ASPECTS OF KUSAAL PHONOLOGY

BY

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DECLARATION

I certify that except for references to other works which have been duly acknowledged, this thesis is the result of original research undertaken by me towards the award of the M.Phil Linguistics degree in the Department of Linguistics, University of Ghana, Legon.

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ABSTRACT

In recent times, there has arisen an overbearing need to describe, analyse and document the various languages of the world. This research investigates aspects of the grammar of Kusaal – a less familiar, un-described and under-studied Mabia (Gur) language spoken in the north-eastern corner of Ghana by some 450,000 people. The study entails a description of the phonology of the language and is concerned with uncovering the underlying sounds, the syllable structures, the phonological processes and the tonal patterns inherent in Kusaal. It is cast within the generative phonological traditions especially formalised by Chomsky and Halle (1968), on Goldsmith's (1979, 1990) autosegmental phonology and on moraic theory. Data for the research was collected with an electronic recorder from twelve respondents on a field trip to Bawku and Zebilla. The data was then used in corroboration with other sources found in a few study materials. Native speaker intuition and the Praat acoustics software were important resources in the transcription, description and analyses of the data. The study reveals that Kusaal has twenty-four consonants, nine short vowels which have long correlates, five nasal vowels which are all [-ATR] and several sequences of vowels. The study also shows that the various syllable structures of the language are collapsible into four predominant types: the peak only, the VC, CV and the CVC. Kusaal is morphologically isolating but words can take up to four syllables of different structures and types in the language. Two phonological processes are identified in the language: assimilation and syllable structure processes. In the former, nasalisation, homorganic nasal assimilation, labialisation, palatalisation and vowel harmony are prevalent while the latter manifests in syllable deletion and truncation, aspiration, glottalisation and loanword re-syllabification. Kusaal is a register tone language which distinguishes three level tones – high, mid and low. It also distinguishes a downstepped high from an underlying high tone. The study identifies the mora as the tone bearing unit and discusses the role of tone in the morphosyntax of the language.

DEDICATION

To my mother,

Veronica Abena Boateng Musah,

who never relents on my resolve

and my father,

Joseph Mbasibidi Musah,

who booked an early appointment with the Maker.

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from Bawku. You have always given me a real home away from home. While the family of Dr Amuzu also provided a convivial atmosphere to relieve some of the pressure that often came with this work. I can never say thank you enough to you all.

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Finally, to all my respondents, to everyone who took a lot of interest in this endeavour, and to all those I have inadvertently left out, I say the battle is won and the day is ours. You are the victor!

M puus ya pamm. 'I thank you profusely.'

Agoswin A. Musah

30th July 2010

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LIST OF ABBREVIATIONS

1	First person
2	Second person
3	Third person
A.	Agole
T.	Tonde
DEF	Definite
DET	Determiner
FUT	Future
H	High
L	Low
M	Mid
HAB	Habitual
HTL	High tone lowering
LTR	Low tone rising
LTS	Low tone spread
MAX. P	Maximum Pitch
NEG	Negative marker
PERF	Perfective
PL	Plural
POSS	Possessive
PROG	Progressive
PST	Past Time
HOD	Hodiernal
REC	Recent
REM	Remote
SG	Singular
SUB	Subject
TAM	Tense, Aspect and Mood
UR	Underlying representation
.n	noun
.v	verb

CHAPTER ONE

THE LANGUAGE UNDER REVIEW

1.1 INTRODUCTION

This section of the study sets the tone for the thesis. It makes the introductory statements about the subject and area of study including the motivations for undertaking the research. It includes brief write-ups on the language and its people, highlighting some of the demographic, sociological and ethno linguistic facts as well as the methodology that is employed for the study. The theories underpinning the research are also expatiated on in subsequent sections. It concludes with a statement on the way the study is organised.

1.2 SCOPE OF THE STUDY

In recent times, there has arisen an imperative need to document the various languages of the world. Linguists, evangelists and archivists the world over, have stressed the importance and benefits that come with a detailed description and subsequent documentation of the indigenous language of a group of people. This study is therefore a modest effort at adding to the meagre stock of linguistic data on the Kusaal language which is one of the many under-studied and under-described languages of Ghana.

As the research is geared at describing the grammar of a less familiar and under-described language, we will endeavour to start from the beginning and

so our focus will be on describing and analysing the underlying sound systems - the phonology of Kusaal.

1.3 STATEMENT OF THE PROBLEM

Kusaal, as intimated earlier, is one of the many under described and under studied languages in Ghana. Though some research has been carried out on the language, most of the works are very old and date as far back as 1957 (Melançon), 1968 and 1972 (Spratt and Spratt). Even these, considering the time lapse, have become quite outdated in relation to the current state of affairs. The consequences of this acute shortage of literature on the language are low school enrolment and literacy because adults do not see the importance of sending their wards to school; widespread poverty, misinformation, unemployment and underdevelopment. Also, inconsistencies and uncertainties often arise as there are no guides on spelling and writing.

Even with the change in the educational language policy which allows for the Ghanaian languages to be used as the media of instruction in the first three years of primary education, schools in the Bawku area can not take advantage of this opportunity because of the lack of educational literature on the language. Also, as far as (Christian) religion is concerned, the only translation of the gospel is on the New Testament and so presently, there is no complete translation of the Holy Bible in the language.

1.4 DEMOGRAPHY

The expanse of land within which Kusaal is spoken is called **Kusaog** meaning

'the country/land of the Kusaas'. The Kusaas are found mainly in the north-eastern corner of Ghana. As a result, the language users share boundaries to the North with the Republic of Burkina Faso, to the South with the area near the Gambaga escarpment beyond which inhabits the Mamprusi. It is also bounded to the East by the Republic of Togo and to the West by the Red Volta after which follows the land of the Talensis and Nabdams. There are therefore several pockets of Kusaal speaking communities in the adjoining areas in Burkina Faso and Togo together numbering some 37,000 people (http://www.globalrecordings.net/langcode/kus). Generally, the homes of the people, especially on the outskirts of the major towns, are conically shaped and built with mud. The roofs are mostly made with thatch not only because it is the readily available material but also to regulate room temperature as the sun can sometimes get blazing hot.

Three districts of the Upper East Region are inhabited by the Kusaas. These are the Garu-Tempane and Bawku-West Districts and the Bawku Municipality (see Fig. 1.1 below). The three districts are further divided into five constituencies namely the Pusiga, Garu-Tempane, Binduri, Bawku Central and Zebilla constituencies with each having one representative in parliament of the country.

Bawku is the administrative and commercial capital of the Kusaas. Incidentally, Bawku is the only town in all of Ghana which shares borders with two countries at the same time; these being Burkina Faso to the north and the Republic of Togo to the east. Its strategic positioning makes it a very important

location to the indigenes, businesses and the government alike. It is thus one of the very viable commercial areas in the country and one of the biggest generators of internal national revenue.

Unfortunately however, the town has often received a lot of bad media as it has been the scene of sporadic skirmishes and civil unrests between the indigenous Kusaas and migrant Mamprusis over issues pertaining to land and politics and to some extent, chieftaincy.

Aside these two ethnic groups, there are large numbers of other migrant communities including Hausas, Moshies, Bissas, Frafras (Gurenɛs), Akans, Dagaaba, Bulsa, Bimobas, Yorubas, Igbos and several others. Melançon (1957: 4) states that Kusaal is mutually intelligible with Mampruli and further, that it is not difficult for the Kusaal speaker to communicate quite easily with speakers of Talni, Nabit, Dagbani, Dagaare, Gurunɛ, Moore, and Nanunne in that linear order. At the extreme end of this cline are Bissa, Buli and Kasem which are languages within close proximity of Kusaal but with which communication is very difficult if not near impossible.

1.4.1 Ecology

The areas inhabited by the Kusaas are generally low lying savannah plains with intermittent ranges of mountains that are potential sites for tourism especially for hiking and paragliding. The vegetation is Sahel Savanna, characterised by pockets of trees and vast grasslands. There are also a number of important forest reserves including the Tiile, Binduri and the Morago West reserves

which stretch for miles on end. In the general Kusaal speaking area, two important rivers provide drainage: the White and Black Voltas. These rivers are often sourced by the rains which come between May and October of every year. Some of the men who live near the water bodies are therefore able to occasionally, take on fishing in addition to farming, which is the mainstay of a majority of the people. These farmers depend a lot on the rains and produce a variety of crops including maize and millet which are the staple food of the people. Large quantities of onions are also produced in the dry season through a system of manual irrigation. Animal rearing for both domestic and commercial purposes is also very common among the people. (www.ghanadistricts.com)

Fig. 1.1 - Map of Upper East Region showing the three Kusaal speaking districts: Bawku West, Bawku Municipal and Garu-Tempane[1]
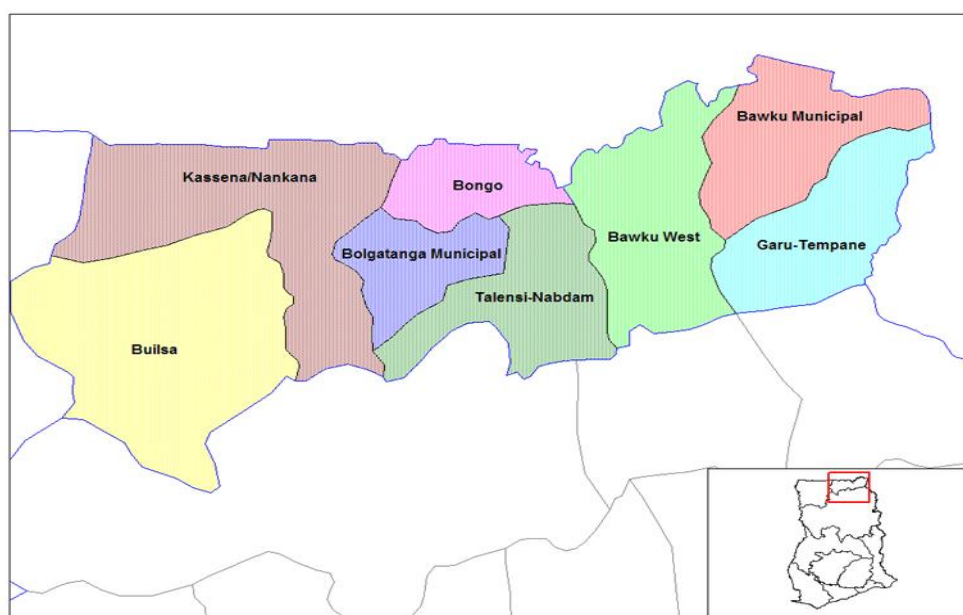
Source: Ghana districts.com

(http://ghana-net.com/Documents/Upper_East_Ghana_districts.bmp)

1.5 THE LANGUAGE AND ITS PEOPLE

The name of the language is Kusaal, also called Kusaalle, and the speakers refer to themselves as the Kusaas (PL) or Kusaa (SG). When other language speakers make reference to the native Kusaal speaker, terms like 'Kusasi' (SG) and 'Kusasis' (PL) come up especially in English. The Ethnologue listing (2010) estimates the number of language speakers to be approximately 450,000. There are two dialects: Agólé which means 'up' or 'high' and Tóndé which means 'front' or 'ahead'. The former is the more dominant variety. It is also the dialect of the investigator.

Kusaal is found under the Mabia cluster of the larger Niger-Congo language family which is spoken in most of the north of Ghana. Hall (1983) states that the languages of the north have been assigned labels such as 'Gur' and 'langues voltaiques' (voltaic languages) because of the recurrence of such a syllable in some of the language names such as 'Gurma', 'Gurunɛ' and 'Gurunnshi' or because of their relative location near the Volta rivers respectively. A third label 'Moore (Mole) – Dagbani' has gradually lost its appeal because of its ineffectiveness in aptly labeling all the important languages of the north. Bodomo's (1993) suggestion of the name 'Mabia' languages is however very representative of most of these languages including Kusaal. This is because 'Mabia' is a concatenation of two morphemes; **ma** 'mother' and **bia~biig~biik~biiga** 'child' that are found in many of the northern languages. Translated loosely, 'Mabia' means 'My mother's child' and by extension it underlies a 'sisterly' relation among all these languages. This study will therefore refer to this cluster of northern languages as the 'Mabia Languages'.

Kusaal is also captured under the Proto Oti-Volta sub-grouping of the Niger-Congo family. In the literature it is classified under the Western Oti-Volta sub-grouping (cf. Naden 1988, 1989, Williamson and Blench 2000). The figure 1.2 below puts the genetic affiliation of the language into greater perspective.

Fig. 1.2 - Genetic affiliation of Kusaal

NIGER CONGO

Atlantic Congo

Volta Congo

North Volta Congo

Mabia 'Gur'   Kwa

Central Mabia

Northern   Southern

Bwamu   Oti-Volta   Kurumfe

Buli-Konni   Western   Gurma   Eastern

Northwest   Southeast   Nootre

Dagaare | Dagbani Hanga **KUSAAL**   Nabit   Talni Mampruli
Gurene
Moore
Wali

Agólé   **Tóndé**
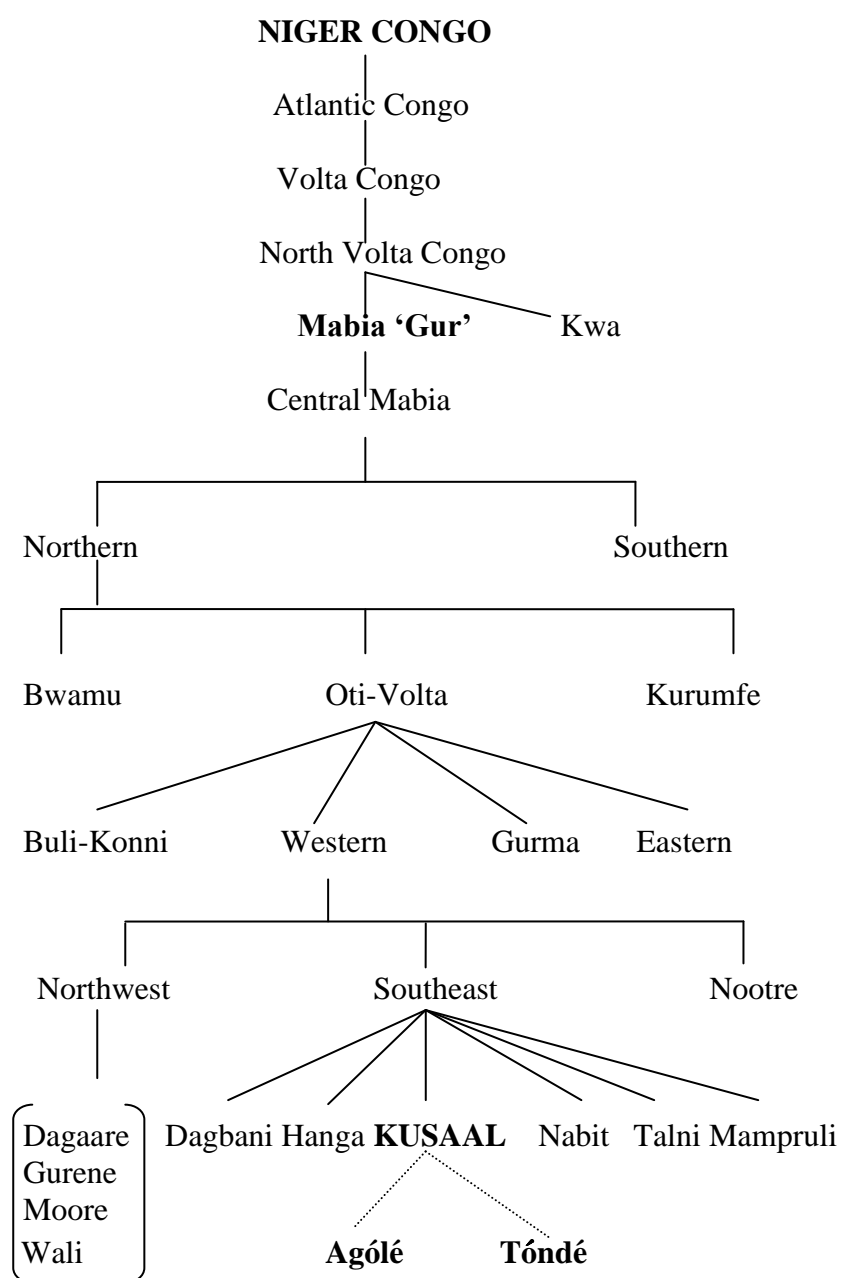
Adapted from Naden (1989: 144-5) and Ethnologue (2009)

(http:ethnologue.com/show_language.asp?code=kus)

1.6 SOCIOLOGICAL AND ETHNOGRAPHIC SITUATION

The Kusaas, along much the same lines as other Ghanaians, are generally a very religious group of people who believe in the existence of a supreme deity called **Wínā'am** or **Wín** meaning God. There are also several smaller gods and totems who are representative of the various clans and communities. While there are large numbers of Christians and Muslims, the majority are traditional religious believers who make sacrifices of animals to their respective gods often with the aid of a **tèndāan** (sing.) 'the land owner'. He (the tendaan), acts as the custodian of both the spiritual and physical needs of the people within his immediate domain (usually a small community). Kusaog (the land of the Kusaas) is further divided into twenty (22) traditional areas each headed by a sub-chief (Na'ab) who is the custodian of all the traditional systems of the people as well as the first point of legal justice and redress. Together with the **tèndāannām** (plu.) and all their subjects, the sub-chiefs pay allegiance to the overlord of Kusaog, the Kúsaá Ná'ab, domiciled at the paramountcy in Bawku.

Among the Kusaas, multilingualism appears to be the norm because the majority are able to use some other language apart from Kusaal. In view of the fact that the language is mutually intelligible with a host of others, inter ethnic communication is often facilitated through constant interaction coupled with the desire to learn other languages. According to Berthelette (2001: 19-20), while at the same time the speakers of Kusaal may not discourage their wards from using other languages such as Bissa, Hausa, Moore or English, they hold a very strong affinity to the language, and are in fact, very proud of it.

Considering that the language is actively used across a wide range of domains - from religion through commerce and business to the daily social interactive activities (as well as in education), it is indeed, a viable language which will stand the test of time. It will be essential in transmitting and preserving the cultural heritage of the people through the ages to come.

1.7 PREVIOUS RESEARCH

There have been several studies on some of the related languages in the Mabia language cluster beginning with Rattray (1932) who undertook a comparative study of about fourteen languages in the group. His work also includes an extensive list of cognate words and sociolinguistic information on the various languages of the north.

The German missionary and linguist, Westermann, in his study with Bryan (1952: 65) writes a line or two on Kusaal. In their study, however, they classify Kusaal, Nanunne and Mampruli as dialects of Dagbani probably because of the similarity they bear to the language (Dagbani). Though this may appear to be the case, there is indeed a lot of information to prove that these 'dialects' in spite of their similarity to Dagbani and to each other, are actually separate languages on their own albeit with a common ancestor (cf. Rattray 1932 and Naden 1988, 1989).

Swadesh et al. (1966) attempts to trace the time depth since the various (Mabia) languages diverged from each other with evidence from a range of

words while Naden (1988, 1989) establishes the various languages and their relationship in the larger Mabia 'Gur' sub-group.

Work has also been carried out by native speakers on cognate languages such as Gurunɛ (Farefare) by Atintono (2002, 2004). Atintono (2004) for instance, examines the morphosyntax of the Gurenɛ verb within a functional theoretical perspective. It studies the morphology and syntax of the Gurunɛ verb and verb phrase and also highlights a number of important facts on the phonology and morphophonemic structures inherent in the language.

On Dagaare, Bodomo (1993 and 1997) are also very representative. In the former, serialisation of verbs as obtains in the language and its near relations (including Kusaal) is discussed. It is also the work which suggests the name 'Mabia' for the cluster of languages which, hitherto, had been called 'Gur'. Bodomo (1997) is dedicated to the structure of the Dagaare language. The study discusses the phonology of the language including the suprasegmental feature 'tone' and the various syllable structures of the language. Some phonological processes are also discussed in the study. It also describes aspects of the morphology and syntax of the language.

Studies on near cognate languages have also been undertaken by researchers such as Akanlig-Pare (1994, 2005a) on Buli. Akanlig-Pare 1994 is a study on aspects of the phonology of Buli from a generative perspective. It highlights a number of important facts about the underlying sound systems of the language and captures some of the recurring syllable structures together with some of the

phonological and syllable structure processes that are very important in the language. The study also discusses the tonal patterns of words in Buli and specifically, posits a two tone system (high and low) for the language. The characteristics of these tones are explained in detail.

A tonology of Buli is the major focus of Akanlig-Pare 2005a. It is cast within the frameworks of autosegmental and lexical phonology and involves an in-depth analysis of the tonal system of the language. In addition to the two tones that are established in his 1994 study, this research identifies an emerging tone (mid) which is an intermediate level between the high and low. The study also identifies the syllable as the tone bearing unit and describes some of the tone processes that are evident in the language. Tones, in the study, are described especially in relation to the morpho-syntactic structure of the Buli language and so it concludes by discussing the role of tone in the morphology of Buli and the interface between tone and syntax.

All these researches shed a lot of light on some important aspects of the grammar of Kusaal because there are several points on which they converge. However, among the pioneering works on Kusaal itself are studies by missionaries and evangelists of the gospel including that of Lucien Melançon (1957), Nancy and David Spratt (1968, 1972).

Melançon (1957) identifies the major sounds of the language describing some of its morphology and explicating the various kinds of prefixes, roots and suffixes that are inherent in the language. He makes some notes on the syntax

of Kusaal pointing out some of the major grammatical categories. The study concludes with a list of some Kusaal proverbs.

Spratt and Spratt (1968) is a study on the phonology of Kusaal. It captures the phonological hierarchy of the sounds and identifies the phoneme as the basic level of the hierarchy, after which comes the 'bar' (which corresponds to the syllable). The study mentions tone but does not go into detail on its influence on the phonology and morpho-syntax of the language. Phonological processes are also not thoroughly discussed. It however looks at aspects of the orthography of Kusaal and includes a word list based on Swadesh's 100 item vocabulary list. Spratt and Spratt (1972) is on the syntax of Kusaal.

There is also an incomplete but elaborate study on the language by an anonymous expatriate writer which looks at the phonology, morphology and syntax and does quite a good job of describing the language. All these works have, conspicuously, been done by non-native speakers and even in the last few years such publications on the language have virtually ceased coming.

Two primers which are used for literacy purposes in the non-formal education sector of the Ghana Education are also available. They are written in a simple and straight forward manner and talk to one social issue or the other and so they will be relevant sources and appropriate reference material for this study.

The most recent work on Kusaal however, is, Abubakar (2007) which describes aspects of the syntax of Kusaal. The preliminary statements in this study

describe some of the phonological systems in the language while highlighting some of the main points on which they either diverge or converge with what pertains in the Mabia language cluster.

1.8 SIGNIFICANCE OF THE STUDY

Kusaal has seen relatively little description in the last forty or so years. Considering the overwhelming need to document the languages of the world, this current state of affairs leaves much to be desired. Further, the stock of literature is too small and mostly too obsolete to allow for an instructive usage of the language. This study is therefore important because:

- it is an attempt at adding to the insufficient literature on Kusaal with particular reference to its phonology;

- it will be useful to policy makers on language especially in the area of education;

- it will serve as a preliminary study on the grammar of Kusaal, culminating in a more expansive description of the grammar in subsequent works or studies;

- it will be relevant to messengers of the gospel (such as GILLBT[2]) who are working around the clock to produce a complete translation of the Bible into the language. This is because a good descriptive phonology will provide the basis for creating a credible orthography;

- it will also contribute toward efforts being made to have the language studied, at least up to the second cycle level.

1.9 RESEARCH OBJECTIVES

The objective of this research is to describe the phonology of the Kusaal language. Essentially, it will entail:

     i.   a detailed description of the distinctive features which underlie the sounds of Kusaal;

    ii.   an account of the various syllable types and structures that are important in the language;

    iii.   an analysis of some of the productive phonological processes and

    iv.   a discussion of the tonal systems of the language.

1.10 THEORETICAL FRAMEWORK

Three phonological theories are relevant to this study. The 'Distinctive Feature' and 'Moraic' theories are specific to Chapter Two while the 'Autosegmental' theory is very crucial to the chapter on tones (Chapter Four). All of these are however set within the larger 'generative phonological framework'.

1.10.1 Generative Phonology

'Classical generative phonology' was started by Chomsky and Halle in their ground-breaking study *The Sound Pattern of English* ((1968) as an aspect of the larger 'Generative Grammar' of language. Kenstowicz (nd: 1) states:

> The basic premises [of the generative phonological theory] are that phonological structure reflects the linguistic competence of the individual native speaker to compute a phonetic representation for the potentially infinite number of sentences generated by the syntactic

component of the grammar and that this competence can
be investigated in a serious scientific fashion.

In line with the views inherent in this theory, grammar is viewed as a system of rules that relate sound creation to meaning conceptualisation. Specifically, the framework stipulates that the sound a speaker is able to produce is a direct result of his/her linguistic competence (over his/her performance). This is a direct outcome of the underlying syntactic structures that are determined by the grammars of that particular language.

Their framework, in further developing the initial sentiments, defines features not in terms of their acoustics (cf. Jakobson and Halle 1956) but rather, with regard to the articulatory, auditory and acoustic properties of the sounds (segments) of the languages of the world.

