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SEGMENTAL AND PROSODIC STRUCTURES IN ƐSAHIE

BY

VICTORIA OWUSU ANSAH

(10063507)

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DECLARATION

I, **Victoria Owusu Ansah,** declare that this research work has not been submitted, either in whole or in part, for the award of any degree elsewhere. All references used in the work have been duly acknowledged, and I am solely responsible for any error detected in the work.

………………………………….. …………………………

VICTORIA OWUSU ANSAH DATE

CANDIDATE

……………………………………… ………………………………

DR. GEORGE AKANLIG-PARE DATE

SUPERVISOR

……………………………………… ……………………………

DR. SETH ANTWI OFORI DATE

SUPERVISOR

……………………………………… …………………………

DR. CLEMENT K. I. APPAH DATE

SUPERVISOR

DEDICATION

THIS THESIS IS DEDICATED TO MY HUSBAND AND CHILDREN,

MY SIBLINGS,

AND

MY MOTHER

THANK YOU FOR BELIEVING IN ME.

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ABSTRACT

Studies show that one quarter of the world's languages are spoken in Africa, yet most of these languages remain unstudied or not fully described (Blench 1998). This may have driven (Crystal 2000) to caution that most languages will be in extinction by 2020, hence the need for inter-generational transmission to help preserve them. One such means of preservation is documentation. Unfortunately, for Ɛsahie, a Kwa language with over 580,000 speakers (2010 National Population Census) located in the Western North Region of Ghana, not much documentation is available, compared to other languages such as Akan, Ewe, Ga and Nzema.

Accordingly, using the qualitative research methodology, this study examines some phonological issues in the language. It investigates the principles that underlie and therefore regulate the organization of segments and prosodic units in Ɛsahie. The study discusses the inherent features of Ɛsahie speech sounds and the constraints on their distribution and sequencing, and establishes the repair strategies available in Ɛsahie for dealing with impermissible sound distributions and sequences. The study further examines the tonal structure of nouns and verbs, both in the basic forms and the non-basic forms. On nouns, the thesis establishes three tonal groups for basic nouns and examines the tonal structure of affixed nouns, deverbal nouns, and reduplicated nouns. The study shows that while nominal suffixes trigger tonal change in the base nouns, nominal prefixes do not.

For verbs, the thesis looks at the tone of inflected as well as reduplicated verbs to identify the tonal processes that occur when tones interact and how they influence lexical and grammatical patterns in the language. It establishes three tonal groups for un-inflected verb forms in Ɛsahie. It further shows that tone influences the inflection of verbs in the language and that tone assignment varies, depending on the verb's tense, aspect or mood but there is no attendant segmental alternation in the lexical verb.

The study is based on data from both primary and secondary sources. The primary data is from field trips to some selected towns in the language community, while the secondary data is from literature written in the language. This thesis is instructional as it will add to the linguistic information available on Ɛsahie and contribute to our understanding of the segmental and prosodic systems of African languages.

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LIST OF ABBREVIATIONS

1	First Person
2	Second Person
3	Third Person
ADJ	Adjective
ADV	Adverb
ATR	Advanced Tongue Root
C	Consonant
C_1	First Constituent
C_2	Second Constituent
DEF	Definite Article
DEM	Demonstrative
FUT	Future
H	High
HAB	Habitual
HNA	Homorganic Nasal Assimilation
HT	High tone
HTS	High Tone Spread
IMP	Imperative
L	Low
LT	Low tone
LTS	Low Tone Spread
N	Noun
NEG	Negative
NMLZ. PRFX.	Nominalisation Prefix

NMLZ. SUFX	Nominalisation Suffix
NP	Noun Phrase
OCP	Obligatory Contour Principle
PERF	Perfective
PL	Plural
PRFX	Prefix
PROG	Progressive
IMP	Imperative
PST	Past
RED	Reduplicated
SF	Surface Form
SG	Singular
SUBJ	Subject
SUFX	Suffix
TBU	Tone Bearing Unit
UR	Underlying Representation
V	Vowel
V_1	First Vowel
V_2	Second Vowel
WFC	Well Formedness Condition

CHAPTER ONE

GENERAL INTRODUCTION

1.1 Introduction

The aim of this dissertation is to investigate the principles that underlie and therefore regulate the organization of segmental and prosodic structures in Ɛsahie by bringing to light the processes involved in the syllable and tonal structure of words in the language. This chapter introduces the thesis and is structured as follows; section (1.2) is on the background of the language and its ethnographic information, section (1.3) is on the geographical location of Sehwi, sections (1.4) review previous studies in the language, while section (1.5) presents the problem statement. In the rest of the chapter, we present the objectives of the study (section 1.6), the research questions guiding the study (section 1.7), the methodology (section 1.8), ethical considerations (section 19) and the organisation of the study (section 1.10). Section (1.11) concludes the chapter.

1.2 Background of the Language and Ethnographic Information

History has it that the people of Sehwi once lived with other Akan tribes and groups before moving to their current location. Their migration was necessitated by war, famine and lack of farmland. Their first settlement was at Takyiman, then Afiena (present Wassa Amenfi) before they finally settled at Enuwomaso where they established the Sehwi state. Presently, pockets of people from every tribe in Ghana

may be found in Sehwi, with Akans being the predominant group of settlers. Ɛsahie is the language spoken by the people of Sehwi. The word "Ɛsahie" is derived from the phrase ɛ*sa awie* 'war has finished' (Daaku 1971; Kobiri 1988;2014; Ntumy & Boafo 2002b). The language is referred to in other circles as Asahyue, Samvi, Sehwi, and is coded in ethnologue as [ISO 639-3] with the identifier [sfw] (Eberhard et al. 2019)[1] History has it that the language evolved from Anyi, Bawule and Akan as a result of intermarriage (Kobiri 2014). Ɛsahie is a Kwa language and belongs to the Northern Bia language group in the Central Comoé or Tano subgroup (Dolphyne & Dakubu 1988).

Speakers of Ɛsahie in Ghana number about 580,000 and they live mostly in the Western North Region of the country (Ghana Statistical Service Report 2012, 2010 National Population Census).[2] The region is located within the tropical rain forest belt and is endowed with natural resources and has very fertile lands. It produces large quantities of cash and food crops, including cocoa. The Sehwis are mostly farmers and grow mainly cocoa. The region is also rich in gold deposit and it hosts the second largest gold mining company in Ghana – Bibiani Gold Mines, in addition to the Kyirano Gold Mines. Again, the region boasts of the only Bauxite mining company in Ghana, Awaso Bauxite. Though rich in natural resources, the literacy rate of Ɛsahie is

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[1] Sehwi is usually wrongly spelt Sefwi. This error is believed to be due to the absence of 'hw' in the orthography of the pioneer German writers of the language.

[2] The number given here as speakers are indeed all people living in Sehwi. The population census did not include language identification. It is therefore very challenging to identify people who speak only Ɛsahie using the census report.

very limited. According to the World Report (World Report 386-June/July), only 53.3% of the Ɛsahie population are literate either in English or a known Ghanaian language.

Linguistically, Ɛsahie is proximate to Nzema, Ahanta, Brosa (Enchi), Chakosi and Sanvi (spoken in La Cote D'voire), as seen in the Language Map of Ghana in map 1.1.

Map 1. 1: Language Map of Ghana (SIL 2012)
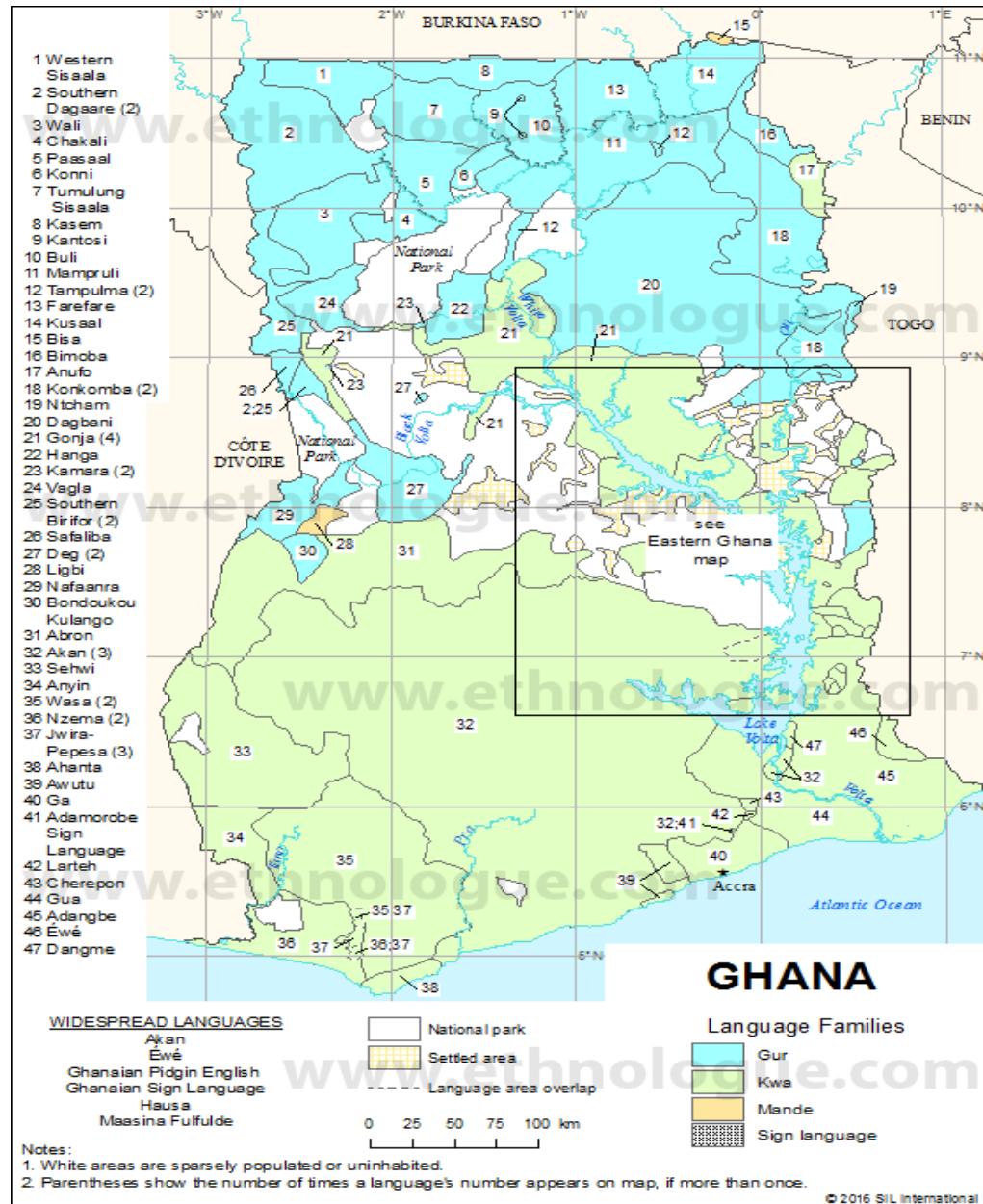
Ɛsahie is greatly influenced by Asante Twi and many Sehwis are bilinguals in

Asante Twi and Ɛsahie. Some of them prefer to speak Asante Twi when they are

outside of their home region. Until the introduction of FM stations in the Western North Region of Ghana, Ɛsahie was not used for any official or educational purpose. In schools and churches, Asante Twi books and scriptures were in use until the mid-1990, when the Bible Society of Ghana (BSG) developed an orthography for Ɛsahie. Available linguistic studies on the language are also few, as compared to neighbouring languages such as Akan, Nzema, and Ahanta. In their discussion of Kwa languages, and focusing on Tano languages in Ghana, Bendor-Samuel and Hartell (1989) did not mention Ɛsahie (Sehwi), even though they mentioned sister languages like Nzema, Ahanta, Baule and Anyi.

The Sehwi people distinguish between two varieties of Ɛsahie – the Anhwiaso variety and the Wiawso variety. The two varieties are mutually intelligible and considered the same language by the speakers of each variety. The minor differences between the two varieties are few vocabulary and phonological items, as exemplified in Table 1 below, which do not cause any intelligibility problems.

Table 1   Example of Words with Dialectal Difference

Anwiaso	Wiawso	English
ebure	ebunaen	Charcoal
binzua	brenzua	Male
nzasrɛ	nnasrɛ	Towel
nnalɪɛ	lalɪɛ	Dream

mmɔwerɛ	boen	Fingernails
boni	beni	which one

The Anhwiaso variety is spoken within Bibiani-Anhwiaso, Awaso and their surrounding communities to the extreme east of the area, which is the east of the River Subri, in towns such as Sehwi Bekwai, Sehwi Anhwiaso and Asawinso. The Wiawso variety, which is the major variety in use, is spoken in the west of River Subri. The dialect area stretches over the Sehwi Wiawso traditional area. Generally, the people believe that the Wiawso variety is the older and authentic variety. The Anhwiaso dialect has some influence from Asante because it shares a boundary with it. There is also Sanvi (Anyi), a dialect cluster of Sehwi spoken in La Cote d'Ivoire, which is mutually intelligible with Ɛsahie, though the people feel it is an Ivorian language and as such must not be encouraged. Explaining the reason for the mutual intelligibility, Kobiri (2014) reports that Anyi was once part of Sehwi, but was divided by the colonial rulers for political expediency; Anyi went to the French and Sehwi to the British. Data for this study is taken from the predominant Wiawso dialect.

In terms of education, the colonial government in 1915 established the first school in Sehwi at Wiawso. The English Church Mission (Anglican) later started a primary school at Bodi and subsequently at Akontombra, Benkyema and other villages. The Methodist church started their schools at Bekwai, Bibiani, Anhwiaso, Adwoafua and Aferi. Ntumy and Boafo (2002b) reports that the Roman Catholic Mission established

schools at Asafo, Bibiani, Anhwiaso, later spreading to several other places. Today, there are many schools in Sehwi, with each paramountcy having at least one government senior high school. Bibiani has one senior high school; Wiawso has two with one each at Asawinso, Bekwai, Juaboso, Akontombra and Debiso. The region also boasts of a teacher training college, the Wiawso Training College.

1.3 Geographical Location of Sehwi

Sehwi is located in the Western North region of Ghana. Map 1.2 shows the towns and boundaries of Sehwi. Ashanti and Ahafo Regions border Sehwi to the north. To the southeast, it is bordered by Western Region and stretches to the Western part of the Central Region and lies approximately between latitudes 6º13' and 6º20' (Frimpong 2009; Ntumy & Boafo 2002b). The western boundary of Sehwi also extends from the Ghana-La Cote d'Ivoire border (approximately along the 6º00' latitude) and cuts across the eastern tributary of the Tano and the Subraw rivers, and then stretches eastwards towards the environs of the Ankobra (cf. map1.2).

Map 1. 2: Geographical Map of Ghana (pulse.com.gh)

Ɛsahie is a Kwa language belonging to the Northern Bia language group in the

Central Comoé or Tano subgroup (Dolphyne & Dakubu 1988). The classification of

the Kwa languages appeared in Greenberg (1948) when he created the Niger-Congo phylum where the Kwa languages belong (cf. map 1.3).

Map 1. 3: The Kwa Languages (Hartley 2005)
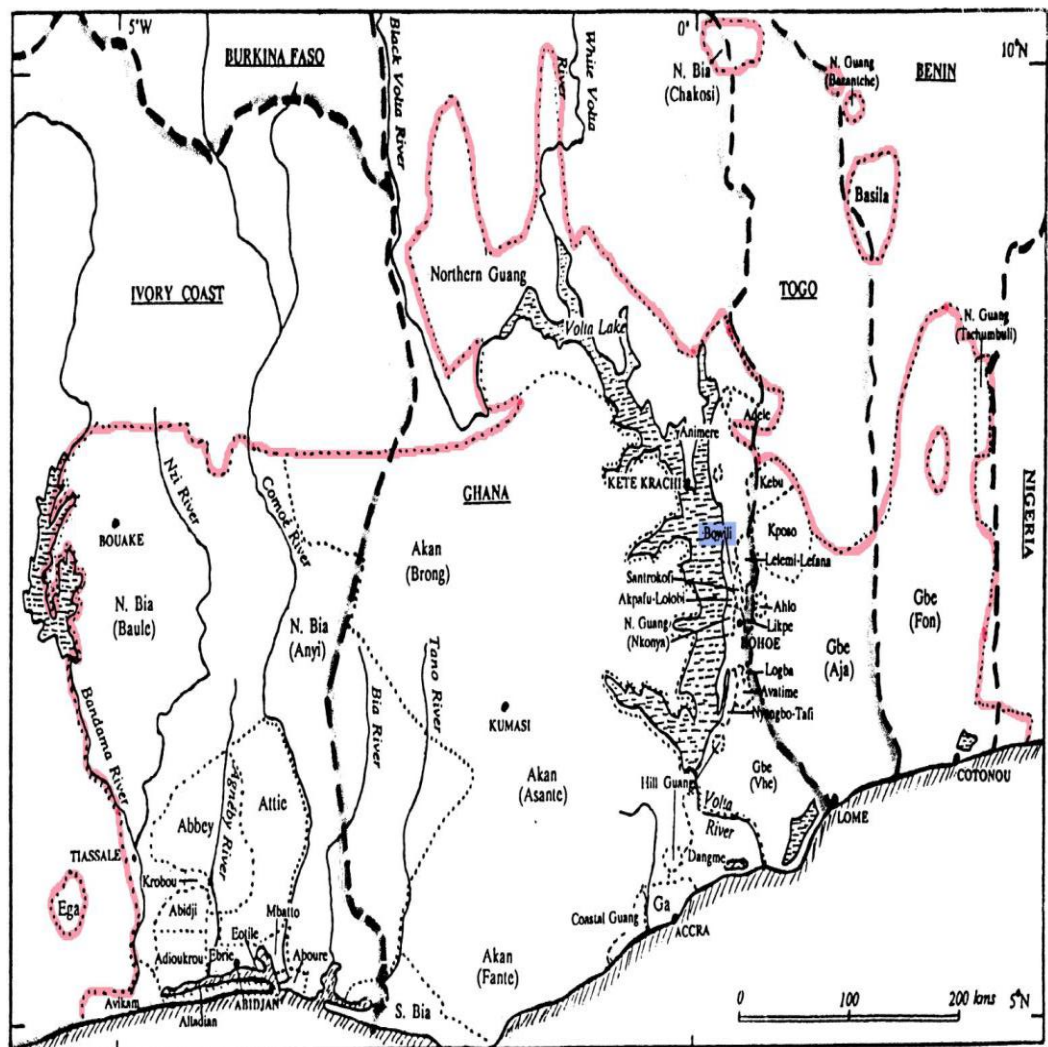
The language family tree in Figure 1 shows the language family of Ɛsahie and the related languages. The diagram shows two language families - Bia and Akan. Under the Bia language group, there was an initial split between Nzema and Ahanta on one hand, and Anyi and Baule on the other hand. Thereafter, Anyi, Baule and Chakosi split from each other. Anyi further split into Anyi (Aowin) and Sehwi (Ɛsahie) (Frimpong 2009).

Proto Central Comoe

'Proto-Tano'

Bia   Akan

(Nzema-Anyi-Baule)

Bron –Wassa   Asante- Akuapem- Fante

Nzema-Ahanta   Anyi-Baule

Anyi   Baule   Chakosi (Anufo)

Nzema   Evalue   Anyi (Aowin)   **Sehwi (Sanvi)**
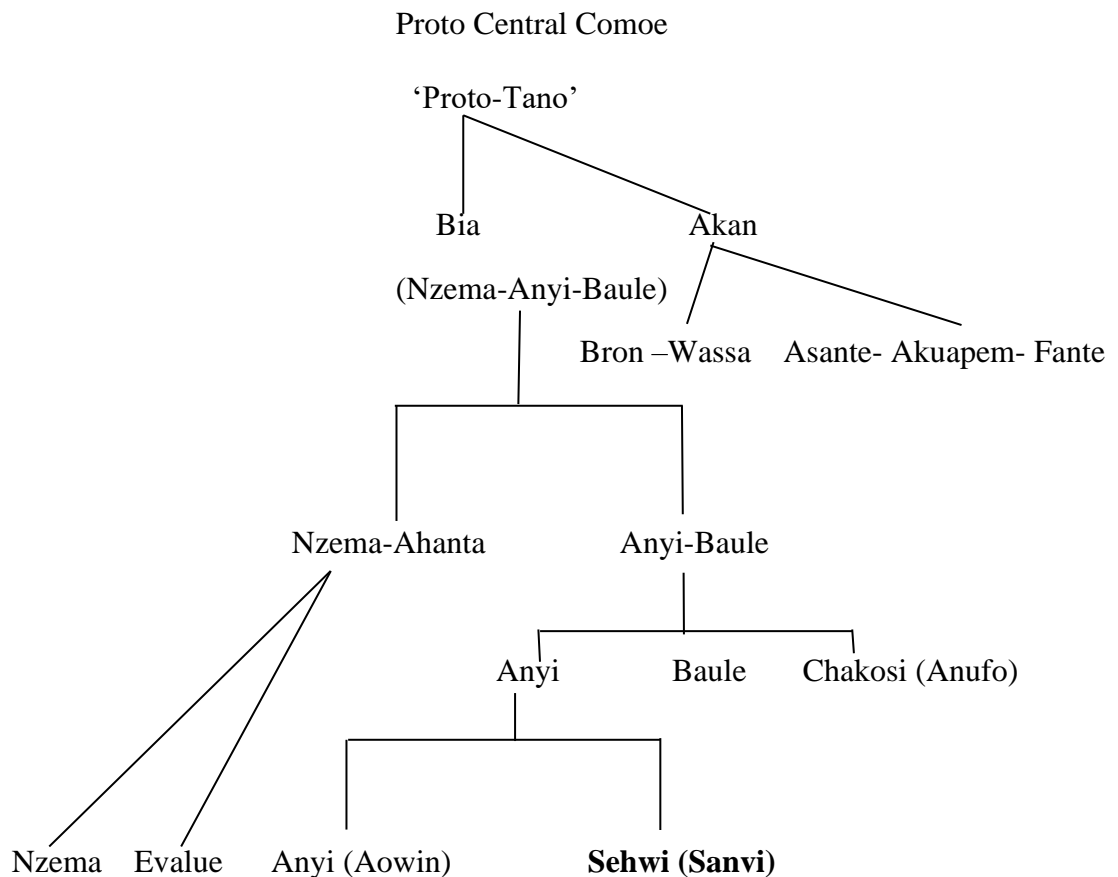
Figure 1. 1: *Kwa Language Family Tree (Dolphyne & Dakubu 1988)*

Administratively, Sehwi is divided into seven districts. These are Bibiani-Anhwiaso-Bekwai, Sehwi Akontombra, Juaboso, Essam Debiso, Sehwi Wiawso, Bia East and Bia West municipality. Politically, it has five constituencies: Bibiani-Anhwiaso-Bekwai, Wiawso, Juaboso, Essam–Debiso and Akontombra. In terms of paramountcy, Sehwi has three paramount areas – Anhwiaso, Bekwai and Wiawso. Some major towns include Yamatwa, Kaase, Asafo, Nsinsin, Osei Kwadwo, Bodi, Bekwai, Akontombra and Asawinso. Map 1. 4 shows the Ɛsahie speaking communities.

Map 1. 4: A Geographical Map Showing Ɛsahie Speaking Areas (Frimpong 2009)

A map of Ghana showing the Esahie speaking areas

1.4 Previous Studies

As noted above, prior to linguistic documentation, T.Y Ennin had written a number of unpublished books and other materials, including '*Me kyire wɔ Ɛsahie'* a translation of the New testament into Ɛsahie, set of primary school readers, a dictionary and spelling book (Kobiri 1988). The Bible Society of Ghana, Ghana Institute of Linguistics, Literacy and Bible Translation (GILLBT), and other religious organizations had also translated parts of the Bible into Ɛsahie, and also written other primers in the language. A set of primers, '*Ɛsahie Kengalɛ* 1-3', was published by GILLBT and Bible Society of Ghana in 2000 to teach the natives how to read and write in Ɛsahie. This was followed by a translation of the New Testament of the Bible into Ɛsahie to be used in churches. The few published linguistic studies are by (Broohm & Rabanus 2018), (Broohm 2017), (Ntumy & Boafo 2002a). There are however other unpublished linguistic research works done on the language. These include (Broohm 2019) (Boateng 2017), (Andam 2017), (Broohm 2014), and (Frimpong 2009). Other anthropological publications such as '*Me kyire wɔ Sehwi'* (Kobiri 1988;2014) are available. Kobiri (1988) highlights some rudiments of Ɛsahie. For instance, it mentions twenty-six (26) alphabets for Ɛsahie although phonologically, the language has more phonemic sounds than those outlined above.

Ntumy and Boafo (2002a) conducted a sociolinguistic survey on the people of Sehwi. On the phonology of Ɛsahie, Frimpong (2009) provides a general description of the sound system and syllable structure in Ɛsahie. The work gives a sense of the

sound segments and words in which these sounds occur. She identifies ten (10) phonetic oral vowels, four contrastive nasal vowels and twenty-four (24) consonants for the language. Frimpong further discusses some aspects of the segmental processes in Ɛsahie. Among them are vowel harmony, reduplication, elision and nasalization, where she provides a general description of these processes to show their presence in the language. While the work shows the presence of these phonological processes, it is not sufficiently detailed in showing the constraints and repair strategies used in handling the constraints. Important phonological features such as syllable structure processes and tonal processes are also not discussed. In this study, we build on Frimpong (2009), using additional data to establish specific cases of sounds constraints and how sounds are distributed at the syllable level.

Also, in his discussion of information structures in Ɛsahie, Broohm (2014) provides a comprehensive description of how information is packaged in Ɛsahie. The work mainly discusses how focus and topic constructions are presented in Ɛsahie. It shows, among other things, that Ɛsahie combines both syntactic strategies (fronting and or clefting) and lexical strategies to signal information structure. He further shows that Ɛsahie has a rich inventory of lexical items/markers, which guide the interlocutor to various aspects of the context of the discourse. These markers include the focus marker *yéyɛ́*, and focus-sensitive particles like the inclusive markers *kósó* 'also' and *pó* 'even', and the exclusive markers *ŋgóm* 'only', *déín* and *álà* 'just'. syntactically, a focus marker or a focus-sensitive particle (including *yéyɛ́*, or *kósó*, *pó*, *ŋgóm*, *déín*, and

álà) immediately follows the constituent in focus and it can appear either at the left periphery of the sentence before a complement clause or after the object. Ɛsahie can encode focus through two strategies; pre-posing and clefting. With the fronting or pre-posing strategy, he explained that the constituent being focused is usually fronted to the left periphery of the sentence, the clause-initial position, and is immediately followed by the focus marker. He adds that to show that a fronted argument was actually moved from its canonical position; an overt copy of the argument in the form of an anaphoric pronoun is left in its canonical position. He, however, observes that the fronting strategy is not enough to encode focus, and that it obligatorily has to be complemented by a lexical strategy where the focus marker *yéyɛ́* immediately follows the fronted constituent. In Ɛsahie, clefting involves placing a sequence of words within the structure beginning with *ɔ-te* 'it is'.

Boateng (2017) studies the morphological structure of nouns in Ɛsahie and identifies three noun formation processes in Ɛsahie – affixation, nominalisation and compounding. On affixation, his study shows that nouns in Ɛsahie are made up of stems and affixes, which are mainly prefixes and suffixes. He identifies three nominal prefixes [a-], [-ɛ] and [n-] and two nominal suffixes - [-niɛ], and [-fʊɛ] with different morphological functions. He further identifies five (5) noun classes using number as the criterion for the classification in the language. He summarises the five noun classes as V-/N-, Ø-/N-, Ø-/Ø-, [-*niɛ*] [-*fʊɛ*], and [-*lɛ*]. Phonologically, he identifies three phonological processes that are very productive in the language. These are homorganic

nasal assimilation (HNA), vowel harmony (VH), and consonant mutation (voicing assimilation). While the work highlights some useful features of nouns in Ɛsahie, it makes some claims that are contestable. Contrary to the claim by Boateng (2017) that the nominalization of verbal forms is always done by the suffixation of [-*lɛ*] to the verb stem, we show in this study that nominals can also be formed by prefixation and parasynthesis (Broohm 2019). We establish that while [-lɛ] is one of the forms for affixation, deverbal nominals can also be formed by prefixing [-a] or the affixes [*a- -lɛ*] which must attach simultaneously to the verb root. Preliminary study for this work confirms Boateng (2017) claim that compounds can be Noun-Noun, Noun-Adjective and Noun-Verb. We add to his analysis by looking also at the prosodic changes inherent in the derivation process.

1.5 Problem Statement

Studies show that one quarter of the world's languages are spoken in Africa and that most of these languages remain unstudied or not fully described (Blench 1998; Polomé & Winter 2011). This may have driven Crystal (2000) to caution that most languages will be in extinction by 2020, hence the need for inter-generation transmission to help preserve them. Sadly, not much documentation is available on Ɛsahie linguistically, compared to such neighbouring languages as Akan, Ewe, Ga, Nzema and others. As noted above, Bendor-Samuel and Hartell (1989) overlooked Ɛsahie in their discussion

of Kwa languages and Tano languages found in Ghana. It is against the foregoing that we study the Segmental and Prosodic Structures in the language to complement the existing literature. The study reviews the segments and segmental processes of the language, bringing to bear some syllable structure changes such as elision that take place when segments occur in morphological and syntactic structures in the language. It also discusses the tonal pattern of nouns and verbs and shows the tonal processes that occur when tones interact in the language.

1.6 Objectives

Despite the linguistic in-roads made in the past years into Ɛsahie, the language continues to remain one of the under-described languages in the Kwa family. This inspired us to study the chosen aspect of the language. The objectives of the study are to identify:

1. The constraints in sound distribution and sound sequencing in Ɛsahie and the accompanying repair strategies.

2. The constraints on syllabification and some of the syllable structure repair mechanisms in the language.

3. The tonal structure of nouns and verbs in the language, and the tonal changes associated with noun and verb forms in the language.

1.7 Research Questions

To realise the objectives stated above, the study explores these questions regarding the language:

1. What is the nature of the sound system of Ɛsahie, and how are the sounds distributed and organized in the language?

2. What are the repair strategies available in Ɛsahie for resolving impermissible sound sequencing?

3. What are the permissible syllable types in the language and how are impermissible syllables dealt with in the language?

4. What is the tonal structure of Ɛsahie nouns; what tone changes exist in the formation of noun forms in the language?

5. What is the tonal structure of Ɛsahie verbs; what tone changes exist in the formation of verb forms in the language?

1.8   Methodology

Data for the study came from both primary and secondary sources. The primary naturalistic data was elicited from native speakers in Sehwi, using ethnographic and stimuli methods. The tools used were the Ibadan Word list, SIL picture story, participant observation and focus group discussion. Forty people were consulted in the data collection, made up of twenty people from each dialect area, i.e. Anhwiaso and Wiawso. Four towns were selected in each dialect area. From each town, five

respondents were selected comprising of two males and three females, young and old, aging between eighteen and sixty-five. All respondents were native speakers of Ɛsahie. However, speakers of Ɛsahie were excluded from the study, if they were non-natives of Sehwi.

An unstructured interview guide was also used. These un-structured interviews were used as follow-ups on the elicitation. The interviews were conducted in Ɛsahie with the aid of a translator. The issues covered bordered on their life, general issues, festivals, historical events, list of animals, events, food, days of the week, months and birthdays and other salient issues. These were recorded using an audio recorder and transcribed. The transcribed data were crosschecked with four different native speakers for consistency and accurateness. Additionally, a copy of the Ɛsahie New Testament of the Bible and some literature in Ɛsahie were acquired for consultation. The work is largely descriptive, so the data recorded was transcribed and described.

1.9   Ethical Considerations

According to Berg (2007), researchers owe professional and ethical obligations to the human subject and the real world they collect data from in order to honour and ensure confidentiality made to them. Supporting this claim, Bryman (2007), states that researchers cannot overlook ethical issues because it holds the integrity of the research they conduct. Following these arguments, ethical issues were given due consideration, as all the protocols of the study were subjected to institutional ethical review by the

College of Humanities of the University of Ghana. Additionally, the study adheres to situational ethics embedded in the qualitative research tradition. Thus, we sought the consent of respondents to participate in the study and future related work.

1.10   Organisation of Thesis

The thesis is organized into six (6) chapters. Chapter one introduces the subject of the study and provides information pertaining to the ethnographic background of the study, the geographical information of the study area, the statement of the problem, objectives of the study, research questions and the methodology used for the study. Chapter two highlights the theoretical framework used for the study and provides a review of relevant literature related to the study. Chapter three describes the segments in the language and examines some segmental processes in the language. Chapter four focuses on the syllable and syllable structure processes such deletion and insertion in the language. Chapter five focuses on tone and tone processes in noun and verb forms in the language. Chapter six provides a summary of findings and conclusions of the research and make recommendations for future research.

1.11   Conclusion

In this introductory chapter, I have discussed the ethnographic and ethnolinguistic background of the people of Sehwi and Ɛsahie as a language. We have observed that although Ɛsahie has a considerable number of speakers, the language lacks formal

usage. Other issues highlighted in the chapter are the objectives of the study, the methods used in data collection, and a review of previous studies on the language, among others.

CHAPTER TWO

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.1 Introduction

This chapter highlights the major theoretical and descriptive concepts that guide the discussion of the data in this work. It also presents a review of relevant literature on the subject matter of the present study. The approach to this study is descriptive. Nonetheless, conducting a description in a theoretical vacuum may be problematic since descriptions sometimes involve some amount of analysis which cannot be carried out without some minimal set of theoretical assumption (Casali 1995;1997). Therefore, the discussion is couched in a manner that is acceptable in the Generative Phonological theory (Chomsky & Halle 1968b; Kenstowicz & Kisseberth 2014; Kisseberth & Kenstowicz 1977). Section 2.2 focuses on the distinctive feature theory and its groupings. In Section 2.3, we discuss the Autosegmental theory with its principles of operation, while section 2.4 through to section 2.8 presents a review of some relevant literature for the study. The section 2.9 concludes the issues discussed in the chapter.

2.2   The Distinctive Feature Theory

The Distinctive Feature theory was outlined in (Chomsky & Halle 1968a) and modified in (Katamba 1989; Kenstowicz 1994; Kisseberth & Kenstowicz 1977). The theory is an aspect of Generative Grammar (Kisseberth & Kenstowicz 1977) and focuses on the inherent properties of speech sounds. Distinctive Features are the minimal constructive units that make up a sound. They are a set of articulatory and acoustic features that are used to define and distinguish between speech sounds. They have phonetic specifiability, in that they are able to determine the phonetic characteristics of a sound. They show that sound features are universal and are relevant for the description of sounds in all languages. (Fromkin et al. 2011: 278) defines it "as a feature that distinguishes one phoneme from another, hence a word from another word". This shows that the distinctive features have functional relevance and can create meaning difference in a word. They can also explain the behaviour of sounds in a phonological structure. Some distinctive features are binary in nature. The binarism shows the presence (+) or absence (-) of a feature. Some of the features are, however, intrinsically unary, that is, they have a single value and specify only sounds that have them. The unary feature focuses on the active articulator used in the sound production. Below are the classifications of the features.

2.2.1 Classification of the distinctive features

The Distinctive features can be classified into five broad groups basically in terms of phonetic specifiability. These groups are Major Class Features, Place of Articulation Features, Manner of Articulation Features, Glottis, and Tongue Body Features.

1. Major Class Features

The major class features define the distinctions between vowels and consonants in general and the roles they play in the structure of a language. They are sub-categorised into three groups namely: [+/- syllabic] which describes sounds that occur in the nucleus of a syllable and those that occur at the periphery; [+/- consonantal] used to separate consonants from non-consonants such as consonants from vowels and glides; and [+/- sonorant] which distinguishes sounds that do not exhibit voicing differences and. those that do. The latter are also called obstruents.

2. Place of Articulation Features

These categorise sounds based on where they are produced along the vocal tract. The sub groups under this features are [+/-anterior] which describes sounds produced from the alveolar ridge to the lips and those produced behind the alveolar ridge. The rest are [labial] for sounds produced with the lips involved as active articulators, [coronal] for

sounds produced with blade/front of tongue as active articulator, and [dorsal] for describing sounds produced with back of tongue as active articulator.

3. Manner of Articulation Features

The manner of articulation features specifies types of stricture. They group sounds into [+/- continuant] for sounds produced with a continuous flow of the airstream and others that do not, [+/- delayed release] for sounds produced with a delay in the release of the airstream and others that do not, [+/- lateral] for sounds produced with the airstream exiting at the sides of the point of articulation and others that do not. [+/- Nasal]: sounds produced with the airstream exiting through the nasal cavity and others that do not.

4. Glottis

The state of the glottis relates to phonation or the activities of the vocal folds. They distinguish between [+/- voice] for sounds produced with vibration of vocal folds and those without vibration of vocal folds, and [+/- spread glottis] for aspirated and non-aspirated sounds.

5. Tongue Body/Root Features

The tongue body features are primarily vowel features but also relevant to consonants. They show whether sounds are [+/- High] for height of tongue, [+/- Low] for height of tongue, [+/- Back] for part of tongue, [+/- Round] for the posture of the lips, and [+/- ATR] for the movement in the tongue root in speech production.

2.2.2 Relevance of the distinctive feature theory

The distinctive feature theory has brought in its wake many advantages. It can resolve the inadequacies of the phonemic theory especially in differentiating between segments. By means of the features, differences in segments are clearly identified. The presence or absence of a feature can contrast the meaning of words. For instance, using the feature nasal, the meaning of the words in example (2.1) below are distinguished otherwise they would have been the same.

Example 2.1   **Nasal**   **Oral**

         a. tɕĩ́à 'day'   tɕíà 'dog'

         b. sṹà 'to learn'   súà 'a house'

In the examples above, the difference in the words is made possible by the feature nasal. Also, using this feature, speakers and even non-speakers of the language

are able to distinguish between two words in the same context as shown in example (2.2) below.

Example 2.2. Ama **sʃ̋à**   nwoma wɔ **súà** ne mu

               Ama learn- HAB book room DEF inside

               'Ama learns in the room'

The theory also enables sounds to be grouped into Natural Classes based on their shared features and general statements made about them. For example, [b, d, g] form a natural class of [+voice] stops. We can often refer to these and no others with just two features, [-continuant, +voiced]. The grouping of sounds into natural class shows that sounds in the same natural class can undergo similar phonological processes and have the same effect on sounds adjacent to them.

Again, the Distinctive Feature theory makes it possible to give detailed description of sounds by breaking them into smaller components. If we take a sound like /a/, we can tell, using the feature matrix, that it is [+syllabic, -consonantal, +sonorant, +voiced]. Using this representation, we are indicating the phonetic characteristics of the sound /a/. For instance, because it is [+ sonorant] it allows free flow of air in the oral cavity. We can therefore deduce that the differences between segments are featural. For example, the difference between/a/ and /ã/ is the feature [nasal].

