	kʋ	kʋ
259	5020	two	mi nù	mi nù
260	5030	three	m ɛnza	m ɛnza
261	5040	four	ɛnaɪ	ɛnaɪ
262	5050	five	n	n
263	5060	six	nz a	nz a
264	5070	seven	ɛnzʋʋ	ɛnzʋʋ
265	5080	eight	ɛnwɔtɕɥ	ɛnwɔtɕɥ

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266	5090	nine	ɛŋgʊnʊ	ɛŋgʊnʊ
267	5100	ten	d	d
268	5120	twelve	d m i nu	d m i nu
269	5150	fifteen	d nu	d nu
270	5160	twenty	dù nu	dù nu
271	5170	thirty	dù sa	dù sa
272	5180	hundred	ɛh	ɛh
273	5190	thousand	p	p
274	5210	hot weather	ɛɕ	ɛɕ
275	5220	cold (weather)	w ɔ	w ɔ
276	5310	long (thing)	t d n	t d n
277	5311	tall	t d ɪɪ	t d ɪɪ
278	5312	deep	m d ɔ	m d ɔ
279	5320	short (thing)	t t	t t
280	5330	big	kɛs ɛ	kɛs ɛ
281	5240	wide	ɛtilɛ	ɛtilɛ
282	5350	small	k t w	k t w
283	5352	thin (thing)	ɕɥɪaa	ɕɥɪaa
284	5380	round (adj.)	kùl kùl w	kùl kùl w
285	5410	heavy	d l d l	d l d l
286	5412	difficult	d d ɪɪ	d d ɪɪ
287	5420	light in weight	h l	h l
288	5422	easy	m lɛ	m lɛ
289	5432	strong	dɪɪ	dɪɪ
290	5440	soft (surface)	m lɛ	m lɛ
291	5450	smooth	tʊlʊ t ʊlʊ	tʊlʊ t ʊlʊ
292	5455	shiny	ɕilɛɪ	ɕilɛɪ
293	5470	clean / pure	ɛhʊ t	ɛhʊ t
294	5475	defiled	gù hʊ f	gù hʊ f
295	5480	good	p p	p p
296	5490	bad	ɛɲɛ	ɛɲɛ
297	5510	bitter	ɲɥʊnʊ	ɲɥʊnʊ
298	5520	sour	s	s
299	5540	sweet	dɛɛdɛɛ	dɛɛdɛɛ
300	5565	truth	nʊkʊlɛ	nʊkʊlɛ
301	5580	false	k ɕɥ	k ɕɥ
302	5650	right (side)	nifa s	nifa s
303	5660	left side	ŋ g s	ŋ g s
304	5710	new	fʊfʊlɔ	fʊfʊlɔ
305	5720	young	kùmaa	kùmaa
306	5750	old (worn)	p ɲ n	p ɲ n
307	5810	all	ɲinaa	ɲinaa
308	5820	many / much	p l	p l
309	5830	crowd (of people)	ɛdɔm	ɛdɔm
310	5850	few	k k l	k k l

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311	5860	some		
312	5870	other / different	fʊfʊlɔ	fʊfʊlɔ
313	5910	red	kɔkɔɔ	kɔkɔɔ
314	5930	yellow	k ʊkɔsɪl d ɪɛ	k ʊkɔsɪl d ɪɛ
315	5940	green	h a ɪmʊnʊ	h a ɪmʊnʊ
316	5950	black	tu du	tu du
317	5960	blue	ùlùù	ùlùù
318	5980	white	f f	f f
319	6000	who?	hwaɪ	hwaɪ
320	6010	i	mɪ	mɪ
321	6020	you	wʊ	wʊ
322	6030	(s)he	ɔnʊ	ɔnʊ
323	6060	we	jɛɪ	jɛɪ
324	6070	you (pl.)	mʊ	mʊ
325	6080	they	wɔʊ	wɔʊ
326	6100	what?	dɛɪ	dɛɪ
327	6110	this	w	w
328	6120	that	ɛnʊ	ɛnʊ
329	6200	where?	ɛhɪ	ɛhɪ
330	6210	here	ɛh	ɛh
331	6220	there	ɛhɔ	ɛhɔ
332	6240	at	ɛwɔ	ɛwɔ
333	6250	(going) towards	ɛɛkɔ	ɛɛkɔ
334	6260	(coming) from	ɛɛ	ɛɛ
335	6280	near	ɛbɛɪ	ɛbɛɪ
336	6290	far	nʊhʊa	nʊhʊa
337	6300	before	n	n
338	6310	behind / after	tɕil	tɕil
339	6350	in	mu	mu
340	6370	above	ɛsʊlʊ	ɛsʊlʊ
341	6380	below	s ɛ	s ɛ
342	6400	how?	sɛɪ	sɛɪ
343	6420	with	ɛn	ɛn
344	6430	also	ɛnzʊ	ɛnzʊ
345	6435	and	ɛn	ɛn
346	6440	if	sɛ	sɛ
347	6450	when	d ɛɪ	d ɛɪ
348	6460	then / that time	s l ɛ nʊ	s l ɛ nʊ
349	6470	today	ɛnɛ	ɛnɛ
350	6480	yesterday	ɛnʊl	ɛnʊl
351	6490	tomorrow	ɛtɕɪna	ɛtɕɪna
352	6500	why?	d ɛɪ	d ɛɪ
353	6510	because	d	d
354	6550	no, not	d	d
355	6610	alive, to be	t sɪ	t sɪ