A number of crucial components of the generative phonological framework are outlined in Kenstowicz and Kisseberth 1979 and elaborated online at (http://www.sil.org/linguistics/GlossaryOfLinguisticTerms/WhatIsGenerativeP honology.htm). First, two levels of phonological representation are relevant to the generative phonologist: the underlying representation and the phonetic representation. The former refers to the most basic form of a word or sound before it is subjected to any phonological rules or derivations. It is tied to the speakers' innate knowledge of what they want to say. The phonetic representation refers to the form of the word that is heard or said - the actual pronunciations or speech forms.

The second significant issue is the preponderance of phonological rules which seek to explain the mechanisms that are on-going in the speech production process. These rules map underlying representations onto phonetic forms and show various instances of insertions, deletions or sequences of feature changes among others.

Third is the use of 'distinctive features' which notion, according to Cohn (2001: 199), grows out of the work of Trubetzkoy (1890-1938), Jakobson et al. (1951) and Jakobson and Halle (1956). The essence of "distinctive features" is that it views segments as unique properties which are characterised by specific features. These features constitute the phonetic realities that are peculiar to the segments, thus marking them as different, one from the other. It also considers segments as complete bundles of distinguishing features (see §2.4).

The fourth component of the theory is phonological derivations. These comprise the set of stages or processes which are used to generate the phonetic form of a word from its underlying representation. Derivations are always influenced by the phonological rules that are relevant to such speech production processes.

Linearity is the final important characteristic of generative phonology. Accordingly, a stream of speech is viewed as a sequence of discrete sound segments with each segment possessing features that occur simultaneously (Kenstowicz and Kisseberth 1979). The trend initially, was to view the process of sound production as occurring in a linear fashion, one after the other. On this

issue however, there were a lot of opposing views because then the framework failed to account for those items that operated beyond the level of the segment. Prosodic or suprasegmental units do not operate in a sequence and as such they appear to be able to operate on their own. They are, to a very large extent, autonomous. This constituted a great setback to the generative phonological tradition until Goldsmith (1976, 1990) proposed his 'Autosegmental' phonological theory which adequately caters for suprasegmentals, especially tones.

The figures in (1a and b) below succinctly make the point about the crucial components of 'classical generative phonology'.

(1)a.

Underlying Representation	*Apply Rules* →	Derivation 1	*Apply Rules* →	Derivation *n*	*Apply Rules* →	Phonetic Representation
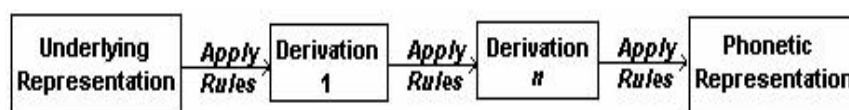
b.

Word	impossible	irreverent	inept
Underlying representation	/ɪn/ /pasəbəl/	/ɪn/ /ɹɛvəɹɛnt/	/ɪn/ /ɛpt/
Assimilation (Derivation 1)	ɪmpasəbəl	ɪɹɹɛvəɹɛnt	------------
Aspiration (Derivation 2)	ɪmpʰasəbəl	------------	ɪnɛptʰ
Phonetic representation	[ɪmpʰasəbəl]	[ɪɹɹɛvəɹɛnt]	[ɪnɛptʰ]

(From Loos 2003)

Observe that the various components of the derivational process in (1a) occur sequentially, the one after the other. This represents the linearity that characterised early generative phonology. In (1b), the phonetic representation at the terminal end of the cline is produced after the underlying representation has undergone a number of derivational processes (by means of phonological rules).

Over the years however, generative phonology has seen a lot of rethinking and important modifications. For instance, some features such as coronal, dorsal and labial are now viewed not as binary sets (Chomsky and Halle 1968: 65) but as unary ones. These unary features draw their labels only from the active articulators and are either specified for a segment or are considered irrelevant in the description of such segments. Thus they do not attract a + or − in their descriptions. Also, the thinking has greatly changed on the initial sentiments by Chomsky and others on the linear model that languages were assumed to take. Non-linearity has proven to be the way to go in describing phonological units especially suprasegmentals.

In adopting the 'generative phonology theory' and the related philosophies for this study, it is hoped that our attention will veer more toward seeing grammar as a system of rules which relate sound creation and meaning conceptualisation. Specifically, we will be more concerned with the levels of competence speakers have when they use their language rather than their ability to simply perform in it. This approach is also useful to the present study

because the systematic grammar of Kusaal can be adequately described by many of the parameters outlined in the theory.

1.10.2 Autosegmental Phonology

> Ever since there have been segments in phonology, there have been phenomena that evaded segmental classification, and so there have been suprasegmentals. (Goldsmith 1976: 11)

Thus, it is the goal of 'autosegmental phonology' to describe those units which do not behave like segments. Goldsmith (1976), drawing inspiration from Leben's (1973) work on suprasegmentals, is credited with putting autosegmental phonology into greater perspective using evidence from mostly African languages. On the basis of the fallout on the linear sequencing of segments (cf. Chomsky and Halle 1968: 65), Goldsmith (1976, 1990) proposes that certain phenomena operate beyond the level of segments. He states: "autosegmental phonology differs from familiar generative and traditional phonemic representation in that it consists of two or more tiers of segments" (Goldsmith 1990: 8). In this regard, the phonological features that are specified on such tiers appear not as a sequence of sounds but as a non-linear process of sound production. Accordingly, phonological units such as stress and pitch, vowel harmony and nasalisation and especially tone are appropriately recognised as "extending over units which can encompass more than one segment" (Hyman 1975: 186).

Autosegmental phonology posits two or more parallel levels (called tiers) of phonological representation. These tiers differ from each other and consist, on

their own, of a "string of segments". Further, the features that are specified on a particular tier are not allowed to appear on different tiers and so this makes for easy identification of the various segments on the different tiers.

The features that are specified on each tier are linked to the segments on the other tiers by means of **association lines**. 'Association lines' are drawn between segments to show that they do not occur haphazardly but in tandem with each other. They are used to indicate the "simultaneity in time" in the production of the various segments. Notwithstanding the foregoing, the manner of mapping between these segments is not always a 'one to one' affair (as in 2a). It is therefore possible to observe that some features on the different tiers are 'multiply associated', i.e., a single segment on a particular tier may have two association lines emanating from two features on a different tier being mapped unto it. The following is representative:

(2)   **Kusaal**

    a. L   H   b.   H

       | | / \

      a.yi   'two'   **fu:g**   'shirt'

The above examples highlight the representation of suprasegmentals within the autosegmental phonological framework. The tone tier is represented by L and H implying low and high tones respectively. The segmental tier also relates to the underlying consonantal and vocalic components of the phonological units while the unbroken lines connecting the two are the **lines of association**.

Further, features on the various tiers are mapped unto each other by a **Universal Association Convention (UAC)** which stipulates:

> When unassociated vowels and tones appear on the same side of an association line, they will be automatically associated in a one-to-one fashion, radiating outward from the association line (Goldsmith 1990: 14).

The implication then, is that in a 'sequence' of sound segments, the association convention determines that all other vowels are linked to some tone in an outward fashion once there is some congruence between them. In light of this, tones as well as the tone bearing units (TBUs) are matched, one to one, from left to right. TBUs that are left-over are then associated with the last tone while the left-over tones are equally associated with the last TBUs (Example 3a).

(3)   **Kusaal**

a.   L H L H
       | | | |
       | | | |
       ʊ pʊ kɪna: 'He did not come'
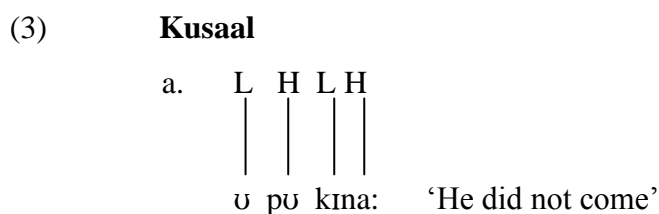
In associating these autosegments, however, care must be taken so as not to draw association lines across each other. This is in keeping with a formal principle known as the **No-crossing Constraint** which states simply that 'association lines do not cross' (Example 3b).

b.   * L   H   H
         ⟋\   ⟍ |
       ʊ pʊ kɪna 'He did not come'
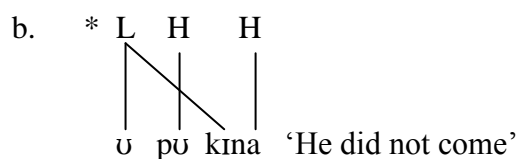
The asterisk (*) in (b) above, shows that the association between the elements on the two tiers is ill-formed. The goal of the 'UAC' and the 'No-crossing constraint' is such that they aim at explaining what is ongoing in speech which involves phenomena that operate beyond the level of the segment. A **Well-formedness Condition (WFC)** (Goldsmith 1990: 319) is thus formulated to explicitly capture the import of these two principles:

1. All vowels are associated with at least one tone.

2. All tones are associated with at least one vowel.

3. Association lines do not cross.

1.10.2.1 Tiers in Autosegmental phonology

Various kinds of tiers can be specified for the varying phonological descriptions. These tiers represent the different levels at which different phonological features operate. They also consist of a sequence of features which differ from one tier to the other. The theory thus embodies a number of tiers that may be relevant to speech including some of the following:

i. A **segmental** tier that spells out the phonetic representations which are relevant to the description. Underlyingly, phonetic segments are the features which appear here.

ii. Separate tiers which establish the various manners and places of articulation of the segments which contribute to the realisation of the suprasegmental phenomena. These are the domains of the **Manner of Articulation** and **Place of Articulation** tiers.

iii. Tone is a very important level in non-linear phonology and so it is assigned a tier which shows whether the underlying tone is high (H)

or low (L) or constitutes a combination of both. This is the **tone/tonal** tier.

iv. Various tiers could also be specified for the respective phonological descriptions, analyses or processes. A **phonation** tier is adduced to describe the voicing quality (+/- voice) of segments while a **nasalisation** tier shows the nasal quality or otherwise (+/- nasal) of the segments that are undergoing some change. Perhaps the most central tier in non-linear phonology is the skeletal tier.

v. The **skeletal** tier is an intermediary level that is posited to link autosegments to the fundamental consonants (C) and vowels (V). It is also referred to as the 'CV tier' or the 'timing tier'. Rather than directly associating tones to vowels (see examples 2 and 3 above), the convention is to associate such tones to a 'skeletal' level which then projects slots for the consonant and vowel segments. These slots, which can be either V or C slots are the anchor points of all other elements in an autosegmental chart and as such, the vowels and consonants in such a chart must link unto the skeletal tier or they will not be overtly realised. The **Linkage Condition** explicitly makes this point: "A segment will not be phonetically realised if it is not linked to a position in the skeletal tier." (Goldsmith 1990: 48, 53)

1.10.2.2 Common conventions in Autosegmental phonology

In autosegmental representations, some recurring shorthand is often employed. They include the following which are explained in relation to the figure in (4):

i.   **Tiers**: Three tiers are specified on the figure: a **nasal** or **nasalisation** tier which attracts either a + or - value for the various segments that are at issue in the phonological process. Segments which are produced naturally through the nasal cavity attract a + nasal value while oral segments attract a - nasal value; a **skeletal** tier which provides the slots unto which the segmental features are projected in order for them to be overtly realised; a **segmental** tier which spells out the exact consonant and vowel segments in the process.

ii. **Straight lines** represent 'association lines' which link one feature to another on the various tiers.

iii. **Dotted lines** represent a spread in the qualities of one segment to another while

iv. **Two short lines** drawn across an association line indicate that there has been a 'delinking' of two segments, i.e., a feature which was shared by two segments on separate tiers is no longer common to both of them.

v.   **Arrows** are also used to show the direction or flow of the phonological process. They show a specific (feeding) order in the processes as a reversal or mix up in the process will yield wrong results.

The example in figure (4) below puts all of the above into perspective. It highlights the processes that derive the French word /bɔ̃/ from *bon* 'good'.

(4)   **French**

Nasal Tier   -N   +N   -N   +N   -N   +N   -N   +N

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

Segmental Tier b   ɔ   n   b   ɔ   n   b   ɔ   n   b   ɔ   n

                -N   +N   -N   +N

                x   x   x ⟶ x   x

                b   ɔ   n   b   ɔ
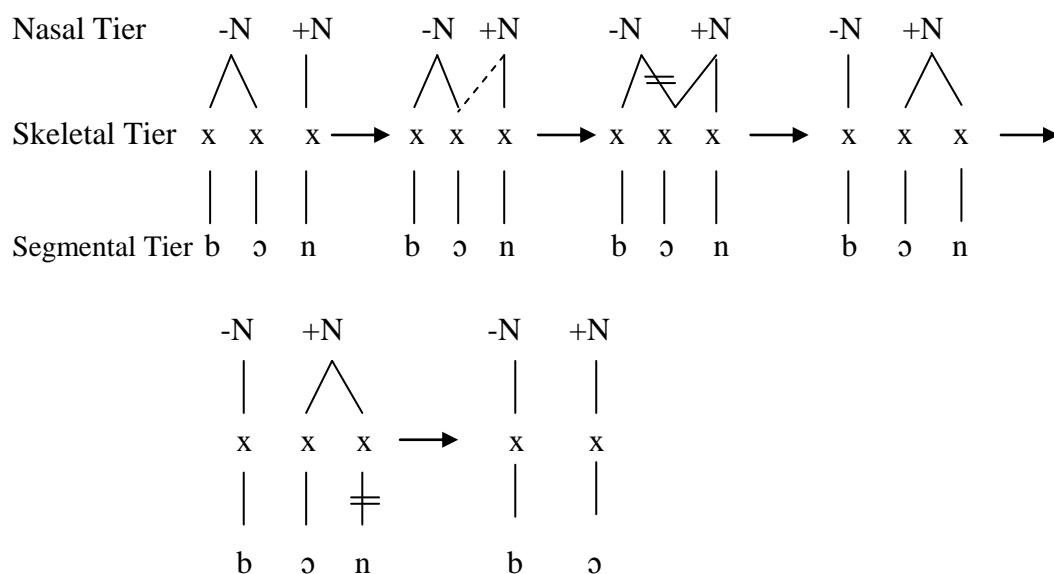
In the derivation, two phonological processes which are strictly ordered are represented. First is a spread of nasality from the word final nasal segment /n/ to the syllabic segment /ɔ/. The second process involves a complete delinking of the syllable final consonant.

Our concluding remarks: this theory is essential to the section on tones (Chapter Four) as it allows us to show how tones (together with other prosodic units such as stress, vowel harmony, nasalisation, etc.) operate on their own. It also allows for us to see how prosodic features are independent of other sound segments such as consonants and vowels.

1.10.3 The Mora

Moraic theory is often traced to Prague School linguists such as Trubetzkoy (1932), but some of the contemporary research has been carried out by such scholars as Hyman (1984, 1985) and van der Hulst (1984) after a lot of

dissatisfaction with the onset-rhyme approach to viewing syllables. 'Mora theory', unlike the onset-rhyme theory, divides the syllable into 'weight units' rather than into immediate constituents called onset and rhyme.

The approach views each mora as the segment which contributes to the weight of a syllable while there may be other occurring segments (especially initial consonants) that may not add to the weight of the syllable. Light syllables according to the mora theory are monomoraic, i.e. they contain only one mora while heavy syllables are bimoraic, i.e., they contain at least two moras (Ewen and van der Hulst 2005). The two moras may be only vowels (such as VV or CVV) or they may include at least one syllabic element and a syllable final consonant (eg. VC). The symbol for the 'mora' is 'μ' and (5) is the moraic representation of the structure of the syllable:

(5)

$$
\begin{array}{ccc}
 & \sigma & \\
 & | \quad \diagdown & \\
 & \mu & \mu \\
 & | & | \\
(C) & V & (V)(C)
\end{array}
$$
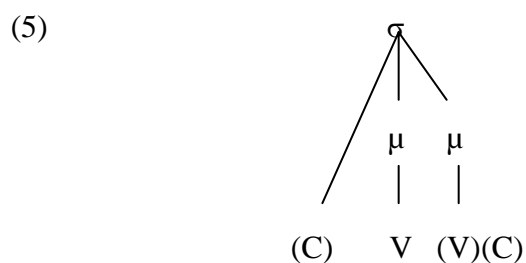
Following from the above, initial consonants and any prevocalic material are characterised as descending directly from the syllable node while the weight carrying segments are linked to the mora. The un-bracketed V is obligatory. The motivation for using the moraic approach in analysing Kusaal syllable structure is simple. It allows for one to represent more appropriately, those "shape-dependent processes" such as compensatory lengthening, sequencing of vowels and vowel lengthening which rely more on the weights of syllables rather than on the number of comprising segments (Broselow 1995: 188).

1.11 METHODOLOGY

As the researcher is a native speaker of Kusaal, native speaker intuition was one of the important assets in this enterprise. However, in order to have accurate and conclusive results, such data was often tested with other native speakers. Language experts with insight into the Mabia languages especially on Kusaal were also consulted.

In view of the fact that this thesis was subsumed in another project that was being facilitated by the researcher's lead supervisor, a number of days of field work (approximately 10 days) was carried out in October 2009 in two of the Kusaal speaking areas, precisely in Bawku and Zebilla. Data was elicited from 12 respondents in all; six from each of the dialects mainly represented in the two towns and this was captured on a digital recorder. Transcriptions were then made for the purposes of describing the phonology of the language.

The 12 respondents comprised six males and females respectively. The ages of the respondents were also greatly varied so as to capture the current state of affairs of the language as well as be fairly representative of the language as it obtains. Of the total number, three were below 17 years of age while four were nearly middle-aged (between 25 and 35 years). The remaining five were people aged 55 years and above. In all of these cases, the respondents showed a lot of interest in helping towards the efforts being made at documenting the language and at having their voices on the recorder. When the respondent was literate, it facilitated the recording session as they could take charge of the wordlist and

provide the answers without any subtle attempts at leading them as was the case with those without formal education.

Respondents were also made to recount short stories and these were recorded. The Ibadan wordlist was also a very useful resource in the data collection process because it allowed for the researcher to gather data that is at once both realistic and specific to the purposes of the study. The responses gathered were used in corroboration with some of the existing secondary sources which include wordlists and previous studies. Some of the sources of this study therefore come from some of the scant existing literature on the language.

In order to determine the nature of tone in the language and how they patterned up in both the morphological and syntactic systems of the language, the Praat acoustics software was a very useful resource. It provided a lot of information on what it is that the language users do with the range of pitches at their disposal.

1.12 ORGANISATION OF WORK

This thesis comprises five chapters. Chapter One makes the introductory statements on the language under review and as well highlights the various theories which are relevant to different sections of the study. Chapter Two presents a full inventory of the underlying sounds of the language. Chapter Three describes some phonological processes while Chapter Four is dedicated to the tonology of the language. The conclusion and summary of findings are taken up in Chapter Five.

1.13 SUMMARY

In this chapter, we have sought to ground the basis of this study. We started by stating the scope of the study as well as the motivations for undertaking the research. The chapter also described the demography, sociology and ethno-linguistic profile of the people under review. Relevant previous studies on the language and its cognates were also briefly cited. The theories that underpin the study: 'generative phonology', 'autosegmental phonology' and 'moraic theory' are also explicated in this chapter. It concludes with a statement on the methodology that is adopted for the study and the organisation of the rest of the work.

ENDNOTES

1 This map shows eight districts of the Upper East Region but actually there are nine. The Kasena-Nankana District was in October 2007, divided into the Kasena-Nankana East and West districts with their capitals in Navrongo and Paga respectively.

2 This is the acronym for the Ghana Institute of Linguistics, Literacy and Bible Translation (GILLBT) located at Tamale in the Northern Region of Ghana.

CHAPTER TWO

THE SOUNDS AND SYLLABLE STRUCTURES

2.1 INTRODUCTION

This section of the study entails a detailed description of the sound systems of Kusaal. The description will be carried out within the larger 'generative phonological framework' drawing on the distinctive feature theory of Chomsky and Halle (1968 hereafter SPE). Phonemically, Kusaal has twenty four (24) consonants and nine (9) vowels.

2.2 THE CONSONANT SYSTEM

The consonant sounds that occur in the language relate to seven places and five manners of articulation shown on the horizontal and vertical axes respectively on Table (1) below. Among them are four double articulated sounds which are used extensively in the language. In section 2.2.1, we make a few observations about the various consonants and put them into context.

Table 1   **Kusaal consonants**

	Bilabial	Labio-dental	Alveolar	Palatals	Velar	Labial-velar	Glottal
Plosive	p b		t d		k g	kp gb	ʔ
Nasal	m		n	ɲ	ŋ	ŋw	
Fricative		f v	s z	ɟ			h
Approximant				j		w	
Lateral			l				
Trill			r				

2.2.1 Notes on consonant sounds

i. **Plosives**

All the plosives in Kusaal have voiced and voiceless counterparts except the velar glottal /ʔ/ which is naturally voiceless. The glottal usually occurs at intervocalic positions and is represented by an apostrophe (') in the orthography. The double articulated sounds /kp/ and /gb/ form one unit and are thus inseparable.

The plosives occur in the following words: the first sets under the phonemes represent occurrences at syllable initial position while the second are syllable final. A dash (-) represents non-occurrence of the consonants at the specific syllable position. In this study, long vowels that have the same tone are marked with only one tone on the first vowel:

/p/		/b/	
pàŋ	'strength'	**báŋ**	'ring'
dá:p	'men'	**dàˀb**	'the act of pushing'

/t/		/d/	
tām	'forget'	**dām**	'shake'
kút	'metal'	**sàˀd**	'refuse.n'

/k/		/g/	
kɔ̄s	'cough'	**gɔ́s**	'look'
sú:k	'hut'	**sʉ̀ːg**	'knife'

/kp/			/gb/	
kpɛ́	'enter'		**gbɛ̀**	'sleep'
-			-	

/ʔ/			/h/	
bɪ̄ắ'ár	'mud'		**hālí**	'until'
-			**áh**	exclamation

ii. **Nasals**

All the nasals are naturally voiced. An allophonic variation of the bilabial nasal /m/ is /ɱ/ realised in homorganic situations with the voiced labio-velar fricative /f/. The palatal /ɲ/ is written (ny) while the velar /ŋ/ is left as such in the orthography. Examples include the following:

/m/			/n/	
múà	'suck'		**núá**	'fowl'
ním	'meat'		**mín**	'also'

/ɲ/			/ŋ/	
nyɪ̄n	'tooth'		-	
-			**tɔ̀ɪ̀ŋ**	'to send'

/ŋw/			/w/	
ŋwìàk	'wring'		**wìàk**	'hatch'
-			-	

iii. **Fricatives**

The labio-dental and alveolar fricatives have both voiced and voiceless counterparts. While the palatal fricative /ʝ/ is voiced its glottal counterpart /h/ is voiceless. In the orthography, /ʝ/ is written (j). It should therefore not be

confused with the palatal approximant /j/ which is written as (y) in the orthography.

/f/			/v/	
fú:g	'shirt'		**vū:g**	'pull'
nɛ́f	'eye'		-	

/s/			/z/	
sìàk	'agree'		**zìàk**	'to variegate'
nī:mí:s	'birds'	-		

/ʝ/			/j/	
jàùk	'type of dance'		**yá:g**	'grave'
-			-	

/h/			/ʕ/	
hāĺi	'until'		**bīá̃'ár**	'mud'
áh	'exclamation'			

iv. **Glides**

The label 'glides' is a hypernymous term used to capture approximants, laterals and trills. All glides in Kusaal are intrinsically voiced. The palatal approximant /j/ is written as (y) while the labial-velar approximant /w/ occurs together with the labial-velar nasal /ŋw/. The lateral /l/ is more pronounced in the language than the trill /r/ which is prominent only in idiolectal or dialectal variations.

/j/			/w/	
yàl̃g	'wide'		**wàl̃g**	'shower'
-			-	

/l/			/r/	
fōlúg	'sheath'		**fōrʊ̀g**	'to sip'
fá:l ŋ	'space'		**fá̃:r**	'to save'

Table (2) highlights the distribution of Kusaal consonants at word initial, medial and final positions. Shaded areas indicate that the consonant does not occur in such environments.