The feature theory further makes it possible, with a small number of features, to specify adequately the nature of speech sounds and their behaviour in structure. For example, we can describe these sounds /m, n, ŋ, ɱ, ɲ, ɳ, ã, õ, ĩ, ũ/ as [+Nasal] and predict that they nasalize adjacent segments.

Additionally, the distinctive features are used to formulate phonological rules to explain phonological processes that occur in languages. Consider the example (2.3) below.

Example 2.3   towaa 'bottle' →   n-towaa → ndowaa 'bottles'.

In this example, the change in the input form of the word is the feature voicing, where the [-voiced] sound /t/ becomes [+voiced] /d/ due to the presence of the nasal consonant /n/. Using the distinctive features, we can explain that the phonological process taking place in example (2.3) above is a voicing assimilation. The phonological rule that explains the data in (2.3) is as follows:

Voicing rule: [-voiced] → [+voiced] $\Big/$ [+voiced]———

This same rule can be recast in the autosegmental way where features and segments are autonomous. In the case of the voicing rule, we can reorganize it as follow:

Voiced tier +vd   -vd +vd   -vd   +vd   -vd +vd   +vd

Skeletal tier x   x   x   x   x   x   x   x   x

Place tier   n   t   n   t   n   t   n   d   n   d
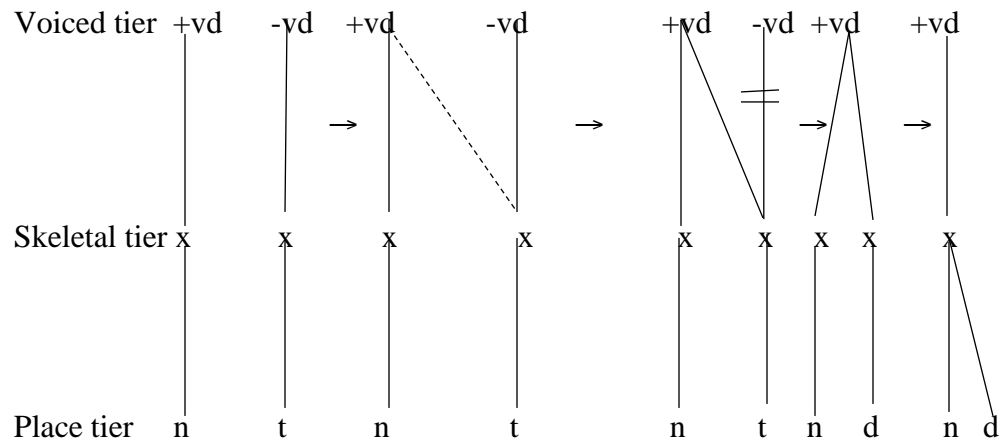
Figure 2 1 Voicing rule

These rules enable us to make general statements to explain several things that occur in a language.

Further justification for the feature-based theory is in line with (Fromkin et al. 2011: 586) observation that:

> feature-based analysis of segments may facilitate the process of language acquisition as it gives the learner the means to generate novel segments sequences which conform to the sound pattern of the language.

Hence, using the feature-based theory, it is possible to anticipate how speakers of a language will pronounce certain words. For example, using the voicing rule above, a speaker who may not be aware of the alternations discussed above would however be

able to predict how a word as *n+ talie* will be pronounced without being told how. He will be able to predict the pronunciation of   *n+talie → ndalie* 'spoons'.

2.3 The Linear theory

The Linear theory is a type of the Generative phonological theory which assumes that phonological descriptions are dependent on information from other linguistics levels and phonological rules map underlying representations onto surface pronunciations. The theory considers phonological representation as consisting of strings of segments and sounds as a feature bundle. The segments are strictly ordered, but the features are unordered. The Linear theory futher assumes that speech is produced in a sequential fashion and that all distinctive features of sounds are equal. Under this theory, speech segments (phonemes) are arranged in sequential order that convey a specific message as done in the distinctive feature theory.

2.3.1 Lapses of the Linear theory

The Linear theory was fraught with some challenges. The theory could not account for the autonomy of tones. Under distinctive feature theory for example, tones were considered part of a segment that bears it. Hence, the deletion of the segment meant the loss of the tone too. It failed to give meaning to floating tones, which are independent from the vowels. Thus, it could not give meaning to and preserve tone stability.

Also, contour tones were thought of as a combination or sequence of two simple tones. The Absolute Slicing Hypothesis (Goldsmith 1990; Katamba 1989) of traditional SPE-style phonology, regarded tone as a feature belonging to the vowel. Under it, a segment such as /â/ would be represented as:

â

$$
\begin{bmatrix}
\text{+syll} \\
\text{-con} \\
\text{-back} \\
\text{-ATR} \\
\text{+H} \\
\text{+L}
\end{bmatrix}
$$

In this representation, tone is seen as a built-in feature of the segment. Contour tones behave as if they were a combination of two simple tones. The linear repressentation could, therefore, not account for contour tones especially on a single syllable. This is because under linear phonology, segments are allotted features. Each feature specification corresponds to one segment (Kenstowicz 1994; Kenstowicz & Kisseberth 2014). A feature has two values [±] and a segment can have only one value, so contour tones could not be assigned two values [+H, +L]. If [+H] and [+L] are built into the matrix, it will be contradictory because it will mean the vowel has a High tone and Low tone at the same time.

Another challenge with the linear theory has to do with the feature arrangement. The linear theory fails to provide an organized arrangement of the features. However, as Clements and Humes (1995), Sagey (1986) indicate through the feature geometry theory, the features that make up the sounds are not arbitrarily ordered, but are organised in a hierarchical order shows the coordination between the features.

Again, in the Sound Pattern of English (SPE) model, morphemes were represented as Underlying Representations (URs) that consist of units that are defined by distinctive feature matrixes; hence segments were thought of as bundles of features.

These inadequacies of the linear repressentation called for an alternate way under generative phonology to resolve the challenges identified in the linear phonology, hence the Autosegmental theory.

2.4 Autosegmental Theory

Autosegmental theory was introduced by Goldsmith (1976) as a framework which gives independent representation to segments and suprasegments. Autosegmental theory is an offshoot of Generative Phonology (Roca 2003) which had its foundations in the Sound Pattern of English (Chomsky & Halle 1968b; Goldsmith & Laks 2016). It came about due to inadequacies identified in the Linear Phonology model. In the Sound Pattern of English (SPE) model, morphemes are represented as Underlying

Representations (URs) that consist of units that are defined by distinctive feature matrixes. One of the primary properties of the SPE model was the postulation that the deepest and most interesting principles of universal grammar would be found in the form and function of phonological rules. The segments were strictly ordered but the features were unordered. For instance, 'The Absolute Slicing Hypothesis' "claims that speech can be exhaustively sliced into segments which consists of unordered bundle of features which are linearly ordered" (Katamba 1989: 191). Phonology in this model was linear and supra segments like tone were properties of the sound segments. This means that anytime a tone-bearing unit was deleted, the tone was also deleted.

The inadequacy of the linear representation in capturing the independency of supra-segments such as tone culminated in the formulation of Autosegmental Phonology. The theory recognized the autonomy of tone. In this theory, phonological features are not represented in a linear order, but in a graphical way that shows the relationship that exists between the features that make up sound segments and supra segments. As Goldsmith (1990: 137) observes, Autosegmental Phonology "is a theory of how the various components of the articulatory apparatus, i.e. the tongue, the lips, the velum are coordinated." Katamba (1989: 190) adds that "in principle the various articulatory parameters such as aspiration, nasalization, voicing and tone are autonomous and the articulations that result from them are in principle independent".

The theory also considers how phonological rules change the organization of phonological representation. In its representation, two or more parallel tiers of

phonological representation are posited. The tiers are anchor points for elements on the various tiers. Each tier carries a string of segments but differs in feature specification. Association lines link the separate tiers. As Goldsmith (1990) explains, the tiers and the association lines make up a chart and the tiers take their names from the feature found on them as shown in example (2.4) below.

Example 2.4   Tonal Tier   H L

                                        | |

                                        | |

             Segmental Tier   b i a
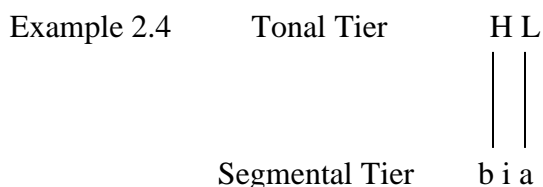
Each tier represents a sequence of gestures, viewed from an articulatory point of view, or a distinct acoustic transition, viewed from an acoustic point of view, (Goldsmith 1990).

Though interconnected, the tiers are in principle autonomous. Segments are linked to tiers using 'Association lines', which are used to show simultaneity in time or co-registration. That is to say, the features and segments are realized at the same time and they occur concurrently (Goldsmith 1990). The autosegments are on independent tiers (tonal tier, segmental tier etc.). When phonological processes take place, segments may be modified. These modifications can be reduced to two processes: linking and delinking (i.e. addition or removal of an association line). It is

for this reason that the Autosegmental theory provides ways of representing these idiosyncratic changes that take place on different tiers.

2.4.1   Basic Tenets of Autosegmental Phonology

Goldsmith (1990) observes that the successful operation of Autosegmental theory hinges on a set of principles, including the Obligatory Contour Principle and the Well Formedness Condition. I present these in turn. Before that, I introduce the notation that are employed in the theory in example (2.5).

Example 2.5 Autosegmental Notations for Rule Writing

```
T
|
V    A vowel linked to a tone


T
|
|    A floating tone which is not linked to a vowel


T
|
| Establishing a link between tone and vowel
|
V


V  Free  vowel slot not linked to any tone
```
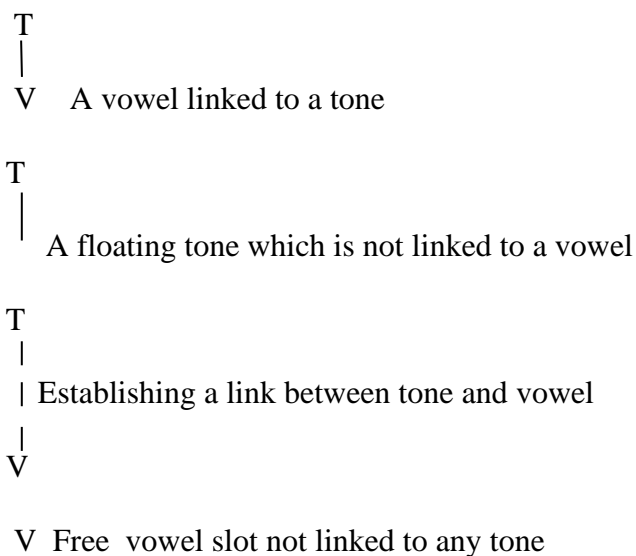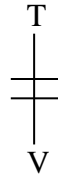
T
V   Delink the tone from the vowel

2.3.1.1 Universal Association Convention

The Universal Association Convention (UAC) states that "when unassociated vowels and tones appear on the same side of an association line, they will be automatically associated in one-to-one fashion radiating outward from the association line" (Goldsmith 1990: 14). The UAC thus helps one to realize the relationship of the elements on each tier to the other. Such relationships are seen after applying the UAC. In other words, the UAC maps tones to the TBU one-to-one, left to right, as demonstrated with the Ɛsahie example in (2.6).

Example 2.6   tìré 'head'

Tonal Tier   L   H

Skeletal Tier   x   x

Segmental Tier t i r e
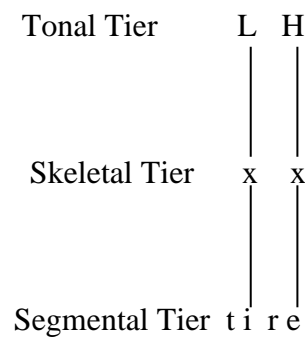
2.3.1.2 Linkage Condition

Goldsmith (1990: 53) observes that "a segment that is not linked to a position on the skeletal tier will not be phonetically realized". All segments must, therefore be associated. This condition explains why floating tones are not phonologically realized unless linked to a skeletal position.

2.3.1.3 Obligatory Contour Principle

First proposed by Leben (1973), the Obligatory Contour Principle (OCP) restricts tone association. This principle prevents two identical features from being adjacent to each other. The principle came about due to "the need to streamline some of the descriptive devices of the theory" (Abakah 2004b: 46). In Autosegmental theory, there was indeterminacy in the structural representation of segment and suprasegments resulting in representations like (2.7a). Thus, with the OCP, when sounds appear in succession to each other, they must differ in at least one tone feature. Where adjacent, the tones must be of different values. OCP is illustrated in (2.7b).

Example 2.7 a.   pɛ́ɛ́   'likely'

```
          *  H  H
             |  |
             |  |
             |  |
             x  x
             |  |
             |  |
            pɛ  ɛ
```

    b.   pɛ́ɛ́   'likely'   H
                                        /\
                                       / \
                                   x   x
                                   | |
                                   | |
                                  pɛ   ɛ
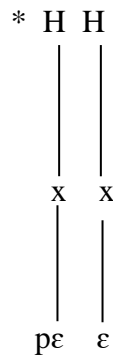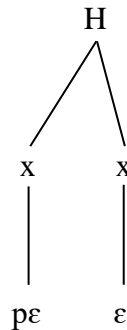
In explaining whether the identical autosegments will be automatically or universally reduced to one, Goldsmith (1990: 311) clarifies that "there are good and general reasons to expect that the OCP will appear to operate as a design strategy in the phonology of natural language; not because the principle is overtly present, but because it follows from basic considerations of how phonology is learned." So, the idea of a single representation for identical and adjacent tones is, as Bota (2002) explains, to demonstrate that their production involves the same gestural activity.

Though regulatory, the OCP has not been spared criticism over the place or otherwise of the principle in phonological theory, either as a rule or a principle

(cf.Kenstowicz & Banksira 1999; McCarthy 1986; Odden 1986;1988a;1988b; 1995a: ,inter alia). To Roca and Johnson (1999), OCP goes beyond a rule or principle. It is rather a latent force that sparks off the application of rules and principle. They write, "the OCP is not a principle as such …but rather a latent force motivating some of the rules and principles of language, somewhat as the shifting of the earth's inner matter motivates volcanoes to erupt: Shifting is not eruption" (Roca & Johnson 1999: 401). After applying the OCP to data from Akan, Abakah (2004b) corroborates Roca and Johnson (1999) assertion that the OCP is not a rule but a constraint. He explains that "… OCP is not a rule. It is a constraint whose obedience or violation does not affect the phonetic representation of a lexical item or tone or phrase. […] its violation does not neutralize the fact that, it is one and the same autosegment that runs over pertinent segmental anchors on the segmental tier" (Abakah 2004b: 22). He continues that "its obedience… does not change the phonetic shape of a lexical item or tone phrase, although it makes for an elegant presentation of phonetic facts" (Abakah 2004b: 22). These counter debates reinforce the notion that OCP is not a rule, but also confirms the utility of OCP as a unifier of segments with the same suprasegmental features.

2.3.1.4 Well Formedness Condition

The Well Formedness Condition (WFC) governs the linking and association of elements on different tiers. The WFC states that:

a. Each vowel must be associated with at least one tone.

Tonal Tier   H

Segmental Tier d i   ' to eat'
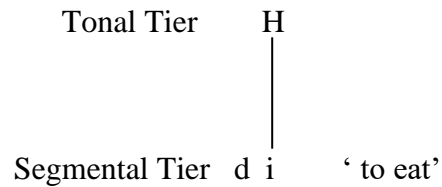
b. Each tone must be associated with at least one vowel.

Segmental Tier   H

Tonal Tier   g o 'to dance'
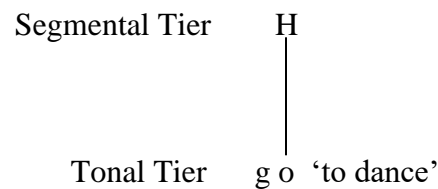
c. No association lines may cross.

*V   V

L   H
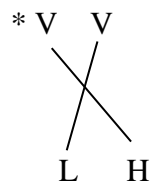
WFC provides sanity in the association of autosegments as associations are not done haphazardly.

2.4.2 Principles of Autosegmental Theory

The application of the Autosegmental theory is governed by some principles. These principles regulate the theory. They aid in the successful application of WFC by solving any problem that might crop up from its application. The principles are mapping, dumping, and spreading, and are described and exemplified below.

a.   *Mapping*—Associate vowels with tones in a one-to-one fashion left to right until one runs out of tones or vowels.

One-to-one mapping
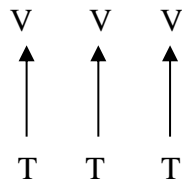
b. *Dumping*— If in applying (a), some tones are still free, that is unassociated, link them to the last vowel to the right.

Dumping of remaining tones
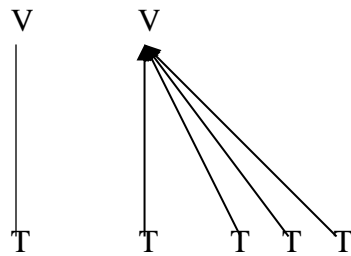
c. *Spreading*—If in applying (a) some vowels are still free, link them to the last tone on the right.

Spreading of remaining vowels
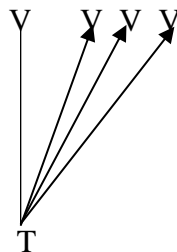
The spreading principle can be equated to one-to-many association; and the dumping to many-to-one association.

2.4.3 Tiers of Representation

Some of the tiers that may be used in the representation of segments and autosegments are provided in (2.8).

Skeletal Tier: Acts as an anchoring device for elements on various tiers. This is sometimes referred to as CV Tier or Timing Tier.

Skeletal Tier The Skeletal tier acts as an anchoring device for elements on various tiers. This is sometimes referred to as CV Tier or Timing Tier.

Example 2.8.   Skeletal Tier   x x
                                                   │ │
                                                   │ │
                                                   │ │
                                                   │ │
                         Segmental Tier   d   a   'to sleep'
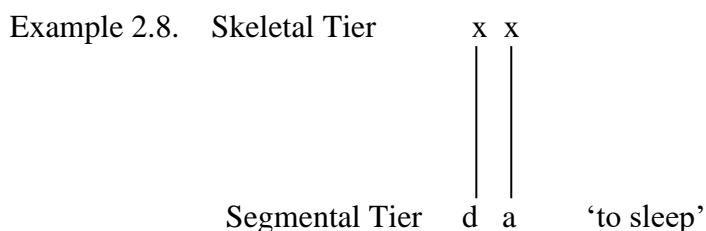
Segmental Tier   Carries the segments.

Tonal Tier   For the representation of tonal features

ATR Tier   Used to show the position of the tongue root in sound production; either pushed forward or retracted.

Nasal Tier   To represent nasal features

Height Tier   To present the feature 'high'

Backness Tier   To carry the feature 'back'

Place of Articulation To represent features that specify the articulation point of a

segment

Phonation Tier   Indicate whether a segment is voiced or voiceless

The use of these tiers are illustrated in (2.9) below.

Example 2.9 a. $\begin{bmatrix} dor \\ +ant \end{bmatrix}$ →   Place of articulation tier

ŋ g o →   Segmental tier

C   C   V →   Skeletal tier

[+nas][-nas] →   Nasal tier

b. [+vd]   →   Phonation tier

b u   e

[+ATR]   →   ATR tier
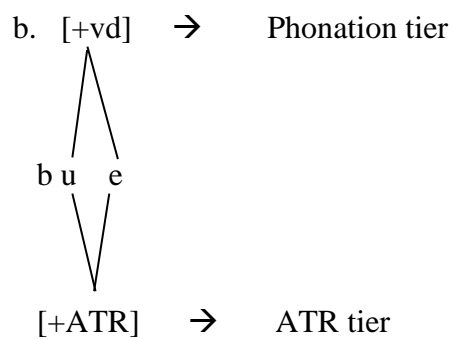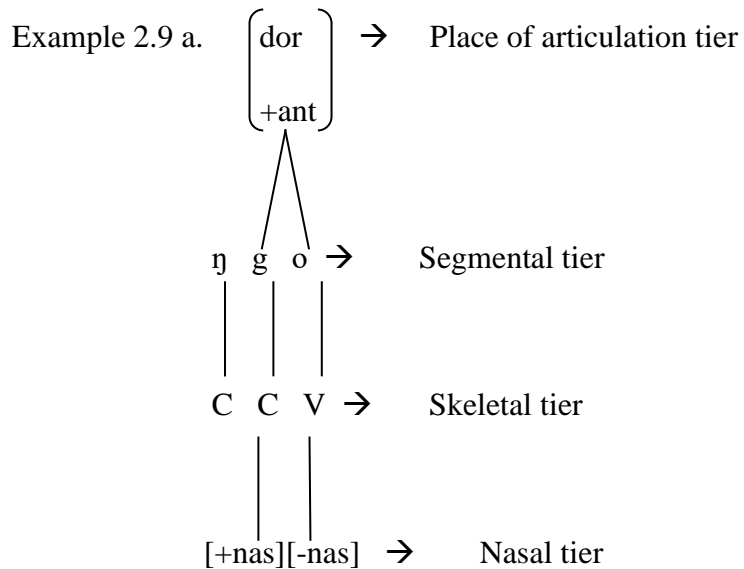
2.4.4 Motivation for the Introduction of the Autosegmental Framework

The autosegmental theory was inspired by certain issues, some of which are highlighted below.

2.3.4.1 Floating Tones

Goldsmith (1990: 40) refers to floating tones as "segments which, at any given moment in the derivation are not associated with any vowel." They come about when a tone is left after the deletion of a vowel linked to it. Under Linear phonology, tones were considered part of a segment that bears it. Hence, the deletion of the segment meant the loss of the tone too. However, the Autosegmental theory showed that tones are independent of the TBU (Clements et al. 2011; Hyman 2014a;2017a). When the TBU is deleted, the tone is left to float until it docks on an adjacent TBU. This is illustrated with this Akan data in example (2.10) (Leben 2006).

Example 2.10 a. hɛn adan ---'their house '

H   L   H

b. hɛn adan→ hɛ́ń ↓ ádáń   'their house'
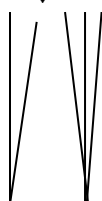
<div align="center">H L H</div>

From the example, the L tone of the prefix survives even when the segmental portion of the prefix assimilates to the following H tone.

2.3.4.2 Tone Stability

Tone stability shows that the deletion of a segment does not affect the tone associated with it, and vice versa. The tone thus resists deletion. Goldsmith (1990: 40) remarked that, "if a segment was deleted on one tier, it may not affect a segment with which it was formally associated. The tone stays put until it is re-associated with the closest segment". This accounts for the autonomy of tones.

2.3.4.3 Tonal Melodies

Goldsmith (1990: 40) explains melody levels as "linguistically significant levels in the grammar which refers to just one or two features in the utterance". Katamba (1989: 195) adds that "tone melody is concerned with languages where a given pitch configuration is linked to certain morphemes or words or grammatical constructions regardless of the number of consonant and vowel segments which they contain". Katamba illustrates this point with an example from Mende, a language spoken in Sierra Leone adapted from (Leben 1973;1978). In the language, a monomorphemic

word could have the following tone melodies: H, L, HL, LH, LHL irrespective of the number of syllables it contains as shown in example (2.11).

Example 2.11 a. H—pɛ́lɛ́—house'

b. L—bɛ̀lɛ̀—'trousers'

c. HL—ǹgílà—'dog'

d. LH—fàndé—'cotton'

e. LHL— nyàha - 'woman'

He continues that it can be assumed and captured that there are given melodies on each class of words regardless of the number of segments present. Tone is melodic, hence autonomous.

2.3.4.4 Contour Tones

The Linear Phonology was unable to account for contour tones especially on a single syllable. This is because segments are allotted features. Autosegmental representation came to the rescue of contour tone representation. (Goldsmith 1990: 143; Goldsmith & Laks 2016) explained, "tonal features are properties of another level; feature specifications on the other level constitute segments, but their relation to the vowels

with which they are associated is merely one of simultaneity." It indicated that contour

tone is two tones on a segment which are produced in tandem and that one is not rooted

in the other as illustrated in (2.12) below:

Example 2.12   a.   â—   *a a   b.   a

                                         | | /\

                                         | | / \

                                         H L   H   L
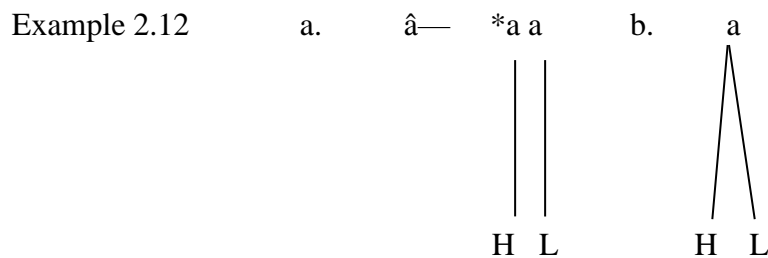
        The illustration shows that in example (2.12a) /â/ was represented as a

combination of two segments, /à/ and /á/ under the linear theory, but autosegmentally,

it is represented as one segment with two tones/ â/ in example (2.12b).

2.4.5 Goals of Autosegmental Framework

The goals of the Autosegmental framework can be summed up in the following:

   i.   To depart from the linear representation where segments were thought of as
bundles of features.

   ii.   To give meaning to and preserve tone stability.

   iii.   To give autonomy to tones.

iv. To give representation to contour tones, which are perceived as multiple tones linked to a vowel.

v. To make abstraction of tones from Tone Bearing Unit (TBU) possible.

vi. To give meaning to floating tones, which are seen as independent from the vowels.

2.4.6 Lapses of the Autosegmental Framework

Despite the effectiveness of the Autosegmental theory in tightening some of the loopholes in the linear theory, especially in respect of tone and other suprasegments, some scholars have identified some loose fitting ends in it (Katamba 1989; Leben 1973;1978; Leben & Ahoua 2006; Odden 1995b). Odden (1995b: 465) notes that "the strongest possible version of OCP at this point is that these may be a dispreference for adjacent identical tones; languages are free to express this dispreference by constraining lexical representation by adding rules of tone fusion or tone deletion, or by putting conditions on tone spreading rules. Ultimately, languages retain the portion of doing nothing about OCP violations". Odden concludes that the Obligatory Contour Principle (OCP), which reduces both H and HH to the same melody is not applicable universally. Katamba (1989: 195) notes that tone stability is not a universal phenomenon. He explains that in languages where only heavy syllables can bear contour tones, the deletion of the tone bearing unit spells doom. This is because such languages allow for only one-to-one association of tones and TBUs.

Despite these lapses, the usefulness of the theory can never be challenged as it formed the springboard for the formulating of the theories of lexical phonology, optimality theory, etc. (Pulleyblank 1986), Yip (1989b), (De Lacy 2002a; De Lacy 2002b), Zoll (2003) along with many others. Because tone and other phonological processes form an integral part of the analysis in this thesis, it is vital to describe the changes or differences in the process. It is in light of this that the autosegmental theory suffices.

2.4.7 Summary

The review of the theoretical frame has expanded our understanding of the inherent features of speech sounds and how supra segmental features such as tone are distinctly treated from segments. As indicated earlier, this study is descriptive. However, the framework above will serve as a guide when linguistic theory becomes imperative in our data analysis. In the next section, we review some literature relevant to the study.

2.5 LITERATURE REVIEW

The study takes inspiration from researches done in other languages that have some relevance on the issues to be discussed. The literature review focuses on three major themes: (i) Segmental processes, (ii) Prosodic structure of nouns and (iii) Prosodic structure of verbs. On the segmental front, we briefly touch on Elision and Reduplication.

2.6 Elision

Elision is the loss of a sound segment or a syllable in a word. The study of elision has been approached from varied angles in the literature. Matthews (1997: 11) indicates that elision occurs at word final position only when he writes that "elision is a process by which a vowel at the end of a word is lost, or elided, before another vowel at the beginning of a word." This definition identifies just one context for elision and excludes other context of elision in other languages such as Ɛsahie. It also limits elision to vowels alone and ignores consonants. Data from Akan and other languages show that elision extends beyond word final to mid and initial positions and from vowels or

consonants. Abakah (2004a: 182) therefore widens the scope and context when he describes elision "as a phonological process by which a vowel, a consonant and sometimes a syllable, which is an intrinsic property of a morpheme in an isolative style, is dropped in a combinative style". Most languages employ vowel elision to break vowel hiatus (Orie & Pulleyblank 2002), however, there are differences in which vowel is elided and the context of elision. In some languages, the first vowel (V_1) is elided, whiles in others, the second vowel (V_2) is elided. For example, Casali (1997) identifies four contexts in which vowel elision is used to dissolve vowel hiatus in Etsako. These are: at the boundary between two lexical words (*dɛ +akpa → dakpa* 'buy a cup' & *owa +ɔda → owɔda* 'a different house'); at the boundary between a lexical word and a functional word, where V_1 elision is more common than V_2. It can also be at the boundary between a CV prefix and a root, where he claims that V_1 occurs; and at the boundary between a root and a suffix, where either V_1 or V_2 elision is possible.

Similar to Etsako, Abakah (2004a) shows that vowel elision involves the truncation of one of two contiguous vowel at word boundary. This occurs when a word that ends in a vowel is followed by another word that begins in a vowel. He explains that if the second vowel in the sequence of $V_1 \# V_2$ is [-Low], then it is obligatorily deleted. However, if the first vowel is [-low], then the first vowel is deleted. Abakah (2004a) further shows that in compounding, word boundary vowel sequence may be deleted simultaneously under the condition that the final syllable of the first free form

is CV#, where the C is [+Son] and the V_1 is [+high], with the # V_2 underspecified for tongue height position feature. He explains that regardless of the dialectal variations in Fante, the post sonorant word final deletion has to occur intervocalically at the underlying level of representation. Aside sound segments, Abakah notes that syllables are also deleted in rapid speech in Fante. These works are relevant to Ɛsahie as it shares similar context of deletion. Ɛsahie also deletes vowels at word boundary as well as truncating syllable in compounding. These contexts of operation will be studied in our discussion as we analysis the data on vowel elision.

2.7 Reduplication

Reduplication has been analysed from different angles. Bodomo (2000: 3) explains it as 'involving repetition or multiple occurrence of a morphological entity within a larger unit." Inkelas (2014: 7) observes that "reduplication is capable of conveying derivational as well as inflectional meaning of any sort" and that "it serves a wide variety of functions cross-linguistically and within individual languages". These functions, obviously, ranges from the standard morphological function of derivation to inflection. This result contributes to our understanding of the role of phonology in determining the realization of reduplicative morphemes. Our observation in Ɛsahie is that reduplication is used to mark plurality of subject, derivation of new words, attenuation, augmentation, emphasis, and particularly for encoding repetition of actions or concepts. Also, it has been shown that reduplication may be used to signal

pluralization, iteration or duration, intensification and sarcasm (cf.Abakah 2015; Boakye 2015; Rubino 2005; Winkler & Obeng 2003: , inter alia). Many approaches on the study of reduplication treat it solely as a morphological concept. For instance, (Inkelas & Zoll 2000;2005) in their Morphological Doubling Theory (MDT) perceive reduplication "as the result of concatenation segmentally underspecifies shape by copying procedure" (Inkelas & Zoll 2005: 144).

However, the works of Marfo (2005) Osam et al. (2013) and Abakah (2015), inter alia, show that reduplication is one area where phonological information informs morphological conclusions. Through their works, we notice that prosodic information such as tone is key in understanding the changes that take place in reduplicated forms. For instance, Abakah (2015) looks at the segmental and tonal process that reduplicants and the bases of nouns, verbs, and adjectives undergo. He notes that the difference between a base and a reduplicant can be deduce from output tonal patterns/melody. He further observes that reduplicated words from different tonal groups behave differently. For instance, nouns derived from class 1 verbs fails to be reduplicated, while nouns derived from class 2 verbs can be reduplicated. Moreover, he shows that nouns derived from verbal class 2 do not take nominal prefix, but in their reduplicated form, the plural morpheme is prefixed to the reduplicated word. While some verbs and nouns copy both the segmental and suprasegmental features of the base, others copy only the segmental features. Some of the example he gives are in (2.13).

2.13　ɕìrá　　'bless' → ɕìré- ɕìrà

　　　wìá　　'steal' → wìé- wìà

　　　ʥí　　'to get' → ʥì- ʥí

Abakah's claim is corroborated by Osam et al. (2013) when they examined the morphology of reduplicated verb stems in Akan and how morphological information affect target sounds. They show that in Akan, reduplicated verb forms where the full stem is reduplicated, one has to resort to phonological information such as vowel harmony, vowel shift or tonal processes to resolve the difference between the base and the reduplicant as exemplified below in (2.14).

2.14　a. bɔɔ　　　'to hit'　　→ bòbɔ́　　→ bòbɔ̀- bòbɔ́

　　　b. kùm̀　　'to kill'　　→ kùǹ-kùm̀　→ kùǹkùm̀ – kùǹkùm̀

(Osam et al. 2013: 46)

They show that where the base and the reduplicant are identical, one resorts to phonological information to identify the differences in forms. This phonological information explains the changes in the similarities of the output form. Though reduplication precedes the phonological processes, the latter is key in understanding the inherent changes in the reduplicated forms. Thus, they may apply differently in

different context, for example, vowel harmony may apply in some monosyllabic verb form but may fail to apply in disyllabic forms as shown below in (2.15).

2.15   sa   'to scoop'   →sesa [sɪsa]

        twa   'to cut'   → twitwa [tɕwitɕwa]

        sɔne   'to seive'   → sɔnesɔne [sɔnɪsɔnɪ]

They further observe that tone interacts with morphological forms in reduplication. For instance, a H tone monosyllabic base may surface as L tone in the reduplicated output. Based on these observations, they conclude that morphological changes in reduplication do not happen in isolation. They are highly influenced by prosody. I share their opinion that phonological impact is key in the reduplicated output. Indeed, there are more than enough evidence in Ɛsahie to support the claims identified in these works.

Boakye (2015) also studies reduplication in Akan and identifies two types of reduplication, full and partial. He notes that like most languages, Akan reduplication employs copying as its strategy where nouns, adjectives, adverbs and numerals copy the base segments in the reduplicant without any change, but in the reduplication of verbs the height of the base vowel determine whether the vowel segments will be modified or copied as it is in the base. Although the work touches on many aspects of reduplication in Akan, it somehow fall short of elaborate thematic discussion.

Some of the examples, for instance, are not elaborate enough to give the reader enough evidence to ascertain some of his claim. However, the work is relevant to this study considering the similar characteristics share by both languages in terms of reduplication.

One key aspect of this study is on prosody and an aspect of it is treated in Downing (2011). On the effect of tone on reduplication, Downing (2011) observes that tones do not usually transfer along with the segmental content of the base in Bantu languages. She notes that tone realization in the RED+Base complex falls out if the complex is a compound verb stem. She compares tone realization in the RED+Base complex to accent realization in compounds in other languages and predicts a three way, three stems (RED stem, Base stem, compound stem) as its domain of realization. The analysis, she notes, confirms that both morphological and phonological factors determine the realization of reduplicative morphemes.

Inagaki (2011) also discusses reduplication in Kadorih and shows that in Kadorih, a duplicated output (the whole structure derived by means of word duplication) is either a repeated or a reduplicated output phonologically. The repeated outputs are either phonological or intonational phrases, whereas reduplicated outputs must be prosodic words. He explains that a reduplicated output must be a single prosodic word, whereas a repeated output must be a phrase composed of two prosodic words. He shows that some prosodic words have two syllables, which can be regarded as appropriate inputs for reduplication in Kadorih. However, he explains that repeated

outputs can receive one or two intonation units, and always express iconic meanings.

He continues that monosyllabic inputs cannot be reduplicated. Furthermore, 'extended

prosodic words' which consist of a clitic and another element, for instance, *ngorihih*

'just drink' (*ngorih=ih*) cannot be reduplicated either: **ngorihi-ngorihih*. Thus, inputs

for reduplication in Kadorih must have at least two syllables and must not be

'extended' through the addition of a clitic.

Shiohara and Furihata (2011) investigates the function of reduplication in some

Indonesia languages and notices that the infix [-ar-] occurs in only a limited number

of nominals which can be recognized as an established and frequently used word and

that other nominals may potentially host the infix [-ar-], but most of them are not

recognized as an established word. On verbal bases, he notes that the infix [-ar-]

usually indicates the plurality of (i) the actor of the situation, or (ii) the undergoer of

the situation expressed by the transitive construction. These findings will enhance our

understanding of the data on reduplication in the study.

2.8 Prosodic Structure of Nouns

Several works confirm the impact of tone on nouns. The segmental and prosodic

melodies of Akan was studied by Abakah (2004b) who makes several observations

about segments and their prosodic melody in Akan. Among other things, he observes

that Akan has optional nominal prefixes and nominal suffixes which play different

morphological roles or functions. While the nominal suffixes are pre-linked for H tone,

the prefix is underspecified for tone and takes an L tone by default. He notes that in Akan, tone is functional and a drop in pitch is usually noticed on H_2 which is separated from H_1 by a linked or floating L tone at the prosodic surface. Akan, as he notices, does not have lexical contour tone but rather have phonetic contour tone which is the output of juxtaposing two contrastive tones. The study further examines the tonal pattern of verbs in Akan and revealed that verbs in Akan can be sub-divided into three tonal classes with prosodic behavoiur unique to each tonal group. These verbs, he notes, undergo different tonal alternations depending on the syntactic role it plays, i.e. whether marking negation, optative, habitual, stative or imperative. To explain the tonal changes, he postulates 14 tonal rules which account for the differences in tonal behavior. These include Floating L-Spread, Leftward H-Spread, Rightward L-Spread, Rightward H-Spread, Right-Edge Floating L-Spread, Perfect Aspect Verb Root Replacement, Past Tense Tone Replacement, and Right-Edge Floating H-Spread. Abakah's examination of Akan nouns shows that prosodic patterns have immense influence on segmental behavior.

Owusu (2015) corroborates Abakah's claim on the tone patterns of possessive constructive in the Asante Twi dialect of Akan when he observes that the tone pattern of possessed nouns does not usually change in the possessive NP construction. He explains that "when the possessive noun is replaced with a possessive adjective, the tone of the possessive adjective is determine by the tone pattern of the possessed noun" (Owusu 2015: 98). For example, he notes that inalienable nominal prefixes are realised

on low tone when used in isolation, but become downstep high in possessive constructions. Accounting for the tonal change, he explains that after the nominal prefix is deleted in a possessive construction, its low tone is left floating and causes a reduction in the pitch level of a following high tone to be downstep. He further explains that for nouns with L-H tone patterns, if the nominal prefix is low, the vowel in the possessive adjective is deleted if it is a pronoun (*mi, wu, ni*). This results in the nominal prefix being realised on a low tone as in these examples:

Example 2.16   a.   /mi/ + anumaa→ manumaa   'my bird'

b.   /mi/ + awuɔ → ma!wuɔ   'my birth' (Owusu 2015: 91)

However, when the nominal prefix is a syllabic nasal, the possessive construction is realised on a high tone as in (2.17).