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356	6615	life	ŋgʊa	ŋgʊa
357	6620	dirty / to become	jɛ f	jɛ f
358	6630	become dry	w ʊ	w ʊ
359	6640	full / filled	ɛma	ɛma
360	6650	ripe, be	dʊ	dʊ
361	6660	botten	pʊlɔ	pʊlɔ
362	6670	sharp	na	na
363	6679	blunt, dull	ku	ku
364	6690	become wet	f ɔ	f ɔ
365	6790	sit (down)	t n s	t n s
366	6770	stand up	ʣɪna hɔ	ʣɪna hɔ
367	6771	to be standing	ʣɪna hɔ	ʣɪna hɔ
368	6772	to stop	ʣ	ʣ
369	6780	lie down	d hɔ	d hɔ
370	6781	to be lying	ɔd hɔ	ɔd hɔ
371	6840	sleep (v)	d	d
372	6850	dream	sʊm d	sʊm d
373	6860	fear	sùl	sùl
374	6870	anger; be angry	bʊ f	bʊ f
375	6880	hunger; be hungry	ɛkɔ	ɛkɔ
276	6890	thirst; be thirsty	z ùkɔ	z ùkɔ
377	6900	shame; be ashamed	n w	n w
378	6910	illness; be ill	j l ɛ	j l ɛ
379	6920	sorrow; be sad	w lɛhʊɔ	w lɛhʊɔ
380	6930	joy; be joyful	n ʣ	n ʣ
381	7010	to bite	k	k
382	7020	eat	d	d
383	7025	food	dɥ aɪ	dɥ aɪ
384	7030	drink	z a	z a
385	7032	to smoke (something)	h	h
386	7050	vomit	f	f
387	7110	to cough; a cough	bɔ ɛw	bɔ ɛw
388	7115	sneeze	hwɪtɪ	hwɪtɪ
389	7150	suck	f	f
390	7152	suck (breast)	nu	nu
391	7170	spit	t d s	t d s
392	7190	blow	h	h
393	7192	the wind blows	ŋv l ma ɔ	ŋv l ma ɔ
394	7195	breathe	hʊmɪ	hʊmɪ
395	7230	yawn (v)	h l m	h l m
396	7315	song	ɛɲwʊ	ɛɲwʊ
397	7320	dance (v)	s	s
398	7325	dance (n)	s	s
399	7340	play (v)	d g ʊlɔ	d g ʊlɔ
400	7350	laugh (v)	s l	s l

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401	7360	weep	su	su
402	7370	to bark	p	p
403	7372	cry out	su	su
404	7375	make noise	j d d	j d d
405	7400	say	ka	ka
406	7410	to talk / speak	k s	k s
407	7420	answer	ji nʋ	ji nʋ
408	7450	ask (question)	s	s
409	7455	ask for	s ma	s ma
410	7460	to command	ɕɛ sʋ	ɕɛ sʋ
411	7465	to rule	d sʋ	d sʋ
412	7470	obey	d sʋ	d sʋ
413	7475	refuse	dù sʋ	dù sʋ
414	7480	to swear an oath	ka da	ka da
415	7490	to curse (someone)	bɔ kʋlɔ	bɔ kʋlɔ
416	7495	insult	d atɛ	d atɛ
417	7510	see	hu ad ɛ	hu ad ɛ
418	7520	look at	ɕᶣɛ	ɕᶣɛ
419	7535	teach	tɕ lɛ	tɕ lɛ
420	7550	hear	t	t
421	7560	listen to	t	t
422	7570	to smell (something)	hua	hua
423	7575	smell; stink	bɔʋ	bɔʋ
424	7600	know (something / one)	n	n
425	7610	learn	sua	sua
426	7614	remember	k ɪ	k ɪ
427	7615	forget	w lɛ f	w lɛ f
428	7620	count (v)	kaɪ	kaɪ
429	7622	read	kaɪ	kaɪ
430	7625	book	ŋwʋma	ŋwʋma
431	7630	write	tɕᶣ lɛ	tɕᶣ lɛ
432	7650	think	ʤᶣ n	ʤᶣ n
433	7700	to love	dɔ	dɔ
434	7730	need (v)	h a	h a
435	7750	to seek	ɕᶣ ɕᶣɛ	ɕᶣ ɕᶣɛ
436	7790	carry	sʋ	sʋ
437	8000	take	ta	ta
438	8004	catch	tɕ	tɕ
439	8005	hold	s	s
440	8010	to lift / raise	p ʤ	p ʤ
441	8020	give	ma	ma
442	8022	gift	atɕɛd ɛ	atɕɛd ɛ
443	8030	pay	tᶣ	tᶣ
444	8035	money	s k	s k
445	8040	cost	ɛbʋɔ	ɛbʋɔ