Table 2   **Distribution of consonants**

Consonant	INITIAL		MEDIAL		FINAL	
	Word	Gloss	Word	Gloss	Word	Gloss
/p/	**pàŋ**	strength	**bīpúŋ**	girl	**táːp**	colleagues
/b/	**búːg**	goat	**bòmbɔ̀k**	hole	**pòáb**	women
/t/	**tīːg**	tree	**àtã̄**	three	**kʰút**	metal
/d/[1]	**dɔ̃ːg**	room	**dīndēɔg**	chameleon	**níd**	person
/k/	**kàrìm**	read	**kīŋkírīg**	dwarf	**lùàk**	search
/g/	**gél**	egg	**yīːgā**	first	**bīːg**	child
/kp/	**kpāːm**	oil	**kpùŋkpàŋ**	wing		
/gb/	**gbàːm**	catch	**agbáŋ**	personal name		
/ʔ/			**nyɔ̄’ɔg**	chest		
/m/	**mān**	I/me	**sālmā**	gold	**dáːm**	pito
/n/	**nāːf**	cow	**nà’ànám**	chiefs	**tán**	sand
/ɲ/	**nyàn**	shame	**pɔnyāŋ**	old lady		
/ŋ/			**nìŋgɔ̀ːr**	neck	**nɔ̄ŋ**	poverty
/ŋw/	**nwám**	calabash				
/f/	**fāːl**	place	**mālfū**	gun	**wāːf**	snake
/v/	**vã:d**	leaves	**búnvén**	beautiful		
/s/	**sūːk**	knife	**sìsīem**	wind	**tà’ãs**	shout
/z/	**zɛ̃ːd**	soup	**zùnzùŋ**	blind person		
/ʝ/	**jēbún**	type of 'juju'	**ābānjá**	lizard		
/h/	**hālí**	until			**àh áh!**	interjection
/j/	**yíːr**	house	**píːjá (T.)**	ten		
/w/	**wélá**	how	**dàwēn**	bird		
/l/	**lāː**	bowl	**bùlùg**	well	**pāl**	street
/r/[1]	**rɔ̀ːg (T.)**	room	**nɔrāːg**	cock	**pʊːr**	stomach

2.2.2 Consonant distribution at word and syllable levels

Based on the distribution of consonants on the above table, we can make the following generalisations:

i. **Initial positions**

At word and/or syllable initial position, all the consonants can occur except the velar nasal /ŋ/. The behaviour of the glottal stop /ʔ/ in the above regard is quite dicey. Naturally, it is a bad candidate at word initial positions. It may however occur syllable initially through a re-syllabification process which moves inserted glottals at intervocalic positions to initial positions of 'second' syllables (See also §3.3.3 below).

ii. **Medial positions**

The glottal fricative /h/ and the labial-velar nasal /ŋw/ are the only consonants that are restricted from occurring in word medial positions. However, at syllable medial positions, no consonants obtain. Such positions are the absolute reserve of vocoids and syllabic nasals which qualify to go into syllable nuclei.

iii. **Final positions**

At syllable or word final positions, three plosives - the double articulated sounds /kp/ and /gb/, and the glottal /ʔ/ do not occur. Two nasals, the palatal /ɲ/ and the labial-velar /ŋw/ are also restricted from occurring at such positions. Together with the approximants /j/ and /w/, all the voiced alveolar fricatives /v/, /z/, and /ʝ/ are barred from occurring at syllable or word final positions.

2.3 THE VOWEL SYSTEM

Spratt and Spratt's (1968: 29) pioneering work identifies a nine oral vowel system for Kusaal [i, ɪ, e, ɛ, a, u, ʊ, o,] and five nasal vowels [ĩ, ɛ̃, ã, ũ, ɔ̃] which are all produced with an advanced tongue root. These vowels are still very important in the language. All the nine oral vowels also have long vowel correlates[2]. Sequences of vowels are also very prolific in the language. Table (3) below is a representation of the nine phonemic vowel system of the language:

Table 3   **Kusaal vowels**
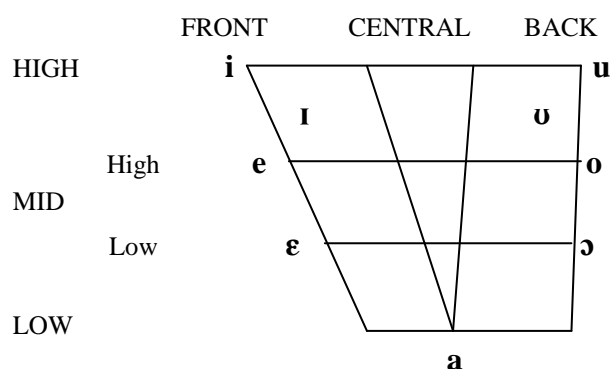
2.3.1 Short oral vowels

All the vowels of Kusaal are produced at either the front [i, ɪ, e, ɛ], central [a] or back [u, ʊ, o, ɔ] of the tongue and also at the high [i, ɪ, u, ʊ], mid [e, ɛ, o, ɔ] or low [a] position of the tongue body. The vowel sounds on Table 3 above represent only the phonemic short vowels in the language. Examples of their occurrence are given after the discussion on long vowels.

2.3.2 Long oral vowels

All the short vowels in the Table 3 above can also be produced with a perceived degree of lengthening in their quality. The evidence for long vowels is given by the existence of many lexical items in the language within which vowels are produced over a longer duration of time than the short ones. Long vowels are usually represented by the short vowel sound followed by a colon (ː). The sets of words below are illustrative of the distribution of short and long vowels in Kusaal. While the set to the left exemplify short vowel occurrences, the ones to the right are the long vowel correlates.

(1) /i/ **síd** 'husband /iː/ **bī̄ːg** 'child'

  /ɪ/ **pìk** 'crack' /ɪː/ **sī̃ːt** 'honey'

  /e/ **pèŋ** 'borrow' /eː/ **bē'ēd** 'bad'

  /ɛ/ **bɛ́** EXISTENTIAL /ɛː/ **bɛ̄ː** 'or'

  /u/ **súmá** 'groundnuts' /uː/ **zú:g** 'head'

  /ʊ/ **ʊ̀** 's/he' /ʊː/ **ʊ́ːn** 'dry season

  /ɔ/ **gɔ́nyám** 'laziness' /ɔː/ **mɔ̄ːg** 'grass'

  /o/ **Bōk** 'Bawku' /oː/ **pó:g** 'farm'

  /a/ **pāl** 'street' /aː/ **pá:l** 'new'

2.3.3 Nasal vowels

In the production of vowel sounds, the velum is usually raised above the normal position in order to check the airstream from escaping through the nasal cavity. This rids the vowel of any nasal qualities thus making it a bona fide oral sound. However, some vowels, through a process of 'simultaneous nasalisation' may be 'distinctively nasalised when the velum is deliberately

lowered to ensure substantial airflow through the nasal cavities' (Clark and Yallop 1995: 31-2, 63). Kusaal has five of such nasal vowels and they are drawn only from the unadvanced/retracted tongue root [-ATR] sounds. They occur in words such as the following:

(2)	/ĩ/	**tĩ**	'vomit'
	/ũ/	**sũ:f**	'heart'
	/ɛ̃/	**gɛ̃**	'mad/angry with'
	/ɔ̃/	**dɔ̃:t**	'dawadawa fruit'
	/ã/	**fã:r**	'to save'

2.3.4 Vowel sequencing

Vowel sequencing is quite a pervasive phenomenon in Kusaal. These often involve sequences of vowels which are however represented as separate moras within the same syllable. Such articulations involve vowel glides from one height position in the oral aperture to another and their number and occurrence is varied. Anonymous (nd: 9) notes that in these sequences of unlike vowels, the first parts usually take a stronger stress than the second. The following make the foregoing clearer. However, they do not on their own, make up an exhaustive list of all the possible vowel-vowel sequences in the language:

(3)	/ie/	**pīèl**	'white'	/ua/	**sūà**	'hide'
	/ia/	**sìāk**	'agree'	/uo/	**kúos**	'sell'
	/ei/	**bèìlīm**	'environment'	/ɔɪ/	**àyɔ́pɔ̄ɪ**	'seven'
	/ɛɪ/	**zɛ̀ɪm**	'potash'	/oi/	**vóí**	'live'
	/ɛo/	**pɛ̄ɔ̄g**	'sheep'	/ʊa/	**púá**	'woman'
	/aɪ/	**nā:ɪ**	'finish'	/ao/	**páóg**	'bark'

2.4 DISTINCTIVE FEATURES (DFs)

SPE (Chomsky and Halle 1968) is the basis of this section of the study. It entails a development of earlier work by Trubetzkoy (1939), Jakobson et al (1951) and Jakobson and Halle (1956) and presents the view that phonological representations are sequences of segments made up of distinct features which describe aspects of articulation and perception. Features are the fundamental building blocks of phonological analyses and as such they are the properties that mark one segment as discrete from the other. They are thus regarded as the phonetic characteristics of any specific segment.

SPE's approach to describing segments is averse to explaining them only from an acoustic outlook. Particularly, it 'replaced acoustically-defined phonological features with a set of features that have, in most cases, articulatory correlates' (Katamba 1989: 42). It also describes such features from a perceptual perspective. This makes for a lot of clarity and precision in the description and analysis of the recurring phonological segments in the languages of the world. The landmark study specifies a larger range of unique universal features in the languages of the world which greatly outnumber the initial 'distinctive features' proposed in pioneering expositions such as Jakobson and Halle (1956) which posits only twelve DFs. It also assigns to each of these features the binary values of Jakobson and Halle (ibid). Binarity specifies that a feature is either present in the general nature of a segment or it is absent in such. In the former case, it attracts a plus (+) value while in the latter it attracts a minus (-) value. In light of stronger evidence and current thinking since the time of the SPE, some features, namely, [labial], [dorsal], and [coronal] have come to be

described, only in relation to the role of the active articulators in their production. They are labelled unary features because, unlike their binary counterparts which are specified with regard to their passive articulators, they (unary features) are either relevant to the segments under consideration or they are not specified at all. Thus, they do not attract + or - values.

Roca and Johnson (1999: 97-8) point out that though the parameters used in the 'distinctive feature theory' are naturally binary, it is not all of them which behave as such. The point they make is that the presence of some articulatory gestures does not imply the absence of another in some situations. For instance, the presence of labial consonants does not mean the absence of other consonants produced in other places of articulation. A major difference between binarism and unarism is in complementarity, i.e. while binary features express mutually exclusive groups - where the presence of one precludes the other, unarism expresses non-complementarity as the presence of one does not mean the absence of the other. In essence, the features [labial], [coronal] and [dorsal] "can co-occur since the gesture each feature represents is not incompatible with the gesture represented by the others".

Segments are considered as consisting of a set of unordered atomic features and so classifying them under particular DFs is a worth while enterprise. Clements (2003) provides a summary of the functions of features in phonetic descriptions or analyses. In consonance with his sentiments, we state that the features in the ensuing discussions are tailored, cross-linguistically, to be:

  i. universal - i.e. they represent the totality of the 'phonetic capabilities of man'. They thus transcend typological descriptions.

ii.   distinctive - i.e. they differentiate one segment/phoneme from the other,

iii.   delimiting - i.e. they 'specify the number of theoretically possible speech sound contrasts within and across languages',

iv.   economical - i.e. using a relatively small number of descriptive features we are able to depict vast paradigms of phonological segments,

v.   capable of defining 'natural classes' - i.e. they allow for us to group together sounds that share similar properties and undergo similar phonological processes,

vi.   indicators of markedness patterns - i.e. they establish which patterns are most or least preferred in speech production across the world.

       (http://nickclements.free.fr/featuretheory.html)

These functions set out some of the crucial roles a feature theory plays in cross-linguistic phonetic descriptions and precisely so for this exposition on the Kusaal language. We will proceed to describe the phonology of Kusaal drawing largely on SPE (1968: 299 ff). An attempt has been made in this study to minimise redundancy from the start and so features that are similar in terminology or function have been collapsed into each other. The following are thus relevant to the description of both consonants and vowels.

2.4.1 Major Class Features

The major class features differentiate those sounds that are produced with either an obstruction or a free flow of the airstream as it moves through the

vocal tract. Consequently, they make the key distinctions between which segments are consonants or vocoids and which ones are sonorants or obstruents. Two features are specified for this class:

2.4.1.1 [Consonantal]

"Consonantal sounds are produced with a radical obstruction in the midsagittal region of the vocal tract; non-consonantal sounds are produced without such an obstruction" (SPE: 302). [+cons] sounds will therefore include all those ones in the production of which the airstream is manipulated. These are all the consonants in Table (1) above; plosives, fricatives, nasals and lateral sounds. [-cons] are all the vowels together with the approximants.

2.4.1.2 [Sonorant]

The extremes in this feature are used to explain the voicing quality inherent in any two sounds. While sonorant sounds are "produced with a vocal tract cavity configuration in which spontaneous voicing is possible; obstruents are produced with a cavity configuration that makes spontaneous voicing impossible" (SPE: ibid). Obstruents are the same as [-son] sounds. Sounds which are naturally voiced in Kusaal are the vowels, nasals, palatals, and all the glides. The rest of the consonants are [-son].

2.4.2 Manner Features

Manner features specify the stricture types that are used as the airstream flows through the vocal tract. Stricture refers to the various modifications of the airstream. Four of these features are discussed below:

2.4.2.1 [Continuant]

Sounds which are produced with an absolute obstruction of the airstream are considered [-cont] while those sounds in whose production the airstream is not impeded are [+cont]. This feature thus groups the fricatives, approximants and laterals into the [+cont] category while plosives and nasals are classified as [-cont]. Vowels are also [+cont].

2.4.2.2 [Nasal]

[+/-nasal] is used to differentiate sounds which are produced with a lowering of the velum from those which are produced with a raising of the velum. The process of either lowering or raising the velum allows for a larger component of the gust of pulmonic egressive airstream to exit through the nasal or oral cavities respectively. Sounds produced through the nasal cavity are given a [+nas] attribute. They include all nasal consonants and nasalised vowels. All other sounds are [-nas].

2.4.2.3 [Lateral]

Only one lateral segmental feature is specifiable in Kusaal; the alveolar lateral [l] which is produced by lowering the mid-section of the tongue at the sides allowing air to flow out near the molars. The lateral sound is voiced in Kusaal.

2.4.2.4 [Strident]

This feature makes a difference between the 'acoustically' more noisy sounds and the less noisy ones. The SPE states that the surface over which the airstream flows, the rate or even the angle at which it flows may result in the

realisation of various degrees of noisiness in the different sounds (pg. 329). The labio-dental, alveolar, palatal and glottal fricatives [f, v, s, z, ʝ, h] of Kusaal are [+strid] while the rest are [-strid].

2.4.3 Cavity Features

This class of DFs puts sounds into groups based on the places in the vocal tract where they are articulated. A total of seven such features are relevant for the purposes of this study. The discussion further incorporates some of the current trends in the 'distinctive feature theory' such as viewing the coronal primary stricture of Chomsky and Halle (1968: 304) - in unary rather than in binary terms. Two other features which are described as unary - [dorsal] and [labial], are also found under this group. Referring to such features as unary is more appropriate because the point of 'binarity' is to spell out whether or not a certain feature is part of the character of a specific segment from the point of view of the passive articulators. In the case of the unary features, active articulators are central in describing sounds. So when an active articulator such as the blade or back of the tongue or the lips makes a precise movement when producing a sound, it is necessary to specify that action otherwise it becomes superfluous to specify such an action when the active articulator has not moved from its position of rest.

2.4.3.1 [Coronal]

While Chomsky and Halle assign binary values to the feature 'coronal' (SPE: 304), this thesis makes reference only to the privative coronal for the reasons stated above. Therefore, sounds which are coronal are produced with the blade

of the tongue as the active articulator. In such articulatory procedures, the tongue is raised above its normal position in the oral cavity and is very critical to the nature of the sound that is to be produced. Coronal sounds in Kusaal are all the alveolar and palatal sounds. The rest are not coronal.

2.4.3.2 [Dorsal]

Dorsal sounds are produced with the back (dorsum) of the tongue as the active articulator. It is a unary feature and refers to the [+back] feature of the SPE (pg. 305) which is "produced by retracting the body of the tongue from the neutral position." The velars [k, g and ŋ] and the glottals [ʔ and h] together with all back vowels have a dorsal constriction. The labial-velars [kp, gb ŋw, and w] also take part of their nature from this feature and from the feature [labial]. It is therefore possible to say that such segments are, at once, both [labial] and [dorsal] rather than labelling them as [+back] [-back] at the same time.

In describing consonants then, the unary [labial] feature is proposed to replace the binary [back] feature. The binary specification is still important because the plus (+) or minus (−) oppositions are indispensable in apt descriptions of some sounds. For example, [+/-back] is an important parameter in describing the nature of vowels because aside front and back vowels, there are also central members.

2.4.3.3 [Labial]

Labial sounds are produced with the lips as active articulators. The flow of the airstream is thus modulated by the two lips or the lower lip in conjunction with

some other articulator such as the teeth. It thus captures all the bilabial and labio-dental sounds [p, b, m, f, v] and the labial-velar approximant [w]. The feature labial is also used to describe the labial-velars [kp, gb and ŋw]. All other sounds are produced elsewhere.

2.4.3.4 [Anterior]

"Anterior sounds are produced with an obstruction that is located in front of the palato-alveolar region of the mouth; non anterior sounds are produced without such an obstruction" (SPE: 304). All sounds which are produced at any point from the alveolar ridge to the lips are [+ant], i.e. all the alveolars, the labio-dentals and the bilabials. The [-ant] sounds are produced at some point after the alveolar ridge beginning from the palatal region through the velum to the pharynx. The labial-velar plosives [kp] and [gb] are however produced spontaneously at the two extremes and so they may not be properly described by this feature. For instance, if they are described as [-ant][+ant], the impression this gives is that they are produced sequentially: [k] first then [p]. On the contrary, this is not so because labial-velars are situations of instantaneous double articulation.

2.4.3.5 [High]

The feature [+/-high] relates to the vertical positioning of the tongue in the oral cavity (Catford 1988: 124). When at rest or neutral position, the body of the tongue is usually raised and pointed towards the front part of the mouth. In the production of [+high] sounds, the body of the tongue is further raised beyond this neutral position while [-high] sounds are produced without any such movement (SPE: 304). [+high] consonants are the palatals and velars. The high

vowels [i, ɪ, ʊ and u] are found in this group. All other sounds attract a [-high] value. Nonetheless, this should not be taken to mean that [-high] sounds are naturally [+low] but rather that they are produced without any considerable rise in the body of the tongue.

2.4.3.6 [Low]

While [+low] is used to describe a lowering of the body of the tongue below the normal rest position when articulating some sounds, [-low] indicates that in such situations the tongue is not lowered below the normal. Along much the same lines as the [+/-high] feature above, [-low] does not imply [+high]. Two [+low] consonants are used in Kusaal: the glottal plosive [ʔ] and fricative [h] in addition to one [+low] vowel [a]. Considering the few representatives of this group, one can assert that the process of further lowering the tongue below the neutral position is a marked phenomenon in Kusaal. In light of the fact that language users often aim at using the most facile and readily available means to achieve their communicative purposes, marked forms, of the like above, are readily sacrificed for the unmarked.

2.4.3.7 [Round]

Rounding relates to the posture of the lips during certain articulations. While [+round] sounds are produced with a narrowing of the lips, [-round] sounds are produced without any such narrowing (SPE: 309). This feature thus distinguishes between the rounded vowels [u, ʊ, o, ɔ] and the unrounded ones [i, e, ɛ, a]. The labial-velar fricative and approximant [ŋw, w] are also articulated with a rounding quality.

2.4.3.8 [ATR]

The advancement or otherwise of the tongue root is at issue in this feature. Kenstowicz (1994: 14) explains that "in the pharynx, the root of the tongue may be projected forward to create a greater pharyngeal opening or it may fail to be so advanced". In the case of the former it relates to Advanced Tongue Root which is the same as [+ATR] while in the latter, it relates to unadvanced/retracted tongue root which is [-ATR]. Vowels are the segments that are described in these terms because yet another parameter is needed to distinguish one vowel from the other in languages such as Kusaal which have four vowel height specifications. Aside the [+/-high], [+/-back] and [+/-round] distinctions then, [i, e, u and o] are considered [+ATR] while [ɪ, ɛ, ʊ, ɔ and a] are [-ATR] in Kusaal.

2.4.3.9 [Voice]

This feature puts into context the action of the vocal cords as the airstream is pushed out of the larynx. When the vocal folds vibrate during the process of articulation, the segment is considered to have taken on a voicing quality indicated by [+voi], while those produced without any vibration are voiceless and therefore [-voi].

2.4.3.10 [Spread Glottis]

The state of the glottis is another parameter used to describe the nature of consonant sounds. **[+/-spread glottis]** is used to distinguish between sounds that are 'aspirated', i.e. produced by spreading the vocal cords or 'glottalised' – by constricting the vocal cords. When the sounds are aspirated they are given a

[+spread gl] feature while they are [-spread gl] when they are glottalised. Spratt and Spratt (1968: 11) identify three [+spread gl] plosives in Kusaal [pʰ, tʰ, and kʰ]. [-spread gl] is wide spread especially intervocalically and degenerates from the voiced velar plosive [g].

The charts in (4) and (5) below are the feature matrices for the various consonant and vowel sounds in the language. The norm, usually, is to put a circle around redundant feature specifications or even to leave the specifications without any overt marking. However, considering that the entire range of possible distinguishing features in Kusaal have been mapped out on the matrices, such an enterprise will prove futile chiefly because the charts will appear a jumble of circles and double circles (if all the redundancies are circled). Advertently, outright redundant features have been left blank. Also, since unary features do not take a (+) or (−) value, they are specified with a tick (√) when they are relevant to the segments under discussion. When they are not, the spaces are left unmarked.

Table 4   Feature matrix of Kusaal consonant sounds

	p	b	t	d	k	g	kp	gb	ʔ	m	n	ɲ	ŋ	ŋw	F	v	s	z	ʝ	h	j	w	l	r
Consonantal	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sonorant	-	-	-	-	-	-	-	-	-	+	+	+	+	+	-	-	-	-	-	-	+	+	+	+
Continuant	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	-
Nasal	-	-	-	-	-	-	-	-	-	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-
Lateral	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
Strident	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	-	-	-	-
Coronal			√	√							√	√					√	√	√		√		√	√
Dorsal					√	√	√	√					√	√								√		
Labial	√	√					√	√		√				√	√	√						√		
Anterior	+	+	+	+	-	-			-	+	+	-	-		+	+	+	+	-	-	-		+	+
High	-	-	-	-	+	+			-	-	-	+	+		-	-	-	-	+	-	+		-	-
Low	-	-	-	-	-	-			+	-	-	-	-						-	+	-			
Round	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	+	-	-
Voicing	-	+	-	+	-	+	-	+	-	+	+	+	+	+	-	+	-	+	+	-	+	+	+	+
Spread glottis	+	-	+	-	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 5   Feature matrix of Kusaal vowel sounds

	i	ɪ	e	ɛ	a	u	ʊ	o	ɔ	iː	ɪː	eː	ɛː	aː	uː	ʊː	oː	ɔː	ĩ	ɛ̃	ã	ũ	ɔ̃
Consonantal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sonorant	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Continuant	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Nasal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+
Front	+	+	+	+	-	-	-	-	-	+	+	+	+	-	-	-	-	-	+	+	-	-	-
Back	-	-	-	-	-	+	+	+	+	-	-	-	-	-	+	+	+	+	-	-	-	+	+
High	+	+	-	-	-	+	+	-	-	+	+	-	-	-	+	+	-	-	+	-	-	+	-
Low	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	+	-	-
Round	-	-	-	-	-	+	+	+	+	-	-	-	-	-	+	+	+	+	-	-	-	+	+
ATR	+	-	+	-	-	+	-	+	-	+	-	+	-	-	+	-	+	-	-	-	-	-	-
Voicing	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

2.5 SEGMENT REDUNDANCIES

Having established the various features that are used in the description of the sounds of Kusaal, there appear to be several points on which some convergence is evident among the features. These are indications of redundancy. Stanley (1967) iterates that:

> …the existence of phonological redundancy is due to the fact that each language exhibits systematic constraints on its phoneme sequences so that not all sequences of phonemes form possible morphemes of the language. (393)

A feature is therefore redundant if it is predictable based on specifications of other features in a matrix (Ewen and van der Hulst 2001). Kenstowicz (1994: 60) also makes reference to these predictable features as non-distinctive vis-à-vis those ones that are unpredictable, contrastive or distinctive. From the charts on tables (4) and (5) it is possible to make a number of generalisations based on the features of the sounds. For instance, one can infer that a segment which has the feature [-cons] also has the feature [+son]. In like manner, if a segment is specified for [+nas] then it means that it is also [+son]. Statements of this sort can either be cross-linguistically true or they may be language specific.

We will take the following cross-linguistic redundancies, exemplified from (4) to (8), as the precedents and then proceed to extract some redundant features which are specific to Kusaal in examples (9) to (13). The downward pointing arrows are used to connote 'implies' or 'then'. Statements that have (a) and (b) counterparts are '"inversely" symmetrical' (Schane 1973: 36), i.e., when the

positions and/or values of the various features are interchanged valid deductions can still be made from the statements.

The notation in (4) makes a a prediction about nasal sounds. It states that once a segment is constricted through the nasal cavity then it is also a naturally voiced segment.

(4)   If   **[+nas]**

$$\downarrow$$

[+son]
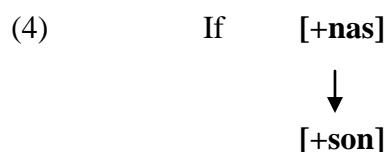
In (5), one can infer that if a segment is [+son] then it is also naturally voiced which means it attracts a [+voi] feature specification.

(5)   If   **[+son]**

$$\downarrow$$

[+voi]
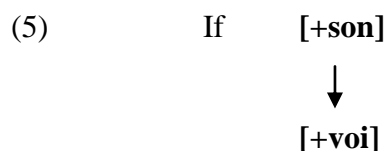
From (6) below, the statement is to the effect that if a sound is a nasal, which also makes it, a naturally voiced sound, then in its production there is a complete obstruction of the airstream.

(6)   If   **[+nas]**

$$\downarrow$$

[-cont]
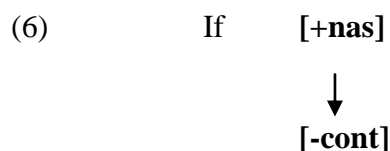
If a segment is produced with the tongue body raised above the rest position, then it cannot at the same instant be produced below the normal rest position of the tongue. Therefore, if a segment is [+high] then by default, it is [-low]. The

vice versa is also true in the (b) statement of (7) below. These statements are thus inversely symmetrical to each other. In (8), the formalism suggests that if a segment is produced from the alveolar region onwards to the lips [+ant], then it must be also be a [-high], [-low] segment.