Example 2.17 a.   mi +mpa→ mi!mpa   'my bed'

b.   mi +nsa → min!sa   'my drink.

Similarly, Marfo (2004) provides a prosodic account of tone and segmental process in Akan phrasal words, and observes that there is an interface between prosody and syntax in phrasal construction in Akan. He specifically cites the output forms of

noun-noun (N-N) and noun-adjective (N-Adj) phrases as evidence of the interaction between syntax and phonology. He argues that the application of phrasal rules in the construction are triggered by phonological contexts. His position is that "phrasal phonological rules apply only with properties of the prosodic domains, and syntactic constituents structure (along with other grammatical information) only constitutes the primary input base on which the domains of the prosodic structure are defined" (Marfo, 2013:94). He goes on to explain that in the construction of N-N and N-Adj, phrasal rules such as H-deletion, Prefix deletion, Diphthong simplification, H-insertion and boundary assimilation has to apply to support the syntactic components. For example, in the formation of N-N, and N-Adj phrasal words, the N_1 loses its non-low stems to become high as shown in example (2.18).

Example 2.18 a.   òdwáí +òníní → òdwàníní

              b.   àsɛ́ḿ + húnú→ àsɛ̀mhúnú   (Marfo 2004: 96)

As a diphthong, either the word is shortened or one of its vowels is lengthened as illustrated (2.19).

Example 2.19 Diphthong Simplification

       a.   kòtéɛ́ + bɔ́tɔ́   'penis, sack'   → kɔ̀tèbɔ́tɔ́   'uncircumcised'

       b.   dàdéɛ́+ kétéwá 'metal, small' → dàdè(kété)wá   'a nail'

(Marfo 2004: 98)

Thus, the low tone of N₂ regressively spreads to replace the deleted H tone. It is interesting to note that similar processes such as H-deletion and subsequent L tone spread are observed in Ɛsahie compounds. Marfo's study obviously is very relevant to our current study, especially in the area of N-N and N-Adj compounds. For Ewe, Capo (1981) shows that noun prefixes are marked for high tone when the stem begins with a sonorant consonant, but a low tone when the stem begins with a voiceless obstruents as in *ā-ŋbā* 'floor'/ *à-gbádzɛ́* 'reed seive'/ *à-sĭkĭɛ́* 'tail'.

Preliminary data analysis show that like Akan, prefixes in Ɛsahie are also underspecified for tone and take low tone by default. Chapters 5 of this study will examine the tonal behavior of nouns and verbs in Ɛsahie and these work will provide immense insight into the data analysis. In Digo and Nguni languages, Odden (1995b) reports that tone and consonants interact and voiced and voiceless consonants are treated alike.

Gac (2002) investigates the tonal alternations of nouns in Somali and posits that tonal alternations are triggered by intonative tone. The work gives a phonological account of the alternations in the tone accent and show that the interactive tone interacts with the tone accent to yield different patterns of parameters. He showed that the tones of nouns undergo several complex changes according to the parameters of nominal class and syntactic discursive contexts. He argues that in hierarchical structure, the low tone of focalization is the key factor that triggers tonal accent

changes and regulates intonative tones. Somali has two independent tonal tiers – the first tonal tier consists of high tones, and the second tier is intonative tier – which are made up of low or high tones preceded by high tones.

Data from Buli also confirm tone-segment interaction in lexical forms. Akanlig-Pare and Kenstowicz (2002) analyse the tonal contrast and alternations in Buli from both the synchronic and diachronic perspective and report that tone is highly relevant in the inflectional morphology of the language. They observe that while nouns and adjectives exhibit all three lexical tone forms, verbs do not. They claim that in Buli, plural suffix ends with [-a] which, when inflected changes to a low, mid or high, as in (2.20). They further observe that the low tone of the emphatic forms of the 1st and 2nd person singular have a spreading effect on the attached nouns and may cause a high tone to become a rising tone as in the examples in (2.20).

Example 2.20 a.　　bí:k　　→　　bísà　　　　'child'

　　　　　　　b.　　bí:ká　→　　bísáŋá　　　'children

　　　　　　　c.　　pōk　　→　　pōbā　　　　'wife'

Example 2.21 a.　　bí:k　'child'　　　 m̀ biˇ:k　　'my child'

　　　　　　　b.　　bísà　plural　　　m̀ bĭsá　　　plural

Kenstowicz (2008) studies the origin of tonal classes in Kinande noun stems and notices that the nouns in the language have four contrasting forms – HH, HL, LH, LL.

Akinlabi and Liberman (2001) also provide further evidence for the relevance of OCP in morpho-phonology as they examine the tonal phonology of Yoruba clitics and identifies what they call a 'morphophonemic conspiracy'. They identified this conspiracy after examining the tonal behaviours of six types of enclitics in standard Yoruba namely the subject marking high tone morpheme, the object pronouns, the emphatic particle, the short subject pronoun, the exclamatory or vocative particle and the reduced forms of the possessive pronouns. They observe that in all case of the enclitic, there is an OCP constraint that prevents the last syllable of the host and the adjacent clitic from having the same tone.

Example 2.22 **Object clitic**   **Emphatic clitic**

      ó kó **mi** 'he/she/it taught me'   ó lo o̩ 'he went'

      ó kó **e**he '/she/it taught you'   ó lo̩ **ò** 'he went (emphatic)

                                    ó dé   'he arrived'

                                    ó dé **é** 'he arrived (emphatic)

                                    ó lé akin 'he pursued Akin'

                              ó lé akin in 'he pursured Akin (emphatic)

                                    (Akinlabi & Liberman 2001: 10-11)

In these examples, the enclitic and the host carry the same tone which is a violation of the OCP. This is resolved by deleting one of the tones belonging to either the clitic or the host, or inserting a toneless vowel. While the constraint is observed in host-plus-clitic forms, it is inapplicable on other constructional forms such at lexical and phrasal levels or even in compounds. They propose that invoking OCP constraint prevents the last syllable of the host and the adjacent clitic from having the same tone.

Akinlabi et al. (2009) study the tonal structure of Nkoroo nominal construction and observe the existence of 'tonal conspiracy'. In the work, they examine the tonal pattern of nominal constructions in Nkoroo and proclitic-host with other types of noun phrases. They discover that regardless of the multiple phonological processes such as floating tone, tone spread, tonal metathesis, the tonal output is always the same. This, they call tonal conspiracy'. They pair compound of different word groups and of different tonal patterns. In all instances, they notice a sameness in tonal output. The only exception is when the first noun bears a low tone, in which case the 'conspiracy' is broken. They explain after pairing nouns with different tonal patterns and getting the same LH output that it appears the language is in need of a specific tonal melody on the output, so it maneuvers to achieve this output regardless of the input tones. This is quite significant to our current study as it brings to the fore the need to assiduously investigate nominal compound pairs to determine similarity in nature.

2.8.1 Prosodic structure of nominalised words

That languages derive nouns from other word groups, lexical and non-lexical, is widely studied (Akanlig-Pare 1999;2005; Appah 2004; Comrie & Thompson 2007; Gerner 2011; Koptjevskaja-Tamm 2002; Payne 1997; Yap et al. 2011: , inter alia). Although this study is not on the process of nominalization, but on the output of the process, knowledge on the process will aid our understanding of the product and their tonal pattern. Nominalization principally refers to the process by which nominal expressions are derived from other constructions (*eat<eater, walk<walk in English*). Comrie and Thompson (2007) identify seven types of nominalizations. These are action/state; agentive; instrument; manner; location; objective, and reason.

Nominalization can be from a lexical or syntactic source. Lexical nominalization is the turning of a word of one class, i.e. verb, adjective, adverb into a noun. Syntactic nominalization on the other hand denotes the conversion of an entire phrase or clause to a nominal.

Affixation is a principal strategy employed in deriving nominals (cf.Akanlig-Pare 1999; Akrofi-Ansah 2012; Antwi-Danso 2005; Appah 2004;2005; Comrie & Thompson 2007; Dolphyne 2006; Koptjevskaja-Tamm 2002; Olawsky 2011: , inter alia). In his study on Dagbani grammar, Olawsky (1999) shows that Dagbani derives nominals via suffixation. This is quite different from nominal derivation in other languages such as Akan (Antwi-Danso 2005, Dolphyne 2006, Appah 2004, 2005),

Buli (Akanlig-Pare 1999) which employ suffixation in addition to prefixation for derived nominals. For instance, in the Dagbani examples in (2.23), the nouns have pair of suffixes for number marking.

Example 2.23		**Singular**	**Plural**	**Root**	**Meaning**
	a.	/sal-ga/	sal-si	sal-	'laddle'
	b.	/ʧeer-li/	ʧee-ra	ʧeer-	'driver- ant'
	c.	/pkal-gul/	/kpal-di/	kpal	'spices'

Akan have nouns formed from compounds (Abakah 2004b; cf.Abakah 2006; cf.Abakah 2015; Anderson 2013; Anyidoho 1990; Appah 2003;2004;2013;2015;2016a; Dolphyne 1988; Marfo 2004: ,inter alia)   Dolphyne (1988) for instance, points out that Akan employs nominal prefix which is either a vowel or a homorganic nasal in deriving nominals. Commenting on the prosodic structure of the derived nominal, she explains that the prefixes bear low tones. Abakah (2004b) corroborates Dolphyne (1988) claim that nominal prefixes in Akan are low toned. This is further confirmed by Appah (2003) in example (2.24) below.

Example 2.24 a.   dzidzi   a-dzidzi (Fa)

 '   eat'   SG-   eat

                                 'the act of eating'

b.   kyerɛw   a-kyerɛw (Fa)

        'write'   SG-write

        'the act of writing'

c.   kekan   a-kenkan

        'read'   SG-read

        'the act of reading' (Appah 2003:84)

The relatedness of Ɛsahie to Akan is further manifested in this angle. Both Ɛsahie and Akan have similar vocal and nasal prefixes, and separate morphemes with minimal change in pronunciation for suffixes. Again, both Akan and Ɛsahie have unique suffix (*nom*) for kinship nouns.

Aside affixation, languages also derive nominals through the process of compounding (Appah 2004; Boateng 2017; Comrie & Thompson 2007; Dorvlo 2008; Olawsky 1999; Payne 1997). In Akan, Appah shows that nominals are derived from verbs through compounding as in example (2.25) below.

Example 2.25 a. Pata ko gye ko bo wo bo   →   *patakogyekobowobo*

        separate fight take fight hit 3sgposs chest 'Defender of the defenseless'

        "separates combatants and takes fight upon yourself"

b.   sɛ me-n-hyia   →   *sɛ menhyia*

        COND 1sg-NEG-meet '   if I had not met "Had I not met"

c.   ɔ-boɔ + dan   →   *ɔboban*

        SG-stone house   'Stone house'

<div align="right">(Appah 2003: 65)</div>

These and other examples confirmation the derivation of nouns via compounding. When lexical forms are nominalised, several phonological processes take place. In Akan and Lɛtɛ, Appah (2004) and Akrofi-Ansah (2012) respectively identify deletion and tonal change as part of the phonological changes. In some dialects of Yoruba, Abiodun (2000) mentions phonological changes such as deletion of final vowel, nasalization, denalisation, assimilation across segment and re-alignment of tone. Marfo (2004) observes that in Akan, when the N_1 modifies N_2, the H tone of the final TBU of N_1 changes to a L tone as shown in example (2.26) below.

Example 2.26. ódwáí 'sheep' + òníní 'male'→òdwààníní 'a ram' Marfo (2004: 3)

In Yoruba, (Akinlabi et al. 2009), serialized words with different tonal inputs for compounds and observe a phenomenon where all tonal output of compounds, regardless of their tonal inputs, turn out as HL. These data confirm that instances of

variation in tonal pattern of the constituents yield compound words with an unswerving tonal output. Thus in this study, I will be guided by these and other related works to discuss how nominals are derived from Ɛsahie, but will be very much interested in examining the prosodic changes that arise from the nominalisation processes.

This study also provides a tonal grouping of nouns in the language. Noun grouping or classification has been discussed from different angles (cf.Akumbu 2009; Bobuafor 2009; Bodomo & Marfo 2006; Creissels 2000; Dimmendaal 2000; Ikoro 1996; Osam 1993: ,inter alia). They are usually classified based on features like number, person, gender, shape, animacy, semantics, affixal markings, etc. Schuh (1995: 128) uses the term noun class in at least two senses in African languages. In one use, it refers to 'a single set of morphological concords'or to 'a paired set of morphological concords'. Akumbu (2009: 210-213) described it as a means by which a language classifies its nouns, and maintains a clear reference to people, things and ideas.

Nouns have also been classified morphologically (Bodomo & Marfo 2006), semantically (Osam 1993) and phonologically (Abakah 2004b). Bodomo and Marfo (2006) classified nouns in Akan and Dagaare based on their morpho-phonological properties. They explain that morphological criterion is insufficient for a proper understanding of noun classes in both languages, hence the morpho-phonological. Morphologically, they categorise nouns in Akan and Dagbani based on the similarity

of their singular and plural affixes. They identify nine classes and ten classes of nouns for Akan and Dagaare respectively. They show that both languages have similar features in the singular and plural affixes. Using the Lexical Phonology approach (Kiparsky 1985), they show that the nouns after affixation undergo some phonological changes such as ATR harmonization, where the vowels in the affixes have to agree with the vowels in the stem in tongue root features. Using this premise, they group nouns into classes based on number affixes. Using number affixation, they identify two ways by which Dagaare and Akan nouns can be set up into classes. Group one base the nouns on the similarity, first, of their singular affixes and then their plural affixes. Nouns with common singular affixes and are in the same group may not necessarily occur in another group, when we consider their plural formation. The other criterion puts the nouns into classes based on the similarity of both the singular and plural affixes. Bodomo and Marfo (2006) further subcategorized this broad classification depending on the phonological processes at play, including vowel harmony, vowel lengthening, nasalisation and homorganic assimilation. Such process are also observed in Olawsky (1999) among others.

In addition to the morphological or syntactic groupings, nouns have also been classified based on the prosodic feature of tone in some languages. Abakah (2004b) presents a tonal classification of Akan nouns. He identified six classes for the nouns. They are Class I nouns-LH, Class II – HLH; Class III- L, Class IV- H; Class V-#H+HLH; Class VI- HLH. Loanwords in Akan are HL. The various types and classes

of nouns take different tonal melodies when compounded. The tonal melody of the second element in most cases determines the total tonal melody of the resultant phonological word (Abakah 2004b: 249). Konoshenko (2008) also discusses the tonal system of nouns and verbs in three dialects of Kpelle, a language of the South-Western group of the Mande language family. She observed that all three dialects have five tonal classes for nouns. For Gbali and the Standard Guinea Kpelle (SGK), the tonal classes are as shown in example (2.27).

Example 2.27 Class 1-cv, cvcv –wulu 'tree' H HH

Class 2 –cvcv-l—yala 'lion' L,L

Class 3- cv, cvcv – yowo 'axe' HL, LHL

Class 4- cvcv - yile 'dog' H, HL

Class 5- cvcv-2 –gbono 'rang' LL

The groping of nouns in this study will be prosodically informed. These tonal classifications will be useful in understanding the nature of the grouping.

2.8.2 Borrowed Nouns

Another type of nominals captured in this study is nouns borrowed from other languages. These constitute a chunk of nouns for most languages and are usually nativised into the receiving language. Linguistic nativisation is the adaptation of a

linguistic expression from one language into another (Thomason & Kaufman 2001). Kaufman and Thomason (1988: 37) refer to it as "the incorporation of foreign features into a group's native language by speakers of that language: the native language is maintained but is changed by the addition of the incorporated features". Tranter (2000: 377) simply describes it as "the process whereby loanwords are copied to the target language's phonology". These viewpoints attest to the fact that loanwords are adapted by making the borrowed word fit into the phonological structure of the receiving language, without altering the phonological structure of the receiving language (Tranter 2000). Indeed, most studies on loanwords have centered on the semantic, syntactic or morphological changes in the loanwords(Bahumaid 2015; Haspelmath 2008;2009; Haspelmath & Tadmor 2009; Lehmann 1992) with others concentrating on phonological changes (cf.Broselow 2009; Calabrese 2009; Calabrese & Wetzels 2009; Davis et al. 2012; Glewwe 2015; Haspelmath & Tadmor 2009; Kenstowicz 2006; Kenstowicz & Suchato 2006; Kim & Kochetov 2011; Pinta 2013: ,inter alia), or both.

Adomako (2008) discusses loanword adaptation in Akan, and shows that in Akan loanword adaptation, two major phonological processes − vowel epenthesis and consonant deletion – apply to repair illicit structures in the source/foreign words adapted to the native vocabulary. He observes that while vowels are inserted to repair illicit word-initial clusters, word-medial clusters and word-final obstruent consonant deletion apply only to word-final clusters. He notes that generally it is always the high

vowels that are inserted into the epenthetic sites, contrary to what have been observed in other loanword grammars where vowels of other heights can also spread place feature into the epenthetic sites. He further observes that it is usually the high back/round, and not the high front vowel that is favoured as the epenthetic vowel in the Akan loanword grammar, and this leads to the labial feature sharing place feature with the epenthetic vowel than the coronal feature, though the coronal, he notes, is very active in the native Akan phonology. He further notes that in the consonant deletion or in the word-final cluster reduction, the sonority level of the target consonants determines which one deletes.

His work, like many others, focuses on segmental changes. While the work is very informative on segmental adjustment to loanwords, it fails to account for prosodic alternation that loanwords undergo. Notwithstanding this, Adomako's work will offer useful insight into the analysis of loanwords nativisation in this study, considering the fact that Ɛsahie, like Akan, adjusts loanwords segmentally and tonally. The nativisation process is similar to Akan, as espoused by Adomako (2008). Indeed, we observed that both languages employ epenthesis and deletion as part of the repair strategies. However, while he observes some kind of asymmetry in loanword adaptation in terms of assimilation which seeks to give credence to the claim that the loanword grammar, to some extent, differs from the native grammar, we observed that loanwords strictly conform to the structural wellformedness conditions of the native grammar and, where there is phonological asymmetry, it is minimal. For example

where a sound is underlyingly voiceless intervocalically, it becomes voiced in the output.

Borrowed nouns also undergo some syllable structure modification processes in order to fit into the syllable structure of most language (cf. Adomako 2008; Apenteng & Amfo 2014; Calabrese 2009; Calabrese & Wetzels 2009; Cleland et al. 2009; Kang 2011: , inter alia). For example, Fula uses /i, u/; Akan uses the vowels/ i, u/ (Adomako 2008), while Korean uses /ɨ/ which tends to devoiced after an aspirated vowel (Tranter, 2000). In English, vowel epenthesis is employed to avoid phonotactically ill-formed sequencing of sibilants (Glewwe 2015, Kim and Kochetov 2011, ibid). The epenthetic vowels are harmonic with the preceding vowel (Uffmann 2002;2004).

Other studies on borrowed words have also focused on how segments of the source language are incorporated into the receiving language (cf.Ito et al. 2006; Ito & Mester 2007; Kang 2003; Kang et al. 2008; Kochetov 2015; Paradis 2006; Uffmann 2004: , inter alia). In most of these studies, the two languages have different pitch systems with the source language having stress and the receiving language having tones: English into Japanese (cf.Kubozono 2006;2007); English into Korean (Lee 2005); English into South Korean (Kim 2009; Kim & Kochetov 2011); English into Thai (Kenstowicz & Suchato 2006); English into Mandarin Chinese (Wu 2006); English into Yoruba (Kenstowicz 2006); English into Cantonese (Hao 2009). A look at their analysis show that usually the receiving language may consider the prosodic

pattern of the source language in assigning a tone or the borrowed word may display prosodic patterns predictable from the syllable structure, but independent from the source language (Broselow 2009; Kang 2011). For example, in Cantonese and Yoruba, a stressed syllable bears a H tone (Hao 2009; Kenstowicz 2006; Silverman 1992). The attention paid to the phonological process involved in loanwords adaption to the native language is important because it has been established that loanwords role in the historical linguistics studies provides evidence for the phonological processes that affect native words in the target language (Tranter 2000). It therefore offers insight into the phonological and phonetic, as well as syllable structure changes in the target language.

2.9 Prosodic Structure of Verbs

Verbs are linguistic components that relate to the actions or states taken by humans. They make possible specifications and differences between events. There has been diverse ways of classifying verbs. Levin (1993) classifies English verbs based on the linguistics forms and transformational patterns of alternation embodied in the mind. She groups verbs into forms such as impact, cutting, separation and disassembling, image creation, creation and transformation, among others. Levin's classification thus provides information on how one navigates through different natural and social environment. This shows that some studies on verbs focus on the semantic and morphological classification. Other studies also indicate tone and other prosodic

features influence the forms of the verb to yield different tenses, aspects and mood forms. Many of these verbal forms are tonally marked (Akanlig-Pare 2005). For instance, Tresbarats (1990) studies tone in Abidji verb morphology and groups verbs in the language into three classes based on their tonal patterns. These are class one – HL, class two –H, and class three – L. He shows that tone and segments interact to produce about fourteen inflected forms of the verb for tense-aspect combination for two classes of verbs. These inflected forms include habitual which is marked with a (+high), perfective (+high) with a pronoun, future (+high), progressive (-high), accomplished (-high), hypothetical (-high), absolute negative (+high), specific negative (-high), progressive negative (-high) plus a pronoun, direct imperative (+high) plus a pronoun, prohibitive (-high), and infinitive (-high).

This verbal classification is similar to that of Abakah (2004b). However, while Tresbarats (1990) classification, though tonal, is based on tense-aspect considerations, that of Abakah is based on the tonal properties. Tresbarats observe that prefixes in Abidji are inherently toneless and therefore requires phonological rules such as Initial Tone Copying, Initial Stem Tone Polarisation to determine the tone of the prefixes in specific environments We see Tresbarats' work to be important to this study. In chapter five of this work, we will discuss how tone interacts with verbal segments to derive tense-aspect-mood forms for verbs in Ɛsahie. We observe that the various inflectional forms in the language are highly influence by tone.

Akumbu (2015), working on Babanki, a Cameroonian language, shows that tone interacts with segments to yield different verbal forms. He observes that in Babanki, verbs can have up to three tonal patterns on the root depending on its usage. A verb with an underlying high tone can surface as H, HL, or L. A low tone verb can also be realised as H, HL, H (H). He employs five tonal rules, downstep, tone docking, high tone spread, low tone spread, and upstep to account to the complex tonal system of the verbs. Like Ɛsahie which uses tone to mark differences in tense-aspect- mood forms, Babanki employs tonal variations to mark verbal inflections. For example, in the future tense, there is a downstep of a high tone. He explains that the future tense is made up of high tone morpheme plus a final floating low tone. - /á`, né `, lú`/. To account for the downstep in the future tense, the low tone remains floating and spreads its low feature to the following high tone. The high tone is then delinked and realised on a lower tone than the former one. He further shows that leftward tone docking helps distinguish the negative imperative and negative imperfective forms of the verb. This is exemplified below in (2.28).

Example 2.28 a. Búŋɔ́ kô ʒɨ́ kɔ́. bájn (bwɛ́n)

Búŋ	ɔ́	kô	ʒɨ́	kɔ́.	Bájn (bwɛ́n)
Búŋ	SM	NEG	eat	C7. fufu	NEG

'Bung has not eaten fufu'

b.   Búŋɔ́ kô jì ʒɨ́ kɔ́. bájn (bwɛ́n)

Búŋ   ɔ́   kô   jì   ʒɨ́   kɔ́.   bájn (bwɛ́n)

Búŋ   SM   NEG   P2   eat   C7. fufu NEG

'Bung did not eat fufu'

Based on the examples in (2.28), he shows that in the past tense, the first negation morpheme is high falling due to the leftward docking of the floating low tone. Other verbal forms that undergo tone docking are the future affirmative and negative forms and the imperative. High tone spread can be to the verb root or not. Akimbu's study provides a clearer insight into understanding the processes involved in Ɛsahie verbal forms. Motivated by the Babanki data, we will be able to appreciate the directionality of the tonal spread and the effect of the spreading on other segments in its environment.

Additionally, the work of Waya and Babarinde (2018) on Tiv verb further reveals the role tone plays in verbal morphology. Their work examined the internal structure of Tiv verbs and their suffixes. In terms of classification, they identify eight verbal classes for the language. Class A verbs are disyllabic verb stems with low tone; class B are disyllabic low tone verbs ending in consonants; class C verbs are low toned monosyllabic with final consonant, while class D are mid tone verbs followed by low tone disyllabic verbs ending with a vowel. The other classes are class E which consist of monosyllabic stems with a downward glide; class F are disyllabic low-low stems

with final vowel, and class H are also monosyllabic mid tone verbs. They note that tense account for the modification of these stems in marking tense. These verbal forms are tonally distinct in their inflected forms as exemplified in (2.29) below, which show how variations in tonal patterns mark different tense forms.

Example 2.29 a.   à kìmbì   (he paid)

b.   á kìmbí (he paid recently)

c.   à kìmbí (he is to pay)

Aside from tone, other phonological processes such as vowel lengthening, vowel harmony are prominent in the verbal morphology. For example, the affirmative imperative is marked by doubling the vowel as seen in example (2.30).

Example 2.30   **Stem**   **imperative form**   **gloss**

a.   tam   taam   'chew'

b.   pav   paav   'break'

c.   kpe   kpee   'die

d.   va   vaa   'cry'(Waya & Babarinde 2018: 13)

Using these examples, they show that tense and aspect are not marked morphologically only, but also tonally as well. This and similar works further show

the interface between morphology and phonology in accounting for word forms and their meanings (Booij 2012).

Hyman (2014b) also discusses verbs in Lulamogi based on their tonal structure and shows that the language makes use of verbal melodies to mark contrast in verbal properties such as tense, mood aspect and polarity and clause types. Tonal melodies thus indicate conjugated affirmative and negative verb forms. Infinitive tone differs depending on the initial sound of the stem, i.e. stems with C-initial have high tone, whiles V-initial stems mark L tone.

Example 2.31 a. C-initial stems

    i.   ó-ku-ly-á   'to eat'

    ii.   ó -ku-h- á   'to give'

    iii. ó -ku-sumit- á 'to stab'

    iv. ó -ku-many- á 'to pluck'

   b. V-initial stems

    HLH   a. ó -kw-iib- á 'to steal'

                b. ó -kw-ooh- á to pour'

    HLHH   c. ó -kw-iigul- á 'to close'

                d. ó -kw-aak- á ;to shine'

    HLHHH e. ó -kw-eemélél-á 'to stand'

Hyman (2014b: 13) further points out that vowel length does not affect tone pattern and that prefixes, suffixes and tones are used for TAM markings. A LH*L indicate past tense, while LH*L indicates present habitual tense. He explains, "initial L of the melody is not realized. The H is shifted onto the first syllable of the stem, but remains in-situ when followed by an object prefix." Main clause negation take H-final melodies, LH, L-H, H-H. Subject prefix does not contrast tone for negatives. Also "when a verb is followed by an object which begins with an argument, the tonal melody is unchanged" (Hyman 2014b: 176).

Bruhn (2010) reveals similar influences of tone in his discussion of the tonal behavior of verb stems in Chungli Ao, a Tibetan-Burma language. Chungli Ao has a register tone system, H, M, L. Bruhn (2010) establishes 3 verbal classes based on the tones of the stems and their tonal interaction with suffixes. Class 1 verbs have a H (L); Class 2 verbs – M (M.), Class 3 verbs – (M.M) which raises to H.H when combined with a L tone bearing suffix. He further reports that verbs in classes 1-3 undergo tonal alternations when combined with any other suffix. Verbs that belong to Class 1 category tend to have disyllabic stems with HL tonal patterns or monosyllables with HL contour. They are either what he calls "an A-stem" which combines the M bearing /a/ prefix with a L root or a bare root stem (B-stem) with a H.L tone pattern. Class 1 verbs have varied behaviours when they come into contact with suffixes such as the immediate present (-taɪ[HL]- imperative; aŋ[M] and present-perfect /-u[H]ku[M]/. The prefix

will be lost when the verb stem combines with any of the suffixes. Again, he shows that when Class 1 A-stem combined with a suffix it results in the deletion of the /a/ prefix. The de-prefixed root then bears an underlying L-tone or a M tone. "B-stems" on the other hand do not lose the a-prefix when combined with suffixes. Class 2 verbs on the other hand bear disyllabic M.M or monosyllabic M and behave uniformly when suffixes are attached. Unlike the class I verbs, class 2 verbs in contact with suffixes have no tonal alteration behavior. A-stem and B-stem verbs behave same. Class 2 verbs with the irrealis, present or preterit suffix bears a H tone and the present suffix bears a HL contour. Also, when Class 2 verbs combine with the imperative suffix /-aŋ^M/, the floating M tone is fused with the underlying M tones of the stem and /-aŋ^M/. However, when a Class 2 verb combines with present perfect or immediate past, the floating M cannot delink the suffix's H and so fuses with the stem tone. Class 3 verbs, he observes are disyllabic verb stem with a M.M tone pattern. Like the Class 1 verbs, fewer class 3 verbs have M.H pattern (Bruhn 2010).

Another tonal classification of verbs is that found in Sotho (Zerbian 2007) where verbs are classified into high and low toned classes, depending on the tone quality of the stem-initial vowel. He claims that:

the entire tonal pattern of the verb form is determined by a lexical association of a H tone to a TBU and also by the principles governing tone spread and deletion. Monosyllabic verbs have H tone, while disyllabic

verbs have an underlying H on the stem-initial syllable but do not spread to the final syllable. Trisyllabic verbs show a H tone on the initial syllable that spreads to the right-adjacent syllable. (Zerbian 2007: 148)

Also in Sesotho, a related language, Zerbian (2007) shows that polysyllabic verbs have initial high tone which uniformly spreads only to the right adjacent syllable. Although there is divergence in Northern Sotho, where high tone spread in polysyllabic verbs is limited to the penultimate syllable (as well as infinitive verbs). Thus, he claims that in Sotho, "verbs with toneless verbal extensions have the same unbounded spreading pattern as polysyllabic infinitives, and also verbal affixes which bear a high tone trigger regular HTS up to the penultimate" (Zerbian 2007).

Still on verbs, Konoshenko (2008) identifies 3 tonal classes for Gbali. These are Class 1- H, HH, Class 2-LL, Class 3- HHL. She explains that only the tone on the last syllable of a direct object is key for the tonal realization of the verb.

Hyman and Olawsky (2004) provide a description and analysis of the verb tones in Dagbani. They make the following observation:

a. Morphologically the verb stem in Dagbani can consist of the bare root or of a root plus a suffix, e.g. /lab/ 'return' (intr.) vs. /lab-si/ 'return' (tr.), where /-si/ is a causative suffix.

b. On Syllable structure: the verb stems can be monosyllabic (CV, CVN, CVV) or bisyllabic (CVC, CVV, CVCC, CVC), the only permissible word final consonants being /m/ and /N/

Among other things, they further discovered that a number of factors such as (a) underlying lexical tone (e.g. on verb roots: H vs. Ø), (b) morphologically assigned tones (e.g. H suffix, LH pattern), (c) lexical tone rules: special H spreading rule; anticipatory HTS & H-H dissimilation in (14e) and (d) postlexical tone rules: HTS, LTS, are involved in determining surface verb tones in Dagbani. These show that verbal paradigms in Dagbani are tonally influenced. We observe that their discussionary approach contrasts sharply with the approach to tonal studies proposed by Hyman (2008),where the underlying tones are first identified, followed by the morphological tones assignment and then determine the tonal rules application etc. However, their work provides insight into how the data may be analysis and guides our discussion of verbal tones in Ɛsahie, in structuring the underlying tones and the morphological tones.

The work of Ebarb (2016) on the verbal tone patterns in Kabarasi, a Kenyan Bantu language of the Luhya group shows a tonal relatedness with other Bantu languages (Downing 2011; Kisseberth & Odden 2003; Marlo 2013; Marlo et al. 2017; Odden 2009), including a lexical contrast between /H/ and /Ø/ verb roots and a rich system of tonal inflection. He reports that lexical tones interact with other lexical tones

and prosodic properties of verbs. For instance, the second of two adjacent Hs is lost due to Meessuen's rule, a common process across Bantu languages[3]. Again, he identifies that Contour tones are generally avoided in Kabarasi, but are actively created in the phrasal penult. In addition, verbal derivation tonal rules come to play in the language. This is seen in the two Kabarasi doubling rules, whereas Ebarb (2016) puts it, one spreads Hs from the penultimate mora of the phrase onto the final, and another spreads Hs from the final mora of the phrase onto the penult. He further contend that akin to most Bantu languages (Odden & Bickmore 2014), morphosyntactic context plays an important role in determining the tonal properties of verbs in Kabarasi. For instance, he explains that inflectional or 'melodic' H tones are assigned to various positions within the verb depending on its tense, aspect, and mood, among other factors. He continue that these melodic Hs (HMs) are assigned to positions within the stem according to often construction-specific rules of HM assignment. Tone spreading in verbal derivations is also exhibited in the language. Ebarb explains that Kabarasi has a rule whereby stem-initial Hs spread onto the stem of a preceding word, and that the rule can cause Hs to spread across inflectional prefixes, but only if spreading into the preceding word is possible. The verb's position within the phrase does not affect most constructions that are inflected with a tonal melody; though it has some challenges with some constructions that take a tonal melody phrase-finally do not

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[3] The Meessuen Rule (1963) relates to tonal alternation in same tonal sequencing in Bantu languages. According to the rule, a sequence of HH in Bantu will change to a HL, more like OCP, thus forbidding similar tone to be adjacent.

realize a tonal melody in phrase-medial position. In this case, postverbal Hs spread some distance into the verb stem. The role of tone in verbal derivations is the focus of chapter six of this study and the Kabarasi example will assist in understanding the role of tone can its spread in the derivation of verbs in Ɛsahie.

These works manifest that prosodic features are significant in understanding the changes that verbs undergo. These inflected forms of verbs are not only morphologically marked. In some cases (Akanlig-Pare & Kenstowicz 2002; Hyman 2011; Osam 2003;2004;2008), the inflected forms are prosodically marked.

Also in Lhasa (Sun 1997), tone interacts with the syllable. The negator morpheme-*ma* in Lhasa forms a single phonological word with the attached verb stem. Consequently, its tone is always identical to the underlying tone of the verb stem. Though not clear as to what the inherent tone of [*–ma]* is so Sun (1997)concludes that [*–ma]* is lexically unspecified for tone and so takes its surface tone from the verb attached to by tone association. Thus, the "underlying tone on the verb is nullified and re-associated with the negator." Akanlig-Pare and Kenstowicz (2002) show that verbs have no contrastive tones, but rather have different tonal patterns for the verbal inflected forms such as tense and aspect. The perfect verb for example, when in the 3rd person takes a low tone but high tone for the 1st and 2nd person. Also, the present tense is realised with a pre-verbal particle' [a], when the verb is mid tone, except when it has an object pronoun suffix as exemplified below in (2.32):

Example 2.32

    a. àtì:m à lā   Atim laughs'

    b. mí à lā (emphatic) laugh

    c. wà à lā   he laughs   (Akanlig-Pare & Kenstowicz 2002: 21)

The imperative verb, they report has a mid tone on both the verb and the object suffix. The negative imperative is realised with a negator [kán] and a low tone on the verb and a mid-tone on the object suffix. The future is marked by a particle [li] which can trigger a mid-tone on the verb like that of the imperative. The stative verb on the other hand is realised with a mid-tone and a suffix [-à]. They further observe that an emphatic alternative inflection for the stative verb with an underlying high tone on the verb root in 1st and 2nd person.

These works will be a source of inspiration and guidance in our attempt to understand the prosodic nature of verbs in Ɛsahie.

2.10 Conclusion

The reviewed works are relevant to the current study considering their relatedness in terms of genetics and phonological properties to Ɛsahie. From the review of the literature, it is clear that segments interact with prosodic features and these prosodic information is significant in understanding the changes that occur when sound form words. The prosodic structures of these forms need to be examined to get a holistic

understanding of the nuances of these forms. They will therefore provide much insight

into the analysis of data for this work.

CHAPTER THREE

SEGMENT AND SEGMENTAL STRUCTURES IN ƐSAHIE

3. 1 Introduction

This chapter describes the speech sounds in Ɛsahie using the Distinctive Feature Theory (Chomsky & Halle 1968b; Hume-O'Haire & Winters 2006; Katamba 1989; Kenstowicz 1994), and show their distribution, sequencing and constraints. The chapter is subdivided as follows: Section 3.2 describes vowel and consonant sounds in Ɛsahie. Section 3.3 focuses on sound distribution in Ɛsahie. Section 3.4 is devoted to sound sequencing and sound sequencing constraints in Ɛsahie. Section 3.5 concludes the chapter.

3.2 Sounds in Ɛsahie: A descriptive Account

This section describes the speech sounds in Ɛsahie, and shows their distribution and sequencing within a word. It first reviews the consonants and vowels in Ɛsahie as outlined in Frimpong (2009), and then follow up with a description of the sounds using the distinctive feature theory.

3.2.1 A review of Frimpong (2009) on consonant and vowel sounds in Ɛsahie

In her work, Frimpong (2009) identified ten (10) oral vowels, four (4) nasal vowels, and twenty-four (24) consonants for Ɛsahie. These sounds were described using the phonemic theory. The vowels were described using several articulatory parameters (Catford 1988;1994) outlined below.

• The part of the tongue used in the production of the sounds. That is the front, central, and back.

• The height of the tongue used in the production of the sound in relation to the palate, thus, high, mid and low.

• The posture of the lips when the sounds are being produced. The degree of lip rounding includes rounded, neutral and unrounded. Very often, only two distinctions are made between rounded and unrounded.

• The position of the velum in the production of sounds also identifies two types of vowels as oral and nasalized vowels. The former is produced with a raised velum, which blocks the nasal passage, to allow the air passing through the oral passage freely without any obstruction, whereas the latter is produced with a lowered velum that allows the air to pass through both cavities.

Orthographically, Ɛsahie has 7 oral vowels. These are [a, i, e, ɔ, o, ɛ, u]. Three of the

vowels in pronunciation have two realizations. The vowels with double realizations

are shown below:

/a/ ⟶   [a], [æ]

/e/ ⟶   [e], [ɪ]

/o/ ⟶   [o], [ɔ]

Accordingly, phonetically, Ɛsahie has 10 oral vowels. These are /a, i, e, ɔ, o,ɛ, u, ʊ, ɪ,

æ/. In addition to the 10 oral vowels, Ɛsahie has four nasal vowels which differ from

the ten only in nasality. They are [ã, ĩ, ũ, õ] as illustrated below.

Example 10

/ã/   [kã́]   'to say'

         [kà̃ã̀bá]   'small/ little

         [bùbã́ã́]   'he broke'

/ĩ/   [bĩ́]   'well cooked'

         [tɕɥĩ́]   'to pull/drag'

         [fĩ́ àsé]   'to fall'

/ũ/ [kṹ] 'to kill'

  [sṹa] 'learn'

  [èfṹí] 'corpse /dead body'

/õ/ [bṍ] 'smell bad'

  [ɛ̀pṍéń] 'table'

  [fṍà] 'to chase away'

The nasal vowels in Ɛsahie are phonemic as they are in contrastive distribution with their oral counterparts. Consider example (11) below.