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446	8050	to get / receive	ʤ	ʤ
447	8060	steal	wɥi	wɥi
448	8070	to hide (something)	f s	f s
449	8080	lie (tell lies)	k ɕɥ	k ɕɥ
450	8090	deceive	d d	d d
451	8100	buy	tɔ	tɔ
452	8105	sell	tɔʊ	tɔʊ
453	8110	to marry (a wife)	w l	w l
454	8130	bear child	wʊ	wʊ
455	8131	bear twins	wʊ d	wʊ d
456	8135	be born	wʊ	wʊ
457	8210	to die	w	w
458	8220	kill	ku	ku
459	8250	to live	t s	t s
460	8310	to leave, depart	ʤ hɔ kɔ	ʤ hɔ kɔ
461	8320	to go (somewhere)	kɔ	kɔ
462	8340	arrive		
463	8341	return	saɪ	saɪ
464	8342	go out	p	p
465	8334	enter	d l	d l
466	8344	go up	kɔ sʊlʊ	kɔ sʊlʊ
467	8346	follow	d tɕ	d tɕ
468	8347	bring	f l	f l
469	8350	send (someone)	sʊma	sʊma
470	8410	fly (v)	t	t
471	8415	jump	hùl	hùl
472	8430	swim	bʊlʊ	bʊlʊ
473	8431	dive	tɕɥ	tɕɥ
474	8432	float	tɛ n	tɛ n
475	8450	walk	na d	na d
476	8460	run	tù m l k	tù m l k
477	8470	fall	tɔ	tɔ
478	8480	turn	danɪ	danɪ
479	8510	scratch	t	t
480	8512	scratch oneself	t t	t t
481	8530	rub	w s	w s
482	8550	wipe	p p	p p
483	8650	pour	ɕɥ	ɕɥ
484	8660	wash	hʊlʊ	hʊlʊ
485	8662	to bathe (oneself)	ʤɥ l	ʤɥ l
486	8662	wash one"s hands	hʊlʊhʊ wʊ z	hʊlʊhʊ wʊ z
487	8665	wash (clothes)	hʊlʊ t dɪɛ	hʊlʊ t dɪɛ
488	8670	sweep	p l	p l
489	8675	broom	p l jɛ	p l jɛ
490	8710	open (v)		

491	8720	shut (v)	tu	tu
492	8800	break (tr)		
493	8810	split (wood)	p	p
494	8812	tear (v tr)	t	t
495	8814	divide	tɕɛ	tɕɛ
496	8820	cut	tɕɥ	tɕɥ
497	8840	chop	tɕɥ	tɕɥ
498	8850	stab (pierce)	wɔ	wɔ
499	8880	fight	kʊ	kʊ
500	8900	hit, strike	bɔ	bɔ
501	8910	beat	bʊ	bʊ
502	8930	to hurt someone	p l	p l
503	8940	help (v)	bʊ	bʊ
504	8950	heal	s	s
505	8955	healer	s fʊɔ	s fʊɔ
506	9010	throw (v)	tʊ	tʊ
507	9015	throw away	tʊ tɕɥɪnɪ	tʊ tɕɥɪnɪ
508	9020	push (v)	p a	p a
509	9030	pull (v)	tɕɥɪ	tɕɥɪ
510	9050	press	hʊ	hʊ
511	9052	squeeze	tɕi	tɕi
512	9100	tie	tɕ tɕl	tɕ tɕl
513	9200	build	s	s
514	9210	make	jɛ	jɛ
515	9220	do	jɛ	jɛ
516	9230	work (v)	jɛ dʑɥuma	jɛ dʑɥuma
517	9235	work	dʑɥuma	dʑɥuma
518	9240	to create	ɲɥ n	ɲɥ n
519	9255	blacksmith	ɔtʊɲvʊɔ	ɔtʊɲvʊɔ
520	9260	begin	ɕɛ as ɛ	ɕɛ as ɛ
521	9270	finish	w	w
522	9280	to sew	pa	pa
523	9290	weave	ɲɥɪnɪ	ɲɥɪnɪ
524	9295	weaver	ɔɲɥɪnɪfʊɔ	ɔɲɥɪnɪfʊɔ
525	9400	dress	ɕɛ	ɕɛ
526	9450	to braid, to plait	ŋwa	ŋwa
527	9500	hunt (v)	kɔ h	kɔ h
528	9505	hunter	bɔmmɔfʊɔ	bɔmmɔfʊɔ
529	9510	shoot	tʊ	tʊ
630	9520	gun	t	t
531	9550	cook (v)	nʊa	nʊa
532	9700	cultivate	dɥ	dɥ
533	9710	to plow	fu da m	fu da m
534	9720	plant (v)	dɥ	dɥ
535	9730	to dig (a hole)	tù m ɪna	tù m ɪna

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536	9750	bury	s	s
537	9800	burn (something)	ɕ	ɕ
538	9810	kindle	sɔ	sɔ
539	9830	extinguish	du	du
540	9900	shiver	pʊ	pʊ
541	9950	swell	hʊnʊ	hʊnʊ