(7)   (a)   If   **[+high]**   (b) If **[+low]**

                      ↓   ↓

                    [-low]   **[-high]**

(8)   If   **[+ant]**

                      ↓

                    [-high]

                    [-low]
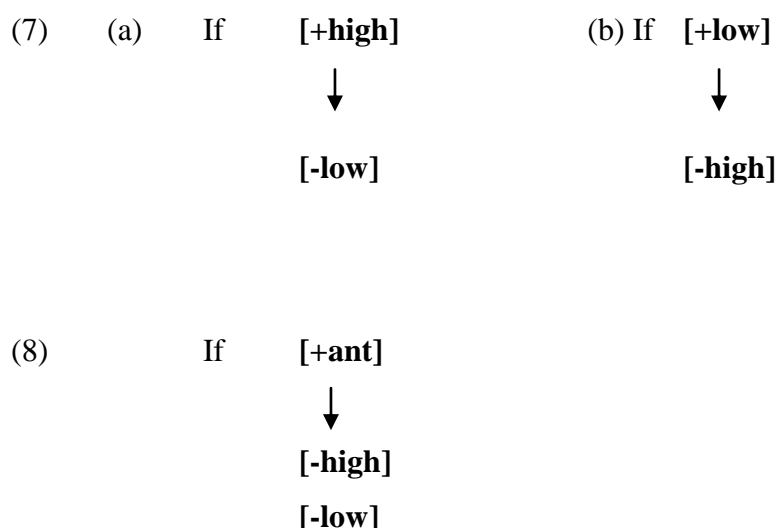
The statements in the above are attested across many of the languages of the world. What follows in (9) to (13) is information about some of the predictable patterning of features in Kusaal. Considering that there is only one low vowel in the language, one is able to infer then that such a segment is automatically unrounded and has other feature specifications for [-back] and [-ATR]. This is found in example (9). The (b) statements are also tenable.

(9)   (a)   If   **[+low]**   (b) If **[+round]**

                      ↓   **[+back]**

                    [-round]   **[+ATR]**

                    [-back]   ↓

                    [-ATR]   **[-low]**

(10) (a)   If

$$\begin{bmatrix} V \\ +nas \end{bmatrix}$$

↓

[-ATR]
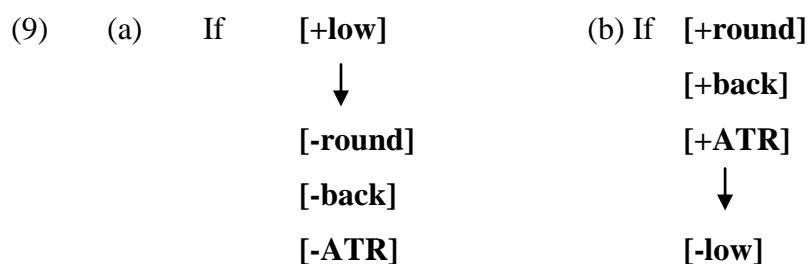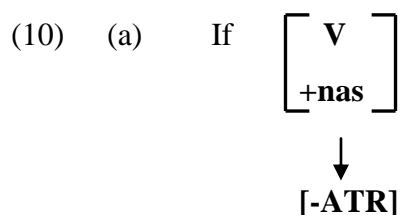
Statement (10) situates the place of nasal vowels in the language. Kusaal has five nasal vowels which are specified for all the features of vowels in addition to nasalisation. The nasal vowels that occur in the language are restricted to only five phonemic short vowels and so one can predict that if a vowel has a nasal quality in Kusaal, then it means that it is produced with a retracted tongue root.

The following (11a and b), are also inversely symmetrical to each other. A sound which is produced without an obstruction of the airstream can not be a strident sound which is produced with some degree of obstruction in the airstream mechanism. [+strid] sounds are produced with airstream modulation is the statement of (11b).

(11) (a)   If   **[-cont]**   (b) If   **[+strid]**

↓   ↓

[-strid]   **[+cont]**
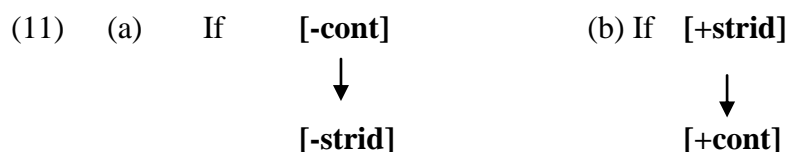
Unary features are the subject of (12) and (13). In (12) the statement points to the fact that if a sound is coronal, i.e. produced with the blade of the tongue then by all indications, it is also produced with a [-low], [-round] constriction.

$$(12) \qquad \text{If} \quad \textbf{[cor]}$$
$$\downarrow$$
$$\textbf{[-low]}$$
$$\textbf{[-round]}$$
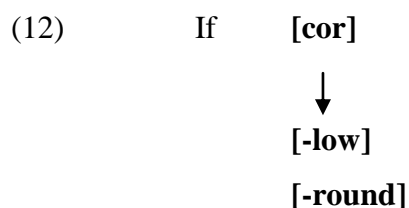
Along much the same lines as the preceding redundant statement above, the statement in (13) makes a prediction about the occurrence of other features with the dorsal feature. Precisely, one can deduce that if a segment has a dorsal specification then it is also [-ant], [+high]. Specifying these features results in a duplication of labels or values.

$$(13) \qquad \text{If} \quad \textbf{[dors]}$$
$$\downarrow$$
$$\textbf{[-ant]}$$
$$\textbf{[+high]}$$
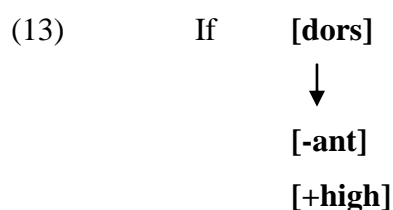
The point of all the discussions on the 'distinctive feature theory' and thereafter proceeding to extract redundant feature specifications serve an important function. These points have already been made elsewhere in this chapter (section 2.3) and pertain to the functions of the feature theory. Summarily, describing the sound system of Kusaal along these lines is a very crucial step because of a number of very important motivations: the features allow us to achieve 'economy' through the use of a small set of features to describe a vast range of segments; they also enable us to group sounds into 'natural classes' from which we can determine common phonological patterns among segments which share similar features. Features also perform phonetic and phonemic functions by describing the systematic sounds of the language in the first instance and by creating lexical differences in the second (Urua 2009: 4).

2.6 THE SYLLABLE STRUCTURE OF KUSAAL

Speakers generally pattern their languages along lines that will make the phonological items in these languages specific to them while at the same time facilitating communication. As repositories of all their linguistic systems, speakers are often aware, either consciously or unconsciously, of points in their conversations when they have to take a pause and then continue. This inherent knowledge is also responsible for the underlying patterning of sound segments in such languages and so it is the case that the sounds in any language are structured by the speakers who decide on what forms constitute separate syllables and how these forms play out.

A syllable is the basic unit of sound organisation. It has been described as a complex unit which comprises nuclear and marginal elements (Laver 1994: 114). These elements together make up the atomic or 'internal structure' of the syllable (Selkirk 1982). Nuclear elements are often vowels or syllabic consonants, while the peripheral elements comprise the consonants which occur before or after the nucleus. In the following discussion (mostly adapted from http://www.personal.rdg.ac.uk/~llsroach/phon2/mitko/syllable.htm), we cite some auditory, acoustic and articulatory motivations used to describe the syllable.

According to Stetson (1951), the syllable as a unit is a direct correlate of pulsations in the chest. The 'chest pulse theory' thus views each syllable as a product of the activities of chest muscles and lungs in the speech production process. Granted that the number and type of syllables can be determined by

experimenting with chest pulses and increases of air pressure in the lungs, this approach however fails to account for especially peak only syllables which do not involve chest pulses. In Kusaal, for instance, the word for 'yes' is ɛ̃ɛ̃. This lexical item is produced without any significant movement or vibration of the chest cavity. A problem therefore arises as to whether this form constitutes a syllable or not because it does not involve any evident situations of chest pulsations. In this regard then, it falls short as an adequate parameter for syllable descriptions.

Second is the 'prominence theory' which is based mainly on auditory judgments. In line with this approach, in order to determine the number of syllables in a word, one must identify the number of prominent sounds in that word. These prominent sounds (also peaks of prominence) specifically refer to the number of vowels that occur in that word. Thus, a word containing three or four vowels is described as having three or four syllables respectively. However, this theory does not help much in discussions of syllable division because what may be heard as one peak may actually be more than one and vice versa.

To buttress the foregoing, we will draw on the Kusaal word for 'goat' **buug**. **Buug** (the underlying representation) contains two vowels which should represent two peaks of prominence. However, this is not the case in the phonetic representation. In one instance, and through a process of resyllabifcation, a glottal stop may be inserted between the vowels to derive **buʔug** which contains two syllables. The glottal stop thus becomes the onset of

the second syllable. In the second instance, the velar final consonant is deleted to derive **buu** which has a long vowel occurrence and only one peak of prominence. This presents a big setback to the 'prominence' approach to syllable depictions.

The last approach to describing syllables, which is not unlike the foregoing discussion, is the 'sonority principle' according to which the pulses of pulmonic air stream in speech "correspond to peaks in sonority" (Giegerich, 1992: 132). The sonority of a sound is its relative loudness in comparison to another. Each syllable then corresponds to a peak in the flow rate of pulmonic air. In the natural scheme of things, vowels are the most sonorous sounds followed by approximants, nasals, fricatives, affricates and plosives in that order.

Two main theories that support the importance of organising sounds into syllables are cited in the literature: the 'onset-rhyme theory' and the 'mora' theory.

2.6.1 Onset-rhyme theory

Ewen and van der Hulst state that "in the Onset-Rhyme theory, the syllable is analysed as consisting of two immediate constituents: the onset, containing any consonants preceding the vowel, and the rhyme which contains the vowel and whatever follows it" (2001: 120). In this regard, the onset and the rhyme are higher level categories that come immediately after the syllable. The rhyme

contains an obligatory nucleus which is syllabic and a coda. The following figure (14) is representative (σ is the symbol for a syllable):

(14)
```
                        σ
                       / \
                      /   \
                 Onset     Rhyme
                            / \
                           /   \
                     Nucleus    Coda
```
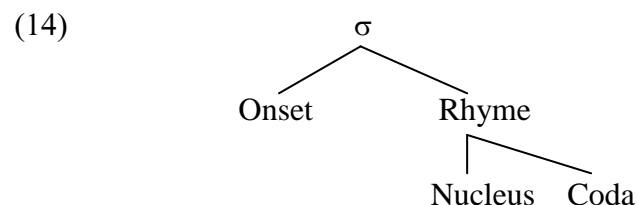
The terminal nodes that come after the onset are often consonants that indicate syllable initial positions while the nucleus could branch further in nucleus weight languages. Syllabic consonants and vowels are the only elements that occur in this position whereas the coda is the preserve of any other occurring consonants.

2.6.2 Mora theory

In the discussions of the structure of syllables in Kusaal, we shall therefore draw on moraic theory which divides syllables into 'weight units' rather than into immediate constituents called onset and rhyme. The approach views each mora as the precise segment which contributes to the weight of a syllable while there may be other occurring segments, especially initial consonants that may not add to the weight of the syllable.

We shall draw on 'moraic theory' for the analyses of the syllable structures that are evident in Kusaal because this system is more representative and is able to appropriately cater for phenomena such as compensatory lengthening and vowel sequencing as well as long vowel occurrences (see also §1.10.3 above for a discussion on moraic theory).

2.6.3 The Syllable Types

As has already been stated, the syllable segments that occur in the language will be accounted for in terms of the number of moras in the syllable rather than in terms of the immediate constituents. The task of determining whether Kusaal is a rhyme weight or a nucleus weight language is thus eliminated in line with moraic approach. Syllables will be described in terms of their respective weights; whether they are heavy or light syllables.

The following are some preliminary statements about the structure of syllables in Kusaal. To begin, only vowels and syllabic consonants (which in this case refer only to the nasal sounds) can occur in the nucleus of the syllable. Further, initial consonant clusters of any kind are barred from occurring in Kusaal syllables. Double-articulated consonants may occur in this position together with all the other consonants in the language with the exception of the velar nasal /ŋ/ and the glottal stop /ʔ/. The diagraphs 'ny' in words such as **nyàn** 'shame' and 'nw' in **nwɛ** 'hit' are the palatal [ɲ] and labial-velar [ŋw] nasals respectively.

At word medial position, the clusters that occur are actually boundaries between compound words, e.g., **tēngbān** 'shrine of the land': **téng** 'land' and **gbán** 'shrine', while there are no consonant clusters of any kind occurring in a syllable. In addition, Kusaal may not simplify word final consonant segments with adjoining vowel segments as pertains in other Mabia languages, e.g., 'child' is **bíyá** in Gurenɛ but **bī:g** in Kusaal. The following syllable types

obtain in the language: the peak only (V/N), the CV, the VC and the CVC syllable types.

2.6.3.1 Peak only syllables

Syllables in Kusaal could be a vowel only. However, syllabic consonants could also be found as the only elements in such syllable types. These forms are light-weight syllables as they involve only one single node from the syllable to the mora (cf. with the graphical representation in 17 below). Examples of such peak only syllables include the following:

(15a) i.   **m̀**:   1SG pronoun 'I', 'me'; 1SG POSS 'my'

ii.   **ń**:   CONJ 'and'

iii. **ʋ̀**:   3SG pronoun 'he', 'him'; 3SG POSS 'him'

iv. **à**-:   prefix for personal names or personified entities.
             e.g. **À**.**tíîg**   'Mr Tree'

(b)   σ
                                    |
                                    μ
                                    |
                                    m

2.6.3.2 VC syllables

There are a few syllables which take the VC pattern. Such syllables are heavy syllables because they have two moras occurring as separate branching nodes within the syllable. There are also a few syllables that are patterned on two vowels followed by a single consonant sound, and so they will also be subsumed under this categorisation chiefly because these vowels are often long ones occurring at peak positions and before syllable final consonants.

Examples include the following in (16a)[3]. Consider also the moraic representations of two of these examples in (16b)

(16)a. **ēl**   'marry'   **kū.òm**   'water'

     ú:n   'wet season'   **vɔ̀.lĩm**   'swallow'

     nɔ̄.k̀ɪm   'take'   **ɔm**   'chew'

     b.   (i)   σ   (ii)   σ

               μ μ   μ   μ

               ε l 'marry'   ʊ   n 'dry season'
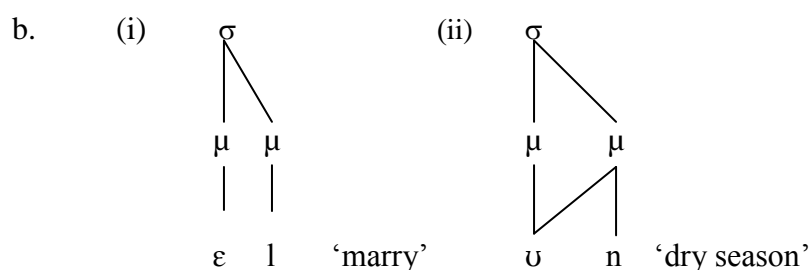
The structures below exemplify the moraic approach to representing syllables. They also point out that the syllables are heavy weight syllables because there are two moras in each case. Observe also that the long vowel in (16b) **ú:n** 'dry season' is realised as a bimoraic segment.

2.6.3.3 CV syllables

The CV syllable structure is a pervasive property of most languages of the world and also in most of the indigenous Ghanaian languages which have syllable types that are structured along similar lines. This structure is preferred in Kusaal because it is relatively simple to use. Most of the consonants on Table (1) above combine with one vowel or the other to create different lexical or functional items in the language. These syllables, in line with the views inherent in the mora theory, are also light-weight syllables. Examples include

the following in (17a) with their moraic representations in (17b) below:

(17)a. **lá** DEF. DET. **là** 'laugh'

    pɔ̄ 'swear' **sā:** PST (yesterday)

    kpī 'die' **kʰí** 'millet,

    dá NEG. **ná** FUT.

    lī.gī.dī 'money' **mà** mother

b. i.   σ   ii.   σ

             μ   μ

       p   ɔ   'swear'   kp   i   'die'
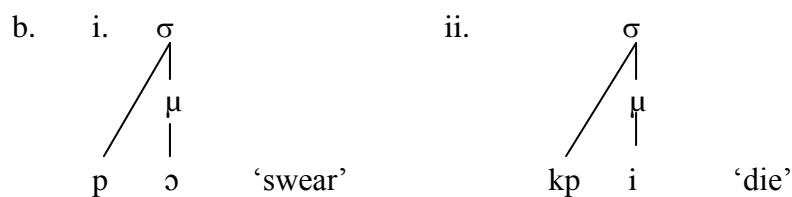
An extended form of the CV syllable structure is the type which has an onset occurring before two obligatory vowels (CVV). The vowels that occur after the consonant may either be long or they may be a sequence of vowels. The range of consonants that can occur at syllable initial position is also not constrained. Examples of syllables that structured on this pattern include the following lexical items (18a). The structural representations of these forms are in (18b):

(18)a. **púá** 'woman' **dáú** 'man'

    lá: 'bowl' **ŋwī:** 'rope'

    nā:ī 'finish' **tɔ́í** 'difficult'

    kpàì 'pour' **bū:** 'goat'

b. i. σ   ii.   σ

         μ μ   μ μ

     p   ʊ   a 'woman'   l   a   'bowl'
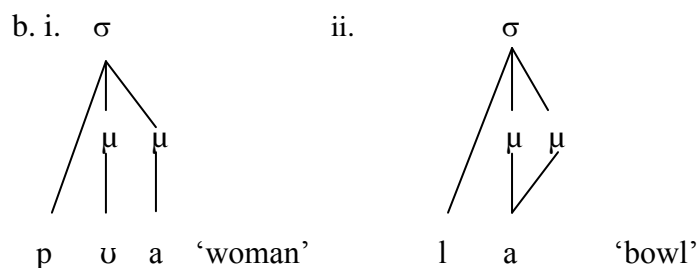
The structural representations above show that the two syllables are heavy-weight syllables because they are bimoraic, i.e., they contain two moras. In syllable configurations of this ty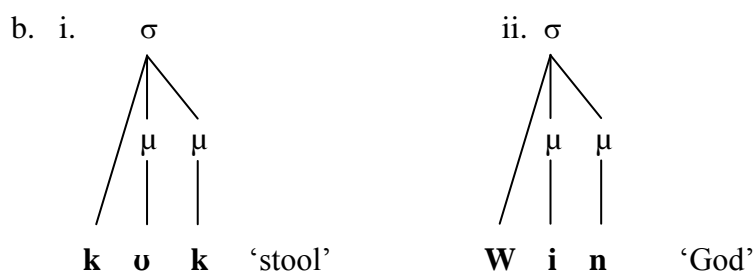pe, the weight of the syllable is determined by the number of vowel segments present in it. Short vowels take only one mora slot while long vowels enter into two moraic slots.

2.6.3.4 CVC syllables

Perhaps, one of the most important syllable structures in Kusaal is the CVC syllable structure which is quite unlike the forms which pertain in the other Mabia languages. Usually, most of the languages in the Mabia subgroup prefer to simplify final consonant segments through a process of vowel suffixation. The case in Kusaal is different with syllables taking the CVC structure, often, with very minimal attempts at simplifying final consonants. It usually takes a compulsory onset and coda consonant. Except the velar nasal /ŋ/, all the other consonants can occur at syllable initial position. All the consonants can also occur syllable finally with the exception of the labial-velar consonants /kp/, /ɡb/, /ŋw/ and /w/, the palatal nasal /ɲ/ and the voiced labio-dental and alveolar fricatives /v/ and /z/. Examples of this syllable type include the following in (19a). Their structural representations are given in (19b):

(19)a. **ní.dɪ́b** 'people'   **kpán** 'arrow'

         nyàn 'shame'   **mūg.sūg** 'labour'

         nɪ́m 'meat'   **mɔ̀r** 'have'

         kúk 'stool'   **tí.tár** 'big'

         pàŋ 'strength'   **Wīn** 'God'

b. i. σ

k ʊ k 'stool'

ii. σ

W i n 'God'

The vowel in a CVC syllable type could also be two obligatory vowel sounds which may either be sequences of vowels or long vowels. The vowels in the CVC syllable could also be two nasalised vowels. Consider the following examples in (20a and b) and the moraic structures in (20c):

(20)a. CV:C

fáɪ̃:r	'property'	**mà:l**	'make'
dá:m	'pito'	**nú:b**	'drinking'
yɔ̀:d yɔ̀ː̄d	'any how'	**bē:d**	'bad'

b. CVVC

píab	'speaking'	**lùàk**	'search'
kpî̃em	'hard'	**gbàŋ**	'book/paper'
páóg	'bark'	**zɛ̀ìm**	'potash'
pó.kṍ:r	'widow'	**zɛ̃:d**	'soup'
vã:d	'leaves'	**tî̃ɛr**	'to remember'

c. i. σ

d a m 'pito'

ii. σ

p i a b 'speaking'
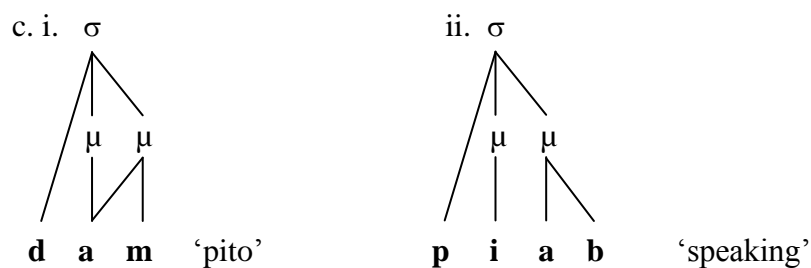
Within the moraic framework, syllable final consonants contribute to syllable weight and so they are moraic. Such consonants may take a mora if there is no vowel which goes into the second mora slot. When a vowel enters into the second mora slot, syllable final consonants are associated with such vowels (Hayes 1989).

2.7 THE STRUCTURE OF KUSAAL WORDS

It is important to also state that the number of syllables in a Kusaal word could range from one to four. Often the longer words are compounds of some already existing words. The following are the types:

2.7.1   Single syllable words

These are words which are made up of only one syllable which function as complete morphemes. Examples include the following: **m̀** 'I, me' which is peak only. All the other syllable structures can also constitute single syllabic words. They include the following:

(21)   **fú:g**   'shirt'   **lɔ́:r**   'car'

   wā:f   'snake'   **dí:b**   'food'

   zɔ́m   'flour'   **sâ:**   'rain'

   tán   'sand'   **zɛ̃:d**   'soup'

   t̀i   'our'

2.7.2 Di-syllabic words

These sets of words arise from a combination of two syllables which take structures such as the following:

(22)   V:.CVC   **à:.ròŋ**   'canoe'   **ī:līm** 'cow milk'

          CV.CV   **tà.bà**   'tobacco'   **tì.mà** 'medicines'

          CV.CV: **bā.nā:**   'smock'   **kù.là:** 'lake'

          CV.CVC: **ní.díb**   'people'   **vɛ̄.nòg** 'beauty'

          CVC.CV: **māl.mā**   'rites'   **sal.ma** 'gold'

          CVC.CVC: **sàŋ.gbàŋ**   'cloud'   **ŋwār.bīl** 'star'

          CV:.CVC: **kpā:.ɗīb** 'farmers'

2.7.3 Tri-syllabic words

Tri-syllabic words are usually formed with a combination of different syllable types which include the following:

(23)   CVC.CV.CVC: **bōŋ.kɔ̆́.bīd**   'animals'

          CVC.CV:.CV: **būm.bū:.dà**   'sowable seeds'

          CVC.CVC.CV: **nàn.nān.nà**   'immediately'

          CVC.CVC.CVC: **tàm.pèl.ɡìm**   'ash'

          CV.CVC.CVC: **sū.mál.sím**   'peace'

          CV:C.CV:.CV: **má:n.túa.kà**   'okro'

2.6.4.3 Four syllable words

These syllable types usually come up in plural imperative constructions. The dominant structure is the CV.CV.CV.CVC. Examples include the following in (24) below:

(24)   **sīlīgīmín**   'you.PL sieve'

          kīlīsīmín   'you.PL listen'

          pūrīgīmín   'you.PL share'

2.8 SUMMARY

An inventory of the number and nature of Kusaal sounds is the major goal of this chapter of the study. We began by establishing twenty four (24) consonants and nine (9) phonemic and vowels. Nine long and five nasalised vowels are also widely used in the language while a number of sequences of vowels also prevail. The chapter also establishes the various distinct groups or classes into which the sounds of the language are found and proceeds to make some predictable statements about the various feature specifications. It concludes with a description of the syllable structures of Kusaal.

ENDNOTES

1   In both dialects, /d/ and /r/ are free variants of each other usually at syllable initial position in bi-syllabic words. Free variation also occurs in mono-syllabic words but usually in rapid speech. Sometimes they mark dialectal differences as in the example for 'room' on the table (2). Other examples include the following which are however not dialectal variations:

tà:rā/tà:dā	sandals	**sìrà/sìdà**	truth
kpā:dīb/kpā:rīb	farmers	**kúrúg/kúdúg**	shorts
à.rā:m/à.dā:m	Mr.Pito (personal name)		

2   Consultations with some representatives of the Community Literacy Development Programme (COLDEP) and GILLBT (Messrs. Awimbilla and Alalbilla) indicate a lot of agreement on this matter. The existing translation of the New Testament was done using only five phonemic vowels: i, e, a, u, o. This poses a number of problems in the daily usage of the language in and out of church.

3   We indicate syllable boundaries with a period within examples or words but with the dollar sign when we formulate phonological rules (See Chap 3)

CHAPTER THREE

PHONOLOGICAL PROCESSES

3.1 INTRODUCTION

This section of the study is concerned with establishing some of the recurring phonological processes in the Kusaal language. It first examines the processes whereby one sound copies or behaves like another within a word or phrase (assimilation). Thereafter it discusses some of the processes that are evident in the structuring of syllables in the language.