Example 11

  <u>Nasal</u>   <u>Oral</u>

  a. ʨĩ́à 'day'   ʨíà 'dog'

  b. kã́ 'to say'   ká 'to bite'

  c. sṹà 'to learn'   súà 'a house'

  d. kṍɛ̀ 'war'   kóɛ̀ 'stomach'

We notice from the data that the nasal vowels have the same qualities as their oral counterparts except for nasality. Thus, in all, Ɛsahie, has 14 phonetic vowels. These vowels occur in words such as:

èjíá 'sun

æ̀wùsú 'darkness'

tɕìrɛ̀ŋvúá 'egg'

ɔ̀hìní 'chief'

àlíɛ́ 'food'

àsóɛ́ 'ear'

èhúrólɛ́ 'love'(noun)

sònà 'person'

kű 'to kill'

bő 'smell bad'

kɑ̋ 'to say'.

The ten oral vowels are represented on figure 3.1 below.
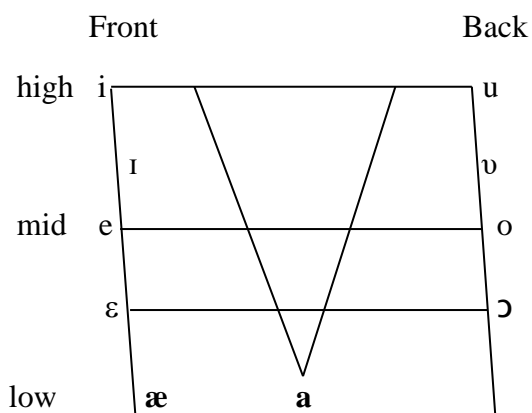
Figure 3. 1: Ɛsahie Vowel Chart   (Source: Frimpong, 2009)

The vowels in Ɛsahie exhibit ATR harmony and are thus classified into two sets as follows:

Set 1-   [+ATR]: [e, u, æ, i, o]

Set 2 - [-ATR]: [ɛ, ʊ, a, ɪ, ɔ]

All the vowels in Ɛsahie occur at word medial and word final positions. The nasal vowels / ã, ĩ, ũ, õ/ do not occur at word initial positions, and the high vowels /i, u, ɪ, ʊ / do not occur at word initial positions. Below in table 3.1 is a summary of the vowel distribution in Ɛsahie.

Table 3 1: Summary of Vowel Distribution in Ɛsahie

Sound	Word Initial	Word Medial	Word Final
/a/	√	√	√
/e/	√	√	√
/ɛ/	√	√	√
/i/	−	√	√
/o/	√	√	√
/u/	−	√	√
/ʊ/	−	√	√
/ɪ/	−	√	√
/ɔ/	√	√	√
/æ/	√	√	√
/ɪ̃/	−	√	√
/ã/	−	√	√
/ ũ /	−	√	√
/õ/	−	√	√

Based on ATR, pronominal prefixes and tense/aspect affixes in Ɛsahie have two forms as illustrated in the tables 3.2 and 3.3 below.

Table 3 2: Pronominal Prefixes

	Underlying Form	Derived Form
	[-ATR]	[+ATR]
1SG	/mɪ/	[mi]
2SG	/wɔ/	[wo]
3SG	/ɔ/	[o]
1PL	/yɛ/	[ye]
2PL	/ɛmɔ/	[ɛmɔ]
3PL	/bɛ/	[be]

Table 3 3 :Tense/ Aspect Affixes

	Underlying Form	Derived Form
	[-ATR]	[+ATR]
Future Prefix	/kɔ/	[ko]
Past Suffix	/lɪ/	[li]
Perfective Prefix	/a/	[æ]

The consonants were also described from three (3) dimensions of articulation. These are the place of articulation, manner of articulation, and the State of the Glottis. The place of articulation looks at the exact point in the oral cavity where the active articulator interacts with the passive articulator to obstruct the airstream. The movement results in a constriction that obstructs the airstream that has been initiated. The manner of articulation also focuses on the manner in which the active articulators position themselves in relation to the passive articulators and to what degree the passage of the airstream through the vocal tract is restricted at the various places of articulation is (Akanlig-Pare 2005;2007). The State of the Glottis (Voicing) looks at the activities of vocal folds as the airstream forces its way out of the larynx. The voiced or voiceless depends on whether the vocal folds vibrate during production or do not

Using these parameters, Frimpong (2009) identified twenty- four (24) consonants for Ɛsahie. These can be found in words such as:

/p/:   [**p**á]   'good'

/b/ :   [**b**ɜ̀tí]   'arm'

/t/:   [**t**ó]   ' to throw

/d/:   [bɔ̀n**d**íré]   'weed'

/k/:   [**k**ɔ̀míɛ́]   'neck'

/g/:   [àŋ**g**órɛ́]   'to play'

/f/:   [**f**ɛ́m]   'to lend'

/v/:   [àɲwùm̀ɲ**v**óín]   'sympathy'

/s/:   [**s**ràĩ́n]   'moon'

/z/   [ǹ**z**úé]   'water'

/m/:   [fɛ́**m**]   'to lend'

/n/:   [sùróí**n**]   'fear'

/r/:   [æ̀nwù**r**ó]   'house'

/l/:   [**l**àlíɛ]   'dream'

/w/:   [bò**w**íé]   'bone'

/j/:   [**j**æ̀tɕí]   'stop'

/ŋ/:   [**ŋ̀**gɔm]   'prophesy'

/ɲ/:   [**ɲ**ɔfõn]   'breast'

/tɕ/:   [**tɕ**ɪrɛ]   'hat'

/dʑ/:   [æ̀wu**dʑ**ee]   'jaw'

/h/:   [**h**ua]   'smell'

/ɕ/:   [ebu**ɕ**e]   'snail'

/kw/:   [**kw**àŋ̀góá]   'a cup'

/gw/:   [**gw**àǹdá]   'ladle'

The twenty-four (24) consonants are shown in table 3.4 below.

Table 3 4: Ɛsahie Consonant Chart

	Bilabial	Labiodental	Alveolar	Alveo-Palatal	Palatal	Labio-Velar	Velar	Glottal
Plosive	p b		t d			kw gw	k g	
Affricate				tɕ dʑ				
Nasal	m		n		ɲ		ŋ	
Fricative		f v	s z		ɕ			h
Lateral			l					
Glide					j	w		
Trill			r					

(Source: Frimpong 2009)

All the consonants occur at word medial position, and all the consonants except /v, r, z/ occur at word initial position. Also, only the nasal consonants /m, n/ occur at word final positon, while the consonants /tɕ, dʑ, ɕ/ occur mostly before the /ɪ/ vowel. The velar nasal consonant /ŋ/ always occurs before /k or g/. Below in table 3.5 is a summary of the distribution of the consonants.

Table 3 5: Summary of Ɛsahie Consonant Distribution

Sound	Word Initial	Word Medial	Word Final
/p/	√	√	
/b/	√	√	
/t/	√	√	
/d/	√	√	
/f/	√	√	
/v/	−	√	
/s/	√	√	
/z/	−	√	
/r/	−	√	
/l/	√	√	
/k/	√	√	
/g/	√	√	
/w/	√	√	
/j/	√	√	
/h/	√	√	
/n/	√	√	√
/m/	√	√	√
/ŋ/	√	√	
/ɲ/	√	√	
/tɕ/	√	√	
/dʑ/	√	√	
/ɕ/	√	√	
/kw/	√	√	

/gw/	√	√	

The phonemic theory, though useful, was not able to differentiate phonemes with identical or same segments, and portrayed sounds as the minimal form of a word. In this study, we describe the speech sounds using the distinctive features.

3.2.2   Description of Ɛsahie Sounds: A Distinctive Feature Account

This section offers an overview of the phonetic description of the vowels and consonants in the language using the distinctive feature theory (Chomsky & Halle 1968b; Hume-O'Haire & Winters 2006; Katamba 1989; Kenstowicz 1994). The Distinctive Feature Theory is an aspect of Generative Grammar (Kisseberth & Kenstowicz 1977) which focuses on the inherent properties of speech sounds. Distinctive Features are the minimal constructive units that make up a sound. They are a set of articulatory and acoustic features that are used to define and distinguish between speech sounds. They have phonetic specifiability since manipulating them results in meaning variation. They also have functional relevance and thus create a meaning difference as well as explaining the behaviour of sounds in a phonological structure. The features are universal and are relevant for the description of sounds in all languages. Distinctive Features group sounds into natural classes and bring out the uniqueness of each sound with others. This theory was introduced to resolve the inadequacies of the phonemic theory which perceived sounds as the minimal forms of

a word. It shows that sounds are not the minimal forms of a word but features. Distinctive features can be categorised into five broad groups basically in terms of phonetic specifiability. These groups are Major Class Features, Place of Articulation Features, Manner of Articulation Features, Glottis, and Tongue Body Features. Some distinctive features are binary. The binarism shows the presence (+) or absence (-) of a feature. Some of the features are, however, intrinsically unary, that is, they have a single value and specify only sounds that have them. The unary feature focuses on the active articulator used in the sound production. In what follows we use the features to describe Ɛsahie speech sounds.

3.2.2.1   Major Class Features

The major class features provide a big umbrella for the combination of all the other sound features. Based on this feature, sounds are grouped into [±sonorants], [±consonantal] and [±syllabic].

[±Sonorants]

Sonorant "classifies sounds in terms of the effects their stricture has on the flow of air across the glottis and can induce vibration of the vocal cords" (Kenstowicz 1994: 36). These sounds are inherently voiced and do not make a distinction between voiced and voiceless sounds. Sonorants in Ɛsahie are: nasals – [m, n, ŋ, ɲ]; liquids – [l, r]; glides – [j, w]; vowels – [a, e, i, o, u, ɛ, ɔ, ʊ, ɪ, æ, ã, ĩ, ũ, õ].

[±Syllabic]

Syllabic is a functional label that distinguishes between sounds that are likely to occur in the nucleus of the syllable and those that are unlikely to do so. The most likely sounds to occur in the nucleus of the syllable are the vowels which are [-consonantal]; [+sonorant] consonants may be [+syllabic] only when the vowels are not in the structure of the syllable. Syllabic sounds in Ɛsahie are [a, e, i, u, o, æ, ɪ, ɔ, ʊ, ɛ, ã, ĩ, ũ, õ].

[± Consonantal]

The Consonantal feature separates consonants from non-consonants. Consonantal sounds are distinguished by how the air mass from the lungs is modified. [+Consonantal] sounds have an obstruction in the modification of the air in the lungs as they come out, while [-Consonantal] sounds are produced without such an obstruction. [+ Consonantal] sounds in Ɛsahie include all stops, fricatives, affricates, glides and nasals. [–Consonantal] sounds in Ɛsahie are vowels.

3.2.2.2 Cavity/ Place of Articulation Features

The Cavity/ Place of Articulation features focus on the place of articulation of the sounds. They indicate areas in the vocal tract where the airstreams are modified. Some cavity features are unary while others are not. The unary ones relate to the use of the active articulators as organs. The cavity features are described in the sub sections below.

[Labial]

[Labial] is sounds articulated with the lips involved as active articulators. This feature is a unary feature. [Labial] sounds include all bilabial and labiodental sounds. Labial sounds in Ɛsahie are [p, b, m, f, v, kw,gw].

Coronal

[Coronal] sounds are produced with the blade and front of the tongue as active articulators. [Coronal] is a unary feature too and examples in Ɛsahie are [t, d, s, z, n, l, r, j, ʨ, ʥ, ɕ, i, ɪ, e, ɛ].

Dorsal

[Dorsal] sounds are produced with the back of the tongue as the active articulator. Sounds of this nature include velar and uvular sounds. [Dorsal] sounds in Ɛsahie are [k, g, ŋ, kw, gw, o, u, ɔ, ʊ].

[± Anterior]

[Anterior] sounds are produced from the alveolar region to the lips. These include the labials, dentals and alveolar sounds. Examples in Ɛsahie are [p, b, t, d, f, v, s, z, m, n].

3.2.2.3 Tongue Body Features

The Tongue Body Features focus on the placement of the tongue body outside its neutral position. Though primarily used to describe vowels, they are also relevant to consonants.

[±High]

Katamba (1989: 49) notes that "[h]igh sounds are produced by raising the body of the tongue above its neutral position. Non-high sounds are produced without such raising of the tongue body". [+High] sounds include all palatal sounds and high vowels. Examples in Ɛsahie are [i, u, ɪ, ʊ, j, ʥ, ʨ]. The rest are [– high].

[± Low]

Low sounds are sounds produced with the tongue body lying low beneath the neutral position. [–Low] sounds have the tongue body raised above the neutral position. Examples of [+Low] sounds in Ɛsahie are [a, æ,p, b, t, d, f, v] and [-Low] sounds are [i, e, o, u, k, g, kw, gw].

[±Back]

Katamba, (1989: 45) further observes that back sounds are produced with a retraction of the body of the tongue from the neutral position. Non-back sounds, on the other hand, are produced without such a retraction from the neutral position or by pushing the tongue body forward. [+back] sounds in Ɛsahie are [k, g, ŋ, w, kw, gw, o, u, ʊ, ɔ].

[±Round]

Roundness has to do with the shape that the lips assume during articulation of sounds. Rounded sounds are produced by the protruding and narrowing of the lips. In Ɛsahie, all back vowels are rounded, and front vowels are unrounded. Rounded sounds in Ɛsahie are [o, u, ʊ, ɔ, w, kw, gw].

[±ATR]

The advancing of the tongue root produces [+ATR] sounds, whereas the retraction of the tongue root produces [-ATR] sounds. Ɛsahie vowels are classified under this feature as follows:

Set 1 - [+ATR]: [e, u, æ, i, o]

Set 2 - [-ATR]: [ɛ, ʊ, a, ɪ, ɔ]

3.2.2.4 Manner of Articulation/Stricture

As noted by Clark and Yallop (1995: 42) manner of articulation focuses on "the degree of a constriction and the way the constriction is formed in the vocal tract". It considers how the airstream is modified before it comes out of the vocal tract. The features that describe the various manners of articulation are discussed below.

[±Continuant]

[–Continuant] sounds are produced with a complete blockage of the airstream while [+continuant] have the airstream flowing continually. Fricatives and vowels are [+continuant] and stops are [–continuant]. [+Continuants] in Ɛsahie are [f, v, s, z, l, r, j, w, a, e, i, o, u, ʊ, ɪ, ɔ, æ, ɛ].

[±Delayed Release]

In the delayed release, the airflow is stopped and then released slowly. This is unlike in stops that have a sudden release of the airstream. Delayed release sounds in Ɛsahie are [tɕ, dʑ].

[±Lateral]

Lateral sounds have the airstream coming out through the sides of the mouth. The only lateral sound in Ɛsahie is [l].

[±Nasal]

Nasal sounds are sounds produced with a lowered velum for the air mass to exit through the nose. The nasal sounds in Ɛsahie are [m, n, ɲ, ŋ, ã, ĩ, ũ, õ].

[± Strident]

Strident sounds are heard with 'more random noise than non-strident sounds' (Katamba 1989). Strident sounds in Ɛsahie are [f, v, s, z, ʣ, ʨ, ɕ].

[±Voice]

Voice has to do with the activities of the vocal folds located in the larynx. With a narrow state of the glottis, the vocal folds vibrate when producing [+voice] sounds; but with an open state of the glottis, the airstream goes through the glottis without setting the vocal folds vibrating to produce [-voice] sounds. [+Voice] sounds in Ɛsahie include all vowels, all sonorant consonants and the following obstruents: [b, d, v, z, g, m, n, ɲ, ŋ, ʣ, gw]; [-Voice] sounds are [p, t, f, s, k, ʨ, kw].

Below is a tabular summary of the Distinctive Features of the various sounds in Ɛsahie. The [+] or [-] signifies the presence or absence of the feature respectively, while the [o] signifies non-applicability of the feature to the language.

Table 3 6: Distinctive Feature Matrix for Ɛsahie Vowels

	a	e	i	o	u	ʊ	ɪ	ɔ	æ	ɛ	ĩ	ã	ũ	õ
Syllabic	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sonorant	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Consonantal	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Continuant	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Nasal	-	-	-	-	-	-	-	-	-	-	+	+	+	+
Front	-	+	+	-	-	-	+	-	-	+	+	+	-	-
Back	-	-	-	+	+	+	-	+	-	-	-	-	+	+
High	-	-	+	-	+	+	+	-	-	-	+	-	+	-
Low	+	-	-	-	-	-	-	-	+	-	-	+	-	-
ATR	-	+	+	+	+	-	-	-	+	-	-	-	+	+
Round	-	-	-	+	+	+	-	+	-	-	-	-	+	+
Voice	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Table 3 7: Distinctive Feature Matrix for Ɛsahie Consonants

	p	b	m	f	v	s	z	t	d	n	r	l	tɕ	dʑ	ɕ	ɲ	j	k	g	ŋ	kw	gw	w	h
Syllabic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sonorants	-	-	+	-	-	-	-	-	-	+	+	+	-	-	-	+	+	-	-	+	-	-	+	-
Consonantal	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Lateral												+												
Continuant	-	-	-	+	+	+	+	-	-	-	-	-	+	-	-	+	-	+	-	-	-	-	+	+
Delayed Release	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-		-	-	-	+	+	-	-
Nasal	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	+	-	-	-	+	-	-	-	-
Strident	-	-	-	+	+	+	+	-	-	-	-	-	+	+	+	-	-	-	-	-	-	-	-	-
Labial	√	√	√	√	√	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	√	√	√	
Coronal	o	o	o	o	o	√	√	√	√	√	√	√	√	√	√	√	√	o	o	o	o	o	o	o
Dorsal	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	√	√	√	√	√	√	o
Anterior	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-
Voice	-	+	+	-	+	-	+	-	+	+	+	+	-	+	-	+	+	-	+	+	-	+	+	-

3.4 Sound Sequencing in Ɛsahie

Sound sequencing describes the co-occurrence of sounds in a word. In the sections that follow, we show the sequencing of vowels in Ɛsahie.

3.4.1 Vowel Sequence

Vowel Sequence looks at the co-occurrence of vowels in a phonological word. The sequence occurs when two or more vowels that are different are juxtaposed. Some morphemes in Ɛsahie have two or more different vowels occurring in close succession. The permissible vowel sequences in the language are presented below.

3.4.1.1 Vowel Sequence across Word Boundary

The issue of vowel sequence occurs across word boundaries when two words with a final vowel for the first word and an initial vowel for the second word are justaposed. In example (3.8), we show the various sequences of vowels across word boundaries.

Example 3.8   a.   Ama   tɔ́   **à**lòkó

                            Ama   buy   ripe plantain

                                  'Ama buys ripe plantain'

b.   kú   èbòté né

        kill   rat   DEF

        'kill the rat'

c.   bìsá   ɔ̀hìní né

        ask   chief   DEF.

        'ask the chief'

d.   ɔ̀   bú   Ámà

        3SG   beat   Ama

        'He beats Ama'

e.   kɔ́kɔ́   té   àlíɛ né

        go. RED   pluck   food   DEF.

        'go and pluck the food (fruit)'

f.   jæ̀.   tɕí-lí   èbòté

        1PL.   catch-PST   rat

        'we've caught a rat'

3.4.1.2 Vowel Sequence in Compounds

Vowel sequence can also occur in words that are put together to form compounds when the first constituent ends with a vowel and the second constituent also begins with a vowel as exemplified in (3.9) below.

Example 3.9

  a. bɔ́ + àdéɛ́ → àbɔ̀déɛ́

     create   thing   'creation'

  b. ɲàmìɛ́ + ɔsóm → ɲàmìzóm

     god   worship 'religious'

  c. pɛ́ 'like' + àdéɛ́ 'thing' → àpɛ̀déɛ́ 'will'

  d. dùá 'tree' + àbá   → dùàbá   fruit

  e. sɛ̀ʨí + èwìàsé → sɛ̀ʨìwìàsé 'destroy the world'

  f. àhìní + èfíé   → àhìɱvíé 'palace'

  g. ɛ̀sàhíé + ɔ̀hìní → ɛsàhìèhìní 'chief of Ɛsahie'

  h. bàkɑ̌:+ɛ̀bóĩ́n → bàkɑ̌:bóĩ́n 'tree bark'

  i. æ̀nìʥí + àdíɛ́ → æ̀nìʥìdíɛ́ 'happiness'

  j. Kòfí + Òwùsú → Kòfí Wúsú 'male name'

A study of the data as exemplified above show a sequence of vowels in the input but no vowel sequence in the output. The issue is that in the compounding process, several phonological changes occur. Among them is the deletion of V_2 in the compounding process as shown above. Following the removal of V_2 the derived compound emerges without a vowel sequence.

Table 3.8 summarises the observation we make on vowel sequence. The empty slots show the impermissible vowel sequencing.

Table 3 8: Ɛsahie Vowel Sequence Chart

	a	e	i	ɛ	o	u	ɪ	æ	ʊ	ɔ
a		ae					aɪ			aɔ
e	ea		ei	eɛ			eɪ			
i	ia	ie		ɪɛ				iæ		
ɛ	ɛa	ɛe			oɛ		ɛɪ			ɔɛ
o	oa	oe	oi				oɪ			
u	ua	ue	ui				uɪ			
ɪ	ɪa			ɪɛ				ɪæ		
æ				æɛ						
ʊ	ʊa			ʊɛ			ʊɪ		ʊɔ	
ɔ	ɔa		ɔi				ɔɪ			

3.4.1.3 Summary on Ɛsahie Vowel Sequence

The following vowel sequences are observed as permissible in Ɛsahie:

- /a/ has wider co-occurrence than all the other vowels. Except for/æ/, it follows all other vowels but can be followed by only / e, o, i/.

- /e/ follows all vowels except / ɪ, æ, ʊ, ɔ/, and are preceded the vowels /a, e, i ɪ, ɛ/.

- /i/ occurs before the vowels /a, e, i, ɛ, æ/ are followed by the vowels /e, i, o, u/.

- /ɛ/ co-occurs with all vowels except /ɔ/ occurs before the vowel /a, e, ɪ/.

- /o/ co-occurs with the vowels /a, e, i, o, u, ɛ, ɪ/.

- /u/ co-occurs with the vowels /a, e, i, o, ɪ/.

- /ɪ/ co-occurs with all vowels.

- /æ/ co-occurs with only /i, ɪ, æ, ɛ/.

- /ʊ/ only occurs with /a, ɛ, ɪ, ɔ/.

- /ɔ/ co-occurs with only the vowels/ a, ɪ, ɛ/.

3.5 Conclusion

This chapter has provided a detailed description of Ɛsahie speech sounds using the distinctive features. The distinctive feature description has been able to bring out the unique features inherent in the sounds. The chapter also provided an analysis of permissible sound distribution and sequencing in the language and their constraints. The resolution of these constraints will be discussed in chapter four in the discussion of syllable structure processes.

CHAPTER 4

THE SYLLABLE AND SYLLABLE STRUCTURE PROCESSES

IN ƐSAHIE

4.1 Introduction

The chapter analyses the nature of the syllable and some syllable structure processes in Ɛsahie. It shows how sound constraints in words are resolved through syllable structure modification processes. The chapter is divided as follows; Section 4.2 looks at the nature of the syllable. Section 4.3 describes the syllable structure of Ɛsahie and the distribution of Ɛsahie speech sounds within the syllable, section 4.4 explains some syllable structure process such as elision, and show how they are utilized in repairing syllable anomalies in the language. The section 4.5 focuses on syllable structure changes in borrowed nouns. The chapter concludes with a summary of the discussion in section 4.6.

4.2 The Nature of a Syllable

There have been many controversies concerning the exact nature of the syllable. As Kenstowicz (1994) explained, the controversy and exclusiveness of the syllable stems from the absence of "any uniform or direct phonetic correlation" with sounds. Several approaches have been adopted in describing the syllable. Gimson (1980: 56) discusses the syllable in relation to chest pulse-muscular activities and lung movement in speech

production. Gimson explains that the air pressure can determine the number of syllables produced. Katamba (1989: 153) sees it as "the unit in terms of which phonological systems are organized." In Goldsmith (1990: 108) opinion, it is "a phonological constituent composed of zero or more consonants and ending with a shorter string of zero or more consonant." Laver (1994: 114) also defines the phonological syllable structure "as a complex unit made up of nuclear and marginal elements." Roach (2000: 70) describes it "as a unit consisting of a centre which has little or no obstruction to airflow and which sounds comparatively loud; before and after that centre, there will be greater obstruction to airflow and /or less loud sound." The comparatively loud sounds with no obstruction of airflow are the vowels and the sounds before or after the centre with an obstruction of airflow are the consonants. Other scholars such as Kenstowicz (1994: 250) also views "the syllable as an abstract unit of prosodic organization through which a language expresses much of its phonology". The sonority level of a sound can also determine the syllable (Blevins 1995). Under the Sonority theory, Giegerich (1992: 132) show that "the pulses of pulmonic airstream in speech correspond to peaks in sonority. Sonority refers to the relative loudness or audibility of a sound compared to other sounds." Based on the above definitions, a syllable can be said to be a phonological constituent made up of vowels at the centre and consonants at the margins and serves as the domain for phonological properties such as tone.

The structure of the syllable is represented using either the onset-rhyme approach or the moraic approach. Based on the onset-rhyme approach, the internal structure of the syllable is made up of an obligatory nucleus, an optional consonantal onset, and coda (Kenstowicz 1994). The onset and the coda are the marginal elements and are filled with consonants whiles the nucleus, the most sonorous element in the syllable is occupied by the vowel or a syllabic consonant. The nucleus is an obligatory element in a syllable. A syllable can therefore be made up of a nucleus alone; a nucleus and a coda alone; or an onset and a nucleus as demonstrated in figure 4.1 below:
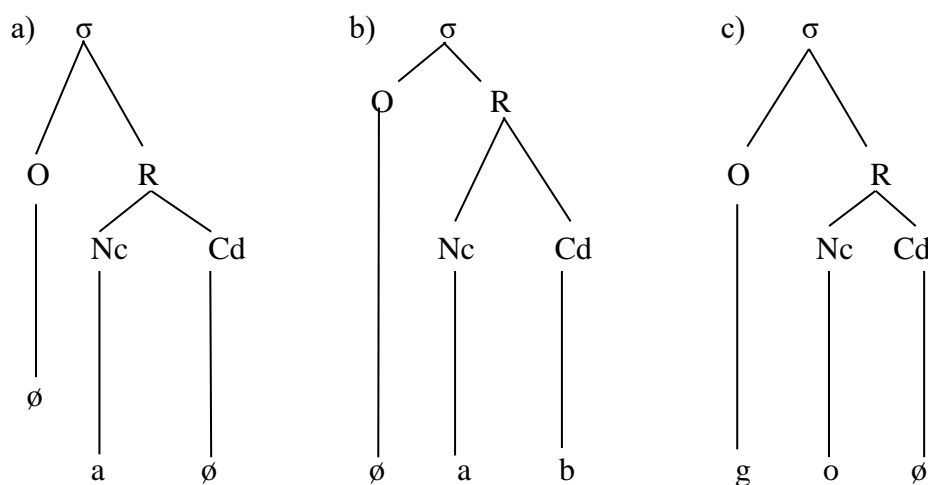
Figure 4 1: Onset-Rhyme Representation of the Syllable

Figure 4.1 shows syllables made up of a nucleus alone as in example (a), a nucleus and coda as in example (b), and onset and nucleus alone as in example (c).

An alternative way of representing the syllable structure is the mora. Under the mora, a syllable with a CVV structure (like _bìá 'chair'_) will not have to be split into

two as done under onset-rhyme representation (cf. figure 4.1), but will be represented as shown in figure 4.2 below:
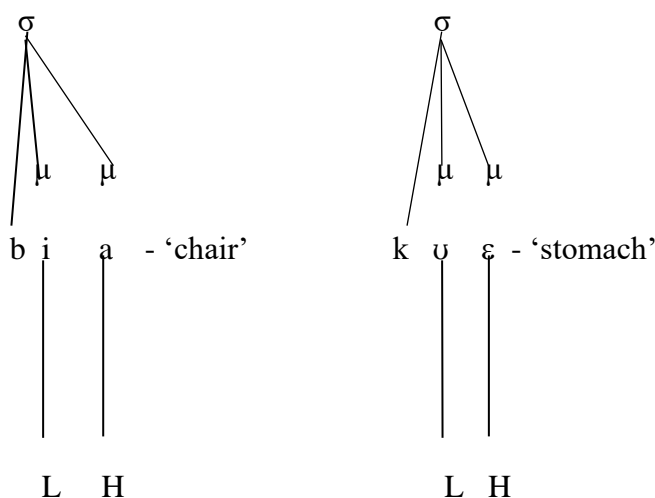
Figure 4 2: Moraic Representation of the Syllable

Using the moraic representation graphically helps to determine the syllable weight of a word. The choice of an onset-ryhme or a moraic representation depends on the TBU in a language, and whether monomoraic and bimoraic syllable can carry tones of the same value.

The basic universal syllable structure is the CV (cf. Battistella 1990; Blevins 1995; Carlisle 1997;1998; Clements 1990; Van der Hulst & Ritter 1999; Vennemann 1988: ,inter alia). As Vennemann (1988) puts it based on his head law and coda law, the onset C and a zero C- coda are optimal in any syllable, hence the CV as the core syllable structure for all languages. Though the CV is the core syllable structure,

languages may create other syllable forms such as V, CCV, VC. Sometimes, languages

may either reduce a CCV syllable to CV as is seen in Bali (Vennemann 1988: 5).

Example 4.1   srotas→ sota 'stream'

svapna→ soppa   'sleep' (Vennemann 1988: 5)

Through phonological processes such as deletion, complex syllables are

simplified at onset and coda. They may also be simplified through insertion of vowels

to break the consonant clusters in both onset and coda (Blevins 1995;2003;2006;

Carlisle 1997;1998; Zec 1995). The nucleus is the most sonorous constituent in the

syllable structure. This is obligatorily a vowel, though other syllabic consonants may

be used. The arrangement of segments in the syllable is regulated by the sonority

sequencing principle which Rubach and Booij (1990: 434) states that "the sonority of

segments must decrease towards the edges of a syllable where the sonority of segments

is defined by following the scale of decreasing sonority: vowels-liquids-nasals-

fricatives- stop". Thus, while the vowel is the peak, other segments comprising of

onsets and coda increase in sonority from the peripheral member. Universally,

complex onsets are sequenced by selecting a segment lower on the scale for onset,

build up with the segment higher on the scale, while complex codas are formed by

choosing a higher segment, and following it with a segment lower on the scale.

Regardless of this principle of segment sequencing, the sequencing of segments in

some languages is a violation of this principle (cf. Carlisle 1997;1998; Rubach & Booij 1990). English words such as *sphere, fact, spin, sky, ax,* are violations of this principle. In *sphere* and *fact*, the onset cluster have the same sonority level, what Clements (1990) calls 'sonority plateau', while in examples like *spin*, *sky* and *ax*, the peripheral segments in the coda have higher sonority than those closer to the nucleus (Carlisle 1997, 1998). Universally, the syllable structure of a language influences how sounds are distributed within the syllable. In what follows we discuss how sounds in Ɛsahie are distributed within the syllable.

4.3 The Syllable Structure of Ɛsahie

Frimpong (2009) discusses the syllable in Ɛsahie and shows that the basic syllable structure in Ɛsahie is CV. However, our data analysis show that the V is also a basic syllable structure in Ɛsahie. The V can be either a vowel or a syllabic consonant, i.e. a pre-consonantal nasal, a trill or a lateral.

Example 4.2- **Syllable types in Ɛsahie**

CV—   /gó/   'to dance'

               /bʊ́/   'to whip'

               /dɔ/   'there'

V—   /ɔ/, /a/, /o/, /n/, /m/, /l/, /r/

CVC —   /fɛm/   'to lend'

            /ɲɔ̀.fʊ́n/   'breast'

We deduce from the syllable types that the language does not allow consonant clusters, however some words in Ɛsahie may have a CRV structure. The question that arises then is that, is the CRV a conconant cluster? The nature of the CRVword structure is discussed in the next section.

4.3.2 The CRV and CVRV Word Structure

We recall from the syllable types (section 4.3) that Esahie dis-allow consonant clusters (CC). This raises questions about the status of (R) in a CRV word. The fact is that Esahie has a CRV word type. This is derived from a CVRV word after the application of a deletion of the first V as shown in example (4.3) below.

	Set A		**Set B**	
Example 4.3	**Underlying Form [CVRV]**		**Phonetic form [CRV]**	
a.	pira	→	pr̩.a	'to sweep'
b.	kɪra	→	kr̩.a	'to bid farewell'
c.	fɪrɛ	→	fr̩.ɛ	'to call'

The examples in set A and set B show underlying form and phonetic form respectively. The V_1 of set A deletes in set B as the phonetic form. The C_2 is always a liquid, and the V_1 always a [+high] vowel. When the V_1 is deleted, its syllabicity falls on the

liquid. Since the TBU in Esahie is the syllable, the liquid thus carries the tone of the deleted vowel. Thus, we notice that the CRV is derived from the CVRV. The CRV in Esahie is therefore disyllabic and realised as Cr̩.V with the [r̩] being syllabic.

This is no indication that all CVRV words are always simplified. There are other contexts where the CVRV is not re-syllabified into CRV, but realised in its full form. Consider the example in (11) below.

Example 4.4.   **Set A [CRV]**   **Set B [CVRV]**

a.	pr̩.a	'to sweep'	a.	pi.ri	'big/ huge'
b.	kr̩.a	'to bid farewell'	b.	ki.ra	'to wear cloth'
c.	fr̩.ɛ	'to call'	c.	hu.ru	'to jump'

Comparable to data in example 10, we observe in this data that while in set A, a V_1 is elided (cf. example 4.3), in set B, the V_1 is maintained. This shows that the CVRV and CRV are in contrastive distribution. The CRV and CVRV word are illustrated in figures 3 and 4 below.
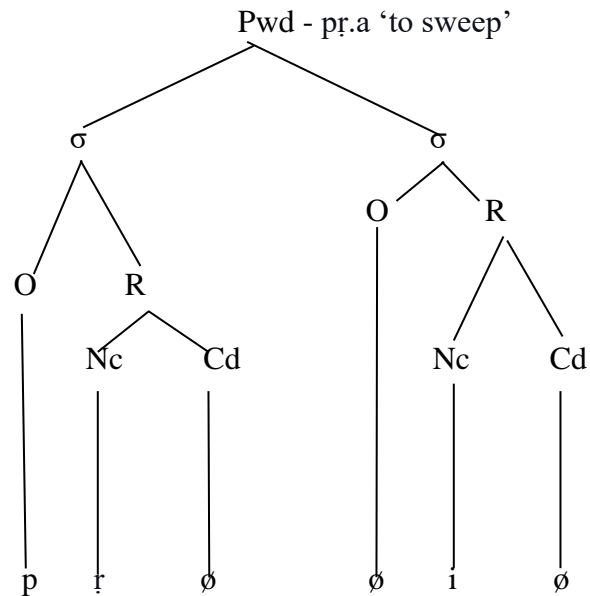
Figure 3 illustrates *pr̥.a* 'to sweep'
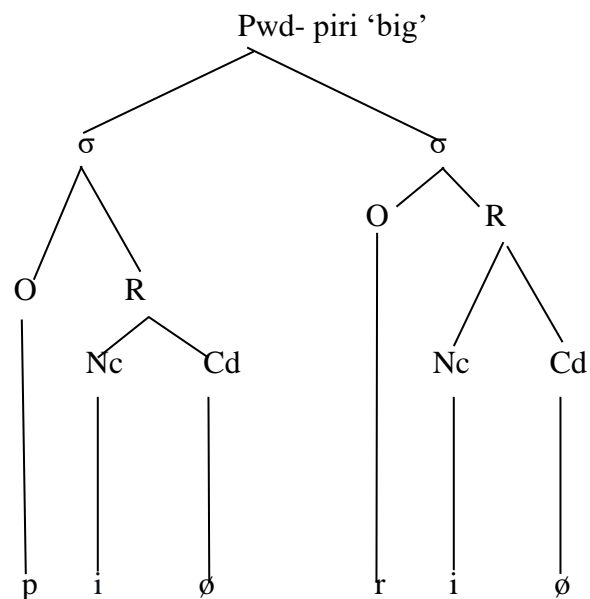
Figure 4 illustrates *piri* 'big'

In the illustration, we notice that although both words are disyllabic, the trill /r/ in figure 3 is syllabic, while in figure 4, it is not. The status of a syllabic /r/ is not unique

to Esahie. Akan also permits /r/ in the V slot of a resyllabified CRV. (Marfo 2013; Marfo & Yankson 2008) report of similar observation in Akan where the V_1 of a CVRV is deleted in rapid speech resulting in a CVR word form. Consider example (4.5).

Example 4.5. **CVRV** → **CRV**

    a. ku.ro →   kro 'town'

    b. tɕi.rɛ → tɕrɛ 'to teach'

    c. bɪ.rɛ → brɛ 'time' (Marfo & Yankson 2008)

They thus explain that "the surface structure of CRV is obtained from a CVRV string of basic syllable" (Marfo & Yankson 2008: 5). Like Akan, the CRV in Esahie also cannot be assumed as a consonant cluster since the alveolar trill occupies the nucleus slot in a syllable structure. Instead, it is a simplified form of the CVRV word structure.

In fact, the behaviour of the CVRV may be a phenomenon in most Bia languages. We observed that in Nzema, a closely related language to Esahie, a CVRV (where the [R] can be a trill or liquid] is not re-syllabified (Marfo & Yankson 2008). Let us examine the Nzema examples in (4.6) below.

Example 4.6.   CVRV

    a. sela   'to give enema'

    b. fola   'to climb'

        c. ebole   'to harass'

The examples confirm that like Esahie, no phonological process takes place on some CVRV. This happening in Akan and Nzema further affirms our claim that while Esahie has a CRV form, it also has a surface CVRV form.

4.3.3 Syllabic Distribution of Speech Sounds in Ɛsahie

Sound distribution looks at the phonotactics of a language and determines the permissible and impermissible occurrence of sounds in a language. Carr (2012) explains distribution as the range of places within a word in which a given sound may occur. The distribution of sounds is a language specific phenomenon as what happens in one language may not happen in another language (Bickel et al. 2009). In this section, we discuss how the sounds are distributed at the syllable level in Ɛsahie, since the syllable is the minimal phonological unit for the occurrence of sound segments of a language. Ɛsahie, as indicated earlier has a basic CV and V syllable structure with other extensions like CVC, CRV and CVRV.

4.3.4 The Ɛsahie Vowel Distribution

Ɛsahie has three ((3) main syllable structural patterns. They are V, CV and CVC structural patterns. Every Ɛsahie vowel can occur as V in a CV syllable type. Below are the distributional patterns.

4.3.4.1 Vowels in CV Syllable Type

All vowels can occur as V in a CV syllable.