3.2 ASSIMILATION

Schane (1973: 49) states that in "assimilatory processes a segment takes on features from a neighbouring segment." In this manner then, there is an influence of one sound segment on the articulation of another such that the two sounds become more alike or identical (Crystal 1997: 30). Assimilation is a widespread phenomenon in the languages of the world. Segments that undergo change may either be partially or completely assimilated. In the first case, the major features of the assimilated segment may linger on while in the second they are completely lost. The assimilatory process may also relate to the 'direction' of the influence or the 'contiguity' of the segments involved. In terms of direction, the process may be regressive (anticipatory) or progressive (perseveratory), i.e., a preceding segment may cause another to change its qualities or a segment that comes after another may condition the change. In relation to contiguity, the segments involved are either directly in contact or

they may influence each other from a distance across intervening segments
(Lass 1984: 171). The sets of data in (1) representing consonant nasalisation in
Buli and (2) representing homorganic assimilation in Kusaal are used to
illustrate this point.

(1)   BULI

#sa:b + mu# ⟶ sa:m + mu   ⟶ [sa:mu]   'the T.Z (meal)'

#na:b + mu# ⟶na:m + mu   ⟶ [na:mu]   'the cow'

biri + ni   ⟶ bir + ni⟶ bin + ni ⟶ [binni]   'the seed'

beli + ni   ⟶ bel +ni⟶ ben + ni ⟶ [benni]   'the river'

(Akanlig-Pare 1994: 111-2)

(2)   KUSAAL

    pʊab + la ⟶ [pʊabba]   'the women'

    daap + la ⟶ [da:ppa]   'the men'

    daam + la ⟶ [da:mma]   'the drink'

    saag + la ⟶ [sa:gga]   'the broom'

From the data above, a number of facts come up. First, all of the data exhibit
assimilation between contiguous segments. i.e., the conditioning factors for the
various renditions are as a result of the closeness of the underlying segments.
Non-contiguous assimilatory processes are a special feature of vowel harmony
across morphemes or word boundaries (see 3.1.6 below). Second, while the
sets of examples in Buli are instances of progressive assimilation (the second
consonant segments in the nouns assimilate the nasal qualities of the definite

determiner **mu**) the Kusaal data exhibit a regressive assimilatory process where the definite determiner **lá** assimilates the features of the syllable final consonant. A final observation is that all the examples in both sets are cases of incomplete or impartial assimilation, i.e., the assimilated segments do not completely lose all of their inherent properties in order to take on new ones. Rather the segments /b, l, and r/ which undergo mutation in the Buli data, lose only their oral nature while retaining their voicing, labial, sonorant and anterior properties. Kusaal also yields a number of geminate consonants in (2) as a result of assimilation.

In the sections that follow some of the assimilatory processes in the language are discussed in detail.

3.2.1 Nasalisation

The feature [+nasal] is the bona fide 'property' of segments such as /m/, /n/, /ɲ/, /ŋ/ and /ŋw/ because of the nature of their articulation – with a lowering in the position of the velum so as to allow the mass of airstream to exit through the nasal cavity to produce nasal sounds. As a pervasive method of assimilation however, it entails "a process whereby an oral segment acquires nasality from a neighbouring segment" (Katamba 1989: 93). This 'neighbouring segment', which is usually a nasal sound, may or may not be overtly specified.

In this regard then, all [-ATR] vowels are candidates for nasalisation in Kusaal especially when they occur before or after nasal segments in the language.

Vowel nasalisation in Kusaal, as in Buli (Akanlig-Pare 1994: 104) occurs only at the level of the syllable in four specific environments:

     i.   before nasal consonants;

     ii.   after nasal consonant;

     iii.   between two nasal consonants and

     iv.   in environments that are degenerates of pre-existing nasalised consonants.

The following data sets in (3) through (8) give examples of such nasalisation processes in the realisation of hitherto oral segments. The oral vowel segments are produced with a marked difference as a result of the nasal 'colouring' spread from the adjoining nasal segments onto them. In this study, we will avoid marking the tilde on automatically nasalised segments because such marks will get in the way of the markings on tone. The following are illustrative:

(3)   N____N

níŋ	'body'	**nyɔ̀:m**	'burn (v)'
ním	'meat'	**nɔ́:m**	'type of soup'
nɛ̀:m	'nothing'	**náŋ**	'scorpion'
mɛ̀ŋ	'self'	**mām**	'me'
mɔ̀n	'stir (v)'	**nyàn**	'shame'

Observe that all the vowels occurring in the data are [-ATR], i.e., they are produced with a retracted tongue root. This is the case in all environments where nasalisation occurs. The consonants /ɲ/ (written ny in the orthography) and /ŋ/ are also mutually exclusive of each other because they are in

complementary distribution. While the former occurs only at syllable or word initial position, the latter occurs only syllable finally. For the above then, the rule in (4) is representational:

(4)   **Rule 1:**   V ⟶ [+nasal] / [+nasal] ___ [+nasal]

The rule states explicitly that, a vowel (V) becomes nasalised when it occurs between two nasal segments. In the set of words in (5), the vowel segments occurring immediately after the nasal consonants are also realised with some nasal quality in their nature. In all the cases of nasalisation evident in Kusaal, the oral segment that is always affected is a [-ATR] vowel.

(5)   N____

mà	'mother'	**nyὲ**	'see'
mὲ	'build'	**níd**	'human being'
nʷɛ̄	'beat'	**nɔ̀bʊ̀g**	'grow'
mʷà	'suck'	**ànī**	'to be'
mɩ̀	'know'		

The data in the set above highlight the influence of the adjoining nasal segments on the vowels. Here, the nasalising effect is from left to right and is restricted, as stated earlier, to the syllable level. For instance, the last example, **ànī** 'to be', consists of two syllables and so the impact of nasalisation is not realised on the vowel in the first syllable but in the second. We formulate the rule below (6) to capture the foregoing. The statement in the rule is generally, that a vowel becomes nasalised when it occurs after a nasal consonant at syllable boundary (syllable boundary is indicated by the dollar sign $).

(6) **Rule 2:** V ⟶ [+nasal] / [+nasal] _____ $

A third point at which oral segments may become nasalised in Kusaal is when they precede nasal consonants but occur in the same syllable. Instances of this process are varied and many and are also restricted, primarily, to the [-ATR] vowels. The examples in (7) make this more explicit:

(7) _____N

pàŋ	'strength'	**gbīn**	'buttocks'
bún	'thing'	**sɔ̄ŋ**	'mat'
tán	'sand'	**dá:m**	'pito'
ú:n	'wet season'	**kpàɔ̄ŋ**	'guinea fowl'
bɛ́n	'end'		

In the above, nasalisation of the oral segments is instantiated from right to left in a regressive assimilation process. The vowels, in an anticipatory assimilatory process take on some of the qualities of the adjoining nasal consonants and are thus also produced with some degree of nasality. We formulate the rule in (8) to explain this process. The rule states that a vowel acquires nasality if it is contiguous with a syllable final nasal consonant.

$$\overset{V}{}$$

(8) **Rule 3:** V ⟶ [+nasal] / _____ [+nasal]

Finally, a number of vowels are produced in Kusaal with a nasal constriction. This relates to "contrastive nasalisation" where some vowel forms occur in environments that have no nasal consonants. In such cases, the nasal vowel is marked with a tilde to indicate that there is no overtly conditioning nasal

segment. These nasalised forms are probably the result of a diachronic process of nasal assimilation whereby the hitherto overt nasal consonants are lost through time. Many examples can be found in the language and, as in all the cases of nasalisation identified in this study, the [-ATR] vowels are the ones which are usually influenced by this process. The following exemplify Kusaal nasal vowels.

(9) __

tĩ	'vomit'	**gĩ:l**	'vein'
gɛ̃	'tired'	**ɛ̃:**	'yes'
tɔ̃	'brother/sister'	**gɔ̃:s**	'thorns'
sʊ̃:r	'anger'	**fã:r**	'save (v)'
tãs	'shout'	**bã:s**	'rings'

While we may state that the above may once have had nasal consonants operating in the underlying environment, this fact does not come up readily in the above data except in the example for 'rings' **bããs**. Evidence for the deleted nasal in this case is adduced from the singular form **báŋ** 'ring'. The process thus highlights an instance of first nasal spreading, then nasal deletion and finally vowel lengthening to make up for the deleted consonant. In the rest, the conditioning nasal segments are not present.

3.2.2 Homorganic Nasal Assimilation (HNA)

Generally, when a nasal consonant precedes an obstruent sound in Kusaal, the two consonants become homorganic: they agree in articulation (Lass 1984: 48). When homorganic nasal assimilation (HNA) occurs the final consonant

segments in the first syllable assimilate the nature of the next consonants so that they make for ease and economy in the process of communication.

Perhaps, the most important point at which HNA is very pervasive in the language is when two morphemes or roots are put together to create a new word. As the word final nasal is placed next to initial consonants in an adjoining word, it usually assimilates the place of articulation of the following consonant. Consider the following examples in (10):

(10)   HNA IN COMPOUND WORDS

tán 'sand' + **pīèl** 'white' ⟶ [**tàmpèlgìm**] 'ash'

bún 'thing' + **gīŋ** 'short' ⟶ [**búŋgíŋ**]   'short thing'

bún 'thing' + **bíl** 'hole' ⟶ [**búmbíl**]   'small thing'

lámá 'gum' + **fèò** 'empty' ⟶ [**làɱfèò**]   'toothless gum'

sáŋ 'time' + **kánná** 'that' ⟶ [**sáŋkánnā**] 'at the time'

nwán 'calabash' + **mà** PLU ⟶ [**ŋwāmmā**]   'calabashes

tēŋ 'land' + **dá:n** 'owner' ⟶ [**tèndā:n**] 'custodian of the land'

tēŋ 'land' **tán** 'sand' **bī:s** 'children' ⟶ [**tēntāmbīsí**] 'fine sand'

In the last example **tēntāmbīsí** 'fine sand' for instance, HNA assimilation is observed at the first two syllable levels. The first nasal is homorganic with the voiceless alveolar /t/ while the second conforms to the voiced bilabial articulation of /b/. Many of such nasal metamorphoses abound in the language.

In possessive constructions in Kusaal, as observed by Akanlig-Pare (1994) for Buli too, the possessive pronoun **mām** 'my' becomes the bilabial nasal **m̀** in

most natural occurring speech. This nasal is also the first person pronominal

form and in all instances it assimilates the place of articulation of the initial

consonant of the following noun (in the case of possessives) or verb (in the

case of the pronoun). The examples in (11) and (12) illustrate this

phenomenon.

(11)　　HNA IN POSSESSIVE CONSTRUCTIONS

   a. **m̀** **zū:k**   **[ɲ̄zū:k]**

     1SG.PRO. head   'my head'

   b. **m̀** **fú:g**   **[ɱ̄fú:g]**

     1SG.PRO. dress   'my dress'

   c. **m̀** **dí:b**   **[n̄dí:b]**

     1SG.PRO. food   'my food'

   d. **m̀** **nɔ́b�̀r**   **[n̄nɔb�̀r]**

     1SG.PRO. leg   'my leg'

   e. **m̀** **kpálíŋ**   **[ŋ̄kpál̄ɪŋ]**

     1SG.PRO. type of smock 'my smock'

(12)　　HNA IN 1st PERSON PRONOMINAL USAGES

   a. **m̀** **dʊ̀g.dɛ́**   **[n̄dʊ́gɪ̄dɛ̄]**

     1SG. cook.PROG 'I am cooking'

   b. **m̀** **kʰèŋ.yá**   **[ŋ̄kʰéŋ̀ijā]**

     1SG. go.PERF   'I have gone'

c. **m̀** **fùói** **lì** **[ŋ̄fùólì]**

　　1SG.　take out　　it　'I took it out'

d. **m̀** **ná** **nù** **[n̄nánū]**

　　1SG.　FUT　drink　　'I will drink'

From the above, one can observe a widespread occurrence of assimilation of nasal sounds to the places of articulation of adjoining consonants. In the first set of data (11), possessive nasal consonants consistently assimilate to the place of articulation of the following consonants and the same is true for (12) which exemplify various usages of the first person pronominal form. The particle that is used to express future time - **ná** 'will' - also influences the nature of the pronoun in the last example in (12d).

In Kusaal, much like the case in many Bantu languages such as Swahili, Chewa, Xhosa or Shona, there is a system of marking various degrees of the past time. Three different particles are used to express the hodiernal/immediate past (indicated with **pā:)**, the recent past (indicated with **sā:)** and the remote past (indicated with **dā:)**. In all of these instances too, the first person pronominal form is homorganic with the initial consonants. These occurrences are exemplified in the data in (13) below:

(13)　HNA IN PAST TIME MARKING

a. **M̀** **pā:** **nyē** **bī:g** **lá.** **[m̀ pá: ɲὲ bī:lā]**

　　1SG　HOD.PST　see　　child　DET.

　　'I saw the child a short while ago.'

b. **M̀**   **sa̅ː**   **tĩ̅s**   **ʊ̀**   **dí:b.** [n̄ sa̋ː tĩ̅s ó dĩ̅:b]

1SG.SUB.   REC.PST   give 3SG food

'I gave him/her food yesterday.'

c. **M̀**   **dā:**   **kɪna** [ǹ dā: kɪ̄nā]

1SG.SUB.   REM.PST   come

'I came (at a certain time beyond yesterday).'

In the above, the particles **pā:**, **sā:** and **dā:** are used to mark various degrees of past time reference in Kusaal. In (a), the meaning conveyed by the particle **pā:** is that of an action which occurred in the course of today prior to the point of speaking but not yesterday or the day before. The particle **sā:** in (b) indicates that the act of killing was carried out only yesterday while **dā:** in (c) refers to an activity which was undertaken at a time point beyond yesterday. HNA is evident only with the first person pronominal form in all cases because it is realised as a sonorous consonant in some instances.

3.2.3 Labialisation

Labialisation refers to the rounding of the lips when a sound is being produced (Dolphyne 1988). It is a secondary articulatory process in Kusaal which accounts for some rounding or labialisation in the features of certain consonants in the language. Rounding may be caused by either the rounded vowels, which are all [+back] or by the labial-velar approximant /w/ which lend their rounding nature to the segments they co-occur with in syllables. All consonants occurring before the rounded vowels in syllable initial position are realised with some degree of lip-rounding. Syllables beginning with the labial-

velar approximant are also rounded. The following examples in (14) are used to illustrate this process.

(14) a. **sɔɔr** /sʷɔ́:r/   'liver'   **dɔɔg** /dʷɔ́:g/ 'room'

b. **nuus** /nʷú:s/   'hands'   **loŋ** /lʷóŋ/   'frog'

c. **pʋa** /pʷá/   'woman'   **mua** /mʷà/ 'suck'

d. **tuon** /tʷōn/   'front'   **kuom** /kʷòm/ 'water'

The above set of data highlights two cases of rounding. In sets (a and b), there are instances of inner rounding in the syllables because the initial consonant segments receive only a significant amount of labialisation from the vowels that come immediately after them. The last two sets (c and d) however showcase instances of rounding involving an outward rounding nature whereby it is possible to determine that the lip-rounding is occasioned by the adjoining back vowel which is also [+round] in Kusaal. These examples involve very pronounced instances of rounding and are not constrained in relation to which consonants can occur. We formulate the rule in (15) to capture the facts above:

(15) **Rule 4:**   C   C   V
      [-round] ——→[+round] /   ——[+round]

Stated simply, (15) means that an unrounded consonant sound (C) becomes rounded when it occurs before a rounded vowel (V).

Spratt and Spratt (1968: 37) note that labialisation is one important level at which difference is evident in the Agole and Tonde dialects of the language. The fact remains that presently, while speakers of the former dialect may labialise certain syllables, the speakers of the latter do not add any such

features to syllables or words. Consider the following which are adapted from

Spratt and Spratt (ibid) in example (16) below:

(16)	UR	Agole	Tonde	Gloss
	buak	[bʷák]	[bɔ́k]	'split'
	tua	[tʷà]	[tɔ̀]	'pound'
	nua	[nʷá]	[nɔ́:]	'fowl'
	kuom	[kʷòm]	[kɔ̀:m]	'water'
	waad	[wā:d]	[ɔ́:t]	'cold'

In the data above, two separate means of labialising segments in Kusaal are

exemplified. In the first set which relates to Agole, labialisation is caused by

the high round vowel /u/ operating generally after initial consonant segments of

syllables. In Tonde, however, the labialising process involves a merger

(coalescence) of the vowel sequences in the underlying forms, transposing

them to the mid-low round vowel in analogous positions as Agole.

3.2.4 Palatalisation and glide formation

Palatalisation is an articulatory process involving two specific phenomena. The

first, primary palatalization, results from a process whereby the body of the

tongue is raised toward the hard palate in the production of some consonants or

where "the primary articulation is changed so that it becomes more palatal."

(Ladefoged 1982: 210) The second, also secondary palatalization, is the effect

that front vowels or the palatal approximant /j/ have on adjoining consonants,

i.e., the effect that the "addition of a high front tongue position has on another

articulation" (Ladefoged ibid). This process is attested cross linguistically and

in many Ghanaian languages. For instance, Dolphyne (1988: 143-7) and Akanlig-Pare (1994: 116-125) describe this process in Akan, and Buli respectively.

In Kusaal, the phenomenon is not different. It is however not as widespread as in Akan or Buli wherein alveolar fricatives, for instance, mutate to post-alveolar or palatal fricatives (primary palatalisation). This is because the language constrains the occurrence of post-alveolar fricatives altogether and thus their absence on the phonological chart of consonants. The palatal fricative /ʝ/ is quite restricted too, occurring in only a few lexical items. In the language, the process is related only to the secondary form whereby consonant sounds occurring before the high front vowel, are produced with the body of the tongue rising toward the hard palate. These consonants are often alveolar or velar consonants. We provide the examples in (17) to underlie the effect of the high front vowel on consonants:

(17)	**tik**	[tʲik]	'satisfy'
	kiɩ	[kʲi]	'millet'
	gi:ŋ	[gʲɪ:ŋ]	'mad person'
	sik	[sʲik]	'to stand on toes'
	kiŋ	[kʲɪŋ]	'to go'

Observe that, the recurring vowel in the data is the advanced high front vowel. The contiguity between the vowel and the relatively low consonants, results in a raising of the tongue body towards the roof of the oral cavity. The statement in (18) below serves to simplify the above: It states that a non-high consonant

sound is produced with some degree of articulation toward the palate (raising/heightening) when it occurs before a high front vowel.

(18) **Rule 5:**

$$\begin{matrix} C \\ \text{[-high]} \end{matrix} \longrightarrow \begin{matrix} C \\ \text{[+high]} \end{matrix} / \underline{\quad\quad} \begin{bmatrix} V \\ +\text{high} \\ -\text{round} \end{bmatrix}$$

A process that is similar though not the same as palatalization is 'glide formation'. This process is triggered in syllables that have a sequence of vowels occurring after consonant onsets. In such sequences, the first vowel, if it is a high front vowel [i or ɪ], is transposed to the palatal approximant /j/. Situations of pervasive glide formation in one dialect and none in the other is another point at which Agole and Tonde diverge a little from each other. A comparison of the following forms adapted from Spratt and Spratt (1968: 38) highlight this development. Though their study views these examples as situations of palatalization, the spread of data instantiates the formation of a glide, represented by the superscripted palatal approximant [ʲ]:

(19)

UR	Agole	Tonde	Gloss
tiak	[tʲàk]	[tàk]	'change'
wiak	[wʲàk]	[wàk]	'hatch'
sia	[sʲá]	[sɛ̄ɛ̄]	'waist'
sisiem	[sìsʲèm]	[sìsèm]	'wind'
zia	[zʲà]	[zɛ̀']	'red'
kiam	[kʲàm]	[kɛ̀'ɛm]	'cut'
siak	[sʲàk]	[sàk]	'agree'
piak	[pʲàk]	[pàk]	'carry under arm'

From the foregoing, it is observed that Agole adopts a systematic approach to dealing with vowel sequences of the type HFV+V (high front vowel + vowel). This is accomplished by the transformation of the high vowel to a glide before more open vowels. In Tonde, however, this is not the case. The dis-preference for glides in Tonde manifests in the selection of the low central vowel segment in environments where Agole selects for the high front vowel with another vowel. Sequences of vowels are also simplified regularly to vowels or, less frequently, to long vowels.

Though the underlying representations above appear different from each other, their respective phonologically depictions are the same: they constitute heavy bimoraic syllables. The point at which they diverge from each other is that while the coda consonant in Agole (20a) is adjoined to the preceding mora, in keeping with Hayes (1989: 257), it constitutes a moraic segment on its own in Tonde (20b). The following illustrate the above:

(20)   a.   b.   'carry under arm'
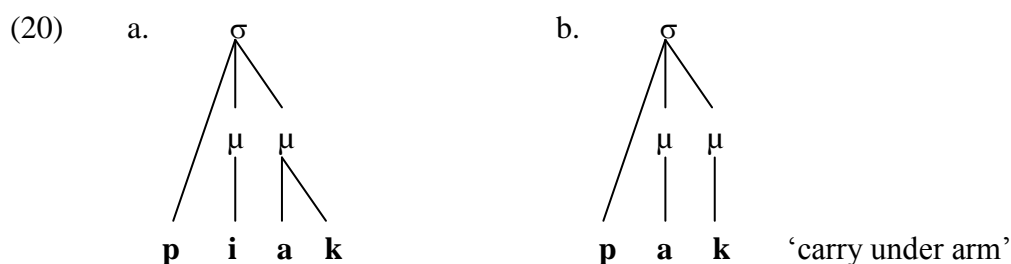
3.2.5 Vowel Harmony

Vowel harmony is a very pervasive property in many languages of the world. It refers to the phenomenon whereby the vowels in a word are observed to be co-occurring with each other. This underlying patterning of vowels is noted both

within and across morpheme boundaries in such languages. Katamba (1989) states that vowel harmony

> …is a process whereby within a certain designated domain, usually the word, all vowels are required to share one or more phonological properties. [Usually] the vowels of a language are divided into two mutually exclusive sets and all vowels within a stipulated domain must be, say, either front or back, high or low, rounded or unrounded, etc. (1989: 211)

Accordingly, Kenstowicz (1994: 347) opines that it is "a phonological state in which the vowels in a given domain harmonise for a particular feature." To this end, Bodomo also refers to it as a kind of "co-occurrence restriction involving contiguous and non-contiguous vowels" (1997: 10) in the organisation of words. The kind of harmonisation between vowels that is evident in Kusaal is described as Cross Height Vowel Harmony (CHVH). CHVH implies that, in a language such as Kusaal, which has four height specifications for the various vowels, harmony between these vowels in words transcends the respective heights and is rather tied to the position of the root of the tongue which is not restricted to specific heights.

Stewart (1967) discusses this type of harmony in some Ghanaian languages with evidence drawn from an Akan corpus of data. The approach he adopts in that study is to describe the harmony between the vowels in Akan words with respect to the position of the tongue root, i.e., whether the vowels are produced with an advancement or retraction in the position of the tongue root. Advanced tongue root [+ATR] implies the vowel sound in question is produced with the root of the tongue pushed forward while the un-advanced (retracted) tongue

root [-ATR] vowels are produced with the root of the tongue drawn further back from the normal position of the tongue.

The nine vowel system of Kusaal can also be divided into the [+ATR] and [-ATR] oppositions. Based on this distinction, the vowels which occur in a word will usually be selected almost exclusively from only one of the sets and not from the two sets at the same time. The sets are shown in (21):

(21)   [+ATR]:   i   e   o   u
       [-ATR]:   ɪ   ɛ   ɔ   ʊ   a

In the structuring of words in the language then, there is an adherence to this systematic patterning of vowels. It is thus the case that stems or words which appear on the surface, not to follow this [+/-ATR] opposition, can actually be shown to be harmonising with each other at the phonetic level. Several examples that can be used to highlight this include the ones in (22) below:

(22)   [+ATR]   [-ATR]

       kúrúg   'shorts/trousers'   **kòròg**   'old'

       kōlòg   'bag'   **kɔ́lúg**   'river'

       pèpsìm   'air'   **kɔ́bīr**   'bone'

       gbèòg   'forehead'   **sābīlɪ̀k** 'black'

       pīsī̄   'twenty'   **vēnòg**   'beauty'

From the examples, it is not difficult to identify the constraints as to which vowels can occur with each other in the organisation of the various words. As stated earlier, the kind of co-occurrence restriction that occurs in Kusaal is

confined to the relative position of the tongue root with regard to the vowels.
Observe that in some of the examples, the vowels are drawn from different
tongue heights. This highlights the cross height selective properties of vowels
in the language. For instance, the mid-low front vowel [ɛ] selects for the high
back vowel [ʊ] in the word for 'beauty' **vɛ̄nʊ̀g**. What is common to the two
vowels [ɛ] and [ʊ] is not their heights but the position of the tongue root in their
respective articulations; in this case they are both [-ATR].