4.3.4.2 The V Syllable Structure

The V syllables are made up of vowels, or syllabic consonants. Apart from the vowel /u, ʊ/, all the vowels in Ɛsahie can occur as a single syllable in V syllable structure. Consider the examples in (4.8) below.

Example 4.8   a. /i/   dò.mú.**í**   'lime'

            b. /e/   **è**-gó   'you dance'

            c. /ɛ/   **ɛ̀**-tú   'you uproot'

            d. /o/   **ò**-sǽ   'he returns'

            e. /ɔ/   **ɔ̀**-sá   'he draws'

            f. **/æ/**   **ǽ.**ʥwù.má   'work'

            g. /a/   **à**.kwà.dáá   'child'

            h. /ɪ/   kà.**ì**   'remember'

            i. /m**/** m.bè.rɛ.gó: 'nails'

            j. /n/   n.kò.tò.kú   'sacks'

            k. /r/   pr̩.a   'to sweep'

These vowels have different functions within words as shown below in examples (4.9)
to (4.13).

Example 4.9   /o, ɔ/ are 3SG verbal prefixes which also acts as pronouns.

       [+ATR]   [-ATR]

       /o/   /ɔ/

a. ò-lí   'he should eat   ɔ̀-hɔ́   'he should go'

b. ò-bú   'she breaks'   ɔ̀-pɛ́   'she cuts'

c. ò-sǽ   'he returns'   ɔ̀-sá   'he draws'

Example 4.10. /a, æ/ are 1SG pronominal prefix used to mark singular form of nouns.

       Singular Marker

       [-ATR]   [+ATR]

       /a/   /æ/

a. **à**-tɕìtɕíré 'tortise'   **æ̀**-ɲíɛ́   'eye'

   à-kwàdá: 'child'   **æ̀-**ʥwùmá 'work'

Example 4.11. /ɛ/ which is the clipped form of [ɛmɔ 'your'] is a 3SG possessive marker.

             ɛ̀ –wá: 'his/her child'

             ɛ̀ – nìè   'his/ her mother'

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(b)   The vowel /a/ can occur as a single vowel syllable to function as a 2SG marker, and perfective aspect marker.

Example 4.12.   /a/ as a 2SG marker.

à-kɔ́ - à-hɔ́	'you have gone'
à-lí	'you have eaten'
à-nò-má	'you have cursed'
à- bá	'you have come'

/a/ as perfective aspect marker

à - bá	'has come'
à – bú	'has open'
à - kɔ́	'has gone'
à - wú	'has died'

Example 4.13.   [e, ɛ], on the other hand, are 2SG verbal prefixes.

[-ATR]		[+ATR]	
/ɛ/		/e/	
a.	ɛ̀-tú 'you uproot'	è-gó 'you dance'
b.	ɛ̀-sὲtɕí 'you destroy'	è-bùtú 'you overturn'

Aside the vowels, the preconsonanatal nasals /m, n/ may occur as V. As syllabic consonants, they have consonant nature, but have the function of the vowels.

Examples are given below.

4.14.   /m/   **m**.mra: 'women'

/n/   **n**.zɛ.m   'matters/issues'

Based on their distribution we observe the following on vowel distribution in Ɛsahie.

Generalizations on Ɛsahie vowel distribution

- All vowels occur in a CV syllable.

- The vowels /u, ʊ/, cannot occur in a V syllable structure.

- [+nasal] vowels / ã, ĩ, ũ, õ/ cannot occur in a V syllable structure.

4.3.4 Ɛsahie Consonant Distribution

This sub-section outlines the various positions consonants occur within the syllable.

4.3.4.1 The Syllable Onset Position

All consonants in Ɛsahie occur at the C position in the CV syllable structural pattern. In other words, apart from the consonants shown above, all Ɛsahie consonants occur at the onset position of monosyllabic words as in example (4.14) below.

Example 4.14   /p/− pám   'to sew'

/b/− brá: 'woman'

/t/− tó   'to throw'

/d/−dí   'to eat'

/k/ −k ɔ̀.mí.ɛ́   'neck'

/g/−gó   'to dance'

/f/− fɛm   'to lend'

/v/- vrɔ̀.lɔ́   'termite

/s/− srà.ĩ   'moon'

/z/- n.zɛm   'words'

/m/− mi.ɛn   'urine'

/n/− nó   'to drink'

/ɲ/- ɲɔ̀.fʊ́n   'breast'

/l/- là.lí. ɛ́   'dream'

/r/- pi.ri   'big'

/w/- wà.wá	'a type wood'	
/j/- jæ̀.tɕí	'to stop'	
/tɕ/- tɕwá	'to cut'	
/dʑ/ dʑà.tá	'lion'	
/h/- hù.á	'to smell'	
/ɕ/-ɕɛ́	'to wear'	
/kw/- kwà.dú	'banana'	
/gw/- gwà.ndá	'ladle'	

4.3.4.2   The Syllable Nucleus Position

At the syllable nucleus position in Ɛsahie, the consonants /m, n/ may occur. These nasals
are pre-consonantal as shown in example (4.16) below.

Example 4.16. a.   /m/   **m.**mra   'women'

               b.   /n/   **n.**zɛm   'matters/issues'

    The syllabic nasal /n/ may function as a plural marker, or as a negative marker. The
examples in (4.17) below illustrate this point.

Example 4.17.   /n/ as a plural marker

        a.   **n**- kò.tò.kú   'sacks'

b.	**n**- pù.ré	'squirrels'
c.	**n**- brèn.zú.á	'men'

Example 4.18.   /n/ as a negative marker

a.	**n**- gó	'don't dance'
b.	**n**- kɔ	'don't go'
c.	**n**- tɔ.ní	'don't sell
d.	**n**- fá	'don't take

4.3.4.3   The Syllable Coda Position

The nasal consonants /n, m/ are the only codable consonants in a phonological word

in Ɛsahie. Consider examples (4.20) and (4.21) below.

Example 4.20.   **/n/**

a.	ɛ. wè.í**n**	'boundary'
b.	è.ʥwí**n**	'song'
c.	ŋ. gwà.í**n**	'south'
d**.**	**t**ìn. dín	'long'

Example 4.21.   **/m/**

a.	n.gɔ**m**	'prophesy'

b. n.zέ**m** 'matters/issues'

c. ɲà.mì.zó**m** 'religious'

d. a.hòn.hó**m** 'spirits'

These distributional patterns are summed up in table 4.2 below.

Table 4 1: Summary of the Syllable Distribution of Ɛsahie Consonants

Consonant	Syllable Onset	Syllable Nucleus	Syllable Coda
p	+	-	-
b	+	-	-
t	+	-	-
d	+	-	-
f	+	-	-
v	+	-	-
s	+	-	-
z	+	-	-
r	+	+	-
l	+	+	-
k	+	-	-
g	+	-	-

w	+	-	-
j	+	-	-
h	+	-	-
n	+	+	+
m	+	+	+
ɲ	+	-	-
ŋ	+	-	-
dʑ	+	-	-
tɕ	+	-	-
ɕ	+	-	-
kw	+	-	-
gw	+	-	-

4.3.4.5 Generalizations on Ɛsahie consonant distribution

1.   All consonants occur at syllable onset slot.

2.   The only consonants that occurs in the coda are the nasals /n, m/.

3.   The nasals /m, n/ have free distribution and occur at the onset, nucleus and
       coda positions.

4.   The lateral /l/ and trill/r/ maybe syllabic.

4.   Ɛsahie has a dis-preference for consonant clusters and does not allow them.

These dispreferences sometimes call for adjustments when words with such syllables are borrowed into the language. In what follows, we turn our attention to discuss some modifications that take place within words to enable 'dis-preferred' syllables fit into the syllable structure of Ɛsahie.

4.4 Syllable Structure Processes

Syllable structure modifications are the changes that syllable forms that make up a word may undergo to fit into the syllable structure of a language. Occasionally, in order for a word to fit into the syllable structure of a language, a segment has to be inserted to break an impermissible syllable sequence, deleted, or shortened (cf.Adomako 2008; Apenteng & Amfo 2014; Cleland et al. 2009). The syllable structure process that is discussed below is Elision.

4.4.1 Elision

One of the syllable structure changes that occur in rapid speech because of sounds influencing each other is Elision. The study of Elision has been approached from varied angles in the literature. Matthews (1997: 11) alludes that elision occurs at word final position only when he writes that "elision is a process by which a vowel at the end of a word is lost, or elided, before another vowel at the beginning of a word." This definition identifies only one context for elision and excludes other context of elision

in other languages such as Ɛsahie. It also limits elision to vowels alone and ignores consonants.

Data from Akan and other languages depicts that elision extends beyond word final to mid and initial positions. Abakah (2004a: 182) widens the scope and context when he describes elision as a phonological process by which a vowel, a consonant and sometimes a syllable, which is an intrinsic property of a morpheme in an isolative style, is dropped in a combinative style. Following the open context of operation inferred from Abakah's definition, we posit that in elision, a sound segment is lost in different phonological contexts. In this study, we group the discussion of elision into two- Vowel Elision and Consonant Elision and show how they manifest in the language. We show that through phonological processes such as deletion, complex syllables are simplified at onset and coda.

4.4.1.1 Vowel Elision

Vowel elision is a productive phonological process which occurs when a vowel is elided either within a word, or at word boundary. In Ɛsahie, anytime two vowels occur in a sequence across syllable boundaries, the language deletes one of the vowels. These include compound words, possessive construction, or perfective verbs, among others. Let us examine some context of occurrence.

4.4.1.2 [V₂] Elision in Compounds

a. In the sequence of V₁ #V₂ across syllable boundary in a compound, the V₂ is

elided as shown in table 4.2.

Table 4 2: [V₂] Elision in Compounds

Input	Output	Meaning
a. dù**á** (tree) + **ɔ̀**bá (offspring)	dùàbá	fruit
b. sɛ̀tɕ**í** (destroy)+ **è**wìàsé (world)	sɛ̀tɕìwìàsé	destroy the world
c. àhìn**í** (chiefs)+ **è**fíé (house)	àhìnìfíé àhìɱvíé	palace
d. ɛ̀sàhí**ɛ́** (Ɛsahie) + **ɔ̀**hìní (chief)	ɛsàhìèhìní	chief of Ɛsahie
e. bàk**ǎ́**:(tree)+**ɛ̀**bó͂n (outer cover)	bàkǎ̀:bó͂n	tree bark
f. æ̀nìdz**í** (happy)+ **à**díɛ́(thing)	æ̀nìdʑìdíɛ́	happiness
g. p**ɛ́** (to like)+ **à**díɛ́(thing)	àpɛ́díɛ́	will
h. Kòf**í** (male name)+ **Ò**wùsú (male name)	Kòfí Wúsú	a male name

In the above examples, the second words lose their initial vowels in the output

form. This is similar to what happens in Fante (Abakah 2004a;2004b), but in Fante the

V₂ is deleted when it is a low vowel preceded by a high vowel at syllable boundary.

V₂ elision in Ɛsahie is captured by the following illustration in figure 4.3 below.

```
d u a # a b a      d u a # a b a       d u  a b a

    |||  |||          |||  |||            ||| |||
                →            ⤬      →
    |||  |||          |||  |||            ||| |||

  CVV  VCV          CVV  VCV           CVV CV
```
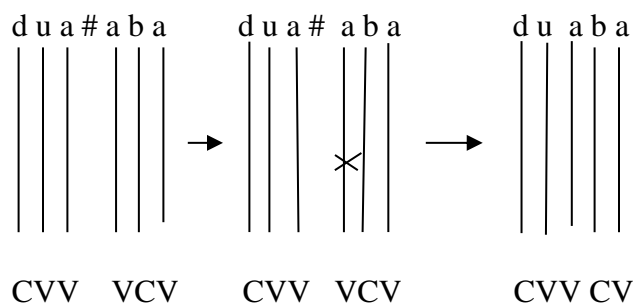
Figure 4 3: Illustrates V₂ elision

4.4.1.3   V₁ elision in Possessive Constructions

In the second context of operation, the vowel of a possessive pronoun (V₁) attached to a noun in a possessive construction is lost in a V₁ # V₂ sequence. Study the examples in (4.23) below:

Example 4.22 a.   wʊ   + àlíɛ́   →   [wàlíɛ́]

                        3SG   food   'your food'

              b.   mɪ   + àdʑàpàdíɛ́ →   [màdʑàpàdíɛ́]

                     1SG   property   'my property'

              c.   yɛ́   + àpíná   →   [yàpíná]

                     2PL   bat   'our bat'

d.	wo	+ æ̀síwá	→		[wæ̀síwá]
	3SG	bethrothed			'your betrothed'

e.	bɛ	+ à̀ŋwúró	→		[bà̀ŋwúró]
	3PL	house			'their house '

V₁ elision in a possessive construction is autosegmentally illustrated below in figure 4.4.

Figure 4 4: V₁ Elision in a possessive construction

Despite the above mentioned, elision in the possessive form is not operational for the 2PL- *ɛmɔ*. *ɛmɔ* does not lose its vowel under the same context. That is, there is no deletion when *ɛmɔ* is attached to a noun in the possessive form as shown below.

Example 4.23.	**Input**	**Output**	**Meaning**
a.	èmɔ́ + àpíná	èmɔ́ àpíná	your bat

your + bat

b.   ὲmɔ́ +èsíré   ὲmɔ́ èsíré   your anthill

    your + anthill

c.   ὲmɔ́ + èsɥ̃ɛ́   ὲmɔ́ èsɥ̃ɛ́   your cry

    your + cry

d.   ὲmɔ́ + èwìàsé   ὲmɔ́ èwìàsé   your world

    your + world

4.4.1.4 Elision in a Perfective construction

In a perfective construction where a pronoun is added to the perfective verb, the pronoun loses its vowel in the sequence. Consider these examples.

Example 4.24.   a.   mí   +   a+   kɔ́   →   màhɔ́

        1SG/SUBJ + PERF + go

         I have gone

b.   bɛ́ + a + kírá   → bàhírá

       3PL/SUBJ + PERF + put on a cloth

they have put on a cloth

c.　　　yɛ́　　+　　a +　　dí　　　　→　　yǽlí

　　　　1PL/SUBJ + PERF + eat

　　　　we have eaten

d.　　　wɔ́　　+　　a +　　sɛ̀tɕí　　→　　wàsɛ̀tɕí

　　　　2SG/SUBJ + PERF + destroy

　　　　he has destroyed

e.　　　wɔ́ +　　　　a +　　ànʊmá　　→　　wànʊmá

　　　　2SG/SUBJ + PERF + cursed

　　　　you have cursed

The presence of the perfective marker creates a vowel sequence which is not permissible in Ɛsahie. This triggers the elision of the vowel of the pronoun.

4.4.1.5 Pre-sonorant High Vowel Elision

In Ɛsahie, anytime a [+High] vowel occurs before a sonorant /r/, the vowel is elided. This occurs in a CVCV syllable structure where the C_2 is a sonorant (CVRV). The V_1 invariably deletes resulting in a CRV sequence. Study the examples in (4.25) below.

Example 4.25.　　　**Underlying**　　　**Surface**　　　**Meaning**

a.	sírí	srí	laugh
b.	tìnàbírɛ́	tìnàbrɛ́	sit
c.	nɛ̀tírɛ́	nɛ̀trɛ́	dust
d.	bìrá	brá	come
e.	tènvìrɛ̀má	tènvrɛ̀má	tongue
f.	nzùtɔ̀bírɛ́	nzùtɔ̀brɛ́	rainy season
g.	abìrètɕwíé	àbrètɕwíé	goat
h.	ànwúró	ànwró	town
i.	ŋgùrùmá:	ŋ̀grùmá:	okro/okra
j.	bùràlɛ́	bràlɛ́	iron (metal)
k.	àsòròbʊ́á	àsròbʊ́á	monkey

From the data, we observe that a presonorant +high vowel is elided in a CVRV syllable structure. The data further shows two types of presonorant [+high] vowel elision. In example (4.25a-g), the high vowels are [-ATR, front] vowels, while that of example (4.25h-k) are [+ATR, back] vowels. In both cases, the elision of the vowel reduces the syllable structure to a CVR structure. This syllable type can still be considered as disyllabic because of the phonetic features of /r/. This is captured by the following rule.

$$CVRV \rightarrow CRV / V_1 \text{———} R$$

$$\begin{bmatrix} +High \\ -ATR \end{bmatrix}$$

This rule deletes a high vowel which is presonorantal and represented autosegmentally as:
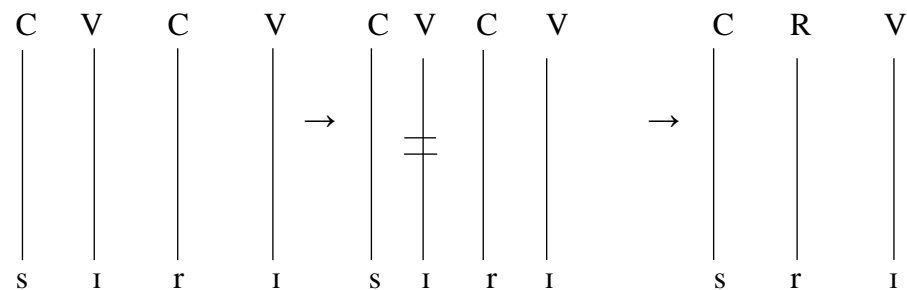
Figure 4 5: Pre-sonorant High Vowel Elision

The subject of presonrant elision also finds epression in Fante, a coastal dialect of Akan (Abakah 2004a). However, in Fante, the vowels which surround the sonorant must be identical as exemplified below:

4.26. a. mɪ +ara → mara → maa 'I emphatically

b. obiara → obiara → obiaa 'everybody'

c. biribi → biibi 'something' (Abakah 2004a: 200-201)

4.4.1.6 Final /n/ Deletion

We further observed that in Ɛsahie, when an alveolar nasal /n/ follows a [+high] vowel in the word final position, the final nasal consonant is deleted. This occurs after the nasal has regressively assimilated the oral [+high] vowel that precedes it to be nasalized. Examine the following examples in (4.26.)

Example 4.27.		**Underlying**	**Surface**	**Meaning**
	a.	sráín	sráĩ́	moon
	b.	àwòsín	àwòsĩ́	darkness
	c.	àmbáín	àmbáĩ́	bat
	d.	ɛ̀sóín	ɛ̀sóĩ́	elephant
	e.	bésín	bèsĩ́	back
	f.	èbíín	èbíĩ́	feces

A close examination of the data shows the deletion of a final nasal consonant. This involves two phonological process of nasalization before deletion. It is noticeable from the data that the deletion is ordered and occurs if the alveolar nasal consonant comes after a [+High, -Back, -ATR] vowel. First, the nasal consonant regressively spreads its nasality feature onto the penultimate vowel causing it to be nasalized. Subsequently, the nasal consonant is deleted resulting in the surface form. This phenomenon is also present in the French derivation of *bõ*. In French, the word [bon]

becomes [bõ] after it has gone through an ordered process of nasal assimilation and final consonant deletion. This can be represented as follows:
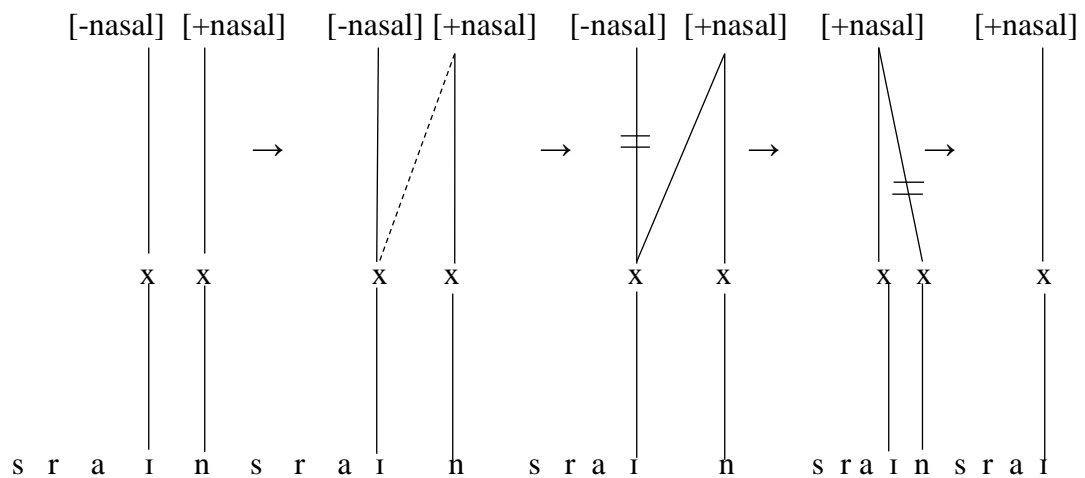
Figure 4 6: Autosegmental representation final nasal deletion in 4.27

It will be recalled from the consonant distribution that the nasal /n/ is allowed at the onset. The deletion in this structure therefore stems from the nasalization of the preceding vowel.

4.4.1.7 Syllable Loss

Another occurrence of deletion in Ɛsahie is found in compounding. In some compounds, a syllable is truncated in the output form. Consider the following example.

Example 4.28.	**Underlying**	**Surface**	**Meaning**
a.	æ̀ʤá +Kwaku	æ̀ʤá:kú (æʤeeku)	male name
b.	ǹzá: + fùfúé	ǹzà:fúé	palmwine
c.	pàpá + Kofi	paakofi	male name
d.	Nana + Osei	naasei	male name

It is clear from the data that two phonological processes are at play. First, there is a truncation of the first syllable of the second stem, after which there is a compensatory lengthening. Obviously, the loss of the syllable is compensated for by lengthening the final vowel of the first stem. In example (4.28a), *ɔ̀ʤa + kwaku*, the initial syllable of the second stem is truncated to [*ku*] before it is attached to the first stem resulting in *ɔʤaku*. Afterwards, the final vowel of the first stem is lengthened to surface as *ɔʤaaku*. By the principles of height harmony, the /a/ raises to /e/ to be realise *ɔʤeeku*. Again, it is observed that the syllable truncation is bi-directional in Ɛsahie. In example (4.28a and b), it is the initial syllable of the second stem that is lost, but in example (4.28c), it is the second syllable of the first stem that is truncated. This syllable loss is illustrated in figure 4.8 below:

n z a   f   u   f   u   e

→ underlying representation

V C V   C   V   C   V   V

n z a   f   u   f   u   e

→ syllable deletion stage

V C V   C   V   C   V   V

n z a   f   u   e

→ vowel lenghtening stage

V C V   V C V V

n z a   f u e

→ surface form

V C V V C V V
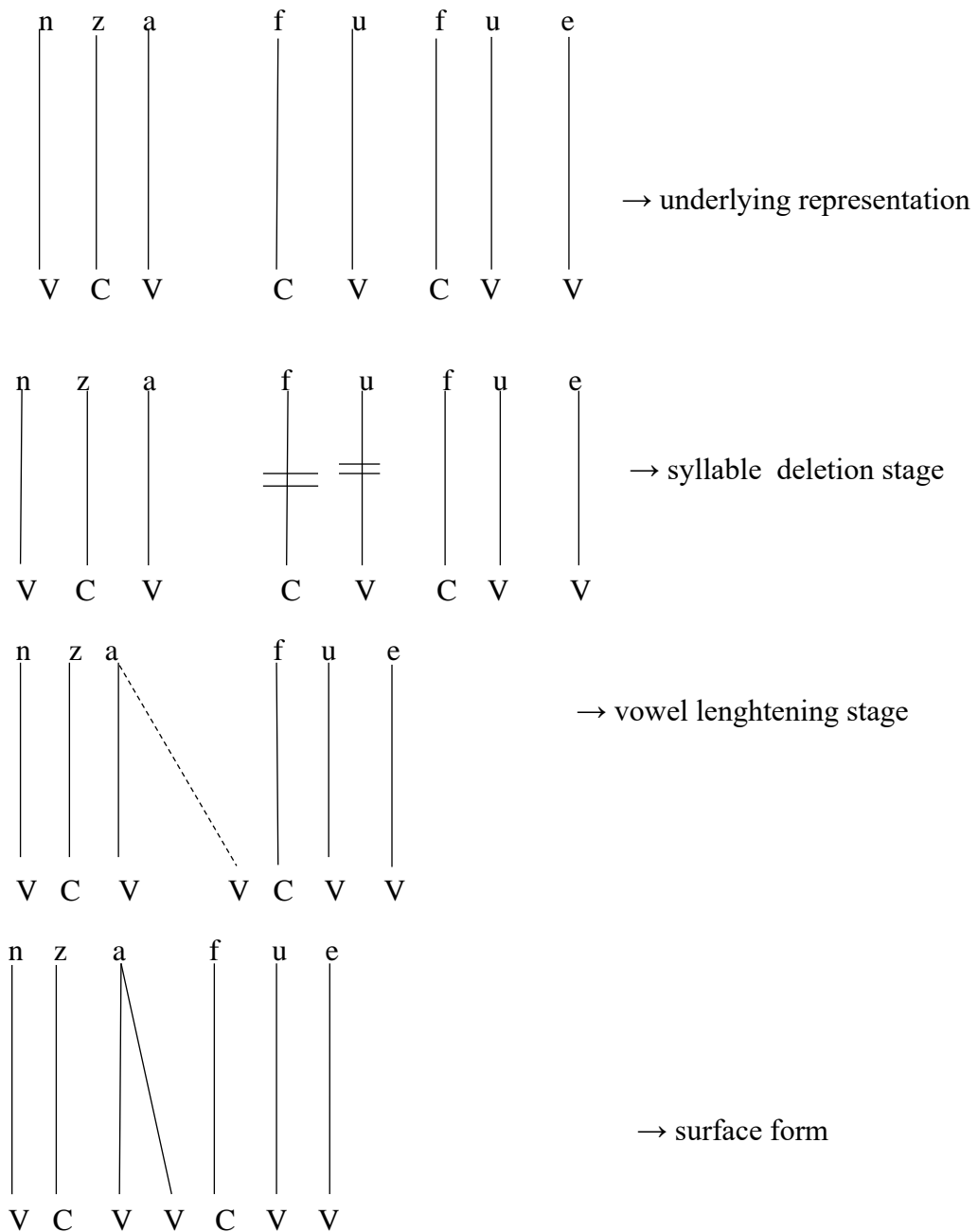
Figure 4 7: Autosegmental representation of syllable loss

It is reported (Abakah 2004a;2004b) that in all dialects of Akan, intervocalic consonant that occur in human names and kinship terms are deleted in a CVCV and VCV syllable structure as in:

Example 4.29. a.   papa+ kwasi   → paakwesi   'male name'

b.   nana + mansa → naamansa   'female name'

c.   kofi + nimo   → koonimo   'male name'

While this is similar to that of Ɛsahie, it must be noted that the context of deletion varies. While in Akan it is always the C_2 of the first stem that is deleted, in Ɛsahie, the deletion is not context specific. It could be in the initial stem as in example (4.29b) or in the second stem as in examples (4.29a) and (4.29c). Again, one cannot conclude that the deletion in Ɛsahie is just intervocalic loss. This is because, while one can argue that in example (4.29a) and (4.29b), it may be the loss of the consonant /kw/ and /p/ respectively, the same cannot be said of [*fufue*] in example (4.29c) where there is a complete syllable loss. It is appropriate, therefore, to call this process as it occurs in Ɛsahie as syllable loss followed by compensatory lengthening, as that will capture all similar cases.

4.4.2 Summary

The study grouped the discussion of Elision into two- Vowel Elision and Consonant Elision, with varied context of operation. Under Vowel Elision, the following observations were made:

a. In the sequence of V_1 #V_2 across syllable boundary in compounds, the V_2 is elided.

b. In the second context of operation, the [V_1] of a pronoun in a possessive construction is lost in a V_1 # V_2.

c. In a perfective construction where the perfective verb is attached to a pronoun, the pronoun loses its vowel.

d. We have also show that, in Ɛsahie, anytime a [-ATR, +high] vowel occurs before a sonorant /r/, the vowel is elided. This occurs in a CVCV syllable structure where the C_2 is a sonorant (CVRV). The V_1 is, invariably, elided resulting in a CRV syllable structure.

e. We further observed that in Ɛsahie, the final consonant of a word is deleted if it is an alveolar nasal. This occurs after the nasal has regressively assimilated an oral high vowel to be nasalized. The deletion is ordered and occurs if the alveolar nasal consonant comes after a [+high, -Back, -ATR] vowel. First, the nasal consonant regressively assimilates its nasality feature onto the penultimate vowel causing it to be nasalized. Subsequently, the nasal consonant is deleted resulting in the surface form.

f.   Finally, we noticed an instance of deletion in compounding, where some

syllables are truncated in the output form.

The next section will discuss how English borrowed nouns are also nativised into

Ɛsahie.

4.5 Syllable Structure Processes in English borrowed nouns in Ɛsahie

According to (Bussmann 2006: 55), linguistics borrowing or loanwords is the "adaptation of a linguistic expression from one language into another". Thomason and Kaufman (1988: 37) on the other hand refer to it as "the incorporation of foreign features into a group's native language by speakers of that language: the native language is maintained but is changed by the addition of the incorporated features". (Treffers-Daller 2010: 377) simply describes it as "the process whereby loanwords are copied to the target language's phonology". The aforementioned viewpoints attest to the fact that loanwords adaptation blends or incorporate the borrowed word or its features into the phonological structure of the receiving language, without altering the phonological structure of the receiving language. The language offering the words or features is referred to as the 'source' or donor' language, while the language receiving the words is the 'target' or 'recipient language' (Tranter 2000; Treffers-Daller 2010).

Loanwords or borrowed words assists in language development as it has over the years been a source of expanding the lexicon of languages, and explaining concepts not found in the target or receiving language. This confirms (Lehmann 1992: 274) point that, "whether spontaneous or induces, borrowing is one of the important influences of languages". Indeed, studies on loanwords have been diverse. Some have centered on the semantic, syntactic or morphological changes in the loanwords (cf.Byarushengo 1976; Halle & Chomsky 1968; Haspelmath 2008;2009; Haspelmath & Sims 2013; Haspelmath & Tadmor 2009; Lehmann 1992; Paradis 2006; Paradis &

Genesee 1996: , inter alia), with others concentrating on phonological changes (Davis et al. 2012; Glewwe 2015; Haspelmath 2008;2009; Haspelmath & Tadmor 2009; Kenstowicz 2006; Kenstowicz & Suchato 2006; Kim & Kochetov 2011), or both. The attention paid to the phonological processes involved in loanwords adaption to the native language is important because "loanwords role in the historical linguistics studies provides evidence for the phonological processes that affect native words in the target language" (Treffers-Daller 2010: 202). It thus offers insight into the phonological and phonetic, as well as syllable structure changes in the target language.

Nouns constitute a key word category from which words are borrowed (Glewwe 2015; Kay 1995; Kim & Kochetov 2011). A relative number of nouns in Ɛsahie are borrowed. In fact, there are extensive influences of English and Akan words in Ɛsahie[4]. Speakers usually adopt words from both languages to fill conceptual gaps as Ɛsahie 'lacks the means to designate newly introduced products or notions' (Bahumaid 2015). These nouns enter the language through speech, and are subsequently written with several segmental and supragemental changes. Though Ɛsahie borrow from many languages, our study will concentrate on borrowed nouns from the English language[5]. We highlight some of the syllable structure changes that

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[4] Akan because it is from the same language family and shares a border with Ɛsahie; English because it is the official language of the country and used in schools and all governmental businesses.
[5] Because of the geographical location of Akan to Ɛsahie, and the long-standing relation between the two language families, they have so many lexicons in common. Speakers still perceive Akan words which have Ɛsahie counterparts as still Ɛsahie.

these borrowed nouns undergo in their nativisation process[6]. The discussion will see us looking into the syllable structure changes in nativising the borrowed nouns, Different changes occur when borrowed nouns are incorporated at the syllable level. These include segmental changes which are usually phonotactic repair strategies used to address the constraints in incorporating the borrowed nouns into the syllable structure of Ɛsahie. Some of the changes are segment replacement, while other are syllable structure processes.

4.5.1 Segmental changes

Vowels and consonants may change in borrowed or loanwords. This occurs because some vowels or consonants in the borrowed words may not be in the sound inventory of Esahie, so they will have to be replaced or substituted. Some of these changes are discussed below.

4.5.1.1 Environment Conditioned Voicing

Some borrowed nouns change their voicing quality due to the environment they find themselves. The influence may be a change in voicing or change in place of

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[6] We focus more on data from the older generation because studies (Haugen 1950; Kaufman & Thomason 1988; Poplack et al. 1988) show that there is a lot of variation in the pronunciation of words from the younger generation who have had contact or may be bi-lingual with the source language than the older generation who may not be very competent in the source language. Older speakers usually have less command on the source language and thus "integrate the loanwords to a larger extent into the phonological patterns of the receiving language much more than the younger speakers will do" (Treffers-Daller 2010: 12).

articulation. In Ɛsahie, anytime a voiceless consonant occurs intervocalic, the voiceless sound changes to its voiced counterpart. Due to this, borrowed nouns with voiceless sounds automatically become voiced when they occur between voiced sounds. This change is illustrated in the examples below:

Example 4.30   **English**   **Ɛsahie**

    a.   /ˈgʌtə/   [gɔdà]   'gutter'

    b.   /ˈdɑktə/   [dɔ**g**ɔ**d**á]   'doctor'

    c.   /ˈmotoʊ/   [mó**d**ó]   'motor'

    d.   /frɒ:ns/   [fræn**z**ì]   'france'

As the examples above shows, the voiceless sounds are changed to voice because they are intervoiced. We see in example (4.30b) that the voiceless /k/ changes to /g/ because of the voicing feature of the surrounding vowels, while in example (4.30c) and (430d), /t/ changes to /d/, and /s/ to /z/ respectively. The consonants adapt the voicing feature of the vowels to become voiced. This change is illustrated in figure 4.19 below.

Voice Tier +voi +voi -voi +voi +voi +voi -voi +voi +voi +voi -voi +voi   +voi

CV Tier   C   V   C   V → C   V   C   V → C   V   C   V →   C   V   C   V

Seg'talTier g   ɔ   t   a   g   ɔ   t   a   g   ɔ   t   a   g   ɔ   d   a
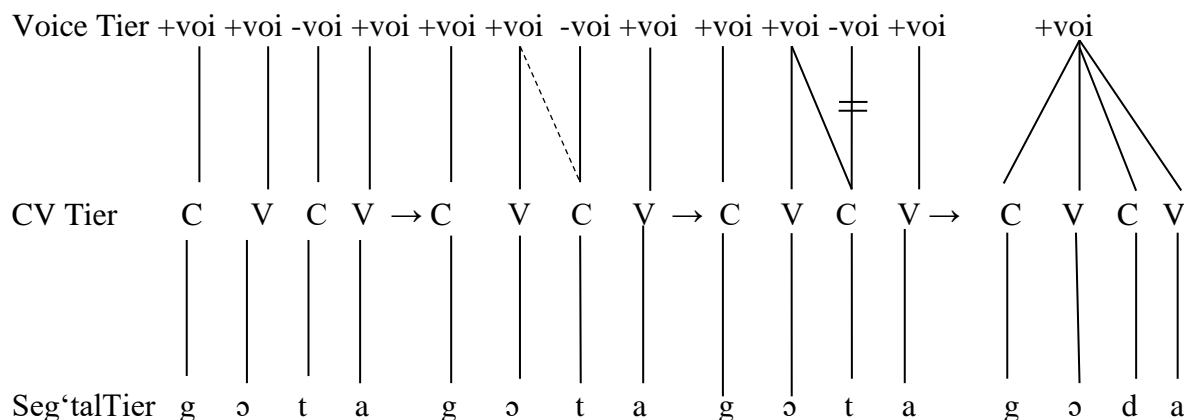
Figure 4 8: Autosegmental representation of environmental voicing change in example 4.30a.

4.5.1.2 ATR Synchronization

Ɛsahie displays ATR vowel harmony (cf. section 3.2.1) and borrowed nouns adapt to the vowel harmony rule of Ɛsahie. Hence, anytime a borrowed noun has two or more vowels, the vowels must synchronize in ATR. Occasionally, vowels in a borrowed noun may violate the Ɛsahie ATR harmony rule. When this happens, as part of the adaptation process, these vowels are substituted with Ɛsahie vowels in order to conform to the vowel harmony rule. Some of such words are shown in (4.31) below:

Example 4.31.   **English**   **Ɛsahie**

            a.   /ˈsikstɪ/   [sisite]   'sixty'

            b.   /ˈfɪftɪ/   [fífite]   'fifty'

The examples above show vowel harmony synchronisation. It is clear from examples that although the advanced high front unrounded vowel /i/ and its unadvanced counterpart /ɪ/ are found in Ɛsahie, the advanced vowel is changed to /e/ to harmonise with the other vowels in the word.

4.5.1.3 Diphthong Replacement

Certain vowels in English are changed when they enter Ɛsahie lexicon due to their absence in the Ɛsahie sound inventory. Some of these vowels are diphthongs; hence, English nouns with diphthongs are replaced with monophthongs when borrowed into Ɛsahie as seen in these examples.

Example 4.32 **English** **Ɛsahie**

a. /ˈleɪ.bə/ [lè:bæ] 'labour'

b. /ˈməʊbɑil/ [mòbæ] 'mobile'

c. /pleɪt/ [píletɪ] 'plate'

d. /ˈdraɪ:və/ [drɔbà] 'driver'

As stated above, Ɛsahie allows only monothong vowels in its words. Therefore, the English diphthongs /əʊ/, /eɪ/ and /ai/ in the data above are 'normalised' in Ɛsahie with simple vowels. This explains why in examples (4.32a) and (4.32d) the diphthongs

/əʊ/ and /ai/ are replaced with the monothongs /o/ and /a/ respectively. In /pleɪt/ to be precise, the vowel /eɪ/ is replaced with the advanced mid high unrounded vowel /e/, while in /ˈleɪ.bə/, the diphthong /ei/ is replaced with /e/ as well.

4.5.1.4 Unstressed Vowel Replacement

Borrowed nouns in Ɛsahie with the unstressed central vowels /ʌ, ə/ are replaced. Examine the examples in (4.33).

Example 4.33		**English**	**Ɛsahie**	
	a.	/ˈgʌtə/	[gɔdà]	'gutter'
	b.	/kʌp/	[kɔ:pʊ:]	'cup'
	c.	/ˈbʌkɪt/	[bógìdí]	'bucket'
	d.	/ˈrʌbə/	[rɔvà]	'rubber'
	e.	/ˈleɪ.bə/	[lé:bà]	'labour'
	f.	/ˈdraɪ.və/	[drɔbà]	'driver'
	g.	/ˈsɪl.və/	[sílɪva]	'silver'

Since the vowels /ʌ, ə/ are not found in Ɛsahie, borrowed nouns with these vowels are substituted with the corresponding vowels /a/ and /ɔ/ respectively. This replacement is not done arbitrarily; the language replaces the 'misfit' vowels with other vowels that share similar features. Again, from the examples we notice that the

central vowel after their replacement harmonises with the other vowels in terms of ATR.