Harmony between the vowels is also evident in the plural forms of words in the
language. Usually in the singular, the co-occurrence restrictions do not come
up readily because, such forms may involve only one vowel segment or one
segment which is lengthened. The harmony in each situation of Kusaal
pluralisation is with respect to the position of the tongue root. Examples of
such occurrences are found in (23) below:

(23)	Singular	Plural	Gloss
	kpán	**kpáná**	'arrow'
	nā:f	**nī:gī**	'cow'
	pú:r	**púyá**	'stomach'
	būlūg	**būlūs**	'well (noun)'
	sɔ̄:r	**sɔ̄yā**	'liver'

Further, in words which involve sequences of vowels, cross height patterning
of vowels is also pervasive and so it is common to find the [+/-ATR]
oppositions operating systematically in the language. Consider the following
examples in (24):

(24)   [+ATR]   [-ATR]

     túōn 'front'   **pē̄'ɔg** 'sheep'

     àyópōi 'eight'   **tɔ́í** 'difficult'

     pī̄èl 'white'   **dǐát** 'dirt'

For sequences of vowels to occur in Kusaal, it is imperative that such segments be produced with a similar movement of the tongue root. Otherwise, there is a spread of [+/-ATR] from the first syllable onto the next. This situation is observed with evidence from many idiolectal variations in the language. For instance, the sets of data in (25) are possible variants of each other in the speech of an individual or even of two separate individuals:

(25)   [+ATR]   [-ATR]   Gloss

     pē̄'ōg   **pē̄'ɔg**   'sheep'

     pōnnír   **pɔ̄nnír**   'toad'

     bùmbòk   **bòmbɔ̀k**   'hole'

     géllá   **géllá**   'eggs'

From the above, we can explain that the [ATR] feature is usually very consistent in words in Kusaal and so if the first segment is produced with an advanced or un-advanced tongue root, the ensuing vowel segment(s) will assimilate this feature. This regularity of harmony between the vowels is widespread in the language. Any disparities which may arise will result from the nature of the low central vowel /a/ which shows up in both the advanced and retracted tongue root oppositions as in the last example in (25) above.

The low central vowel /a/ is usually produced with a retraction of the root of the tongue thereby making it a [-ATR] vowel. However, it is not uncommon to find this vowel co-occurring with all the [+ATR] vowel segments in the production of some words as has been exemplified above. Historical evidence that may be adduced to posit a coalescence of an advanced and un-advanced low vowel is not straightforwardly available because of the lack of documented material on the development of the language.

Synchronically, however, it is commonplace to find that speakers of the language resort to producing words with more vowels drawn from the un-advanced tongue root classification than from the advanced class. In the data collated on the current state of language use among the people, the propensity of the respondents to produce more words from the retracted tongue root system is noteworthy. Though this may be a marked phenomenon cross linguistically, it is unmistakable in the Kusaal language. It may however shed light on the 'missing' [+ATR] low central vowel and point further to a process of vowel coalescence in the language. The schematic representation in (26) establishes the extent of merging between the two sets of vowels. The arrows indicate the direction of merging.

(26)   [+ATR]   [-ATR]

            i   e   o   u   -   ɪ   ɛ   ɔ   ʊ   a
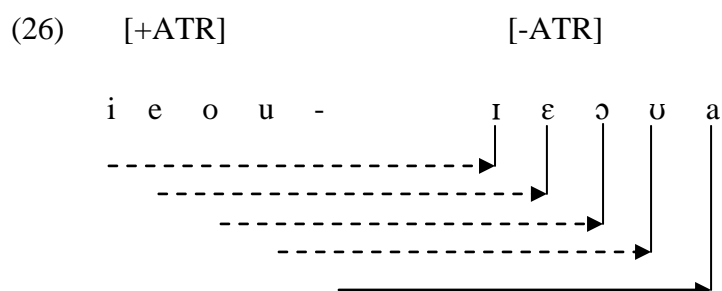
The point of the above is to state that the process of merging is on-going (represented by the broken arrows) from the [+ATR] to the [-ATR] except in the case of the low central vowel which has been completely coalesced (shown by the unbroken arrow). The straight lines map the overt representations of the vowels to the process of merging. We cite the examples in (25) again to explain that though it is possible to articulate any of the words from the different sets of vowels, it is more widespread to hear the forms produced with the [-ATR] vowels. Over time then, it is possible that the nine vowel system of Kusaal may further be reduced to fewer than seven with the [-ATR] counterparts surviving the process.

3.3 SYLLABLE STRUCTURE PROCESSES

Syllable structure processes relate to the processes which characterise the organisation of syllables in Kusaal. In this section, we will discuss some of these processes which include syllable truncation, aspiration, glottalisation and the phonology of loanwords.

3.3.1 Deletion and syllable truncation

A productive means of creating novel lexical items in a language is by putting together two or more underlying stems through a process of compounding. These concatenated stems usually generate new forms after they have undergone some phonological processes so that they can harmonise with each other and surface as one homogeneous lexical item. In the resulting output forms, some of the features of the combined stems are often truncated or even deleted to allow for such a harmony. While long vowels or a sequence of

vowels are usually shortened some consonants are also deleted especially when they occur at morpheme or root boundaries in compound words.

3.3.1.1 Vowel truncation

In Kusaal, when a syllable containing two vowels combines with the stem of another syllable, there is usually a shortening of the vowel segments in the first syllable. These vowels could involve either long vowels or a sequence of vowels in a heavy weight bimoraic syllable which terminates only in vowels. The candidate which is shortened in order for the compounded form to arise is always the second vowel segment. The examples in (27) below are illustrative:

In all the examples, the second vowel segments are truncated thereby shortening the lengths of the first syllables and subsequently reducing their weights from heavy bimoraic stems to light monomoraic stems. This system of syllable truncation is very systematic in the language and is occasioned whenever two adjoining vowels, whether long or a sequence, compound with existing stems in the language.

(27)   **dáú** 'man'+ **sáŋ** 'moment'   →   **[dāsáŋ]**   'young man'

         nɔ: 'fowl' + **bíl** 'small'   →   **[nɔ́bíl]**   'chick'

         púá 'woman'+ **nyá:ŋ** 'old'   →   **[pɔ̄ɲá:ŋ]**   'old lady'

         lā: 'bowl' + **yàlìk** 'wide'   →   **[lāyàlìk]**   'big bowl'

         mũ̀ì 'rice' + **pièlìk** 'white'   →   **[mùpʲèlìk]**   'white rice

The discussion above is formalised in (28) below which states that in a sequence of vowels [V1] and [V2], syllable truncation eliminates [V2] leaving behind [V1] at syllable final position of the first stem of compounded forms.

(28) **Rule 6:** [V1] [V2] ⟶ [V1] / ____$$

3.3.1.2   Consonant deletion

In compounded forms, all consonants at syllable final position in the first stem usually get deleted while initial and final consonants in the second syllable are left behind. The behaviour of syllable final nasal consonants in first stems however deserves comment. When they occur after long vowels in first stems they are often deleted in compounded forms. However, when they occur after short vowels they become homorganic with the initial consonants of adjoining (second) stems thereby evading deletion (c.f. **3.2.2** above on HNA). The following (29) exemplify final consonant deletion in Kusaal.

(29) **yír** 'house' + **dá:n** 'owner' ⟶ **[jídá:n]** 'landlord'

kúk 'seat' + **bíl** 'small' ⟶ **[kúbíl]** 'stool'

lɔ́:r 'lorry' + **má:súg** 'cool' ⟶ **[lɔ́má:súg]** 'fresh car'

kút 'metal' + **dúk** 'pot' ⟶ **[kúdúk]** 'metal pot'

zák 'compound' + **nɔ́:r** 'mouth' ⟶ **[zānɔ̄:r]** 'door'

In the examples above, the final consonant segments in the first stems are truncated to allow for a smooth transition in the novel usages the language has been put by means of putting these original stems together. We formulate the rule in (30) below to explain consonant deletion in Kusaal. The rule states that syllable final consonants become empty at stem boundaries of compound words:

(30) **Rule 7:**   [+cons] ⟶ Ø / _____$$

The phonology of compound forms in the language is also very systematic and proceeds always in a specific pattern. For instance, when two existing stems are being combined, speakers of the language, methodically, go on to delete both vowel and consonant segments in order to allow for an agglutination that fits into the syllable structure of the language. In the following examples, syllable truncation proceeds in a feeding order that specifies first that, final consonant segments in first stems be deleted and then long vocalic segments be truncated to short ones. A reversal in this order yields ungrammatical forms. In (31) we establish the order of the process of truncation while in (32) we cite some of the examples:

(31)   **kpā:m** 'oil' + **mǐŋ̀ir** 'real' →   **[kpāmǐŋǐr]** 'shea butter'

          bī:g 'child' + **púá** 'wife' →   **[bīpúá]**   'child's wife'

          nɔ́:r 'mouth' + **gbáŋ** 'skin' →   **[nɔ́gbáŋ]** 'lips'

          nú:g 'hand' + **bǐl** 'small' →   **[núbǐl]**   'finger'

          sā'āb 'TZ (a meal)' + **tú:l** 'hot' → **[sā'tú:l]** 'hot TZ'

(32)   *Stem*   1   2

        Underlying form   **nɔ́:r** 'mouth' +   **gbáŋ** 'skin'

        Consonant   **nɔ́:**   +   **gbáŋ**
          deletion

        Vowel   **nɔ́**   +   **gbáŋ**
          truncation

        Phonetic representation   **[nɔ́gbáŋ]**   'lips'
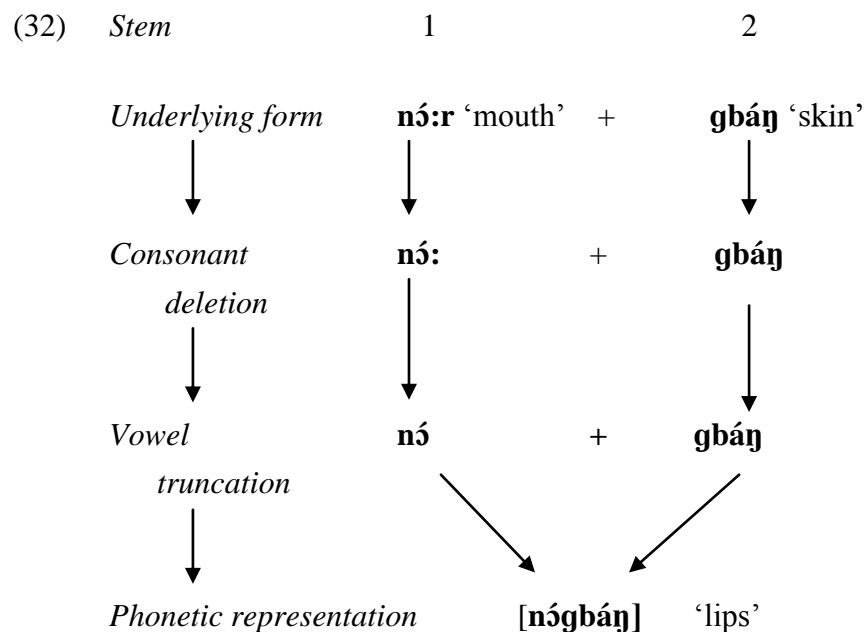
Aside the deletion of final consonants in first stems of compound words, some consonant segments may also get deleted in Kusaal. Specifically, in simple nominal stems which have the voiced velar stop /g/ occurring at syllable final position, the stop can usually be deleted if two special conditions are met:

      i.   if the stem is a heavy bimoraic syllable and

      ii.   if the vowel segments occurring in the syllable are long vowels.

These facts are captured in the examples in (33a and b) which are acceptable variants of the same lexical items. The forms in (34) are however not admissible in Kusaal because they do not pass the second criterion (ii) above:

(33)	A	B	Gloss
	bī:g	**bī:**	'child'
	tī:g	**tī:**	'tree'
	fʊ́:g	**fʊ́:**	'cloth'
	dá:g	**dá:**	'wood'
	dɔ̄:g	**dɔ̄:**	'room'

(34)	A	B	Gloss
	páóg	***pa:**	'bark'
	pɛ́ɔ̀g	***pɛ:**	'sheep'
	sîák	***si:**	'agree'

3.3.2 Aspiration

In the production of some sounds, a stronger degree of force is exerted on the airstream mechanism. This process is known as aspiration and usually it is

associated with voiceless stops. As Bodomo (1997: 12) reports for Dagaare, in Kusaal too, "voiceless plosives are usually aspirated when they occur in primary syllable initial position." In particular, the consonants [p, t, and k] are the candidates which are produced with a greater degree of force when they occur at the beginning of syllables. This is initiated as a result of the spread state of the glottis. Examples are provided on the table (1) below. The labial-velar plosive /kp/ is not specified on the table because it occurs only at syllable initial position in all cases. It is always realised as an aspirated sound.

Table 1   Aspirated and un-aspirated sounds

		ASPIRATED			UN-ASPIRATED	
/p/	pʰɛ̀ŋ	'borrow'	sápʰíríg	'breastbone'	dá'áp	'men'
	pʰʊ̀rʊ̀g	'share'	tāmpʰ**ī**:g	'rock'	tá'áp	'siblings'
/t/	tʰā:rít	'sandal'	búntʰítʰār	'thing big	sà'àt	'rubbish'
	tʰán	'sand'	tʰú:má	'work'	nínká'át	'eyelids'
/k/	kʰú̃:r	'hoe'	kʰíŋkʰín	'welcome'	pɛ̄ɔk	'sheep'
	kʰɔ́m	'hunger'	kʰɔ̀rʊ̀g	'slaughter'	lùàk	'search'

Aspirated syllables are indicated by the superscripted /ʰ/. While the set to the right highlights the environments in which the voiceless plosives are aspirated the second shows non-aspiration of the consonants in syllable final positions. The phonological rule in (34) captures the facts on the table above. It states that

a voiceless stop (p, t, k) becomes aspirated when it occurs only syllable initially.

(35) **Rule 8:** $\begin{bmatrix} +\text{cons} \\ -\text{voice} \end{bmatrix} \rightarrow [+\text{spread gl}] / \$ \underline{\hspace{1cm}}$

3.3.3 Glottalisation

Glottalisation is yet another important syllable structure process in Kusaal and many of the related Mabia languages. It refers to a "process where the primary supralaryngeal articulation is accompanied by a secondary stricture at the glottal level" (Laver 1994: 330). This process occurs with reference to the realisation of the glottal stop /ʔ/ in certain positions within syllables. The glottal stop is produced with a closure of the vocal folds thereby impeding briefly the flow of pulmonic airstream out of the vocal tract. It is realised only as a voiceless consonant.

In the English language, some speakers may glottalise or pre-glottalise stops such as the voiceless alveolar /t/ in words like 'city' [sɪʔtɪ]. At other times, oral stops may be completely replaced by the glottal stops as in the example for "Britain" pronounced [bɹɪʔən]. The case of the glottal stop in Kusaal is unlike either of the foregoing. Specifically, it does not co-occur with any consonants nor does it replace them.

Glottalisation in Kusaal occurs only inter-vocalically. At such positions, and as noted by Ladefoged and Maddieson (1996: 75) a complete glottal closure is not achieved but rather "some compressed form of creaky voice or some less

extreme form of stiff phonation" is realised   Between sequences of vowels, the glottal stop is usually inserted to simplify the length of the vowel segments. These sequences could either be long vowels or a combination of two separate vowels. By inserting the glottal stop, the sounds may be pronounced as though they were two syllables with the glottal occurring at syllable initial position in the second syllable. The glottal stop /ʔ/ is indicated by an apostrophe (') in the orthography and this is shown in the data in (36) below. Glottalisation is more pronounced in the Agole dialect of the language than in Tonde. In (37), we exemplify the way the lexical items are re-syllabified in the language after glottal insertion has occurred in keeping with moraic theory (see Hayes 1989).

(36)   **nyɔ̄'ɔ̄g**   [ɲɔʔɔg]   'chest'

     bū'ūg   [buʔug]   'goat'

     sù'ōr   [suʔor]   'path'

     bē'ēd   [beʔed]   'bad'

     sɛ̀'ɔ̀k   [sɛʔɔk]   'wet season'

     wā'āt   [waʔat]   'cold'

(37) a.   σ   b.   σ   σ   'chest'
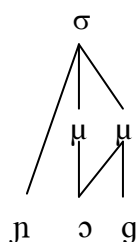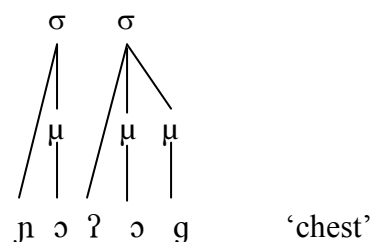
3.3.4 Loanword Phonology

Across languages, lexical items are constantly being borrowed, i.e. they are constantly changing their domains of usage from one language to another.

Kusaal has a large number of linguistic items that are borrowed from English and Hausa which are two of the most dominant languages in the Kusaas traditional area. These loanwords are configured so that they fit snugly into the linguistic systems of the indigenes without deviating from what is the case in the language. The process of nativising the incoming segments is systematic. The following are some of the important strategies used to incorporate borrowed items into the language.

3.3.4.1 Consonant deletion/replacement and compensatory lengthening

Complex consonant or vowel systems in borrowed lexical items often get deleted or replaced in order to simplify them so that they fit into the borrowing language. Through a process of re-syllabification, unfamiliar consonant clusters or vowel sounds in the source language are reconfigured such that they conform to the internal organisation of syllables in the target language. To compensate for such deleted segments, original consonants are replaced or new vowel segments are provided through a process of compensatory lengthening which generates either long vowels or diphthongs to make up for the deleted sounds. The English borrowings in (38) and (39) below provide examples of this restructuring process:

(38)	English	Kusaal	Gloss
	[dɒktəʳ]	**[dúátá]**	'doctor'
	[bʌkɪt]	**[būā̀tì]**	'bucket'
	[laɪt]	**[lā́ːt]**	'light'
	[taɪt]	**[tā́ːt]**	'tight'
	[lɔːri]	**[lɔ́ːr]**	'lorry'

[taɪm]	**[tā́ːm]**	'time'
[fɜ:st]	**[fɛ́:s]**	'first'
[ma:stəʳ]	**[másā̄]**	'master'

(39)

[ʃʊgəʳ]	**[sùgà]**	'sugar'
[ʃɒk]	**[sɔ́:k]**	'shock'
[ʃɔ:t]	**[sɔ́:t]**	'short'
[tʃɜ:tʃ]	**[kɛ̃́:k]**	'church'
[fɪʃ]	**[fîs]**	'fish'
[kɪtʃɪn]	**[kíkīn]**	'kitchen'
[tʃɪkɪn]	**[kíkīn]**	'chicken'
[steiʃɪn]	**[sítésīn]**	'station'

The examples in (39) also illustrate another process of commuting lexical items from other languages into Kusaal. This involves replacing consonant systems in the source language with the nearest consonants in the target language as a result of a deficiency of such consonants in the target language. This is not often without some hilarious renderings. Forms like these are 'shortcuts' that speakers of Kusaal including some of the literate English users, adopt when they attempt to give renditions of words that contain the post-alveolar fricatives /ʃ/ and /ʒ/ which are conspicuously missing from the Kusaal consonant chart.

3.3.4.2 Epenthesis

A fourth process that is probably one of the most important in Kusaal loanword phonology is epenthesis. Epenthesis entails inserting vowels to break ill preferred consonant clusters in new lexical items. Clusters occurring at syllable

initial, medial or final positions are often simplified through the insertion of one vowel sound or the other. Examples of such occurrences are widespread in the language and the following in (40) serve to illustrate:

(40)   English   Kusaal   Gloss

[sku:l]   **[sākór]**   'school'

[hɒspɪtl]   **[sípítì]**   'hospital'

[teɪbl]   **[té:būl]**   'table'

[stri:t]   **[sītítì]**   'street'

[bæg]   **[bágì]**   'bag'

[fɪlm]   **[filím]**   'film'

Hausa loanwords are also treated to similar processes such as consonant deletion, consonant replacement and epenthesis. Some examples are provided below in (41):

(41)   Hausa   Kusaal   Gloss

[kerfe]   **[kèríf]**   'metal>hour'

[ʃa:fi]   **[sá:f̀ì]**   'key'

[dʒummah]   **[zúmmáh]**   'Friday'

[al-sabbath]   **[àsībì]**   'Saturday'

[al-hadʒi]   **[àlázì]**   'Alhaji'

3.3.4.3 Other loanword processes

In addition to the loanword processes described in section 3.3.4.1 − 2 above, borrowed lexical items are subjected to the assimilatory and syllable structure processes discussed in the preceding sections. We will draw on the examples in

(38 – 41) for the discussions in this and the subsequent sections. In (42) for instance, a labialising effect is produced in Kusaal to make up for the absence of the low back and the mid-low central vowels in the first and second examples respectively. The process results in vowel glides from high to low positions. In the third example, the schewa vowel /ə/ which features as a variation in the second syllable of table [teibəl], is replaced by the high round vowel. This results in the rounding of the voiced bilabial and alveolar plosives which hitherto, were unrounded.

(42)	English	Kusaal	Gloss
	[dɒktəʳ]	**[dúátá]**	'doctor'
	[bʌkɪt]	**[būātì]**	'bucket'
	[teɪbl]	**[té:būl]**	'table'

Long vowel occurrences in borrowed lexical items are also subjected to a process of glottalisation. In the following examples, the incidence of glottal stop insertion is realised between the long vowels. This leads to a restructuring of the syllable with the result that the glottal stop goes into onset position of the second (new) syllable. In the first three examples, the process is much more pronounced than in the last:

(43)	English	Kusaal	Gloss
	[laɪt]	**[lāʔát]**	'light'
	[taɪt]	**[tāʔát]**	'tight'
	[taɪm]	**[tāʔám]**	'time'
	[fɜ:st]	**[fɛ́':s]**	'first'

In the last set of examples in (43), voiceless plosives in borrowed items are produced with a degree of aspiration in Kusaal when they occur at syllable initial position. Syllable final plosives do not acquire aspiration. This trend is consistent in the data below:

(43)	English	Kusaal	Gloss
	[hɒspɪtl]	**[sípʰítʰɪ]**	'hospital'
	[tʃɪkɪn]	**[kʰíkʰĩn]**	'chicken'
	[steiʃɪn]	**[sítʰésĩn]**	'station'
	[taɪt]	**[tʰá:t]**	'tight'

3.4 SUMMARY

This chapter discussed some of the important phonological processes in the Kusaal language. We begun by describing some of the means by which segments and/or words assimilate each other in the language through processes such as nasalisation, homorganic nasal assimilation (HNA), labialisation, palatalisation and vowel harmony. We proceeded to describe in detail, some of the processes that are on-going in the structuring of syllables in the language. Of particular interest in this section were discussions on processes such as aspiration, glottalisation, deletion and syllable truncation and the phonology of borrowed lexical items.

CHAPTER FOUR

TONOLOGY

4.1 INTRODUCTION

In this chapter, we explore the nature and types of tones in Kusaal within an autosegmental phonological perspective. We begin by identifying the basic tones and the ways in which these tones are combined in the language together with their distribution. In this chapter too, we establish the tone bearing unit (TBU) in Kusaal and go on to discuss the nature of tones in the nominal and verbal morphology of the language. We also describe and analyse the role of tone in the syntax of the language by examining other linguistic structures such as the question or statement and negation.

4.2 INVENTORY OF KUSAAL TONES

A language is characterised as tonal when it has "lexically significant, contrastive, but relative pitch on each syllable" (Pike 1948:3). Pitch refers to the rate of vibration of the vocal folds. Varying forms of this pitch can be created by modifying the tension in the vocal folds or by increasing or decreasing the flow of air out of the lungs (Ladefoged 1982: 226, 2001: 233). These varying pitches are subsequently used to create lexical contrasts, i.e., to differentiate one lexical item from the other. Pitch is also relative because variations of the same type of pitch may be produced by men or women, by young or old people or even by the same individual in different situations or circumstances.

Further, the pitches which are used to create such meaning differentials are 'contrastive' because they bring about differences in meaning, much like phonemes do. Tone is not only crucial in creating lexical differences, it is also important in making many grammatical distinctions in languages.

Though relative pitch is a property of the languages of the world, the disparity lies in whether a language uses such pitches to create meaning differences in a sentence (across syntactic units) or to make lexical and/or grammatical differentiations (Pike 1948, Ladefoged 2001). Whereas languages which have the former property are characterised as "intonational" (see for e.g. Ladd 1997), those which use pitch for the latter are called "tonal". English, together with a great many European languages, are intonational, while Chinese and many African languages south of the Sahara are tonal languages.

Distinctions are also made in the linguistic literature between register tone and contour tone languages. Languages which have register tone use level pitches to make different lexical and grammatical meanings. Tones in such languages are usually specific to one height position: high, low, or mid, occurring on the tone bearing unit. In addition to these level pitches, register tone languages also have gliding pitches occurring on the relevant tone bearing unit. These glides are usually sequences of level pitches that are contiguous to each other and could therefore be rising (i.e. a sequence of low – high tones) or falling (from high –low tones). Contour tone languages on the other hand are not level or fixed to specific heights but are characterised by pitch glides from one height position to another on the same tone bearer. The languages of Africa usually

draw on level pitches to create tonal differences while most Asian languages use tones that are contour (Pike 1968, Hyman 1972, Yip 1995, 2002).

4.2.1 The Basic Tones

Extensive studies on tone in the Mabia (traditionally Gur) cluster of languages such as Mampruli, Dagbani and Gurunɛ (Naden 1988), Moore and Lama (Kenstowicz et al 1988), Dagaare (Bodomo 1997), Gurenɛ (Dakubu 2006), etc. have shown conclusively that the majority of these languages have two tonemes. On Buli too, Akanlig-Pare (1994 inter alia) posits a two tone system: the high and the low that characterise the languages in the cluster. However, drawing on synchronic and diachronic data on the language, Akanlig-Pare and Kenstowicz (2002) and Akanlig-Pare (2005a, 2005b) adduce evidence to show that an emergent mid tone is present in Buli thereby creating an underlying three tone contrast in the language with no instances of downstepping. This is quite a different phenomenon from what obtains in the cluster where the trend is not only for languages to have a two tonal system but to also distinguish a downstepped high tone from an underlying high tone.

The tonal system of Kusaal is similar to that of Buli in one regard, it contrasts three underlying tones which are high (H), mid (M) and low (L) tones. It differs in relation to the fact that it distinguishes a downstepped high from an underlying high tone. Generally, high toned syllables are produced with higher pitches than mid tones which are in turn also higher in pitch than the low toned ones. With the aid of the Praat acoustics software, we are able to determine that the fundamental frequency (f0) of Kusaal high tones (´) are initiated at 150Hz

and above. Mid tones (¯) oscillate between 120 and 150Hz, and low tones (ˋ)
are initiated below 120Hz. We provide examples below to illustrate. As very
few lexical items are differentiated in the language based only on their relative
pitches, it is however not possible to provide corresponding tonal minimal
triples in all cases. We draw on both nominals and verbs to make the contrasts
in (1). In (2), we further exemplify the tonal differences by showing the pitch
tracings of three lexical items (the dotted lines go through the highest pitch
points of the sounds. They indicate the maximum pitches).
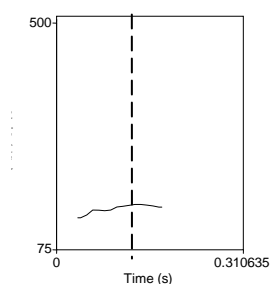
(1) **HIGH**

bá	'father'	**kú**	'kill'
dá	NEG	**nɔ́ŋ**	'poverty
mɔ́n	'monitor lizard	**lá**	DEF.DET
yú:m	'year'	**dí:b**	'food'

MID

bī̄:g	`child'	**yā**	'houses'
nyɔ̄:k	'chest'	**nā:f**	'cow'
dā:m	'pito'	**sū:r**	'heart'
yū:m	'sing'	**dī**	'eat'

LOW

bà	3PL.	**yà**	2PL
dà	'buy'	**nɔ̀ŋ**	'like'
mɔ̀n	'stir (v)'	**là**	'laugh'
dà:m	'worry'	**bà:**	'dog'

(2) **bá** 'father'   **dī** 'eat'   **bà** 'their'
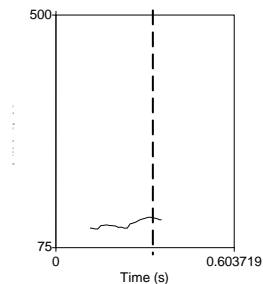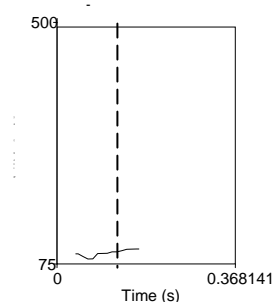
MAX.P (160.10 Hz)   (142.78 Hz)   (108.67 Hz)

4.2.2 Tonal Combinations

The high, mid and low tones are combined in the language to produce nine separate sequences of tones on disyllabic words. These are the HH, HM, HL, MH, MM, ML, LH, LM and LL. On polysyllabic words too, the tonal occurrences are not restricted and thus a combination of these tones is evident on lexical items. The examples in (3) highlight the above:

(3)   **HH**

    pí:gá   'ten'   **kúrúg**   'shorts'

    wélá   'how'   **Púsúg**   'Pusiga'

    níndá: 'face'   **kúgúr**   'stone'

    HM / MH

    Wínā:m   'God'   **bīpúŋ**   'daughter'

    kpínī   'guinea fowls' **kpībíg**   'orphan'

    nɔ́bīr   'leg'   **hālí**   'until'

    HL / LH

    kùrwɔ́:k   'trousers'   **nà'ànám**   'chiefs'

    gɔ̀nyám   'laziness'   **àyí**   'two'

MM

bānā:	smock	**tāmpī:g**	'rock'
kū:mīn	'Kill!'	**nyɔ̄'ɔ̄g**	'chest'
nɔ̄rā:g	'cock'	**wābōk**	'elephant'

ML / LM

yēlǐm	'tell!'	**ànū**	'five'
sīlgìm	'sieve!'	**sìdīb**	'husbands'
làŋgbāŋ	'scrotum'	**dàwēn**	bird

LL

kòròg	old	**zìlǐm**	'tongue'
pòsòg	'burst'	**gɔ̀nyàm**	'laziness'
gɛ̀dòk	'crazy'	**tùbìr**	'ear'

4.3 TONE BEARING UNIT (TBU)

Determining the elements or structural features which carry the tonal melodies of a language has always been a fundamental problem in tone studies (Odden 1995: 448). The dicey nature of this phenomenon is also articulated by Yip (2002: 73) who affirms that "it's not always clear whether tones associate to segments, syllables or moras." The dissenting views center, generally, on whether the tone bearing unit (TBU) should be construed as a segmental feature such as an oral or nasal sound or as a suprasegmental feature such as the syllable or mora (Akanlig-Pare 2005).

In some of the approaches to tone studies, the element on which tones dock is assumed to be a segmental feature. For instance, Goldsmith proposes that in an

autosegmental framework all **vowels** should be associated with **tones** and all **tones** be associated to **vowels** (1976: 48). Consequently, various researchers have proceeded to equate the tone bearing unit (TBU) to the vowel or even to consonants. In Fox (2000), for instance, studies such as Gandour (1974) and Schachter and Fromkin (1968) are cited as establishing consonant sounds and vowel segments as the units which carry the tonal melodies of Thai and Akan respectively.

This approach though seamless at the onset is faulted in one important regard. It fails to account for those instances in the phonology of tone languages where it is evident that certain tones persist in the absence of underlying segmental features. In light of phenomena such as 'tone stability' by which process suprasegmentals often survive deletion, elision or contraction of segmental features, this view of the TBU as a segmental feature is untenable (Bao 1999: 134, Fox 2000: 218). We replicate below an example by Yip (2002: 67) on a case of metathesis in Thai secret languages to buttress this point. In the examples, while the segmental features exchange places in the phonetic representations, the tonal features that are linked to them do not move but remain in the same position and are then associated with the new segments.

(4)   Thai secret languages

klúày hɔ̀ɔ́m   >   **klɔ̀ɔ̀m hùáy**   'banana'

téǹ rām̄   >   **tám̀ rēn̄**   'dance'

In the build up to the discussions on tone bearing ability, Clements and Ford (1979: 181 in Ahoua 1986: 74) assert that "…tones are not directly associated

with vowels or segments, but rather with higher level units…such as the syllable…in which vowels typically function as peaks of prominence." A similar stance is also taken by Pike (1948: 4) who regards the syllable as the domain of tones in languages. In other works, too, the TBU is regarded not as the syllable but as the mora. The following views are very instructive in determining whether the syllable or the mora constitutes the tone bearer:

> One general diagnostic for establishing what a TBU is is to determine the weight of the syllable that bears what type of tone. If a language displays a situation where there is one to one correlation of a tone to a mora, such that monomoraic light syllables bear only a single and for that matter, a simple tone such as a level high, mid or low tone, whilst for a complex tone such as rising or falling contour, there must be a bimoraic heavy syllable, there is justification in claiming the mora as the TBU. However, if both light monomoraic and heavy bimoraic syllables can bear the same types of tones, simple and complex, in one and the same language, then the TBU in that language must be the syllable. (Akanlig-Pare 2005: 153-4)

With insight from the above, it is not difficult to posit the mora as the tone bearing unit in Kusaal. Evidence that may be used to back this claim is offered by the fact that various perturbations of tone in the language are restricted to whether the affected syllables are light weight or heavy weight ones. While monomoraic syllables take only one level tone, usually H, M or L, bimoraic stems may take a sequence of HH, MM or LL tones. Rising or falling contour tones are also realised only on heavy bimoraic syllables. These contour tones (LH, LM, MH, HM, HL, or HM), are a combination of two level tones realised on two adjacent moras. Additionally, it is impossible for two different tones of

whatever type to be realised on a single mora. Finally, consonant codas in heavy bimoraic syllables are not marked for tone. The structural representations in the following (5) and (6) are used to exemplify the foregoing observations.

(5)a. σ — L — μ — **l a** 'laugh'   b. σ — M — μ μ — **b i** 'child'
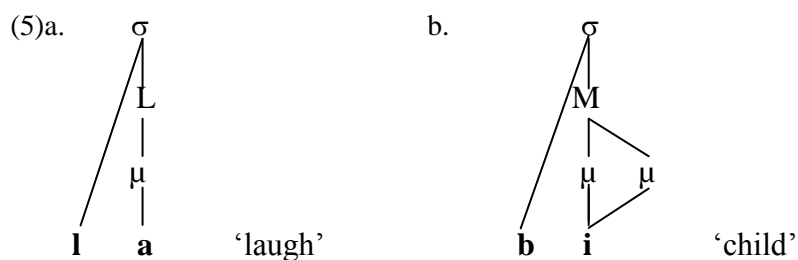
The above configurations depict that the suprasegmental feature docks on the mora in each instance as a low tone in (a) and as a mid tone in (b). In (6) below, the reason for citing the mora as the TBU in Kusaal is made clearer by the realisation of a falling tone on the heavy weight bimoraic syllable **sáà** 'rain' which has a sequence of long vowels:

(6)a. σ — H L — μ μ — **s a** 'rain'   b. * σ — H L — μ — **b ɛ** EXISTENTIAL
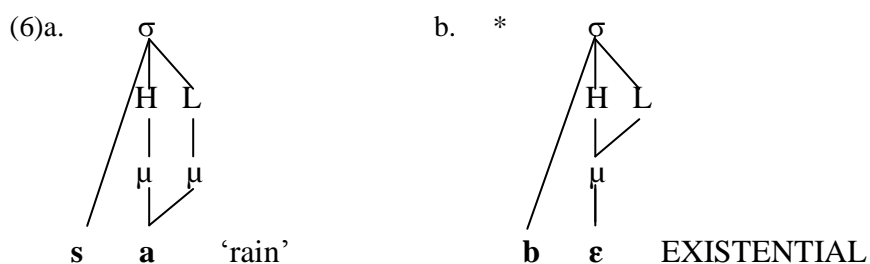
The asterisk in the (b) example above indicates that situations whereby two tonemes map unto one light monomoraic segment are inadmissible in the language. In order to associate a second tone to a light syllable, vowel lengthening (or a sequence of vowels) is often instantiated so that monomoraic

syllables become bimoraic to enable them carry the extra tone. For instance, the light monomoraic syllable **pī** 'bury' carries only one tone while two tonemes are mapped unto the verb **pía̋** 'speak' because it is a heavy weight syllable containing two vowels. Contour tones will usually occur only on heavy bimoraic syllables.

4.4 AUTOSEGMENTAL REPRESENTATION

The rest of this chapter takes as its basis, the autosegmental representation that was formalised by Goldsmith (1976, 1990) and sharpened by some of the resulting discourse on the topic (see § 1.10.2 above for an in-depth discussion). Different tiers will be used to show the various levels at which the phonology of Kusaal operates with the various elements specified for each of these tiers. Segmental features and tones on the separate tiers will also be mapped onto each other by means of association lines. In keeping with Pulleyblank (1986: 11) on the 'association convention' we will map sequences of tones not to vowels (Goldsmith 1990: 14) but to "tone bearing units (a) from left to right and (b) in a one-to-one relation."

Similarly, we will, in consonance with Yip (2002: 76), modify the initial sentiments on the well formedness condition (WFC) of Goldsmith (1990: 319) to rather read as follows; the point of departure from Goldsmith is the entity which has tone bearing ability in any language:

1. Every TBU must have a tone.
2. Every tone must be associated to some TBU.
3. Association proceeds one-to-one, left-to-right.
4. Association lines must not cross.

4.5 MORPHOLOGICAL FUNCTIONS OF TONE

Tone creates a number of variations in the morphology of Kusaal. In this section, we will discuss the role of tone in nominal morphology. The types of tones which occur on noun roots in Kusaal are not constrained. It is possible then, to have either high, low, rising or falling tones occurring on various nominal forms. This system of tones turning up arbitrarily on nouns makes it very difficult to predict which tones can be realised and on what nominal form. To a very large extent however, nouns usually carry non-low tones in the language.

4.5.1   Simple singular and plural forms

Singular forms of Kusaal nominal items usually carry different tones. Lexical items are thus not specified in relation to which tones can occur on them in the singular. In plural formation, however, the recurring tone patterns on the singular stems are retained and replicated on the corresponding plural forms. Pluralisation in Kusaal normally entails a modification of syllable final segments and so the number of tones that are found on singular roots are usually also required in the plural. If a noun root with long vowels has a uniform sequence of tones, we will mark only the first one. If the sequence of tones on long vowels is different, we will however, mark both of them in this study. These occurrences are exemplified in (7) below:

(7)	Singular	Plural	Gloss
	kpībíg	**kpībís**	'orphan'
	sâː	**sâːs**	'rain'

nā:f	nī:gī	'cow'
sɔ́fʊ́lʊ́nfʊ̀:g	sɔ́fʊ́lʊ́nfʊ̀:t	'lung'
yɪ́r	yá	'house'
yú:r	yúrá	'name'
púmpī	púmpīnàm	'borehole'
kʊ́gʊ́r	kʊ́gá	'stone'

4.5.2 Derived nouns

Nominal items can normally be derived from other categories of speech. These derived items usually take on many of the properties of nouns and are used as such. Nominal forms can be derived from the lexical classes of words such as adjectives, verbs or nouns themselves or from the functional classes such as determiners and prepositions. The most productive category of words from which nouns are typically derived is the verb class. Several nominal items in Kusaal can thus be traced to verbal origins. Nominalisation in Kusaal results from suffixing a nominalising affix to existing verb stems. We will describe the role of tone in two processes of nominalisation in Kusaal: action nominalisation and agentive nominalisation.

4.5.2.1 Action nominals

They are derived from action verbs. Such nominals, as stated by Appah (2003: 69), usually refer to an action, process or occurrence that is designated by the verb. He provides the examples below (8) on Akan (Fante) to clarify this process. In Fante, the process is marked by either morphologically converting the verb to a noun or by affixing a nominalising prefix. The following show nominal derivation through affixation:

(8)   **Fante**

    a. **kénkàn**   **à-kènkán**

        'read'   SG-read

                       'the act of reading'

    b. **dzídzì**   **à-dzìdzí**

        'eat'   SG-eat

                       'the act of eating'

In Kusaal, the process of action nominalisation always involves an overtly represented nominalising suffix which is realised as the voiced bilabial plosive **-b** on verb stems which terminate in vowel segments. Verbs which end in obstruent sounds take the suffix **-ug**. Regularly, these derivations transpose recurring low or mid tones on bare verbs into high tones in the nominal while high toned verbs retain their high tones in the derived form. Single short vowels in light monomoraic syllables also become lengthened before the nominalising suffix in the language. This is exemplified in (9) below:

(9)   a. **nū**   **nú:-b**

            'drink'   drink-AC. NOM.

                       'the act of drinking'

       b. **pía**   **pía-b**

            'speak/talk'   talk- AC. NOM.

                       'the act of talking'

       c. **kúà**   **kúá-b**

            'farm'   farm- AC. NOM.

                       'the act of farming'

	d.	**kā: s**	**ká:s-úg**
		'cry'	cry- AC. NOM.
			'the act of crying'
	e.	**yū:m**	**yú:m-úg**
		'sing'	sing- AC. NOM.
			'the act of singing'

4.5.2.2 Agentive nominals

Agentive nominals belong in the larger class of participant nominals. These refer to the agents that are depicted by the verb roots from which they are derived. The derived forms are then understood as meaning "one who executes the action of the verb" (cf. Appah 2003: 73). Agentive nominals are derived in Kusaal by suffixing the morphemes **–r** to verbs for singular and **–rîb/-ib** for the plural forms. In this case too, the nominalising suffix changes recurring low or falling tones on verbs to high in the derived form or it retains high tones on verbs in the derivations. As in the above, short vowels in light weight syllables become long in the derived forms (10):

(10)	a.	**kúà**	**kúá-r**
		'farm'	kua-AG. NOM
			'one who farms'
	b.	**nū**	**nú:-r**
		'drink'	nuu-AG.NOM
			'one who drinks'
	c.	**kú**	**kú:-rîb**
		'kill'	ku-AG.NOM
			'people who kill'

d.   **bɔ̀:d**   **bɔ́:d-íb**

    'want'   want-AG.NOM

                         'people who like/want'

Derived agentive nominals may often collocate with other nouns or they may be used as they stand in the above. When they collocate with other nouns, they point exactly to the activity that is being referred to thereby making it more specific. For instance, while **nú:r** refers to a hypothetical 'drinker', adding a noun such as **dá:m** 'pito' to **nú:r** 'drinker' yields the form **dānū:r** 'pito drinker/drunkard'. Along much the same lines, a combination of **pūā** 'woman' and **bɔ́:díb** 'likers' becomes **pùàbɔ̄:díb** 'likers of women/philanderers'.

2.7.4 Associative constructions

Associative constructions refer to combinations of nominal forms in noun phrases. They involve possessive or genitive constructions which depict the relationship between a possessor and a possessed entity. Such constructions result from a juxtaposition of the possessive pronoun and a noun or by putting together two different nouns. Though nouns may bear any tone, they generally take non-low tones in Kusaal. Possessive pronouns however carry underlying low tones and have both singular and plural forms. They are listed in (11):

(11)   Singular   Plural

    1   **m̀**   'my'   **tì**   'our'

    2   **fù**   'your'   **yà**   'your'

    3   **ù**   'his/her'   **bà**   'their'

Earlier in this section, we stated that the majority of nominal items in the Kusaal language generally bear non-low tones. When the possessive pronoun is joined to a noun then, the low tone on the pronoun is raised through a process of low tone raising (LTR) to become a mid tone on condition that the noun has a non-low tone, i.e, it has either a high or mid tone. If the nominal item carries a low tone, this tone is retained in the associative, likewise default low tones on possessive pronouns. This is exemplified in (12) below:

(12)   PRONOUN AND NOUN

m̀   bú:g   [m̄ bú:g]
1SG.POSS   goat   'my goat'

fù   yír   [fū yír]
2SG.POSS   house   'your house'

t̀ı   bǐ:g   [tī bǐ:g]
1PL.POSS   child   'our child'

ù   bà: [ùbà:]
3SG.POSS   dog   'his dog'

Combining two nominal forms to make associative constructions is a very prevalent phenomenon in many languages. In Kusaal, the two nouns that can be placed adjacent each other in the associative must be related to some degree: they often refer to one specific entity or strictly to a possessor possessum relationship. The meaning carried by such constructions can be conceptualised schematically as 'the N2 of N1", where N refers to noun and 1 and 2 are the first and second nouns found in such constructions respectively.

As these constructions comprise two nouns, the tones on the nominal items are often retained in noun + noun combinations. However, final high tones in a sequence in the associative attain a considerable rise in their pitch levels as compared to their pitches in the bare token forms. The following (13) is illustrative:

(13)　NOUN + NOUN

zú:g	**kúk**	**[zúkúk]**
'head'	'stool'	'the seat of the head (pillow)'
dá:m	**bín**	**[dábín]**
'pito'	'excrement'	'the waste of the pito (yeast)'
nînî	**kɔ́búk**	**níŋkɔ́búk**
'eyes'	'hair'	'the hair of the eyes (eyelashes)'
tī̃:g	**gbín**	**tīgbín**
'tree'	'buttocks'	'the buttocks of the tree (under the tree)'
súmá	**páóg**	**súmpáóg**
'groundnuts'	'bark'	'the bark of the groundnuts (groundnut shells)'

4.5.4 Compounding

The tonal processes that obtain in compound forms do not differ very much from what obtains in the associative constructions discussed in the foregoing. Compound forms are usually subjected to a re-syllabification process whereby syllable final segments in the first stem are truncated so that the new

(conjoined) forms become compatible with the underlying structuring of syllables in the language. In compounds which involve noun plus noun combinations, tones on the root stems are usually retained in the new forms. The examples in (14) illustrate this trend:

(14) **bī:g** **pòa** **[bīpòa]**
    'child'   'woman'   'daughter in law'

    dá:m   **bín**   **[dábín]**
    'pito'   'excreta'   'yeast'

    nú:g   **bíl**   **báŋ**   **[núbílbáŋ]**
    'hand'   small   ring   'finger ring'

A combination of nouns and adjectives also results in the creation of lexical items which refer to nominal forms. This is usually achieved in some cases with the affixation of a suffix **–im** which derives nominal forms from adjectives. This suffix always carries a mid tone in compounded forms. In most instances, the tone that occurs on penultimate moras in adjectival stems is copied and then associated with all tone bearing units in the new forms. In other instances, there are no conditioning affixes in the derived compound forms. Such compounds are simple combinations of noun and adjective stems. We cite the examples in (15) to illustrate the above:
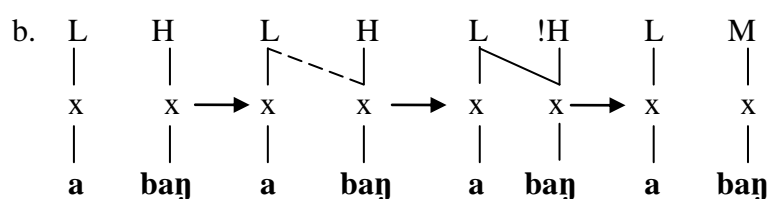
(15) **pú:r** **pîel** **[pūpīelīm]**
    'stomach'   'white'   'joy'

    sū:r   **mālís**   **[sūmālīsīm**
    'heart'   'sweet'   'peace'

bà:	gèdòk	[bàgèdòk]
'dog'	'mad'	'mad dog'

kúrúg	wɔ̄:k	[kūrwɔ̄:k]
'shorts'	'long'	'trousers'

dá:m	pā:l	[dāpā:l]
'pito'	'new'	'new pito'

Proper noun forms which may not be compounds also arise from a concatenation of the prefix **à-** which is used to denote that the unit spoken about is a personified entity or a personal name. Preceding low tones on the morpheme **a-** usually lower the following high tones on nouns through a process of high tone lowering (HTL). These high tones are then realised as mid tones. Examples include the following in (16a) with the autosegmental representation in (16b). (!) means the high tone is lowered or downstepped:

(16)a.

à-	**báŋ**	[àbāŋ]
'Mr.'	'ring/bangle'	'Mr ring/bangle'

à-	**Wín**	**būn**	[àwīmbūn]
'Ms.'	'God'	'thing'	'God's own'

à-	**láríb**	[àlārīb]
'Mr.'	'Wednesday'	'Mr Wednesday'

b.
```
   L    H        L      H        L     !H        L     M
   |    |        ⌐----⌐|        ⌐----⌐|        |     |
   x    x   →    x      x   →    x     x   →    x     x
   |    |        |      |        |     |        |     |
   a   baŋ       a     baŋ       a    baŋ       a    baŋ
```

4.6 SYNTACTIC FUNCTIONS OF TONE

Tone plays a very critical role in the syntax of Kusaal. The syntactic functions relate to the ways in which the various perturbations of tone in the verbal morphology of the language are used to create different grammatical meanings. In this section we will explore the way tone influences the tense, aspect and modal systems of the language as well as how it is used to differentiate between questions, statements and negation.

In Buli (Kenstowicz 2004: 3), it is not possible to find verbs that can be distinguished based only on tonal contrasts. Verbs in the language are therefore not lexically contrastive. A similar situation is reported for Kusaal however with a caveat – in the bare infinitive, a great majority of verbs in the language carry a non-high tone. This comes with a number of implications for the organisation of syntactic structures in the language. The following are relevant in Kusaal tonology and syntax.

4.6.1   Tense, Aspect and Mood (TAM)

In every language, references are made to situations that have already happened or that are anticipated. Such references could also relate to the current time of speaking. These indications to temporal situations are often achieved through the use of tense which is understood as "a category which expresses a temporal relation between the time of the described event and some reference time" (Van Valin and LaPolla 1997: 40). Implicit in this statement is the fact that references of time pertain to the "here-and-now of speech" (Timberlake 2007) in relation to an ongoing event (understood as the present);

to an event that has already happened (understood as the past); and to an event that is anticipated in a time frame ahead of the present moment of speaking (referred to as the future).

Languages and cultures perceive time and therefore the locations within that time (tense) differently based on the varying cognitive and/or perceptive situations. The various approaches that languages will use in the descriptions of the linguistic time frame will reflect their intrinsic knowledge or concept of time. According to Botne and Kershner (2008: 150) "tense systems constitute the overt manifestation of the linguistic organisation of time." Tense is also construed as the "grammaticalised expression of location in time" Comrie (1985: 9). It implies then that, tense as a grammatical category must be marked using overt morphological categories. In some instances, however, these morphological inflections may not be overt morphs but may be coded as is the case in empty/null morphemes which are, nonetheless, morphological variations. Languages which fail to mark time through grammaticalised properties or overtly represented grammatical categories are considered as lacking a system of tense marking. Kusaal falls under this category.

In Kusaal, as much in many Ghanaian languages, there is no morphological system (either overt or coded) that is inflected on verb stems to show that the event or situation being spoken about happens in the past, present or future. Consequently, tense as a category, is not tenable in the language as verbs cannot be shown to have undergone any process of grammaticalisation wherein the morphology of verb stems change to instantiate tense systems. The

language however, has a system of making references to events or situations that occur in the past or present time. References to future time situations are also achieved through the use of the particle **na** occurring before main verbs in verb phrases. Various degrees of remoteness pertaining to past time and future time references also obtain in the language and these are achieved with the use of three particles – **pa:**, **sa:** and **da:** for variations of the past and by the particle **sa:** for future time marking.