4.5.1.5 Consonant Substitution

The absence of certain consonants in Ɛsahie leads to their substitution when found in borrowed nouns. Two of such consonants are the dental sounds/ θ, ð /. Examine the following examples which demonstrate this change:

Example 4.40.   **English**   **Ɛsahie**

      a. /ˈθɜːtiːn/   [tɛːdĩ]   'thirteen'

      b. /ðɪs]   [dizɪ]   'this'

      c. /ˈfɑðə/   [fada/ fala]   'father'

      d. /ˈbrʌðə/   [brɛda /brɛla]   'brother'

      e. /ˈmʌðə/   [mada /mala]   'mother'

Ɛsahie does not have the dental sounds in its sound inventory; hence, borrowed nouns with the dental fricative are replaced with an alveolar stop. The choice of /d/ is

due to the nearness of it to the dental /ð/ in terms of articulation and to ensure

faithfulness to the voicing feature since the substituted sound is voiced.

4.5.2 Syllable Modification

Aside the vowel adjustments, another major adjustment that occur in borrowed nouns

is the modification to the syllable structure of the borrowed noun. The phonotactics of

Ɛsahie do not allow certain syllable structures; hence, borrowed words with

unacceptable syllable structures therefore have to be re-structured to fit into the

structure of the language. Two of such changes discussed in this section are epenthesis

and deletion.

4.5.2.1 Epenthesis

Epenthesis, also known as vowel insertion, is the addition or insertion of a segment,

usually a vowel, into the borrowed word to diffuse an unacceptable consonant cluster.

Most languages use the epenthetic vowel to break impermissible consonant clusters in

the borrowed nouns (Lombardi 2003; Uffmann 2002;2004). For example, Fula and

Akan use the vowels/ i, u/ (Adomako 2008), while Korean uses /ɨ/ which tends to

devoiced after an aspirated vowel (Tranter 2000; Treffers-Daller 2010). Similarly, in

English, vowel epenthesis is employed to avoid phonotactically ill-formed sequencing

of sibilants (Glewwe 2015; Kim & Kochetov 2011). Epenthesis may either occur at

the syllable onset or syllable coda position. The use of epenthesis as a phonotactics repair strategy applies after a morpheme concatenation or a loanword adaptation. The epenthetic vowels are harmonic with the preceding vowel (Uffmann 2002;2004). Following the typology of epenthetic vowels, (Lombardi 2003; Uffmann 2002;2004), Ɛsahie falls within the languages that have the high, front and back vowel /ɪ, ʊ/ based on the ATR harmony and rounding harmony system of the language. The epenthetic vowels in Ɛsahie are /ɪ/ for nouns with front vowels, and /ʊ/ for nouns with back vowels. The epenthetic vowels in Ɛsahie are to used to break consonant clusters or to turn an unacceptable coda into an onset. These vowels after their insertion harmonise with the ATR feature of the other vowels in the noun. The rules for insertion therefore apply as:

- ➢ Rule 1: Ø →ɪ, ʊ
- ➢ Rule 2: Ø → ɪ, ʊ/C― C
- ➢ Rule 2: [-ATR] →[+ATR] / [+ATR]

We examine instances of syllable onset epenthesis as well as syllable coda epenthesis in what follows.

4.5.2.2 Syllable- onset Epenthesis /ʊ, ɪ /

Ɛsahie does not have CCV syllable structure (cf. section 4.3). This means that borrowed nouns with such syllable structure have to be adjusted as exemplified below.

Example 4.34.		**English**	**Ɛsahie**	
	a.	spreɪ /	[sʊpre:]→ [supre]	'spray
	b.	/ sku:l/	[sʊku:]→ [suku:]	'school'
	c.	/sməʊk/	[sʊmokʊ]→[sumoku]	'smoke'
	d.	/ ˈspɛə/	[sʊper]	'sparɛ
	e.	/stɔ:ri/	[sʊtɔ:rɪ]	'story'

In the examples above, the onset consonant cluster of the noun is broken up with the insertion of the high back unadvanced round vowel /ʊ/ in between the CC. The insertion of /ʊ/ diffuses the consonant clusters and creates a CV syllable. Inserting a high back unadvanced round vowel will follow this rule:

➢ Rule 1: Ø→ʊ

As seen in examples [4.34a-c], the epenthetic vowel, after insertion harmonise with the vowels in the stem by following this rule below:

➢ Rule 2: [-ATR] →[+ATR]/ [+ATR]

Accordingly, /ʊ/ which is –ATR changes to its +ATR counterpart /u/. Aside /ʊ/, the high front unrounded unadvanced vowel /ɪ/ is also used in some cases to break up onset consonant clusters. Examples of nouns with such consonant clusters are given below:

Example 4.35   **English**   **Ɛsahie**

    a.   / pleɪt/   [pɪlɛtɪ]   'plate'

    b.   /ˈmɑ:stə /   [mazɪda]   'master'

    c.   /ˈsteɪʃən/   [site:hen]   'station'

    d.   /ˈsɪl.və/   [sɪlɪva]   'silver'

    e.   /spi:d/   [sɪpɪ:dɪ]   speed

Like its counterparts in (4.34), in (4.35) the nouns after insertion harmonises in tongue root with the root nouns.

4.5.2.3 Syllable-coda Epenthesis- /ʊ/, /ɪ/

Also known as 'Paragogic Vowel Insertion' (Bahumaid 2015), syllable-coda epenthesis is equally motivated by the syllable structure of Ɛsahie which forbids consonants other than the nasals/ n, m/ in the coda slot of a syllable. Borrowed nouns with the unacceptable coda are thus adjusted as exemplified below:

Example 4.36   **English**   **Ɛsahie**

    a. / bʊk/   [bó:ku]   'book'

    b. /bɔ:l/   [bɔ:lʊ]   'ball'

    c. /ˈstæmp/ [sɪtambʊ] 'stamp'

The adjustment is done with an epenthetic vowel /ʊ/ inserted at the syllable coda of the English borrowed nouns. The addition of the high back unadvanced round vowel /ʊ/ is to create another CV syllable and thus simplify the pronunciation of those nouns in line with the syllable structure of Ɛsahie. Like its onset cluster counterpart (cf. example 4.34 and 4.35), the high front unrounded unadvanced vowel /ɪ/ is sometimes incorporated for most borrowed nouns at the coda. This is illustrated in the examples (4.37):

Example 4.37   **English**   **Ɛsahie**

    a. /pleɪt/   [pɪlɛtɪ]   'plate'

    b. /ˈɒfɪs/   [ɔfɪzɪ]   'office'

    c /ˈsteɪʃən/   [[site:hen]   'station'

    d. /ˈwai.ə.ləs / [wálɛsì]   'wireless'

    e. /glɑ:s/   [gɪlásì]   'glass'

It will be recalled (cf. section 4.3.4.3) that the only codable consonants in Ɛsahie are /n, m/. Accordingly, borrowed nouns with codas that are not /n/ or /m/ have to be re-syllabified with the parogogic vowel to become a CV. In example (4.37a) for instance, /pleɪt/ has a coda /t/, so this is converted to onset to transform the syllable in this case into a CV. Conversely, if you consider /ˈsteɪʃ.ən/ *'station'* to [sɪtæhɛn] in example (4.37c), you notice that the paragogic vowel is not used. This is because the borrowed noun has a nasal coda which agrees with the phonotactics of Ɛsahie. Mention must also be made that in examples (4.37d-e), *walɛsɪ, glasɪ* voicing assimilation fails to apply. This is because voicing assimilation fails to apply when the preceding syllable has a liquid in it. Thus, these processes are to ensure that the borrowed nouns do not violate the syllable structure constraints of the language.

4.5.2.2 Deletion

Another major phonotactic repair strategy in borrowed nouns is segment deletion. This occurs when the borrowed noun has an impermissible sound sequencing. The deletion of the sound, like the epenthesis, is to make room for permissible sound sequencing of the borrowed noun. The deleted segment may be either a consonant or a vowel.

4.5.2.2.1 Consonant Deletion

As indicated above, as part of the syllable structure of the language, Ɛsahie does not allow coda unless for /n, m/ (cf.4.3). Due to this, borrowed nouns from English with

coda have to be resyllabified. The resyllabification is done either by insertion (cf. 4.5.5.1) or by consonant deletion. In case of deletion, the C_1 or C_2 may be deleted. Let us examine the data in example (4.38) below.

Example 4.38.   **English   Ɛsahie**

     a.   /fækt/   [fædi]   'fact'

     b.   /tæk.si/   [tazɪ]   'taxi'

We notice from the data above that in (4.38a and 4.38b) it is C_1 which is deleted, while in (4.38a-4.38b) it is C_2 that is deleted. Indeed, the nativsation process involves four ordered rules, namely- C_1 or C_2 deletion, vowel insertion, resyllabifcation, and assimilation. In (4.38a) for instance, the English borrowed word /fækt/ has a final CC. The C_1 is first deleted leaving a final /t/. Ɛsahie does not permit /t/ in the coda so a vowel is inserted to become/fæti/. The word, after insertion, becomes disyllabic so it is further resyllabified for /t/ to become onset following the onset maximization principle–/fæ.ti/. By voicing assimilation, /t/ becomes /d/ resulting in /fæ.di/ being realised by the natives. This process is illustrated in figure 4.10 below.

U R   C₁ Deletion   Vowel Insertion
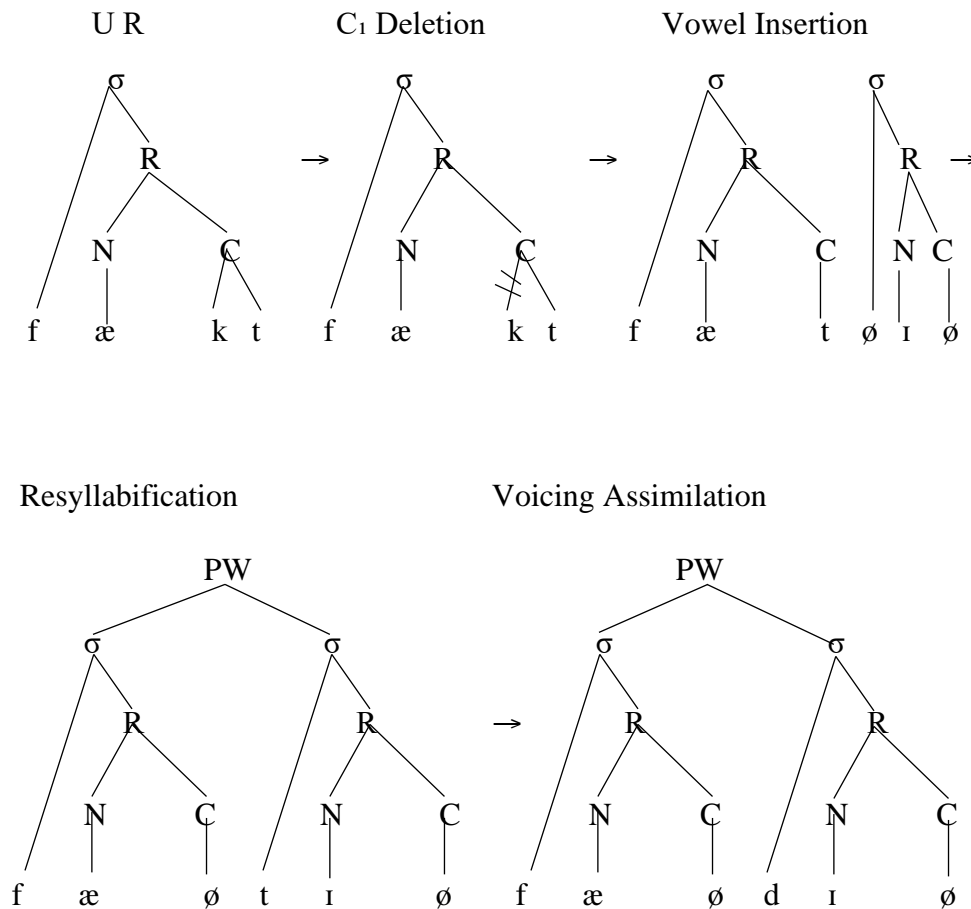
Figure 4 9: Consonant deletion in English borrowed nouns.

4.5.2.2.2 Vowel Deletion

As part of the syllable structure of the Ɛsahie, the front high, vowels /i, ɪ/ are not allowed at word-initial position (cf. 3.2.1). Based on this, when English words with the initial [high, front] vowel are borrowed into Ɛsahie, these vowels are deleted. Consider the words in example (4.39) below.

Example 4.39. **English** **Ɛsahie**

      a. /ɪn ˈspɛktə/   [nzɪpɛda]   'inspector'

      b.   /ɪn. ˈstɛd/ [nzɪdɛ:dɪ]   'instead'

In these examples, the vowel /i/ is deleted for the word to begin with the alveolar nasal /n/. Let us look at / ɪn ˈspɛktə/ in example (4.39a). We notice in the example that the initial vowel /i/ of / ɪn ˈspɛktə/ is deleted because Ɛsahie does not accept it. The deletion of the initial vowel causes the nasal /n/, which is a sonorant to become syllabic. The syllabic nasal then assimilates the onset voiceless fricative of the second syllable /s/ to become voiced /z/. Following the rules of C_1 deletion, vowel insertion and resyllabification, the CC at the coda of the second syllable is restructured resulting in the word being realised as [nzɪpɛda].

4. 6 Conclusion

This chapter has shed light on the syllable and some syllable structure processes in Ɛsahie. It has shown that the basic syllable structure in Ɛsahie is the CV, the V, and the CVC, with other types such as the CRV, CVRV, CVCV. We have seen that the language has a dispreference for consonant cluster, also all consonants, except /r, z, v/

occur at syllable onset slot. The nasals /m, n/ has free distribution and occur at the onset, nucleus and coda positions.

We have further discussed the syllable structure changes of English borrowed nouns in Ɛsahie. We have shown that to conform to the syllable structure of Ɛsahie, English borrowed nouns with vowels that are not found in the sound system of Ɛsahie are replaced with Ɛsahie ones. Some of these foreign vowels are /ə, ʌ/ and diphthongs. In other instances, too, the vowels, though available, are replaced with different ones for the vowels to harmonize. On epenthesis, we have shown that the vowels /ɪ, ʊ/ are inserted to break consonant clusters not found in the language. Regarding deletion, we noticed that borrowed nouns go through other rules of consonant deletion, vowel insertion, resyllabification and assimilation to realise a word whose syllable structure is acceptable in the language. All these changes to the structure of the borrowed nouns are repair strategies on the syllable structure constraints found in the borrowed nouns. We now turn our attention to chapter five where we discuss another prosodic feature and its process— tone.

CHAPTER 5

TONE AND TONAL PROCESSES IN ƐSAHIE NOUNS & VERBS

5.1 Introduction

The focus of this chapter is to analyse tone and tonal processes that occur in Ɛsahie nouns and verbs. On nouns, the attention is on tone in basic nouns and non-basic nouns such as deverbal nouns, nominalised nouns, compounds, and reduplicated nouns. On verbs, we look at the tonal patterns of basic verbs and other verbal forms such as inflected verbs and reduplicated verbs. The chapter is segmented as follows; section 5.2 looks at the nature of pitch and tone, where we deliberate on the nature of tone, how tone is represented in the language; the tone-bearing unit in the language; as well as the functionality of tone in the language. Section 5.3 focuses on the tone of basic nouns and verbs. The section 5.4 looks at the tone of non-basic nouns and non- basic verbs, while section 5.5 concludes the chapter.

5.2 Pitch and Tone

Several researchers, (cf.Genzel & Kügler 2011; Kisseberth & Kenstowicz 1977; Kügler 2016; Kügler & Skopeteas 2006; Xu & Sun 2002; Zerbian 2006;2010; Zerbian & Barnard 2010: ,inter alia) have highlighted the distinction between pitch and tone. According to Kisseberth and Kenstowicz (1977: 256),

"the reason for making the distinction resides in the fact that absolute pitch is of very little interest; it is the relative pitch that matters. Two vowels uttered at the same pitch level do not linguistically count as the same sound and that sameness in pitch does not necessarily imply sameness at the phonological level"

Pitch is a phonetic feature that relates to the vibration of the vocal folds. Ladefoged and Maddieson (1996: 168) describe it "as that auditory property that enables a listener to place the voice on a scale going from low to high without considering its acoustic properties." Pitch level is determined by the rate of vibration of the vocal folds. A number of factors influence this rate. One of them is the air flow through the glottis and across the vocal folds during different phonation. If there is rapid airflow, the vocal folds vibrate faster producing a higher pitch and if the airflow is low, the vocal folds vibrate slower resulting in a lower pitch.

In addition to this, the thickness of the vocal folds also determines the rate of vibration of the vocal folds; thick vocal folds vibrate slower and produce low pitch, whiles thin vocal folds vibrate faster to produce higher pitches. Schuh (1978) remarks that it is segments that influence tone and not the opposite. However (Obeng 1987: 137) argues levels of distinction for pitch and tone when he remarked that "tone is a phonological concept because in some contest, a low pitch may be rendered as high phonologically and high pitch as a low tone in the phonology". Pitch as an auditory sensation is perceived as the result of the vibration of the vocal folds (Laver 1994).

The vocal folds do not vibrate at a constant rate. The rate at which the vocal folds vibrate varies according to a number of factors. These factors range from the size of the airstream, the size of the vocal folds to the tension in the vocal folds. The amount of air and the force at which it is pushed through the glottis can affect the rate of vibration of the vocal folds. When the air from the airstream is large, the vocal folds are caused to vibrate faster to produce higher pitches and vice versa. Thinner vocal folds have the propensity to vibrate faster than thicker ones. This explains why women and children have higher pitches than adult males. Also, based on the configuration in the oral cavity during speech, various articulatory gestures impede or allow the free flow of the airstream out of the lungs. When the airstream is restricted, greater initiation force is needed for the air to move out of the sub-glottis through the vocal folds. This activity causes a difference between obstruents and sonorants. In the case of obstruents, there are varied degrees of restriction of the flow of airstream, whereas sonorants have a relatively free flow of airstream in the vocal folds.

Related to the thickness is the tension in the vocal folds. Pitch is also influenced by the tension in the vocal folds. The folds can be stretched or relaxed. Stretched vocal folds become tense and tend to vibrate faster to produce higher pitches than relaxed vocal folds which vibrate slowly and subsequently produce low pitches. The tension of the vocal folds is related to the movement of the larynx. If the larynx is pushed down, the vocal folds relax and cannot vibrate faster. Conversely, if it is pushed up,

the vocal folds become tense and thinner and therefore vibrate faster resulting in higher pitches (Abramson 2004; Edmondson & Gregerson 1993; Laver 1994) .

Tone on the other hand is the functional use of pitch. It can be used to distinguish between the meaning of words which otherwise would have been identical. Cruttenden (1997: 8) thus defines it as "a feature of the lexicon, being described in terms of prescribed pitches for syllable", and Collinge (1990:60) adds that it is "the use of suprasegmental parameters to differentiate lexical items and the parameter most frequently used is pitch". Pitch realised over lexical items is tone whereas pitch realised over sentences is intonation (Yip 2002;2007). Tone can be used to determine whether a lexical item is a noun or a verb, and whether a string of words is an interrogative or a declarative sentence. Languages differ in the relative number of tones it can have. South and East Asian languages tend to have a higher number of tonal contrast than African languages (Yip 1989a;1995;2002;2007). Chinese for instance contrast 4 levels of tones and several contour tones, whiles most African languages have two or three (cf.Abakah 2004b;2005; Akanlig-Pare 2005; Gimba 2001; Hyman & Leben 2017; Hyman 2017a;2017b;2017c; Hyman 2018; Kenstowicz 2003; Yip 2002; 2007: ,inter alia). Languages also make a distinction between register tone and contour tones.

Tone languages are languages that use pitch of the voice to convey meaning of words (Ohala et al. 2004; Yip 2002). A tonal language is a language "in which an indication of pitch enters into the lexical realization of at least some morphemes"

(Hyman et al. 2007; Hyman 2011; Yip 2002;2007). Thus, in a tonal language, pitch variation is used to create difference in the core meaning of a word. Tone is therefore perceived as the functional use of pitch to create meaning difference in words. In such languages, pitch is used to bring about difference in the meaning of words. For instance, in Ɛsahie, the word [*bɔkɔ:]* has two meanings depending on the type of tone pattern used in the production of the word. It can be produced with a low- low tone, or a high- high tone to convey different meanings. This is seen in example (5.1) below.

Example 5.1. a.   bɔ́kɔ́:   'completely'

            b.   bɔ̀kɔ̀:   'slowly'

The examples show that like most tonal languages, the meaning of a word in Ɛsahie does not depend on the segments alone, but also on the pitch patterns associated with them.

5.2.1 Tone Bearing Unit in Ɛsahie

The Tone Bearing Unit (TBU) differs across languages. In some languages, the Tone Bearing Unit (TBU) is the syllable while in others it is the mora. To establish the TBU of a language, one must ascertain the weight of the syllable that bears the tone in the language, or whether the language has a one- to- one correlation of tone to mora. If a language has only one monomoraic, open syllable bearing exactly one tone, the TBU

can be the vowel, mora, or the syllable. However, if the language has syllabic nasals which bears tones, but onset nasals which do not, the syllable is the TBU. On the other hand, where a language has both light monomoraic and heavy monomoraic syllable which differ in the number of tones they can bear, it is justified to claim the mora as the TBU and not the syllable (Akanlig-Pare 2005; Downing 2011). In Ɛsahie, monomoraic and bimoraic syllable can carry tones of the same value, also every vowel constitutes a syllable, and pre-consonantal nasals are syllabic. Multiple tones cannot be assigned to a syllable, and toneless segments are usually associated with the tone of the next syllable. We therefore conclude the TBU in Ɛsahie to be the syllable. This conclusion follows similar evidence for the syllable as the TBU in Akan (Dolphyne 1988) and Konni (Cahill 1992;1997; Cahill 2016).

5.3 Tone of Basic Nouns and Verbs in Ɛsahie

This sub-section looks at the tonal pattern of nouns and verbs in their basic form. The essence is to set the foundation for the discussion on non-basic forms and to determine which tonal group to place the non- basic forms. The section first focuses on the tone of basic nouns and subsequently on basic verbs.

5. 3.1 Tone of Basic Nouns in Ɛsahie

Nouns can generally be classified into morpho-syntactic diverse groupings such as common/proper nouns; count/non-count nouns; generic/non-generic nouns;

locative/non-locative nouns; animate/inanimate nouns; alienable/non-alienable nouns, among others. Structurally, they can be classified based on their syllabic forms giving rise to CV, CVC, CVCV, CVRV etc. nouns. Most studies on noun classification has centered on the morphological or syntactic features (cf.Agbetsoamedo 2014; Boateng 2017; Bobuafor 2009; Bodomo & Marfo 2006; Broohm 2017; Essegbey 2009; Osam 1993; Sagna 2008: , inter alia). For Ɛsahie, the initial study on noun classification is on their morpho-syntactic features (Broohm 2017 and Boateng, 2017). Both discuss noun classes for Ɛsahie based on the morpho-syntactic feature of number agreement. They each group the nouns into classes according to their similarity of singular and plural affixes since most of the nouns share a common pluralizer. Nonetheless, the grouping of nouns in this study is different from the aforementioned. In this study, we classify the nouns in Ɛsahie based on the prosodic feature of tone. We specifically group these nouns into tonal classes based on their common tonal pattern. Motivated by the classification of nouns in other languages (Abakah 2004b; Hyman 2017a;2017b), we focus on the root noun and exclude the tone of the affixes. The affixal tones will be considered in the subsequent sections. We identify three (3) basic tonal groups of nouns. These are shown below.

5.3.1.1Low tone Nouns

Group I nouns are L tone. These nouns may be monosyllabic or polysyllabic; however, regardless of the number of TBUs in the syllable, they are all L tones as exemplified in (5.2) below:

Example 5.2.	a.	tòà	'penis'
	b.	tàà	'tobacco'
	c.	ǹzòì	'ashes'
	d.	bùà	'waterpod'
	e.	àsà	'mud'

5.3.1.2 LH tone Nouns

Group II nouns in Ɛsahie have a LH tonal pattern. Nouns in this group are disyllabic and constitute the largest group. Examples of such nouns are:

Example 5.3.	a.	tìré	'head'
	b.	bèsĩ́	'back'
	c.	à̰ɲwá	'salad oil'
	d.	màkó	'pepper
	e.	ɲìɛ́	'eyes'

5.3.1.3 High Tone Nouns

Group III nouns are relatively few. Nouns in this class are H toned. H toned nouns usually have contrastive L tone counterparts. Examples are in (5.4) below.

Example 5.4   a.   nóá   'mouth'

             b.   kúɛ́   'stomach'

             c.   náí   'meat

             d.   tɕíɾɛ́   'hat'

5.3.2 Tone of Basic Verbs in Ɛsahie

Verbs essentially denote actions carried by the subject of a sentence. They are sometimes classified based on their semantic types, syllable types, or tonal structure. The works of Abakah (2004b) as well as Hyman and Olawsky (2004) help in appreciating how verbs are classified tonally. In Akan, Abakah (2004b) classifies verbs three into tonal groups, while Hyman and Olawsky (2004) did same for verbs in Dagbani. In both classifications, they show that usually verbs from the same tonal class have unique tonal behavior distinct from verbs in other classes. In the next sub-section, we will group verbs in Ɛsahie according to their tones, and subsequently investigate how verbal morphological operations are influenced by tonal alternations. Based on tone, we identify three groups of verbs for Ɛsahie.

5.3.2.1 Group I Verbs

The group I verbs have a H (H) tonal pattern and can be monosyllabic or disyllabic.

They include verbs such as:

Example 5.6. a.   fá   'to take'

            b.   ká   'to bite'

            c.   gó   'to dance'

            d.   bíé   'to urinate'

            e.   tóí   'to follow'

            f.   tɕírɛ́   'to show/teach'

5.3.2.2 Group II Verbs

The group II verbs have a L (L) H H) tonal pattern, Examples are:

Example 5.7. a.   lìtɕí   'to ask'

            b.   tòtó   'to roast'

            c.   sòmá   'to send'

            d.   sàndʑí   'to untie'

            e.   kàtàsó   'to cover'

            f.   àdʑá: 'to marry'

5.3.2.3 Group III Verbs

The group III verbs are few and have a L (L) tonal pattern. Examples include:

Example 5.8.　a.　　tɕìrɛ̀　'to write'

　　　　　　b.　　wìùà　'to steal'

　　　　　　c.　　ɕwìè　'to pour'

　　　　　　d.　　kàì　　'to remember'

Having discussed tone patterns of basic nouns and basic verbs, we now focus on tonal patterns of non-basic nouns and non-basic verbs.

5.3.3 Tone in non-basic nouns in Ɛsahie

This sub-subsection discusses the tonal structure of non-basic nouns found in Ɛsahie and show where they fit in the basic noun group. Non-basic nouns are the nouns derived from the basic ones through diverse morphological processes. These include affixated nouns, deverbal nouns, compounds, and reduplicated nouns.

5.3.3.1 Tone in Affixation in Ɛsahie

The tonal grouping of nouns of the basic nouns excluded the nominal affixes. However, some nouns in Ɛsahie co-occur with affixes (Boateng 2017; Broohm 2017).

Boateng (2017) notes that the language makes use of nominal prefixes and nominal suffixes and identifies three nominal prefixes [a-], [-ɛ] and [n-] and two nominal suffixes which are *[-niɛ],* and *[-fʊɛ]* with different morphological functions. These affixes are bound morphemes attach to nouns to convey meaning. We first discuss the tonal behavior of nominal prefixes and subsequently follow it up with that of the nominal suffixes.

5.3.3.1.1 Tone in Nominal Prefixes

The nominal prefix in Ɛsahie is either a nasal or a vowel. The vowel or vocalic prefix always harmonizes with the vowels in the noun stem, while the nasal consonant assimilates in place of articulation with the initial consonant of the stem. Let us first focus on the vocalic prefixes.

5.3.3.1.1.1 Vocalic Prefixes

The vocalic prefix is either /a-/ or /ɛ-/ or /ɔ-/, /n-/ (Boateng 2017). The vocalic prefixes morphologically denote number, i.e. singular or plural form of the noun. These vocalic prefixes are unspecified for tone and are therefore assigned a default L tone[7]. The prefixal tone does not affect the stem in anyway. Let us consider the following examples in (5.9- 5.12) below.

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[7] This follows Abakah (2004:210) that "in any two tone language, a toneless morpheme is assigned L tone by default".

Example 5.9.   /a-/

    /a-/ +LH tone noun

    a.   /a + bɔ̀ndʑé /→   [àbɔ̀ndʑé]

            SG   stem   'a goat'

    b.   /a+tà:díɛ́/   →   [àtà:díɛ́]   'dress'

    c.   /a+nòmá:/   →   [ànòmà:]   'bird'

    d.   /a+tɛ̀krá/   →   [àtɛ̀krá]   'feather'

    e.   /a+kwàdú/   →   [àkwàdú]   'banana'

    /a-/+ Low tone noun

    f. /a+sà/   →   [àsà]   'mud'

Example 5.10   Plural

    a.   /a+sòná/   → [àsòná]

            PL   stem   'persons'

    b.   /a+wòsí:/   →   [àwòsí:]   'stumps'

    c.   /a+ tɕwìlíɛ́/   →   [àtɕwìlíɛ́]   'ladders'

    d.   /a+ dòmá:/   →   [àdòmá:]   'babies'

    /a-/ +LH tone noun

    e.   /a+ kɔ́/   −   ]àkɔ́]   'fowls'

Example 5.11.   /ɛ-/

    /ɛ-/+LH tone noun

      a.   /ɛ +wìá/   →   [èwìá]

            SG   stem   'a sun'

      b.   /ɛ +bòtí/   →   [èbòtí] 'rat'

    /ɛ-/+H tone noun

      c.   /ɛ+   wó:/   →   [èwó:]   'a snake'

      d.   /ɛ+ sín/   →   [èsín]   'funeral'

      e.   /ɛ +kɔ́m/   →   [èhɔ́m]   'famine'

      f.   /ɛ + mó/   →   [èmó]   'rice'

Example 5.12.   /ɔ-/

/ɔ-/+LH tone noun

      a.   /ɔ+sɔ̀fʊ́/   'priest   → [àsɔ̀fʊ́]   'priests'

/ɔ-/+H tone noun

      b.   /ɔ+mámá/ 'prominent person'→ [àmámá] 'prominent people'

It is obvious that the nouns in the data above assume their number marking

based on the attached prefixes. In (5.12a) the prefix /ɔ-/ is used to mark singularity,

and the prefix /a-/ used for plurality. We notice in all the examples that regardless of the attached prefix, the nouns are unaffected tonally. It is therefore clear that the tonal system of Ɛsahie is such that the addition of a prefixal tone does not affect the tonal melody of the stem. Moreover, the examples in (5.11a) and (5.11c) confirm that the ATR harmonization affect the vowel segments. We see that in (5.11a) *ɛ*+ wìá*: → e*wìá 'sun, where the prefix /ɛ-/ after prefixation changes to /e-/ to conform with the [+ATR] vowels in the stem.

5.3.3.1.1.2 The Nasal Prefix

The nasal prefix /N-/ in Ɛsahie is a homorganic nasal. The nasal, like its vocalic counterpart, is toneless and is used morphologically to mark number as depicted in the examples that follow.

Example 5.13.   /N-/

/n-/+LH tone noun

      a. /n+ tɛ̀krá /   →   [ndɛ̀krá]

          PL stem   'feathers'

      b.   /n+ àkɔ̀lá:/   →   [ŋgwɔ̀lá:]   'children'

      c. /n+ bràsuá/   → /mbràsuá/→[mmràsuá] 'women/females'

      d. /n+ dàdíɛ́/   →   /ndàdíɛ́/→[nnàdíɛ́]   'cutlasses'

e. /n+ èbòté/   →   /mbòté/→ [mmòté]   'rats'

/n-/+H tone noun

f. /n+ zóí/   →   [ǹzóí] → 'ashes'

/n-/+L tone noun

g. /n+sà:/   →   [ǹsà:] → 'muds'

h. /n+kùkùè/   →   [ŋ̀gùkùè] → 'cooking pots'

In these examples, the prefix /N-/ which is attached to the singular nouns mark plural do not change the tonal pattern of the stem. These prefixes after their attachment are assimilated homorganically by the initial consonant of the stem as evidenced by example (5.13a) and (5.13b) and others. In fact, in (5.13c- e), we see a further complete mutation of the prefix to the initial consonant of the noun. We therefore conclude based on the above discussion that all Ɛsahie nominals have prefixes that are unspecified for tone and therefore assigned a L tone by default. These prefixes have no tonal assimilation effect on the noun stem. In the section that follows, we turn our attention to the nominal suffixes.

5.3.3.2 Tone in nominal suffixes in Ɛsahie

The bound morphemes */-nìɛ́, -fʋ̀ɛ́, -mɔ́/* are suffixed to nouns in Ɛsahie. Unlike the nominal prefixes that do not affect the tonal pattern of the stem, the suffixation of the stems leads to tonal changes in the noun stem as will be discussed below. In these examples, notice, please, how the addition of the suffixes affects the tonal structure of the noun stems, a phenomenon that is different from the prefixes. We will discuss the suffix /-*fʋ̀ɛ́* / and follow it up with /- *nìɛ́*/ and /-*mɔ́*/ respectively.

5.3.3.2.1 The /-nιɛ/ suffix

The suffix /-*nìɛ́*/ is attached to a root noun to denote a singular agent. Let us examine the examples below and note the tonal changes that emanate after the suffixation of /-*nìɛ́*/.

Example 5.14.   /-*nìɛ́*/

/-nìɛ́/ +LH tone noun

a.   /sìdʑá   + *nìɛ́*/ →   [sìdʑànìɛ́]

         bachelor agent   'bachelor/spinster'

b.   /kùá+ *nìɛ́*/   →   [kùànìɛ́]   'farmer'

c.   /dʑìdí+ *nìɛ́*/   →   [dʑìdìnìɛ́]   'a person with faith'

d.   /æ̀mùmùyɛ́+ *nìɛ́*/ →   [æ̀mùmùyɛ̀nìɛ́] 'wicked person'

e.   /òwùdí+ *nìɛ́*/   →   [òwùdìnìɛ́]   'killer'

/-nɩ̀ɛ́/ +L tone noun

f.   ǹànὺὲ + *nɩ̀ɛ́*   −   ǹànὺὲ*nɩ̀ɛ́*   'villager'

The suffix /*-nɩ̀ɛ́*/ is pre-linked for LH. It is worth noting that the nouns in the data have LH tonal pattern. The suffixation of /*-nɩ̀ɛ́*/ triggers changes in the tonal structure of the root noun. A leftward L tone spread is triggered by the initial low tone of the suffix which displaces the final high tone of the stem. This regressive tone assimilation delinks the immediately successive high tone and replaces it. However, if the stem has low tone as in example (5.14f), there is not tonal change in after suffixation. This type of tonal process is also manifested in compounding and other combinative constructions. Notwithstanding the tonal change, after suffixation the nouns still have a LH tone pattern. Figure 5.1 below illustrate the L tone spread in (5.14a).

UR   LT Spread   H T Delinking

Seg Tier   s i dʑ a   + n ɪ ɛ   s i dʑ a   + n ɪ ɛ   s i dʑ a n ɪ ɛ

→   →

Skel Tier   x   x   x x   x   x   x x   x   x   x x

Tonal Tier   L   H   L H   L   H   L H   L   H L H

SF   OCP Application

Seg Tier   s i dʑ a n ɪ   ɛ   s i dʑ a n ɪ ɛ

→

Skel Tier   x   x   x   x   x   x   x   x

Tonal Tier   L   L L H   L   L H
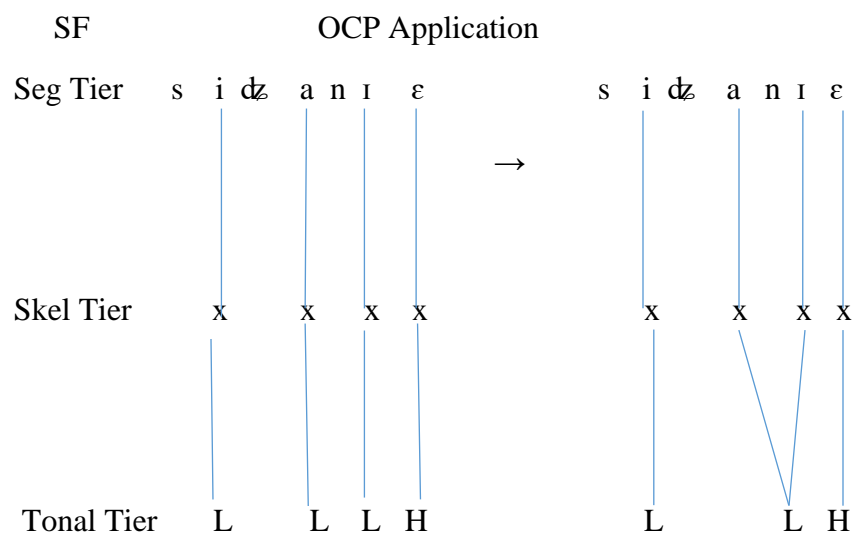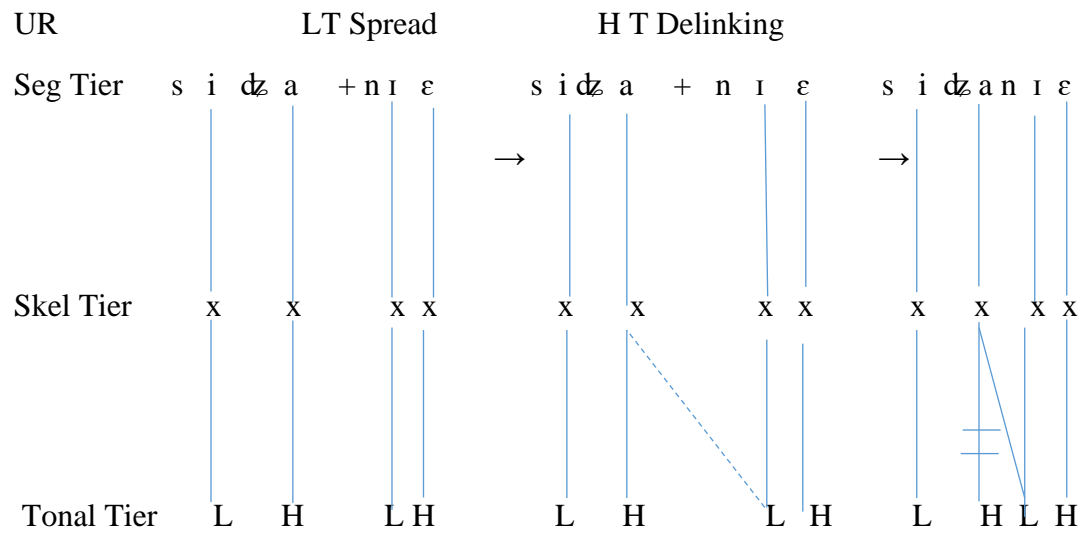
Figure 5 1: Low Tone Spread in example 5.14

5.3.3.2.2 The /-fʊɛ/ suffix

Morphologically, /-fʊ̀ɛ́ / is attached after a noun to mark the plural agent of the noun.
Let us study these examples and observe the tonal changes that occur with the
suffixation of /-fʊ̀ɛ́/.

Example 5.15   /-fʊ̀ɛ́/

/-fʊ̀ɛ́/ + LH tone noun

a.   bɔ̀ní   + fʊ̀ɛ́   −   [àbɔ̀nìjɛ̀fʊ̀ɛ́]

       sin   agent'   sinners'

 b.   /ɲà:tɕwɔ́m   +   fʊ̀ɛ́/   −   [ɲà:tɕwʊ̀m̀vʊ̀ɛ́] 'hypocrites'

 c.   /ànwùbràsíɛ   +   fʊ̀ɛ́/   −   [ànwùbràsìɛ̀fʊ́ɛ́] 'meek persons'

d.   /æ̀wùé   +   fʊ̀ɛ́/   −   [æ̀wùɛ̀fʊ̀ɛ́]   'thieves'

e.   /æ̀dʑwàmmɔ́   +   fʊ̀ɛ́/   −   [æ̀dʑwàmmɔ̀fʊ̀ɛ́] 'fornicators'

f.   /æ̀ɲwʊ̀tìlɛ́   +   fʊ̀ɛ́/   −   [æ̀ɲwʊ̀tì:fʊ̀ɛ́]   'righteous persons'

g.   /æ̀wùdíé   +   fʊ́ɛ́/   −   [æ̀wùdìfʊ̀ɛ́]   'murderers'

/-fʊ̀ɛ́/ + H tone noun

h.   /járí   +   fʊ̀ɛ́/   −   [àjàrífʊ̀ɛ́]   'sick persons'

/-fʊ̀ɛ́/ + L tone noun

i.   /nànùè   +   fʊ̀ɛ́/   −   [nànùèfʊ̀ɛ́]   'villagers'

The suffix /-fʊ̀ɛ́ / is also pre-linked for LH tone and results in some tonal

changes in the root noun. [-fʊ̀ɛ́/] behaves like its /-nɪ̀ɛ́ / equivalent and triggers some

tonal structure modifications as well. We again notice a low tone spread in the output

form. When /-fʊ̀ɛ́/ is attached to the stem, the input final high of the stem is delinked

and replaced by a L tone. Morphologically, /-fʊ̀ɛ́/ can co-occur with the vocalic prefix

/a-/ in denoting plurality of a noun as in examples (5.15h-m). For instance, in example

(5.15f), the root noun, ʤìdí 'faith' is prefixed and suffixed with /a-/ and /-fʊ̀ɛ́/

respectively. The same is seen in (5.15g). Figure 5.3 illustrates the change in tonal

pattern of the base noun after suffixation.

UR   LT Spread   H T Delinking

Tone Tier: L H   L H   L H   L H   L   H L H

→   →   →

Skel. Tier: x   x   x x   x   x   x x   x   x   x   x

Seg Tier: b ɔ n ɪ + f ʊ ɛ   b ɔ n ɪ + f ʊ ɛ   b ɔ n ɪ f ʊ ɛ

SF

Tonal Tier: L   H

Skel. Tier: x   x   x   x

Seg Tier: b ɔ n ɪ f ʊ ɛ
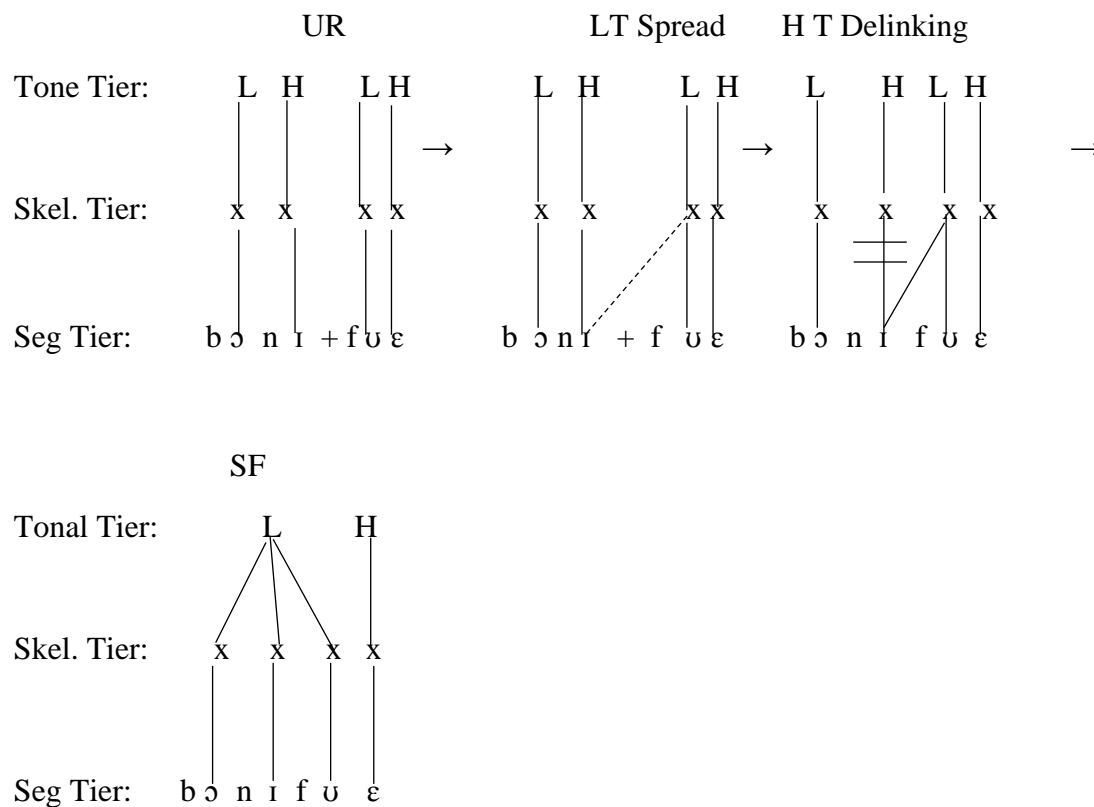
Figure 5 2 : Low Tone Spread in suffixation of fʊ̀ɛ́

5.3.3.2.3 The /-mɔ/ Suffix

Akin to [-*fʊ̀ɛ́*], the suffix *[-mɔ́]* is attached to noun stems to mark plurality. */-mɔ́/* is

exclusively used for kinship nouns as shown in the example (5.16) below.

Example 5.16.

[-mɔ́]

[-mɔ́]+ LH tone noun

a.	/nàná	+ mɔ́/ →	[nànàmɔ́]		
	grandparent	agent		'grandparents'	
b.	/bàbá+ mɔ́/	−	[bàbàmɔ́]	'fathers'	
c.	/sìwá:+ mɔ́/	−	[sìwà:mɔ́]	'aunties'	

[-mɔ́]+ L tone noun

d.	/hùὲ+ mɔ́/	−	[hùὲmɔ́]	'husbands'
e.	/nìὲ+ mɔ́/	−	[nìὲmɔ́]	'mothers'
f.	/fìὲ+ mɔ́/	−	[fìὲmɔ́]	'fathers'

The suffix */-mɔ́/* is also pre-specified for H tone. Because the suffix is a monosyllabic H, its effect on immediately preceding tones is not seen. The derivation process therefore evokes a L tone insertion which spreads and delink the final H of the stem to become L. We see this in examples (5.16a – 5.16c) which have a LH on the stem. In the derivation process, a L tone is inserted to spread to and delink the final H of the stem to subsequently become L. This leads the output to become LH. However, in examples (5.16d - 5.16f) no L tone is inserted when */-mɔ́/* is attached to the nouns because the stems have L tones. L tone insertion is illustrated in figure 5.4.

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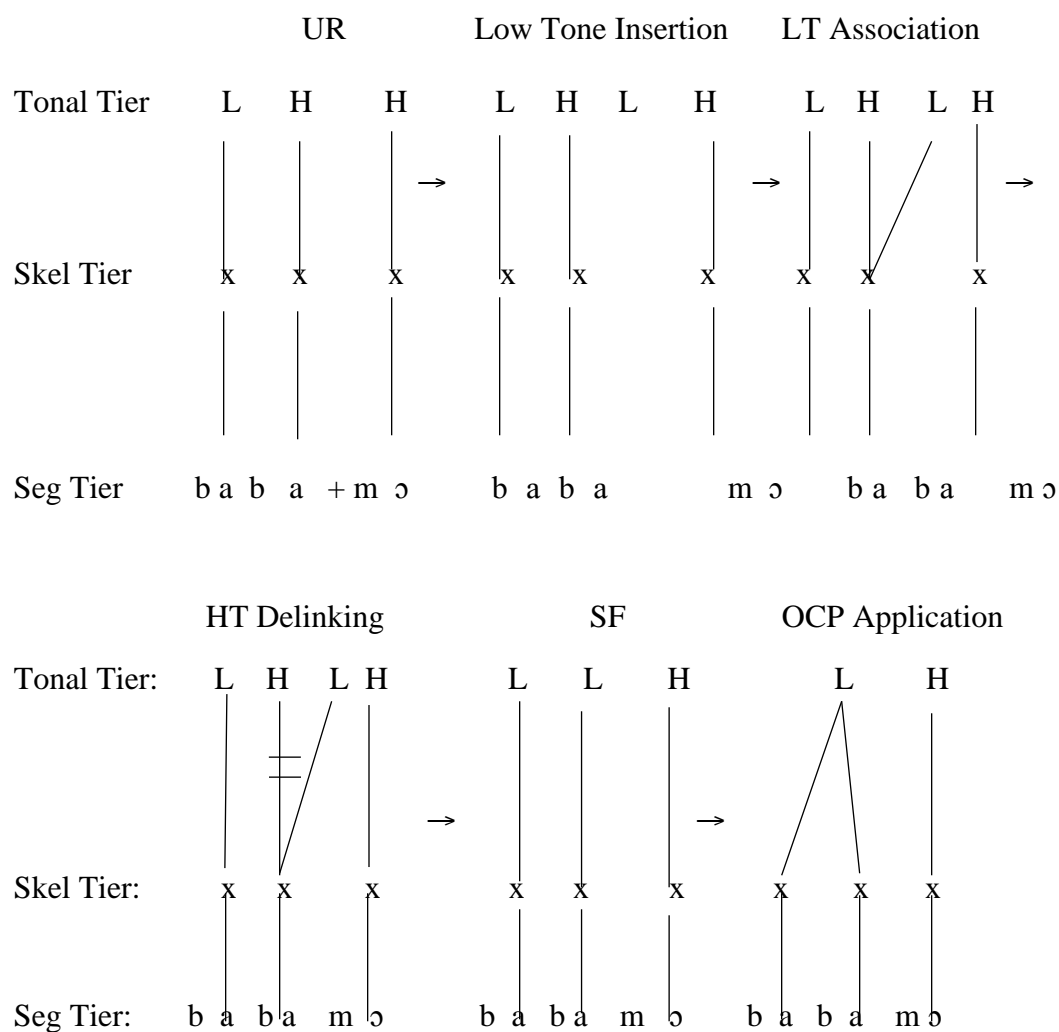
Figure 5 3: Autosegmental representation of LT insertion and LTS in example 5.14b.

5.3.4 Summary

We have so far noticed that non-derived nouns in Ɛsahie may have a prefix or a suffix. The prefixes are by default low toned vowels or nasal. The suffixes, */-fʊ̀ɛ́, -nὶɛ́, -mɔ́/* are LH, H tone respectively, with different morphological functions. Tonally, the addition of a prefix to a noun stem does not change or affect the structure of the root noun. However, the attachment of a suffix to a noun stem changes the tonal structure of the stem. Based on the above discussion, one essential conclusion we make is that, nominal suffixes in Ɛsahie regressively trigger a tonal change. We observed in the data that inflected nouns in Ɛsahie require a surface LH tone melody. We conclude among other things that, to meet the LH condition of the output, the basic noun loses its tone. Since the suffix is the head of the noun, it tonally controls the basic noun. Thus, the basic tone of the rightward unit (the suffix) spreads to the leftward unit. If the rightward unit is LH, the L spreads to the leftward unit, but if the rightward unit is H, a default L tone is inserted to get a LH. We therefore postulate the following rule to account for tonal changes in suffixed noun:

Suffixation Rule: When a LH tone suffix is attached to a noun stem with a final H, the H tone will be changed to a L tone.

$$H \longrightarrow L / \text{———} \; L \; (SUFX)$$

Accepting this rule makes it easy to account for the change in tonal structure of the noun stems after suffixation. The rule does not say anything about penultimate

TBU of the stem as this is affected by the change. It is rather the tonal value of the final TBU that is ultimately changed as shown in all data above.

In the next section, we will focus on derived nouns, and look at their tonal structure in the derived form.

5.3.5 Tone in Derived Nouns in Ɛsahie

Derived nouns are nouns created from other word groups through diverse morphological processes. The process of deriving the nominals is what is referred to as "nominalization" in the literature (Adomako 2012; Appah 2005; Koptjevskaja-Tamm 2002). Nominalization has received different explanations. Li & Thompson (1982:575) define it as the "grammatical processes by which a verb, a verb phrase, a sentence, or a portion of a sentence including the verb can function as a noun phrase". Payne (1997: 223) calls it the 'operations that allow a verb to function as a noun". Judging from these definitions, nominalization can be said to be the act of turning a non-noun into a noun such as the following:

a. Nouns derived from verbs- prayer [derived from pray]; teacher [derived from teach]; seizure [derived from seize]; measurement [derived from measure].

b. Nouns derived from adjectives – goodness [derived from good]; stupidity [derived from stupid]; ability [derived from able].

c. Nouns derived from compounds- teapot [derived from tea and pot]; blackboard [derived from black and board].

d. Gerundive nouns- going [go]; watching [watch]; building [build]; cooking [cook].

However, it is evident from Ɛsahie and other languages that nominals can be derived from nouns as well (cf.Akanlig-Pare 1999; Anyanwu & Omego 2015; Kenstowicz 2006; Mathieu 2012; Pinta 2013; Sayahi 2005: ,inter alia) which exemplify that nominals can be derived from other word groups aside verbs. Nominalisation is of different categories – lexical and syntactic nominalisation (Chomsky 1970). The lexical nominalisation generates linguistic forms that are characterized as a noun, while the syntactic nominalisation generates nominal expressions that do not have lexical status (McFarland 2009; Shibatani & Awadh Bin Makhashen 2009). The lexical nominalisation as noted by Anyanwu and Omego (2015: 1) "is able to identify the referent and classify them as belonging to a particular class of lexical entity". This feature is absent in syntactic nominalisation as the latter only acts to identify an entity referred to in terms of an event without specifying the identification or names. The derived nominals in this study results from lexical nominalisation. Contrary to the claim by Boateng (2017) that the derivation of verbal forms in Ɛsahie is always done through the suffixation of [-*lɛ*] to the verb stem, we show in this study that nominals can also be formed by prefixation and parasynthesis.

We establish that while [-*lɛ*] is one of the forms, deverbal nominals can also be formed by prefixing [-a] or the prarasynthetic affixes [*a- lɛ*] simultaneously to the verb root. The following sub-sections will provide a descriptive account of lexical nominals in Ɛsahie. Using the available data, we will demonstrate that although nominalisation is a morphological phenomenon, it operates in the context of high phonological influence.

5.3.5.1 Tone in Deverbal Nouns

Verbs constitute one major group from which nouns are derived (cf.Adomako 2012; Akanlig-Pare 1999; Akrofi-Ansah 2012; Appah 2003; Davis 2010; Haspelmath & Sims 2013; Kenstowicz 2005: , inter alia). Deverbal nominals are usually from action or non-stative verbs denoting an action (Comrie & Thompson 2007). As pertains in most languages, deverbal nouns undergo morphological processes such as affixation, which ultimately triggers tonal changes in the output nominal even though they are able to retain certain properties of the verb root. In this study, we discuss the tone of four types of deverbal nouns found in Ɛsahie. They are action nominals, gerundive nominals, product nominals, and participant nominals, and show their tonal behaviour.

5.3.5.2 Tone in action nominals in Ɛsahie

Action or state nominals in Ɛsahie are formed from action or state verbs through the processes of affixation and compounding. In the affixation process in Ɛsahie, the

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nominalizing affix (prefix or suffix) is/are attached to a non-stative verb to form the action nominal. The derivational affix may be attached in front of the base, after the base, or parasynthesized to the base. The nominalising prefix in Ɛsahie is a vowel [*a- or ɛ-*] as shown in the example (5.17).

Example 5.17   a.   a +   tùá   →   atùá

                         NMLZ. PRFX.   rebel   'rebellion'

         b.   a   +   tɔní   →   atɔní

                         NMLZ. PRFX.   sell   'the act of selling'

In these other examples that follow, the nominalization suffixes [-*lɛ*] is attached to the verbs to turn them into nouns.

Example 5.18   a.   sɛ̀tɕí   +   lɛ́   →   sɛ̀tɕìlɛ́

                         destroy   NMLZ. SUFX   'destruction'

         b.   tɕí   +   lɛ́   →   tɕìlɛ́

                 reject   NMLZ. SUFX'   rejection'

         c.   tìndʑɛ́ +   lɛ́   →   tìndʑɛ̀lɛ́

                 resurrect   NMLZ. SUFX   'resurrection'

The third type of affixation used for action nominals in Ɛsahie is Parasynthesis (Abakah 2003; Bisetto & Melloni 2008). Parasynthesis is an affixation process where a two-part affix surrounds a base and must occur simultaneously as a morphological unit. The parasynthetic affixes used in Ɛsahie are [*ε-lε*]. To get a nominalised word, both affixes must surround the word simultaneously; only one cannot be used. In the examples given below, the roots are sandwiched by both affixes.

Example 5.19.　a.　ɛ̀　　　+　　　　　nàntí　+　lɛ́　　　　→　ɛ̀nàntìlɛ́

　　　　　　　　NMLZ. PRFX　　　　walk　　NMLZ. SUFX'　walking' (n)

b.　ɛ̀　　　+　　　　kèngá　+　　　lɛ́　　→　ɛ̀kèngàlɛ́

　　　　NMLZ. PRFX　　　　read-　NMLZ. SUFX　　'reading'(n)

c.　ɛ̀　　　+　　　　frɛ́　　+　　　lɛ́　　→　ɛ̀frɛ̀lɛ́

　　　　NMLZ. PRFX　　　　call　　NMLZ. SUFX　　'calling' (n)

d.　ɛ̀　　　+　　　　nó +　　　　　lɛ́　　→　ɛ̀nòlɛ́

　　　　NMLZ. PRFX　　　　drink　+ NMLZ. SUFX　　'drinking'(n)

In all the examples above, the nominals are separated by hyphen from the root from which they are derived. For instance, in example (5.19a) the root/ base is *nàntì* 'to walk. This is nominalized with the attachment of the nominaliser [a-*lɛ*] to the root to become *ènàntìlɛ́*   'walking' which is an action nominal that names the act of walking. The prefix is low tone, while the suffix is high tone. After suffixation, the tonal patterns of the noun stem change. There are two ways of accounting for the change in tone of the stem from high to low in these examples. One is to assume that the low tone of the prefix progressively assimilates and displace the final high of the stem. However, recalling from earlier discussion on nominal prefix where the prefix did not affect the tone of the stem in anyway (cf. 5.3.3), this explanation may not seem plausible. We therefore assume that a L tone is inserted. This L tone associates with the preceeding vowel, and subsequently spreads onto the H tone vowel. The H tone is then delinkned resulting in a LH tonal output. This must occur for the nominalised verb to meet the preferred LH tonal pattern of derived nouns in the language.

5.3.5.3 Tone of gerundive nominals

Ɛsahie, like other languages (Anghelescu 2013; Anghelescu et al. 2017; Anyanwu & Omego 2015; Boateng 2017; Davidson 2007) has a way of converting verbs into gerundive nominals. This process is called gerundisation. These nouns express the "act of verb-ing" (Anyanwu & Omego 2015; Comrie 1985; Comrie & Thompson 1985). Gerundive nominals in Ɛsahie are compounded in nature and are formed by attaching

the high toned nominaliser [-*lɛ*] to a noun plus a verb. The suffix [-*lɛ*] has two forms,

[-*lɛ*] and [-*nɛ*]. /-*lɛ́* /undergoes consonant nasalization when the nasal feature of the

nasal vowel spreads to the consonant. Consider the examples in (5.20) and (5.21)

below.

Example 5.20.   a.   sóná   +   kú   +   lɛ́   → sònàhùlɛ́

                     person +   kill   NMLZ. SUFX   'murdering'

            b   ǹdírí   +   dɔ́   +   lɛ́   →   ndìrìbɔ̀lɛ́

                    weeds (n) + weed (v) +   NMLZ. SUFX   'act of weeding'

            c.   àlíɛ́   +   dí   + lɛ́   → àlìɛ́dìlɛ́

                   food   +   eat   NMLZ. SUFX   'act of eating'

Example 5.21.   a.   àdʑwílɛ́   +   kǎ́   +   lɛ́   → èdʑwìlèhǎ̀nɛ́

                     words   say   NMLZ.SUFX 'act of speaking'

            b.   ŋ̀gòndí: +   kǒ́   +   lɛ́   →   ŋ̀gòndì:hɔ́̃nɛ́

                   fight (n)   fight (v) NMLZ. SUFX   'act of fighting'

c. ǹzá: + nǒ + lɛ́ → ǹzà:̀nǒ̀nɛ́

alcoholic drink + drink   NMLZ. SUFX   'act of drinking'

In example (5.21), the nasal feature of the vowel spreads progresively to the /l/ of *[-lɛ]*, which represents the underlying form of the gerund marker. It follows from the examples above that the tonal pattern of the gerundive nominal is related to that of action nominals. We observed that the nominaliser [*-lɛ]* has a H tone. The verbs used in the process are also H toned monosyllabic verbs. The nouns, however, vary in tonal patterns but they are usually polysyllabic. The suffixation of [*-lɛ*] triggers a tonal change in the derived form. To meet the LH tonal pattern for derived nouns, certain tonal changes take place in the underlying form. The H tone verb changes to L tone while that of the noun also changes to LL if it originally was LH, but remains unchanged if it is LL. For instance, in example (5.20a) *sóná+ kú+lɛ́ → sònàhùlɛ́* 'murdering' we notice that the input tones are all high but the output tones are all low. This is as result of the derivation process. The same can be said for *àlíɛ́ + dí+ lɛ́* becoming *àlìɛ̀dìlɛ́* 'act of eating'. Thus, these tonal changes are driven by the need for a LH tone in the output form.

5.3.5.4 Tone of Product Nominals

Product nominalisation is the output of the event described by the verb. Payne (1997:229) defines it as "the product or result of an event described by a verb". Ɛsahie derives product nominals either by compounding or by affixation which kindles phonological changes in the output. The compounding brings together two existing words – noun plus a verb – to generate a new word which is the output or result of the event described by the verb as exemplified in (5.22) below.

Example 5.22.   **Noun-Verb**   **Product Nominal**

a.   ǹzùé   +   yìlí   →   ǹzùèyìlí

water   +   flow   'flood'

b.   bɔ́   +   àdíɛ́   →   àbɔ̀díɛ́

create   +   thing   'creation'

c.   àsòɛ́   +   tìé   →   àsòtìé

'ear   +   obey   'obedience'

d.   yàm   +   yé   →   àyàmyé

'   stomach+   good   'generous'

In these examples, the derived nouns are the output or result of the events carried out by the verbs. In example (5.22a) for instance, *ǹzùèyìlí* 'flood' is the product of rain/water overflowing. Alternatively, the product nominals can be derived through affixation as shown in (5.23) below.

Example 5.23   a.   dʑìná   +   ɛ́   →   àdʑìnà-ɛ́

                           stand   NMLZ. SUFX   'decision'

          b.   ɕìrá   +   a   →   ǹɕìrá:

                           bless   NMLZ. SUFX   'blessing'

          c.   tìé   +   fʊ̀ɛ́   →   tìèfʊ̀ɛ́

                           listen /hear   NMLZ. SUFX   'listener /hearer'

The examples again confirm that product nominalisation involves other phonological processes such as tonal change, and these changes are very much related to the earlier ones observed in action nominals.

5.3.5.5 Tone of participant nominals

Another type of deverbal nominals is participant nominals. "Participant nominalization is a verb based nominalization strategy that results in a noun that refers to one of the participants of the verb root" (Payne 1997:225). Payne identifies two types of participant nominalization- 'agent nominalization and patient nominalization. The agent nominalization, he explains, refers to "the agent of the nominalised verb". In other words, the participant is permanently characterized by the action of the nominalized verb. The participant nominals denote the 'doer of something or one that verbs' (Comrie & Thompson 1985). Languages use different morphological strategies to derive agent nominals. In English, the suffix [-er] or [–or] is usually attached to the verb to get the agent nominal as exemplified below.

Example 5.24. **Verb**   **Agent nominal**

a.   farm   farm-er   'one who farm'

b.   hunt   hunt-er   'one who hunt'

c.   law   lawy-er   ' one who practices law'

d.   act   act-or   'one who act'

In Akan, the suffix [-ni] is attached to the verb to derive the agent of the action expressed by the verb, as in example (5.25).

Example 5.25		**Verb**	**Agent nominal**		
	a.	kua	kua	-ni	'farmer'
		farm	farm- NMLZ. SUFX		
	b.	kyerɛkyerɛ	kyerɛkyerɛ	-ni	'teacher'
		teach	teach	- NMLZ. SUFX	

Human participant nominals in Ɛsahie are formed by suffixing a LH tone participant nominaliser *[-nɪ̀ɛ́]* to the action verb if the agent is singular, or *[-fʋɛ́]* if the agent is plural. In most cases, the choice of the nominalising suffix agrees with the ATR feature of the vowels in the verb. The addition of the suffix also triggers a significant change in the tonal structure of the verb root. Consider the examples below.

Example 5.26.		**Verb**		**Participant Nominal**		
	a.	kùà	→	kùà	- nɪ̀ɛ́	'farmer'
		farm		farm	NMLZ. SUFX	
	b.	sùà	→	sùà	- nɪ̀ɛ́	'student'
		learn		learn	NMLZ. SUFX	

c. æ̀ʥwùmàyɛ́ → æ̀ʥwùmàyɛ̀ *-fʊ̀ɛ́* 'workers/employees'

    work   work   NMLZ. SUFX

d. àdètɔ́n → àdètɔ̀n - *fʊ̀ɛ́* 'sellers'

    sell   sell   NMLZ. SUFX

The examples in (5.26) show a suffixation of *[-nìɛ́]* and *[-fʊ̀ɛ́]* to the verbs. The verbs after suffixation emerge with a different tonal pattern. If the tonal pattern of the verb is LL, as in example (5.26a and 5.26b) the derived form remains unchanged. However, if the tonal pattern is LH or HH as in example (5.26c and d), the derived nominal becomes LL.

5.3.5.6 Tone of nominalised nouns

Nouns themselves can serve as repository for the formation of other nouns. These nouns behave as agents or bearers of the nouns, and have similar features as participant nominals. Nominalised nouns in Ɛsahie are formed by attaching the suffixes *[-nìɛ́]*, or *[-fʊ̀ɛ́]* to the nouns. Like the participant nominals, the suffix *[-nìɛ́]* is used when the noun is singular, and *[-fʊ̀ɛ́]* for plural nouns as shown in table 5.1 below.

Table 5. 1: Nominalised Nouns

[-niɛ]

sìdʑá	sìdʑànìɛ́	'bachelor/spinster'
æmùmùjɛ́	æmùmùjɛ̀nìɛ́	'wicked person'
kwàtá	kwàtànìɛ́	'leper'
èwìàsé	èwìàsènìɛ́	'worldly person'
òhíá	òhìànnìɛ́	'a poor person'
tènèné:	tènènè: nìɛ́	'righteous person'

/-fʊ̀ɛ́/

bɔ̀ní	àbɔ̀nìfʊ̀ɛ́	'sinners'
kà:ná	kà:nàfʊ̀ɛ́	'Canaanites'
ɲà:ʨwɔ́m	ɲà:ʨwɔ̀mfʊ̀ɛ́	'hypocrites'
àŋwùbràsíɛ́	àŋwùbràsìɛ̀fʊ̀ɛ́	'meek persons'
jàrí	àjàrìfʊ̀ɛ́	'sick persons'
kwàtá	àkwàtàfʊ̀ɛ́	'lepers'
òhíá	àhìàfʊ̀ɛ́	'needy ones'

One would have expected that with the change in the word group of the constituents to a noun, the output might differ. However, it is evident from the examples above that the same LH tonal pattern pertains for nominalised nouns as it did for nominalised verbs. In both cases, the final TBU has a H tone. This supports our claim that derived nouns in Ɛsahie have a LH tonal structure. That is, regardless of the number of TBUs, the final tone is always H. In the next sub-section, we study the nominals derive from compounds and examine their tonal output with our claim.

5.3.5.7 Tonal Structure of Compounds

As in most languages (cf.Akrofi-Ansah 2012; Appah 2004;2005; Comrie & Thompson 2007; Koptjevskaja-Tamm 2002; Obeng 1981; Obeng 2009; Ofori 1988: ,inter alia), Ɛsahie has a straightforward process of nominalization through compounding. In compounding, two independent words or constituents are put together to form a new word. The new word may belong to the same syntactic class as the constituents, or a new word class different from the class category of the constituents. Ɛsahie have compounds formed from different syntactic groups as exemplified in (5.27) to (5.29).

Example 5.27 **Noun–Noun compounds**

a. /ɔtɕìàmí/ + /pòmá/ → [àtɕìàmpòmá]

linguist' 'staff' 'linguist staff'

    b. /èbòtí/   +   / bɔ́ín/   →   [èbòtèbɔ́ín]

        'rat'   'hole'   'rat hole'

    c. /ɲàmíɛ́/   +   /ǹzùé/   →   [ɲàmízùé]

        'god'   'water'   'rainwater'

Example 5.28 **Noun –Adjective compounds**

    a. /sùnzùmé/ 'ghost'+ /bɔ̀ní/   'bad' → [sùnzùmmɔ̀ní] 'bad spirit'

    b. /ǹzùé/   'water'+ /pírí/   'big' → [ǽsùèpírí]   'big river'

    c. /ǹzá:/   wine + /fùfùé/ 'white' → [ǹzà:fùé 'palmwine'

Example 5.29 **Noun – Verb compounds**

    a. /àlíɛ́ /   'food' + /ǹvùín/ 'dead' → [àlìèǹvùín]   'rotten food'

    b. /kràtá:/   'paper'+ /púé/ 'open' →   [kràtà:púé]   'page'

    c. /ǹzùé/   'water'+ /jìlí / overflow' → [ǹzùèjìlí]   'flood'

The constituents for the compounds in these examples have different syntactic groups, but the derived compound turns out as a noun (Broohm 2019). We notice from the data above that the tonal pattern of the compounds differ from the tonal pattern of the input constituents. In this sub-section, we focus on the compounds and dwell specifically on the tonal alternations that take place in the construction. To make our discussion much clearer, we follow (Akinlabi et al. 2009) and organize the nominals based on the word class of the constituents, and alternate their underlying tone patterns. Based on previous observation, we posit that, in Ɛsahie compounds, regardless of the input tones, the output tone will always have a final high.

5.3.5.7.1 Noun –Noun Compound

In the example (5.30), we put the tone of the first noun (N₁) as LL and the tone of the second noun (N₂) as HH.

Example 5.30.		**LL**	**+**	**HH**
	a.	bùà	+	nóá
		waterpot		mouth
		[bùànóá]		'mouth of a waterpot'

b.   àsà: +   súá

mud   room

[àsà:súá]   'muddy room'

c.   tɕìrɛ̀   +   dúá

write   stick

[tɕìrɛ̀dúá] 'pen'

d.   bèà   +   páén

man   elder

[bèàpáén]   'an elderly man'

Where the N₁ has a L tone and the N₂ has a H tone no tonal change occurs since the derivational tone will be LH.

LH +H(H)

We now set a compound with N₁ as LH and N₂ as H.

Example 5.31   a. /tìré   +   ɲá:/   →   [tìrèɲá:]

head   hair   'hair'

b. /ɲàmíɛ́   +   pírí/   →   [ɲàmíɛpírí

    god   big   'God

c. /màkʊ́   +   ɲá:/   →   [màkʊ̀ɲá:]

    pepper   leaf   'pepper leaf'

Again, we notice that in a LH + H compound, the L tone of N_1 spreads rightward to displace the final H of N_1 to become L. Since the N_2 is already H, it does not undergo any change. Let us further consider the examples below with a H+ LH combination.

Example 5.32   **H+ LH**

b. /nóá   +   bɔ̀ní/   →   [nòàbɔ̀ní]

    mouth   bad '   bad mouth (smelly mouth)'

b. /mó   +   bràsúá/→   [mɔ̀:brá]

    elder   woman   'elderly woman'

c. /nóá + àwùró/ → [àwùrònóá]

mouth house 'prescint of a house'

d. /tɕírɛ́ + fùfúé / → [tɕìrɛ̀fùfúé]

hat white 'white hat'

H+LH compound involve two cycles of tonal spread if the N₁ is a LH. First, the L tone of N₂ spreads leftward across morpheme boundary to displace the final H of N₁ to become L. Thereafter, this L also spreads leftwards to further displace the initial H of C_1 to become L, thus the compound becomes LLLH, which subsequently becomes LH courtesy OCP.

Example 5.33. **L+LH**

a. /ɛ̀tìnà + fùfúé/ → [ɛ̀tìnàfùfúé]

cloth white 'white cloth'

b. /kùró + sòná/ → [kùròsòná]

town person 'folks'

c. / àsá: +   àwùró/   →[àsà:wùró]

   mud   house   'mud house'

Example 5.34. **LH   +   LH**

a. /ɔ̀tɕɪ̀àmí +   pòmá/ →   [ɔ̀tɕɪ̀àmpòmá]

   linguist   staff   'linguist staff'

b. /èbòté   +   bɔ̀ín/   →   [èbòtèbɔ̀ín]

   rat   hole   'rat hole'

c. /wèím   +   àsìɛ/   →   [èwìàsí]

   sky   under   'earth'

d. æ̀/wíá +   sòró/   →   [wìàɔ̀só]

   sun   high /up   'name of a town'

When both constituents are LH as in LH+LH, there is a L tone spread where

the L of N₁ spreads to displace the H of N₁ to become LL. If there is a nominal prefix

on the N_2, this is deleted due to the vowel sequence across word boundary. The output then becomes LH by the principle of OCP.

The fore-going data analysis shows that Ɛsahie maintains a high level of uniformity in the tonal output of its deriver or non-basic nouns. These are regardless of the tonal variations of the input nouns, the output tones remain the same. We see in the examples that where the constituents have LL+HH, the output nominal compound takes a LLLH tonal pattern. This fall in the first syllable of the N_2 occurs because of a rightward spread of the low tone of the N_1 onto the initial syllable of the second constituent. In the case where the N_1 is LH, and the N_2 is also H, the same conclusion prevails in the output tone pattern of the compound as in the above discussion; the output of the compound takes a LH tonal pattern. In this construction, the L of N_1 spreads progressively to dislodge and replace the H of the N_1, leaving the resultant compound with a LH tonal melody. Furthermore, we see that when the N_1 is H and N_2 is LH, the same generalization holds for the output tonal melody of the compound. Comparable to Ɛsahie, (Marfo 2004) observes that in Akan, when the N_1 modifies N_2, the H tone of the final TBU of N_1 changes to a L tone as shown in the example below.

Example 5.35. a.　odwai　+　onini　→　odwainini

　　　　　　　sheep　+　a male　'a ram'

b.   asɛm   + hunu   ⟶   asɛmhunu

story   + useless   'nonsense'   (Marfo 2004)

The Akan data adds to the fact that instances of variation in tonal pattern of the constituents can yield a compound with same tonal output. This uniformity in output is what is called 'constructional tone' or what (Akinlabi et al. 2009) calls the "tonal conspiracy".[8]

5.3.5.7.2 Noun-Verb Compounds

We now turn our attention to compounds with a noun as the first constituent (N) and a verb as the second constituent (V). Like the N-N compounds, we pair the nouns with verbs from different tonal groups to determine their tonal output.

Example 5.36.   **N+V (H)**

a.   /ɔmán   +   yɛ́/   ⟶   [àmàɲɔ́]

country   do   'politics'

---

[8] Tonal conspiracy (Akinlabi et al. 2009) "is a phenomenon in which several tonal processes in a language result in the same tonal outcome. It is as if the language requires a specific tonal melody on the output, and it does not matter what the input is".

b.   /æ̀ní   +   ʥí/   →   [æ̀nìnʥí]

eye   get'   happiness'

c   /ɲàmíɛ́   +   sóm/   →   [ɲàmìzóm]

god   worship   'religious'

d.   /kràtá: +   púé /   →   [kràtà:púé]

book   open   'page'

In a LH +H(H), the L tone of C_1 spreads rightward to displace the final H of C_1 to become L.

Example 5.37. **N + V (LH)**

a.   /ǹzúé   +   yìlí/   →   [ǹzùèyìlí]

water   flow   'flood'

b.   /àsíɛ́   +   wòzó/   →   [àsìɛ̀wòzó]

under   shake   'earthquake'

c.   /kwán   +   tɕìré/   →   [kwàntɕìré]

way   show   'direction'

d.   /àlíɛ́+   ǹvúín/ →   [àlìɛ̀ǹvúín[

food   spoil   'rotten food'

e.   /sìká: +   ɲèbòróɛ́ /   →   [sìkà:ɲèbòróɛ́]

money   love   'lover of money'

Where the noun has LH and the verb has LH, the derivation process proceeds as follows. The C_1 changes its tonal pattern to LL following the rightward spread of the L of the C_1. The L of C_1 thus assimilate the H tone. It is clear that even where the noun-verb constituents have LH and HH tones, it still yields a LH output. This demonstrates that even when the compound has a mixed base of N-V, the output tonal pattern remains the same as that of a N-N compound.

5.3.5.7.3 Noun-Adjective Compound

We look at compounds with a noun and an adjective stem. Though not serialised as the other compounds above, we still notice that in their composition, the input tonal pattern varies. We exemplify these tonal alternations with the examples in table 5.2 below.

Table 5. 2: Noun-Adjective Compound

a. sùnzùmé	'ghost'	bɔ̀ní	'bad'	sùnzùmmɔ̀ní	'bad spirit'
b. ǹzúé	'water'	pírí	'big'	àsùèpírí	'big river'
c. ǹzá:	'wine'	fùfúé	'white'	ǹzà:fúé	'palmwine'
d. ŋvràmá	'air'	fɛ́:	'sweet/ nice'	ŋvràmàfɛ́	'fresh air'

We once more see examples where different tonal inputs yield same tonal output. With the same LH tonal pattern for N-Adj nominal compounds as it did for the N-N and the N-V, the output tone is the same. In all cases, the output tone bears a LH.

5.3.5.7.4 Verb-Verb Compound

We now turn our attention to compounds with verbs as both constituents. These compounds are few in the language and are exemplified in (5.389) below.

Example 5.38.   a.   /ʤí   +   dí/   →   [ʤídí]

                  get   eat   'faith'

         b.   f/á   +   tɕɛ́/   →   [fàtɕɛ́]

                  take   give   'forgive'

         c.   /tè   +   má/   →   [tèmá]

                   feel   give   'fellow feeling'

The verb-verb compounds have H tones on both constituents. With both constituents having HH tone, the derived compound is expected to be HHHH, but it turns out to be LH as expected because derived nouns cannot have independent H.H in the output form. To meet the LH condition for derived nouns, we can assume two derivational processes to account for the output. One, we postulate that the V$_2$ in its original form is a habitual verb with a LH structure. In the derivation process, the initial L of the V$_2$ regressively spreads to delink the H of the V$_1$ and replaces it to become L. Afterwards, the habitual L is deleted to get a LH structure.

We could also assume that to meet the LH condition for derived nouns, the leftward H tone is deleted and a default L tone is inserted. This default tonal insertion is similar to the intervening floating L tone spread propounded by (Abakah 2004b;2010). An intervening L tone is inserted between the two constituents to further

spread accordingly to the deserving constituent. This is to ensure that the compounding process follows the compounding rule in Ɛsahie where the final output is always a LH.

In all, we posit four rules for derivation of nominal compounds in Ɛsahie. They are:

1. Low Tone Spread
2. Low Tone Insertion
3. High Tone Deletion
4. OCP Application

The order of application of these rules may vary as noted in the discussion; however, they are constant in arriving at the consistency of tonal output for nominalised compounds. Certainly, such consistency in tonal pattern of compounds is not unique to Ɛsahie. In Yoruba, (Akinlabi et al. 2009) observes a phenomenon where all tonal output of compounds, regardless of their tonal inputs, turn out as HL. Having digested on the tones of nominals, let us turn our attention to tone in reduplicated nouns.

5.3.6 Tone in Reduplicated Nouns

The subject of tone in reduplication has sparked much interest in the literature by researchers into tonal languages. Some theories of reduplication have always required suprasegmental information to correspond faithfully as segmental information from the base (cf.Inagaki 2011; Inkelas & Zoll 2000;2005; Mattes & Schwaiger 2014; McCarthy & Prince 1995; Steriade 1988: , inter alia). Myers and Carleton (1996: 6)

for instance, predict that, "the tone of the base will always appear on the reduplicant", while Clements (1985) talks of tone transfer to the reduplicant. Ofori (2013) also predict differences in tone when he made the following observations about tone in Akan reduplicants:

- a reduplicant and base do not harmonise in tone

- tonal output of CV syllables do not correspond with the base

- reduplicants do not generally agree with their output tones

- base tone is always the polar opposite of a reduplicant final tone

His observation shows that there is variation in the tonal output of reduplicants compared to the base. In his discussion on tonal reduplication, Mtenje (1988: 125) also posits three logical possibilities in the reduplication of segmental and suprasegmental material:

i. Reduplication can transfer segmental material.

ii. Reduplication can transfer both segmental and tonal material.

iii. Reduplication can transfer suprasegmental material.

This analysis means that in reduplication, the tendency for the tone of the base to be copied or left out is possible. The first assertion by Mtenje is confirmed by (Abakah et al. 2010) when they showed that in Akan, the reduplicant copies only the segmental melody and not the tone as it realises a default low tone. Following these assertions, we examine tone in reduplicated nouns in Ɛsahie in the next sub-section.

Noun reduplication involves copying of the base either partially or fully. In Ɛsahie, the reduplicant noun copies both the segment and the tonal melody of the root noun. Examine the following data in (5.39).

Example 5.39.	**Base**	**Reduplicated**	**Meaning**
a.	/ŋ̀gó/	[ŋ̀góŋ̀gó]	oily
b.	/ŋ̀gwàlá:/	[ŋ̀gwàlá:ŋ̀gwàlá:]	children
c.	/m̀màkɑ̃́:/	m̀màkɑ̃́:m̀màkɑ̃́:	trees
d.	/ǹzá/	[ǹzáǹzá]	threes
e.	/àbòsóm /	[àbòsómàbòsóm]	[smaller] gods

We discern from the examples above that the reduplicant does not only copy the entire base, but also copies the supra segmental structure of the base. This process is consistent with Mtenje (1988) second assertion that reduplication can transfer both segmental and tonal material. The reduplicated output can be said as a clone copy of the base (Abakah 2010;2015). Below is an Autosegmental representation of example (5.39).
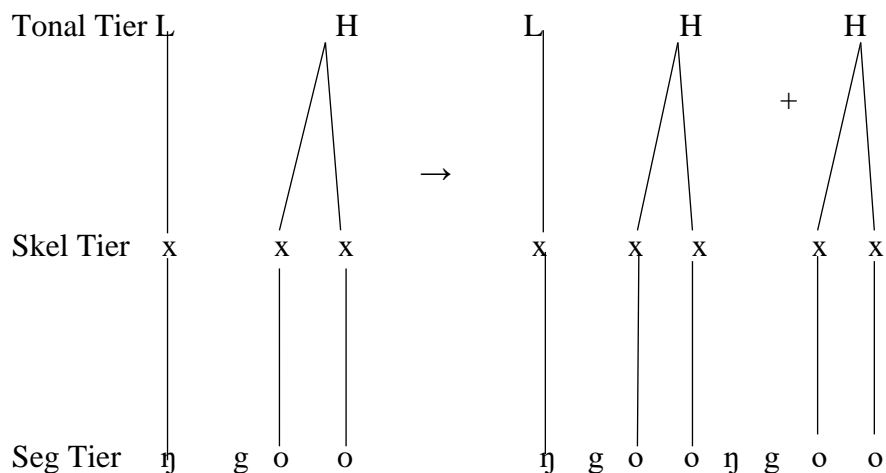
Tonal Tier L   H   L   H   H

                                           →   +

Skel Tier   x   x   x   x   x   x   x   x

Seg Tier   ŋ   g   o   o   ŋ   g   o   o ŋ   g   o   o

Figure 5 4: Autosegmental representation of example 5.39a.

5.4 Tone in Verbal Forms

We have noticed from section 5.3.2 that verbs in their basic form can be high tone, low tone or LH tone. Prosodic features such as tone triggers morphological changes in verbs. This subsection examines the tonal structure of verbal forms such as inflected verbs and reduplicated verbs, and describes how tone influences the morphological processes in verbs and other verb forms.

5.4.1 Tone of Inflected Verbs in Ɛsahie

Verbs undergo some morpho-phonological changes such as affixation, tonal change or both to produce inflected verbal forms for marking tense, aspect or mood

(cf.Abakah 2004b; Kügler 2016; Kügler & Skopeteas 2006; Kügler et al. 2007; Marfo 2004; Osam 2008). In Buli, verbs in the underlying forms do not have tones, but they rather take inflectional tones to mark TAMP (Tense, Aspect, Mood and Polarity) (Akanlig-Pare & Kenstowicz 2002; Kenstowicz 2005). Also in Nata, verbal root exhibit no lexical tone distinctions, but inflected verbs differ tonally depending on the tense/aspect/mood" (Anghelescu et al. 2017). Again in Bantu, (Marlo 2013;2017; Marlo et al. 2017; Odden 2009;2015), certain tense-aspect forms are marked with a melodic tone and final H plus spreading forward. In Kalabari (Ijoid-Nigeria), Harry and Hyman (2012) observe that the difference between transitive and intransitive verbs is manifested tonally, as exemplified below.

Example 5.40. **Transitive**   **Intransitive**

    a. kán 'tear/demolish' kàán 'tear…

    b. kɔ́n   'judge'   kɔ̀ɔ́n 'to be judged' (Harry & Hyman 2012)

These and many other examples confirm Hyman (2013) assertion that morphological forms such as inflectional marking of subject, object, transitivity, tense, aspect, mood, negation, clause type that are frequently marked by a segment affix or process can also be marked by tone. In Ɛsahie, lexical information as well as grammatical information can be conveyed tonally. In this part of the study, we focus

on the morphological tone assignment and describe how tones are used to convey meaning difference in verbal forms such as Tense, Aspect and Mood (TAM).

The issue of TAM has received extensive study in the literature (cf.Ameka 2008; Ameka & Dakubu 2008; Malchukov & de Hoop 2011; Nordlinger & Caudal 2012; Osam 2003;2004; 2008: , inter alia). While Comrie (1976: 2) explains that tense "relates the time of the situation to some other time, usually to the moment of speaking", De Haan (2011) describes it as "the linguistic representation of time which informs one about where the action or event spoken of is located (past, present, future)". These imply that tense denotes the time of the action in relation to the time of utterance. Certain parameters have been set to describe these grammatical terms. Tense is labelled in terms of 'situation time [S]' which denotes the time of utterance or moment of speech; 'event time [E]' denoting the time the action described by the verb occurred; 'reference time [R]' which marks the time against which E is measured'(Comrie 1985; De Haan 2011). Tense can be overtly or covertly marked. In English, the commonest tense related to present, past, and future are overtly marked as in 'I dance – present'; 'I danced' – past; 'I will dance' – future, whereas in Bole, (Gimba 2001), tense is covertly marked.

Aspect conversely conveys the "different ways of viewing the internal temporal constituency of a situation instead of relation to the time of the occurrence" (Comrie 1976:3). Based on this, aspect may be perfective or imperfective. Mood, on the other hand "expresses the attitude of the speaker in a particular discourse such as

assertion…non-assertion…command (imperative) and so on" (Gimba 2001: 60). This implies that mood is directly affected by tense or the time of utterance.

Though the study of TAM is yet to receive attention in Ɛsahie, we take inspiration from discussions on the subject from sister languages such as Akan (Dolphyne 1988; Dolphyne 2006; Osam 2003;2004;2008) where the subject has been extensively analysed. For instance, Osam (2003) identifies five primary tense/aspectual forms for Akan – Future tense, Completive (Past tense), Perfect, Progressive and Habitual, and two secondary aspectual forms- Continuative and Consecutive. These tense/aspects forms are morphologically marked with a high degree of tonal influence. In our data analysis, we observed that Ɛsahie has seven categories for TAM system namely: Past, Future, Progressive, Perfective, Habitual, Stative, Optative, and Imperative. Each form is characterized by tonal change and/or affixation. In this study, however, we will focus on five of them− Perfective, Habitual, Progressive, Future, Imperative, and Past.

5.4.1.1 The Perfective Verb

The perfective verb refers to completed actions related in English as past tense. The perfective verb in Ɛsahie is realised with an H tone on the verb root plus a prefix [a-]. The prefix [a-] marks the perfective. The clitic [a-] is toneless. Let us examine the examples below.

Example 5.41. **Underlying Form**   **Prefixation**   **Perfective form**

/a/ + H tone verb

a.	/dí/	/a + dí /	/a- dí/→[àlí]
		Perf. eat	'have eaten'
b.	/gó/	/a+gó/	[àgó] have danced'
c.	/dá/	/a+ dá/	[àlá] 'have slept'
d.	/prá/	/a+prá/	[àp"rá] 'have swept'
e.	/kírá/	/a+kírá/	[àhírá] 'have worn'

/a/ + LH tone verb

f.	/nìá/	/a+ nìá/	[àníá] 'have seen'
g.	/jæ̀tɕí/	/a+jæ̀tɕí /	[àjǽtɕí] 'have followed'

/a/ + L tone verb

h.	/tɕìrɛ̀/	/a+tɕìrɛ̀/	/àtɕírɛ́/ 'have written'
i.	/ɥìùà/	/a+ɥìùà/	àɥíúá 'have stolen'
j.	/ɕɥìè/	/a+ ɕɥìè/	àɕɥíé 'have poured'

The perfective form marks a change in the tonal pattern of the verb stem. We notice from the examples that the monosyllabic verb roots in examples (5.41a-c) are consistent in the inflected form, while the disyllabic LH verb roots in examples (5.41f-

g) become HH. The perfective verb is realised on a H tone. Since monosyllabic verb roots are H, their underlying tones are maintained so that the lexical form and the output form will have the same tonal structure. However, when the verb root is disyllabic with LH tonal pattern or a Ltone pattern, a high tonal spread is triggered. For the disyllabic verb, the final high tone of the verb spreads leftward to dislodge the L tone and replaces it resulting in a HH; however, for the L tone verbs, a H tone is inserted to trigger the H tone tone spread to the verb, and subsequently delete the L tone. Sometimes, the perfective verb co-occurs with a subject pronoun as in the examples below:

Example 5.42

/ɔ/ + H tone verb

a. /ɔ + a + dí/→ /ɔalí/ →[ɔ̀lí]

3SG + PERF + eat' s/he has eaten'

b. /ɔ + a + gó/ → ɔ/agó/→ [ɔgó]

3SG + PERF + dance 's/he has danced'

/bɛ/ + LH tone verb

c. /bɛ + a + jæ̀tɕí/→ /bɛajǽtɕí/→ [bajǽtɕí]

3PL + PERF + stop 'They have stopped

/ɔ/ + L tone verb

d. /ɔ   +   a   +   tɕìrɛ̀/   → [ɔ̀tɕírɛ́]   's/he has written'

e. /ɔ   +   a   +   ɥìùà/   → [ɔ̀ɥíúá]   's/he has stolen'

f. /ɔ   +   a   +   ɕɥìè/   → [ɔ̀ɕɥíé]   's/he has poured'

The use of the subject pronoun results in vowel sequence as seen in the examples (5.42a-c). The sequence of vowels triggers elision of the initial vowel (V_1) because Ɛsahie has vowel elision when successive vowels occur at word boundaries. Aside the vowel elision we also observe lenition in example (5.42a) where /d/ becomes /l/ intervocalic. Tonally, the presence of the subject does not affect the tone of the verb. The perfective verb still maintains its lexical tone if it is monosyllabic, but become HH if it is disyllabic LH. In other situations where the perfective verb takes a complement or direct object, the object equally does not have any impact on the tone of the verb. Consider these examples.

Example 5.43.   a.   Abam à- kírá   ɛ̀tìná   fùfúé   nè

                        Abam PERF- wear   cloth   white   DEF

                        Abam has worn the white cloth

b.   Kofi à- lí   àlíɛ́   nè

Kofi   PERF-eat   food   DEF

Kofi has eaten the food

It is obvious from the examples that the tone of the perfective verb is not altered by the presence of the object.

5.4.1.2 Habitual Verb

The habitual is an aspect that shows that the action being talked of occurs repetitively over an extended period. The habitual in Ɛsahie is marked with a low tone on the verb. Consider the examples in (5.44) below.

Example 5.44.   **Verb root**   **Prefixation**   **Habitual form**

        /Subject + H tone verb

a.   /kɔ́/   →   /mì   +   kɔ́/   →   [mìkɔ̀]

                   1SGSUB   +   go   'I go'

Subject + LH tone verb

b.   /dʑwùdʑwó/   →   /ò   + dʑwùdʑwó/ → [òdʑwùdʑwò]

                        3SGSUB +   speak   'he speaks'

c.   /jæ̀tɕíbɛ́/   →   / bɛ̀   +   jæ̀tɕíbɛ́/   →   [bɛ̀jæ̀tɕìbɛ̀]

3PL/SUB + set free   'they set him free'

Subject + L tone verb

d. /tɕìrɛ̀/ →   /mì   +   tɕìrɛ̀/   →   [mìtɕìrɛ̀]   'I write'

e. /ɥìùà/ →   /mì   +   ɥìùà/   →   [mìɥìùà]   'I steal'

f. /ɕɥìè/ →   /mì   +   ɕɥìè/   →   [mìɕɥìè]   'I pour'

We notice from the examples that the habitual verb forms are L tone. We account for the tonal change to be an influence from the pronominal prefix. It follows that when the pronominal clitic is attached to the verb, its low tone spreads onto the verb. If the verb is a monosyllabic high, the prefixal L tone spreads to delink the high tone of the verb stem. However, if it is a disyllabic LH, the high tone of the verb is dropped to a low. For the L tone verbs, no tonal change occurs as the verb stem maintain its original tone. This is similar to Ewe where the habitual aspect is also marked with a toneless suffix [-na, or –a]. However, in contrast to Ɛsahie where the prefix is assumed L, the toneless suffix in Ewe rather acquires its tone from the preceding syllable (Ameka 2008). The habitual verb in Ɛsahie may sometimes be realised in the negative form. When it does, it is prefixed with the toneless negative marker /N/ which homorganically assimilates the place of articulation of the initial

consonant of the verb root. The verb however maintains its tonal pattern. Consider the following examples in (5.45).

Example 5.45

a. /mì   + kɔ́ /   →   /mì   +   N   +   kɔ/   →   [mìŋgɔ̀]

     1SGSUB   + g o   1SG.SUB + NEG + go/HAB   'I don't go'

b. /ò + ʥwùʥwó/   →   /ò   + N + ʥwùʥwó /   → [òǹʥwùʥwò]

     3SGSUB +speak   1SGSUB + NEG + speak/HAB   'he doesn't speak'

Since the toneless negative maker is assumed by default to be a L tone, the entire inflected verbal tone becomes L.

5.4.1.3 The Future Tense

The future tense of a verb indicates that the action described by the verb has not yet began at the time of utterance, or will take place after the time of utterance. In some languages, future is periphrastically marked with a bound morpheme. In English for instance, the future tense is marked with either a modal auxiliary, simple present forms, or progressive form (Quirk & Greenbaum 2000), while in Akan, the morpheme [bɛ] is prefixed to the verb to mark future (Abakah 2004b; Osam 2003;2004) . For Ɛsahie, the future tense is marked with the high tone prefix /kɔ́/ cliticised to the verb

root, which harmonizes in tongue root with the vowels in the verb. Let us examine the
examples in (5.46) below:

Example 5.46.   **Verb root**   **Prefixation**   **Future form**

    /kɔ́/ + H tone verb

      a.   /kɔ́/   →   /kɔ́ + kɔ́/   →   [kɔ́hɔ́]

                       FUT + go   'will go'

      b.   /dí/ → /kɔ́   +   dí/   →   [kólí]

                    FUT   +   eat   'will eat'

      c.   /tóí/ →   /kɔ́   +   tóí/   →   [kótóí]

                FUT   +   follow   'will follow'

    /kɔ́/ + L tone verb

    d. /tɕìrɛ̀/ →   /kɔ́   +   tɕìrɛ̀/ →   [kótɕìrɛ̀] 'will write'

    e. /ɥìùà/ →   /kɔ́   +   ɥìùà/ →   [kɔ́ɥìùà] 'willsteal'

    f. /ɕɥìè/ →   /kɔ́   +   ɕɥìè/ →   [kɔ́ɕɥìè] 'will pour'

     The future tense does not involve a tonal change in the verb root. In the
formation of the future tense, the high tone of the prefix does not spread onto the verb

root. The verbs maintain their lexical tone after the prefixation. This is quite different from other forms of affixation in the language like the nominal suffix, which triggers a tonal assimilation. If the lexical verb is high tone as in example (5.46a-c), the derived form after prefixation will be HH.

5.4.1.4 The Progressive Verb

Also called continuous, this form indicates that the action described by the verb is ongoing at the time of speaking. The progressive form of the verb in Ɛsahie is marked by prefixing a pronominal clitic to the verb, and changing the tone of the verb to high. The verb itself does not undergo any segmental change. The examples (5.47) illustrate this.

Example 5.47   **Verb root**   **Prefixation**   **Progressive form**

Subject + LH tone verb

a. /dʑwùdʑwó/ → /ò + dʑwùdʑwó/ → [òdʑwúdʑwó]

     2SG + speak   's/he is speaking'

b. / wɔ̀ndɛ́/ → / ɔ̀ + wɔ̀ndɛ́/ → [ɔ̀wɔ́ndɛ̀]

     2SG + wait   's/he is waiting'

c. /fɔ̀fá / → /ɛ + fɔ̀fá/ → [ɛ̀fófá]   's/he is smelling'

d. /pàtɕí/ → /ɛ̀mɔ́ + pàtɕí / → [ɛ̀mɔ́pátɕí]   'you are splitting'

Subject + H tone verb

    e. /tɛ́/   →   /bɛ́   +   tɛ́/   →   [bɛ́tɛ́] 'they are grinding'

Subject + L tone verb

    f. /tɕìrɛ̀/ →   /mì   +   tɕìrɛ̀/ →   [mìtɕírɛ́] 'I am writing'

    g. /ɥìùà/ →   /mì   +   ɥìùà/ →   [mìɥíúá] 'I am stealing'

    h. /ɕɥìè/ →   /mì   +   ɕɥìè/ →   [mìɕɥíé] 'I am pouring'

It is evident from the examples that it is not only the verb that assumes a H tone in the progressive form, but the prefix as well. To account for the H tone of the progressive verb, we posit a leftward H tone spread. We assume that the H tone of the second syllable of the verb spreads leftward and replace the initial L tone to become H. Let us take a closer look at example (5.47a) *dʑwùdʑwó → òdʑwúdʑwó*. In this example, we notice that the LH verb in the progressive form is said on a High tone. What happens is that the H of the second syllable spreads leftward to displace the initial L to become H. After the cliticisation of the pronominal prefix, the toneless clitic does not copy the tone of the verb. The pronominal prefix with a L tone is attached resulting in a LH output. In situations where the verb stem is L tone, because both the subject and the verbs are L, a H tone is inserted to spread and delink the L tone of the verb to make it H tone. Similar to languages such as Nata, (Anghelescu 2013; Anghelescu et al. 2017;

Malchukov & de Hoop 2011) where subject markers do not condition tonal alternation in the verb root, we notice from the examples that the tonal alternation in the verb root marking the progressive does not come from the pronoun.

The progressive verb can also be realised in the negative form by attaching the toneless homorganic nasal /N/ to the verb as in (5.48) below.

Example 5.48 **Verb root**   **Negative Progressive verb**

    a.   /o   +   N   +   ʤwùʤwó/ → [ònʤwúʤwó]

    2SG   NEG   speak   's/he is not speaking'

    b.   /o   +   N   +   wɔ̀ndɛ́/ →   [ɔ̀nwɔ́ndɛ́]

        3SG   NEG   's/he is not waiting'

    c.   /ɛ   +   N   fòfá/ → [ɛ̀m̀fófá]

        3SG   NEG   smell   's/he is not smelling'

    d.   /bɛ + N   +   tɛ́/   →   [bɛ̀ndɛ́]

        3PL NEG   grind 'they are not grinding'

The negative of the progressive verb is said on a LH tone. In the derivation process the toneless homorganic nasal /N/, is realised as a L but does not affect the verb root. The inflected verb then becomes LH.

5.4.1.5 The Imperative Verb

The imperative mood is used to give commands or instructions. Ɛsahie realises the imperative form of a verb by tonal change. Let us examine the examples in (5.49) below.

Example 5.49.   **Verb root**   **Imperative**

      a.   /gó/   [gó!]   'dance!'

      b.   /tɛ́/   [tɛ́!]   'grind!'

      c.   /bùbú/   [búbú!]   'break!'

      d.   /pàtɕí/   [pátɕí!]   'stop!'

The data show that the imperative form is marked with a high tone on the verb root for both monosyllabic and disyllabic verbs. For monosyllabic H tone verbs, there is no tonal change in the imperative. However, for L tone verbs and disyllabic verbs with LH or LL, the imperative form brings with it a change in tone. For such verbs,

there is a regressive H tone spreading. First, the H tone spreads onto the L tone syllable.

The L tone is deleted and replaced with a H. We observed that Akan also marks H tone

for the imperative verb, however, unlike Ɛsahie; the H in Akan is due to the failure of

a grammatical L tone to replace the H at the surface level before or after a complement

(Abakah 2004b;2005). Because of the definiteness of the command, the imperative

verb is not always ellipsed, but may occur with a subject as in (5.50) below.

Example 5.50.   a.   Àbéná dí!

Abena eat /IMP

Abena eat!

b.   Àmá   tɕíɾɛ́!

Ama   write /IMP

Ama write!

When a subject is used, the H tone remains unchanged as shown in (5.50)

above. In addition, the imperative may be either in the affirmative or in non-

affirmative. Consider example (5.51) below.

Example 5.51. **Verb root**   **Non-Affirmative Imperative**

a. /go →   / ń +   gó/   →   [ŋ́gó!]

          NEG   dance   'don't dance!

b. /dí/ →   /ń +   dí/   →   [ńlí!]

          NEG   eat   'don't eat!

c. /tènú/ →   /ń +   ténú/   →   [ńténú!]

          NEG   spit   'don't spit!

d. /ɕwìè/ →   /ń +   ɕwíé/   →   [ńɕwíé!]

          NEG   pour   'don't pour!

In the negative form of the imperative, as with all negation in Ɛsahie, the toneless homorganic nasal /N/ is prefixed to the verb. However, unlike the non-affirmative progressive where the negation is unaffected by the tone of the stem (cf. example 5.48), in the non-affirmative imperative form, the negation prefix is affected by the tone of the verb as it copies the H tone of the verb. This results in the inflected verb being said on a high tone for both the affirmative and the non-affirmative imperative.

5.4.1.6 Past Tense Formation

The Past tense denotes actions or events that occurred before the situation time or time of utterance. The past tense in some languages is formed with bound morphemes which may vary in their phonetic shape due to phonological rules leading to allomorphs. In Ɛsahie, the verbal past tense is realised by suffixation of *[-lí, -lí]*. The suffix is ATR sensitive as exemplified below in (5.52)

Example 5.52

	[-ATR]		**[+ATR]**			
a.	/pàtɕí + lí/ →]pátɕílí]		a. /dí +	lí/	→	[dílí]
	split + PST→ 'splitted'		eat +	PST	→	ate
b.	/pɛ́ + lí/ → [pɛ́lí]		b. /í +	lí/	→	[fílí]
	hate + PST → 'hated'		come from + PST		→	'came from'

In this data, the *'lí'* as in '*patɕili*' contrasts with '*li*' as in '*dili*' in ATR.

The lateral in /li/ undergoes nasalization to become [-ní] or [-nɪ̃] if the root/stem has a nasal feature. When the suffix is used, the nasal feature of the vowel assimilates to the 'l' of [-lí]. The nasal quality of the vowel is then lost in the output. Consider the examples in (5.53) below.

Example 5.53.

	[-ATR]				[+ATR]		

a. /tí̃ + lí/ → [tíní]   a. /tòtŏ̃ +   lí/ → [tótóní]

    grind + PST → 'grounded'   bake +   PST   →   'baked'

b. /pí̃ + lí / →   [píní]   b. /ɔ + kã̃́ + lí/ → [ɔ̀hání]

    dark + PST → 'darkened'   3SG +say + PST →   'she said'

Like its /li/ counterpart, in this data too, the *'ní'* as in '*tíní*' contrasts with '*ni*' as in

'*tótóní*' in ATR.

    As indicated earlier, Ɛsahie forms the past tense through suffixation. The suffix

is pre-linked for H tone and that leads to a tonal change in the underlying form of the

verb. In the case of monosyllabic verbs, the final vowel of the verb is lengthened before

the suffix if the verb takes an object or complement. Examine the following examples.

Example 5.54.

    a.   Kofi   fá:-lí   sìká   nè

          Kofi   take-PST   money   DEF

          Kofi took the money

b.   Adu   kó:-lí   sùkúú   kã̀ã̀bá nè

        Adu   go-PST   school   small   DEF

        Adu went to the small school.

We notice from the example (5.54) that in the inflectional process, the H tone of the suffix spreads onto the verb to be realised as H. The lengthened vowel copies the tone of the verb. If the verb is disyllabic, there will a leftward high tone spread, which will alter the tonal pattern. Following the continuous spreading of the tone, the verb becomes HH. These expectable changes in the verb forms after suffixation is related to what Lieber (2009) calls 'predictable allomorphy' as it is easy to tell from the phonological properties the pattern the past tense will follow. For example, it is easy to predict the form a negative marker of a verb in Ɛsahie will use by looking at its phonological properties.

Summary on the tonal structure of inflected verbs in Ɛsahie

- The perfective verb is marked with a high tone on the verb and a low tone on the perfective marker /a/.

- The habitual verb is marked with a low tone on the verb.

- The future tense is marked with the high tone prefix /kɔ́/ cliticised to the verb root with no tonal change in the stem.

- The progressive verb is marked by prefixing a pronominal clitic to the verb root, and changing the tone of the verb root to high.

- The imperative form is marked with a high tone on the verb for both monosyllabic and disyllabic verbs.

- The past tense is marked with a high tone suffix /lí, lí/which is ATR sensitive.

5.4.2 Tone in Reduplicated Verbs

For the examination of the tone of reduplicated verbs, we will group the verbs into 2−

monosyllabic and disyllabic.

5.4.2.1 Tone in Reduplicated Monosyllabic Verbs

Monosyllabic verbs in Ɛsahie are mostly H toned. Study the monosyllabic verbs in

(5.56) below.

Example 5.56.		**Base**	**Reduplicated**	**Meaning**
	a.	/wú/	[wùwú]	to die
	b.	tɕí	[tɕìtɕí]	to catch
	c.	/tɑ̃́/	[tìtɑ̃́]	to fart
	d.	/dá/	[dìdá]	to sleep
	e.	/kɔ́/	[kùkɔ́]	to go

Contrary to the reduplicated nouns where the reduplicant copies both the base and the tone, we notice a polarity of tones from the data. The reduplicant bears a tone that is opposite in value to the base. In the data above, the reduplicant carries a low tone while the base carries a high tone. Explaining a similar occurrence in Akan, Abakah et al. (2010: 26) suggest, "the reduplicant and the base are realized with different tones because reduplication copies only the segmental melody and as such the reduplicant receives a low tone". We assume a similar explanation for Ɛsahie that the reduplicant fails to copy the tone of the base for these verbs because these are words borrowed from Akan.

5.4.2.2 Tone in Reduplicated Disyllabic Verbs

Disyllabic verbs in Ɛsahie, on the other hand, vary in tonal pattern from the monosyllabic verbs. The data in example (5.57) below presents some examples.

Example 5.57.	**Base**	**Meaning**	**Reduplicated**
a.	/sɛ̀ʨɪ́/	to destroy	[sɛ̀ʨɪ́sɛ̀ʨɪ́]
b.	/hùrú/	to jump	[hùrúhùrú]
c.	/tíé/	to listen	[tíétíé]
d.	/sòmá/	to send	[sòmásòmá]
e.	/bùtú/	to pour	[bùtúbùtú]

     f.   /dúá/   to plant   [dúádúá]

The data above exemplifies tone copying. It follows from the examples that the disyllabic verbs copy the tone of the base. Accordingly, in reduplicating disyllabic verbs, the underlying and phonetic tone melodies of the base are transferred to the reduplicant without any tonal change. This follows the pattern of reduplicated nouns. Unlike the monosyllabic verbs where the reduplicant is toneless and assumes a low tone by default, in the case of the disyllabic verbs, both segmental and suprasegmental features are entirely copied.

5.5 Conclusion

This chapter has expounded on the nature of tones in nouns and verbs in Ɛsahie. We have established three tonal groups for basic nouns and further examined the tonal structure of affixed nouns, deverbal nouns, nominal compounds, and reduplicated nouns. We noticed in the discussion that derived nouns, regardless of the input tones, yield an output with a LH tone pattern. We have shown that while nominal suffixes trigger tonal change in the base nouns, nominal prefixes do not. We have also shown that verbs in their basic form have three tonal groups. Using available data, we have shown that tone influences the inflection of verbs, lexically and grammatically, in the language, and that tone assignment varies depending on the verb's tense, aspect or

mood with no segmental alternation in the lexical verb. We further show that tense is marked both overtly and covertly in Ɛsahie. The future and past tense are overtly marked with bound morphemes, whiles the present is covertly marked. Overtly or covertly, we noticed that a change in verbal form is tonally influenced. Other issues addressed in the chapter included the tonal structure of reduplicated verbs, which among other things triggers tonal processes such as tone copying and tone polarity.

CHAPTER 6

SUMMARY, FINDINGS, RECOMMENDATION AND CONCLUSION

6.1 Introduction

This chapter presents a summary of the major issues discussed in this study. It provides a chapter-by-chapter summary, and gives an account of the findings and significance of the study, the limitations to the study, as well as recommendations for future research into the language.

6.2 Chapter Summary

The chapter one introduced the entire work. It discussed the ethnographic and ethnolinguistic background of the people of Sehwi, and Ɛsahie as a language. We noticed that although Ɛsahie has a considerable number of speakers, the language lacks formal usage. Other issues highlighted in the chapter are the objectives of the study, the methods used in data collection, and a review of previous studies in the language, among others.

The chapter two reviewed the theoretical framework used in the study and other literary works relevant to the current study considering their related in terms of genetics and phonological properties to Ɛsahie. From the review of the literature, it became clear that segments interact with prosodic features and this prosodic information is significant in understanding the changes that occur when words are

formed. The prosodic structures of these forms need to be examined to get a holistic understanding of the nuances of these forms.

The chapter three provided a detailed description of Ɛsahie speech sounds using the distinctive features. The essence of the distinctive feature description is to bring out the unique features inherent in the sounds and makes it possible to group them into natural classes, as well as predicting their redundancies. The chapter also analysed sound sequencing in the language and identified the restrictions in there.

The chapter four highlighted on the syllable and some syllable structure processes in Ɛsahie. We observed that there are three syllable structure in Ɛsahie — CV, V and the CVC, and the nasals /m, n/ have free distribution and occur at the onset, nucleus and coda positions. We also noticed that the language has a dis-preference for consonant cluster, and all consonants occur at syllable onset slot.

Still in chapter four, we examined elision as a syllable structure process. We grouped elision into two- Vowel Elision and Consonant Elision, with varied context of operation. Under Vowel Elision, the following observations were made:

a. In the sequence of V_1 #V_2 across syllable boundary in compounds, the V_2 is elided.

b. In the second context of operation, the [V_1] of a pronoun in a possessive construction is lost in a V_1 # V_2.

c. In a perfective construction where the perfective verb is attached to a pronoun, the pronoun loses its vowel.

We have also shown that in Ɛsahie, anytime a [-ATR, +high] vowel occurs before a sonorant /r/, the vowel is elided. This occurs in a CVCV word structure where the C₂ is a sonorant (CVRV). The V₁ is elided resulting in a CRV word structure. We further observed that in Ɛsahie, the final consonant of a word is deleted if it an alveolar nasal. This occurs after the nasal has regressively assimilated an oral high vowel to be nasalized. Finally, we observed an instance of deletion in compounding, where some syllables are truncated in the output form.

Still in chapter four, we discussed some syllable structure changes that English borrowed nouns undergo in Ɛsahie, and showed that in Ɛsahie, borrowed nouns undergo several phonological changes such as vowel change, assimilation, epenthesis or deletion. On epenthesis, we have shown that the vowels /ɪ, ʊ/ are inserted to break consonant clusters not found in the language, and provide onset to non-nasal codas. Regarding deletion, we noticed that borrowed nouns go through four unordered rules of consonant deletion, vowel insertion, resyllabification and assimilation to realise a word whose syllable structure is acceptable in the language. All these changes to structure of the borrowed nouns are repair strategies on the syllable structure constraints found in the borrowed nouns.

The chapter five expounded on the nature of tones and tonal processes of nouns and verbs in the language. We have established three tonal groups for basic nouns in the language. Group one has L tones, group two has LH tones, and group three has H tones. Still on nouns, the focus was on the tonal structure of affixed nouns, deverbal

nouns, compounds and reduplicated nouns. We have shown that while nominal suffixes trigger tonal change in the base nouns, nominal prefixes do not.

Concerning verbs, we have shown that uninflected verbs or verbs in their bare form in Ɛsahie can be classified into three tonal classes. These are L, H, LH for groups one, two and three respectively. Using available data, we have also shown the grammatical role of tone in the languages in that tone influences the inflection of verbs in the language, and that tone assignment varies depending on the verb's tense, aspect or mood with no segmental alternation in the lexical verb. We further show that tense is marked both overtly and covertly in Ɛsahie. The future and past tense are overtly marked with bound morphemes, whiles the present is covertly marked. We further examined the tonal structure of reduplicated verbs and noticed that they trigger tonal process such as tone copying and tone polarity.

6.3 Significance of the study

Though there are some linguistic works on Ɛsahie, there is very little on the phonology of the language. The main significance of this work lies in the fact that this study provides a detailed phonological description of the sound system and prosodic structures of the language.

The study affords other researchers' opportunity to get access to documented data and information on the sounds as well as the prosodic structure of nouns and verbs in the language. It also adds to the documentation of prosody in African languages,

and contributes to the literature on Ɛsahie and to the overall efforts at describing the grammar of human language.

6.4 Summary of Findings

This research work has brought to bear interesting things about the phonology of Ɛsahie. Some of the discoveries are outlined below.

1. The syllable structure in Ɛsahie are the CV, the V, and the CVC.

2. Ɛsahie has a dis-preference for CCV syllables and this impermissible syllable structure is repaired either via epenthesis or deletion to meet the syllable structure requirement of Ɛsahie.

3. Ɛsahie has three tonal groups for nouns, namely L, LH, H for group one, two, and three respectively.

5. Ɛsahie has three tonal groups for verbs. They are L tone for group one, H tone for group two, and LH tone for group three.

5. We have also shown that while nominal suffixes trigger tone changes in the base noun, prefixes do not affect the tone of the base noun.

6. We have also shown that derived nouns in Ɛsahie have a LH tonal pattern, regardless of the input tones.

7. We have shown that grammatically, tone influences the inflection of verbal forms such as tense and aspect in Ɛsahie.

In all, a broad phonological description of the language has been provided to serve as a footing for future research.

6.5 Delimitations of the Study

Regardless of the efforts to describe fully the prosodic structure in Ɛsahie, time and effort could not allow us to investigate all parts of speech. Our focus therefore was on nouns and verbs. Even on verbal forms, the study could not analyse the prosodic structure of stative and optative verbs.

6.6 Recommendation for future research

Though in- roads have been into the phonology of Ɛsahie, not all phonological issues were discussed. We hope that future studies will extend to examining other untouched phonological areas such as adjectives and adverbs in the language. In addition, the data analysis was couched in the generative phonology theory. It will therefore be insightful to see how these segmental and prosodic structures work out in a theory such as Optimality theory. Also, the study was impressionistic, so future studies can conduct an acoustic analysis to confirm the findings.

6.7 Conclusion

This study hinged on three objectives— to identify the constraints in sound distribution and sound sequencing in Ɛsahie and the accompanying repair strategies; to identify the constraints on syllabification and some of the syllable structure repair mechanisms in the language. The final one was to describe the tonal structure of nouns and verbs in the language, and the tonal changes associated with noun and verb forms in the language. While admitting that not every phonological detail in the language has been studied, from a descriptive perspective, this study has addressed the issues outlined in the objectives using the research questions. We are therefore optimistic that this research work will spur on other scholars interested in the study of Ɛsahie to embark on further studies to facilitate the development of the language and linguistics in general.

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