Kusaal verbal systems are therefore inherently aspectual in nature. Unlike tense which relates to the ways in which language is used to "carve up" various positions on a hypothetical time line (Haspelmath 1997), aspect examines the internal organisation of the verbs which distinguish the varying references to time. This view is in line with Comrie (1985: 6-7) who characterises aspect as the internal temporal contour of a situation. Aspectual systems further qualify the temporal references made by tense and determine whether the action being referred to by the verb is an ongoing or repetitive situation such as the habitual or progressive. It could also refer to a completed or uncompleted situation such as the perfective and imperfective. The language therefore distinguishes between the progressive and habitual aspects in present time references. In past time references, too, the perfective and imperfective aspects are evident.

Mood, also mode/modality, refers to verbs that are used in connection with other verbs to express a number of situations. Modality thus expresses the sentiments of the speaker toward the issue being spoken about. It shows whether the action in a sentence is a fact, an order, a wish or other and thus

expresses a possibility, permission, obligation, necessity or ability. Saeed (2003: 135) says of modality that it "is a cover term for devices which allow speakers to express degrees of commitment to, or belief in, a proposition." In the words of Palmer (2001: 1) modality is "concerned with the status of the proposition that describes the event." Underlyingly, modal expressions are semantic categories that permit a speaker to shed light on situations. As a grammatical category, modality is expressed through the use of modal (auxiliary) verbs in conjunction with main verbs.

In the majority of tonal languages, the role of tone in tense, aspect and modality cannot be underscored. Tone is therefore important in Kusaal aspectual systems. The language is typologically SVO. Subjects precede verbs which also precede objects in the syntactic structure of the language. The following are important in the tonology of the language:
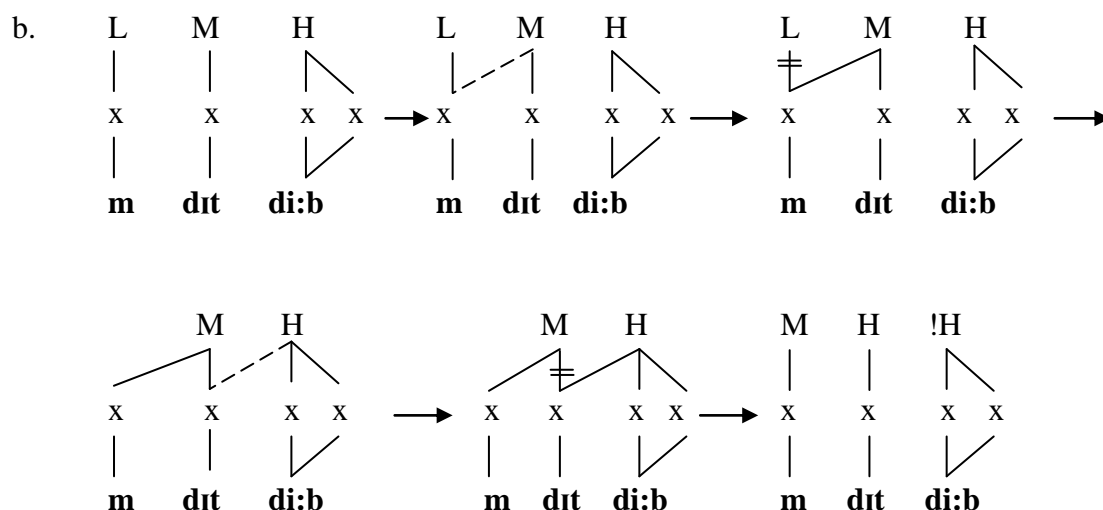
4.6.1.1 The Habitual

Present time references in the language are often made in relation to either the habitual or progressive aspects. While the former refers to an activity that is lengthened over time, or that occurs frequently within a period of time, the latter refers to an activity that is ongoing within a specific time frame. To form the habitual aspect, verb stems take various allomorphs of the suffix **/-t/**: which is realised as **/-d/** after verb stems which end in back vowels, as **/–t/** in stems which end in front vowels and as the suffix **/-id/** in stems which end in obstruent sounds. In habitual constructions, all the verbs bear mid tones with the first and second person pronouns while the pronouns are all realised with a

default low tone. In the third person however, recurring mid tones on verbs become low in the underlying representation. This patterning is illustrated in (17) below:

(17)   Singular   Plural

1   **[ǹ d̄ɪt]**   'I eat'   **[tì d̄ɪt]**   'We eat'

2   **[fʊ̀ d̄ɪt]**   'You eat'   **[yà d̄ɪt]**   'You eat'

3   **[ʊ̀ d̀ɪt]**   'S/he eats'   **[bà d̀ɪt]**   'They eat'

When the verb takes a direct object in the habitual, it copies the high tone of the object in the first and second persons. Recurring high tones on the object are subsequently realised as downstepped high tones or mid tones in all cases. The first and second person pronouns in turn acquire mid tones through a process of low tone rising which is triggered by the verb. Direct objects do not influence the tonal properties of verbs with the third person pronominal subject. This is exemplified in (18a) and represented autosegmentally in (18b):

(18)a. i.   **m̀**   **d̄ɪ.t**   **dí:b**   **[ǹ dɪ́t d̄ɪ̄:b]**

1SG   eat.HAB   food

'I eat food.'

ii.   **fʊ̀**   **d̄ɪt**   **dí:b**   **[fʊ̄ dɪ́t d̄ɪ̄:b]**

2SG   eat.HAB   food

'You eat food.'

iii. **ʊ̀**   **d̄ɪt**   **dí:b**   **[ʊ̀ d̀ɪt d̄ɪ̄:b]**

23SG   eat.HAB   food

'S/he eats food.'

b.

```
   L    M    H        L    M    H        L    M    H
   |    |   /\        |.--´|  /\        =|/|  /\
   x    x  x  x  →  x    x  x  x  →  x    x  x  x  →
   |    |   \/        |    |   \/        |    |   \/
   m   dɪt  di:b      m   dɪt  di:b      m   dɪt  di:b
```

```
        M    H             M    H        M    H   !H
       /\.--´\           /=\   /\        |    |   /\
    x   x  x  x    →   x   x  x  x   →  x    x  x  x
    |   |   \/          |   |   \/        |    |   \/
    m  dɪt  di:b        m  dɪt  di:b      m   dɪt  di:b
```

In the above representation, it is observed that the mid tone of verb spreads in a leftward direction to the pronominal form. Through a process of LTR, the pronoun acquires a mid tone. Subsequently, the high tone of the nominal form also spreads in a leftward direction causing the mid-tonal verb to become high toned. The high tone on the noun is realised as a down stepped high tone in the final derivation.

4.6.1.2 The Progressive

Forms in the progressive aspect also differentiate between those that have objects from those that do not. The progressive aspectual marker is a suffix **-ɛ** affixed to present or habitual forms of verbs. The default tone on this suffix is a non-high tone – either mid for the 1st and 2nd persons or low for the 3rd person pronouns respectively. The suffix however becomes high when there is a direct object in the sentence. The examples below exemplify null object (19a) and object usages (19b).

(19)a. **[n̄ nú:dɛ̄]**   'I am drinking'
    [fʊ̀ nú:dɛ̄]   'You are drinking'
    [ʊ̀ nù:dɛ̀]   'S/he is drinking'

b. **[n̄ nú:dɛ́ kúòm]**   'I am drinking water'

[fʊ̀ nú:dɛ́ kúòm]   'You are drinking water'

[ʊ̀ nū:dɛ́ kúòm]   'S/he is drinking water'

4.6.1.3 The Perfective and Interrogative

Past tense forms in Kusaal are always explicated with an inherent reference to the perfective and imperfective aspectual systems. The perfective aspect describes an event that was carried out in the past and that has been successfully accomplished. It is expressed through the perfective suffix **–ja**, (20a) or with one of three particles: **pā:** (hodiernal past time), **sā:** (recent past time) and **dā:** (remote past time) which designate various degrees of past time reference (20 b - d). In the following we illustrate how tone patterns out in expressions involving the perfective.

(20)a. SIMPLE PERFECT

m̀   sō.jà   [n̄ só.jà]
1SG   bath.PERF
'I have bathed.'

fʊ̀   sō.jà   [fʊ̀ só.jà]
2SG   bath.PERF
'You have bathed.'

àdā:m sō.jà   [àdā:m sò.jà]
Name bath.PERF
'Adaam has bathed.'

b. HODIERNAL PAST (Restricted to only events of today)

m̀ pā: sō.jà [m̄ pá: sò.jà]

1SG HOD.PST bath.PERF

'I bathed earlier today.'

fʊ̀ pā: sō.jà [fʊ̀ pá: sò.jà]

2SG HOD.PST bath.PERF

'You bathed earlier today.'

àdā:m pā: sō.jà [àdā:m pà: sò.jà]

Name HOD.PST bath.PERF

'Adaam bathed earlier today.'

c. RECENT PAST (Refers to only yesterday's events)

m̀ sā: sō.jà [n̄ sā: sò.jà]

1SG REC.PST bath.PERF

'I bathed yesterday'

fʊ̀ sā: sō.jà [fʊ̀ sā: sò.jà]

2SG REC.PST bath.PERF

'You bathed yesterday'

àdā:m sā: sō.já [àdā:m sà: sò.jà]

Name REC.PST bath.PERF

'Adaam bathed yesterday'

d. REMOTE PAST (Refers to events before yesterday)

m̀ dā: sō [n̄ dā: sō]

1SG REM.PST bath

'I bathed some time ago'

fừ   **dā:**   **sō**   **[fừ dā: sō]**

2SG   REM.PST   bath

'You bathed some time ago'

àdā:m dā: **sō**   **[àdā:m dā: sō]**

2SG   REM.PST   bath

'Adaam bathed some time ago'

The examples in (20a and b) make reference to a situation occurring within the same time frame. We explain that in (a), for instance, a high tone is borne by the verb stem that inflects for time. When the particle **pā:** is introduced in (b) a number of tonal processes are triggered. First, the particle copies the high tone of the inflected verb. Second, the high tone on the verb is deleted and it subsequently acquires a low tone through a process of low tone spread (LTS) from the perfective suffix. This is also represented autosegmentally in (21). In (20c) however, the tone on the preceding particle causes a lowering of tones in the verb stems and suffixes while in (20d) all the segments copy the underlying mid tone of the verb.

(21) Tone
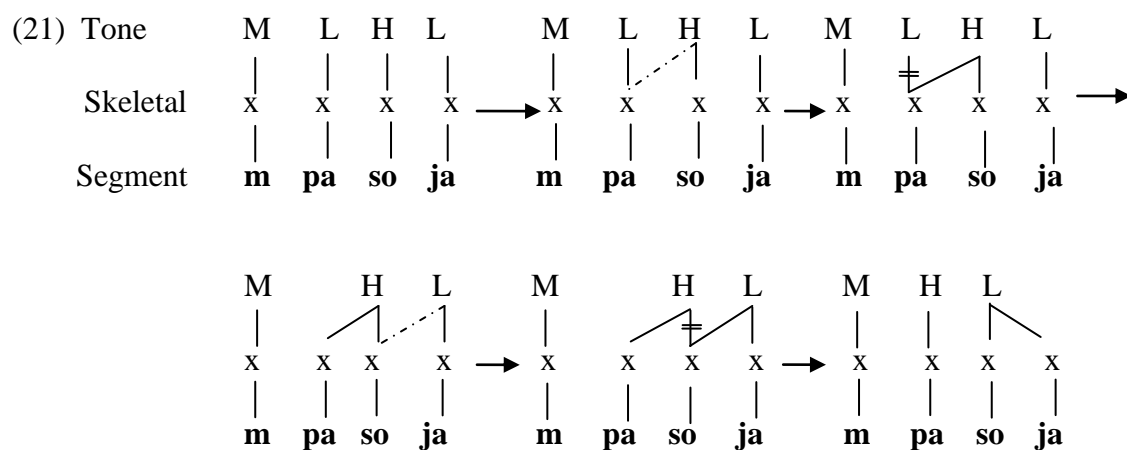
In order to form the interrogative from the perfective, the short final vowel segment in the affix acquires a long vowel quality. This creates a domain for falling contour tones (a sequence of high - low tones) to dock on. Penultimate vowels in the interrogative forms carry a downstepped high tone (22):

(22) **[àdá:m sò!jâ:]**   'Has Adaam bathed?'

  [àdá:m pá sō!jâ:]   'Did Adam bath earlier today?'

  [àdá:m sá sō!jâ:]   'Did Adaam bath yesterday?'

  [àdá:m dá !sô:]   'Did Adaam bath some days ago?'

4.6.1.4 The Future and Interrogative

Distinctions between future time marking and the future interrogative are made based on only tone contrasts in the language. In much the same way as the English language, futurity in Kusaal is not marked through overt or covert morphological properties but rather by a particle **na**. The particle is used to indicate that the event being spoken about occurs in a timeframe ahead of the present moment of speaking. It is used pre-verbally and bears a high tone in 1st and 2nd pronominal forms. This high tone conditions adjacent low tones on 1st and 2nd pronouns to rise to mid tones. Verbs retain their default non-high tones.

(23) **M̀ ná zō**   **[ñ ná zō]**   'I will run'

  Fò ná zō   **[fū ná zō]**   'You will run'

  ù ná zō   **[ù nà zō]**   'S/he will run'

  Tì ná zō   **[fī ná zō]**   'We will run'

  Yà ná zō   **[yā ná zō]**   'You will run'

  Bà ná zō   **[bà nà zō]**   'They will run'

Creating the interrogative of the future forms is achieved through a significant degree of tone rising until the end of the statement where short final vowel segments in the verb stem are lengthened. The second mora in the verb always takes a low tone. Observe also that mid tones in the first and second person in the statements above become high toned in the question while low tones on the third person become mid-toned. The examples in (24) illustrate this strategy:

(24)   **M̀ ná zɔ̄**   **[ń ná zɔ̂:]**   'Will I run?'

      Fʋ̀ ná zɔ̄   **[fʋ́ ná zɔ̂:]**   'Will you run?'

      ʋ̀ ná zɔ̄   **[ʋ̄ nā zɔ̂:]**   'Will s/he run?'

      Tì ná zɔ̄   **[tí ná zɔ̂:]**   'Will we run?'

      Yà ná zɔ̄   **[yá ná zɔ̂:]**   'Will you run?'

      Bà ná zɔ̄   **[bā nā zɔ̂:]**   'Will they run?'

When the verbs in the future do not terminate in vocalic segments, an interrogative particle **-ɛ:/e:** is suffixed to the verb stem so that it can carry the low tone of the future interrogative. This is exemplified in (25):

(25)   Future   **[bà nà gɔ̄s]**   'They will look'

                [fʋ̄ ná dūm]   'You will bite'

                [ñ ná sī̀àk]   'I will agree'

      Interrogative   **[bā nā gɔ́sɛ̀:]**   'Will they look?'

                [fʋ́ ná dúmɛ̀:]   'Will you bite?'

                [ń ná sī̀ákɛ̀:]   'Will I agree?'

4.6.1.5 Perfective and future negation

Kusaal perfective and future forms can both be used in a negative sense. This is achieved through a variation of the tonal quality on the negative morphemes **pʋ/kʋ**. When a low tone is associated with the moraic segment in the morpheme - **pʋ̀/kʋ̀** - the derived meaning is 'will not'. On the other hand, when these morphemes carry high tones - **pʋ́/kʋ́** - a negative meaning 'did not' arises. Verb roots which occur in both forms acquire an extra long quality if they end in short vowels. If they end in consonants, verb stems are re-syllabified by a clitic **-ɛ**. The first moraic elements in the verb stems also copy the tone of the negation marker. We illustrate this phenomenon in the following examples in (26):

(26)	PERF.:	**[m̄ pʋ́ kúà]**	'I did not farm'
	FUT.:	**[m̄ pʋ̀ kʋ̀à]**	'I will not farm'
	PERF.:	**[t̄ɪ pʋ́ kʋ̂ː]**	'We did not kill'
	FUT.:	**[t̄ɪ pʋ̀ kʋ̀ː]**	'We will not kill'
	PERF.:	**[àssìbɪ́ pʋ́ sɔ́bɛ̀]**	'Assibi did not write'
	FUT.:	**[àssìbɪ́ pʋ̄ sɔ̄bɛ̄]**	'Assibi will not write'

4.6.1.6 The Imperative

Imperative constructions are used to make demands of other people over whom the speaker has some degree of authority or power. The imperative suffixes are **–m/-im** for singular constructions and **-min** for plural imperative constructions

respectively. A verb takes the suffix **–m** in the imperative if the stem ends in vowel sounds which can be either a sequence of vowels or long vowels but never short vowels. Short vowels are regularly transmuted to long ones so that they can take the suffix. The **–im** suffix is conjoined to verb stems which end in consonant sounds. Imperative constructions are characteristically composed of non-high tones. Final tones in the singular imperative are generally low toned while in the plural, the imperative suffix bears a mid-tone. The examples in (27) exemplify both the singular and plural imperative forms:

(27) Singular Plural

[zɔ̂ːm] [zɔ̂ːmīn] 'Run!'

[kū̂ːm] [kū̄ːmīn] 'Kill!'

[pīâm] [pīâmīn] 'Speak!'

[gɔ̄sīm] [gɔ̄sīmīn] 'Look!'

[yɛ̄l̀ɩm] [yɛ̄l̀ɩmīn] 'Tell!'

[kā̂ːsɩm] [kā̂ːsīmīn] 'Cry!'

[sīlg̀ɩm] [sīlg̀ɩmīn] 'Sieve!'

4.7   SUMMARY

In this chapter, we explored several aspects of the tonology of Kusaal. We identified that much like the case in the Buli language; Kusaal has a three tone contrast - high, mid and low. Unlike Buli, however, there are instances of high tones which are realised as downstepped highs because of adjacent high tones. We identified that the tones of nominal items are regularly non-low, i.e., that they bear either high or mid tones, while uninflected verb stems are regularly mid-tonal or low. The chapter further discussed the role of tone in Kusaal

nominal morphology where it differentiates between singular and plural nominals, derived nominals, associative constructions and compounding. We also discussed the distinctions that are created in the syntax of the language based on tonal differences. We specifically looked into the role of tone in marking the different tense, aspect and modal systems of the language.

CHAPTER FIVE

SUMMARY AND RECOMMENDATIONS

5.1   INTRODUCTION

This concluding chapter summarises the various issues discussed in the preceding chapters. It also makes a number of recommendations for future research on the language. The study is divided into five broad sections - chapters one through five.

5.2   SUMMARY

Chapter One set the basis for the study. Kusaal, we intimated, is one of the many under-described, under-studied and less familiar languages of Ghana. Though some research has been carried out on the language, the scant material is mostly too dated to allow for an instructive usage of the language. Considering the overwhelming need to describe, analyse and document the various languages of the world, we stated that there was a need to change the status quo and undertake an up-to-date description of the language. The scope of the study therefore entailed describing aspects of the grammar of the language with particular reference to its phonology. Kusaal is the language of some 450,000 Kusaas who inhabit the north-eastern corner of Ghana. This area is bounded to the north by Burkina Faso and to the east by Togo where there are pockets of Kusaal speaking communities. The areas inhabited by the language speakers are generally low lying with intermittent ranges of mountains. The vegetation is Sahel Savanna and drainage is mostly sourced

from the White and Black Voltas which run across the three Kusaal speaking districts in the Upper East Region.

The language is found in the Mabia cluster under the Proto Oti-Volta grouping of the larger Niger-Congo language family. It has two dialects – Agole and Tonde which are spoken in the east and west of the language area respectively. The indigenes are typically traditional African religion adherents who believe in small deities and in a supreme being called Winaam. Christianity and Islam are also common among the people. Kusaog – the traditional name of the Kusaal speaking area – has 22 sub-chieftaincy institutions and one paramount chief domiciled in Bawku, the most important commercial and administrative town of the Kusaas. Multilingualism is an accepted phenomenon while the people, at the same time, hold a strong cultural affinity to the language.

The significance of the study include updating and adding up to the obsolete and insufficient linguistic data on the language; providing a resource for language policy makers and translators; setting the basis for subsequent and more expansive descriptions of the language and contributing to efforts being made to have the language studied in school.

In this chapter too, we highlighted the theories which form the basis of the study. The generative phonological theory especially formalised by Chomsky and Halle (1968) was drawn upon because of our belief that the linguistic competence of a speaker, and not their ability to simply perform in it, directs him/her to choose the optimal form from a huge list of potential forms

generated by the syntax of the language (Kenstowicz nd: 1). The autosegmental phonological theory of Goldsmith (1979, 1990) adequately makes up for some of the short falls of the generative theory, especially with regard to the linearity principle encapsulated in the latter. Within an autosegmental framework, we are able to posit that certain elements are autonomous, unlike segmental features such as consonants and vowels. These suprasegmentals include elements such as stress and intonation, and in our own case, tone. With moraic theory, we are able to break down the atomic composition of Kusaal syllables. We discuss the structure of syllables in the language in relation to their weight units rather than to their immediate constituents (such as onset and rhyme).

The methodology that was adopted for the study involved embarking on a 10 day field trip to the general Kusaal speaking area. Using an electronic recorder, we interviewed 6 respondents from each dialect with the aid of a word list. We also recorded spontaneous speeches in both religious and social settings. The collected data was then transcribed and, using Praat, we determined the relative pitches of some of the words and constructions. Native speaker intuition was also an important asset in this endeavour. Other native speakers and a few secondary sources were often consulted for clarity and accuracy of data transcription and analyses.

In **Chapter Two**, we described the sounds and syllable structure of the language. We identified 24 consonants: three bilabials - /p/, /b/, /m/; two labio-dentals - /f/, /v/; seven alveolars - /t/, /d/, /n/, /s/, /z/, /l/, /r/; three palatals -/ɲ/, /j/, /ʄ/; three velars - /k/, /g/, /ŋ/; four labial-velars - /kp/, /ɡb/, /ŋw/, /w/ and two

glottal sounds - /ʔ/ and /h/. At word initial position, all except the glottal stop /ʔ/ and the velar nasal /ŋ/ can occur while word medially only the glottal fricative /h/ does not occur. At word final position the labial-velar and glottal stops /kp/, /gb/, and /ʔ/; the labio-dental and velar nasals /ɱ/ and /ŋ/; the voiced labio-dental and alveolar fricatives /v/ and /z/ and the approximants /j/ and /w/ are constrained from occurring.

There are also 9 short oral vowels - /i, ɪ, e, ɛ, a, u, ʊ, ɔ, o,/ which have long vowel correlates - /i:, ɪ:, e:, ɛ:, a:, u:, ʊ:, ɔ:, o:/. Five nasal vowels which are all [-ATR] also obtain in the language - /ĩ/, /ɛ̃/, /ã/, /ũ/ and /ɔ̃/ and there are also sequences of vowels involving many of the above.

The distinct features which underlie these sounds are three: the major class features - [consonantal] and [sonorant]; the manner of articulation features - [continuant], [nasal], [lateral], and [strident] and the place of articulation or cavity features - [coronal], [dorsal], [labial], [anterior], [high], [low], [round], [ATR], [voice] and [spread glottis]. All these features have binary values except [coronal], [dorsal] and [labial] which are unary in nature, i.e., they are specified only if they contribute to the nature of the sound under consideration. We then proceeded to extract some universal and language specific feature redundancies in order to show that the use of distinctive features results in a more economical description of the sounds of language. For instance, we are able to deduce that if a vowel sound has a nasal quality in the language then it is automatically a [-ATR] sound.

We further discussed the structuring of Kusaal syllables from a moraic perspective. Four broad syllable types were identified: the peak only syllable which can be either a vowel or nasal consonant; the heavy VC syllable which can be realised as either a long vowel and a consonant (V:C) or as a sequence of two separate vowels followed by a consonant (VVC); the CV syllable which also extends to become CV: or CVV in some cases and finally the CVC syllable which can take up to three different forms: CV:C, CVVC and CVVCC. Words in the language can thus be mono-, di- or tri- syllabic or they can combine up to four syllable types.

Chapter Three discussed two important phonological processes in the language: assimilation and syllable structure processes. When words assimilate each other, they behave like each other in the same environment. Assimilatory processes in the language include nasalisation by which process oral segments acquire nasal qualities in the environment of nasal sounds; homorganic nasal assimilation (HNA) through which nasal sounds copy the place of articulation of contiguous consonant sounds; labialisation – a process whereby hitherto unrounded segments are produced with a degree of lip rounding as a result of the presence of a back vowel or the labial-velar approximant in the syllable or word; palatalisation which raises the body of the tongue in the production of certain consonants - a result of an underlying high front vowel in the syllable and lastly vowel harmony.

Vowel harmony is a very productive process in the language wherein it is observed that the vowels which occur in syllables or words always come from

the same category. The harmonisation cuts across the various vowel heights and is tied to the position of the tongue root in speech production. It thus depends on whether the vowel is [+ATR] or [-ATR]. Vowels in words or syllables thus occur only with members of their group but not with others. The sets are captured below:

[+ATR]	i	e	o	u	
[-ATR]	ɪ	ɛ	ɔ	ʊ	a

It was also observed that the only [-ATR] vowel which co-occurs with [+ATR] vowels is the low central vowel /a/. It was further observed that variations of words produced with either set of the vowels are often possible in the language. In most situations however, the language users are prone to select vowel forms from the unadvanced tongue root than from the advanced class in speech. This projects a process of vowel coalescence from the advanced to the unadvanced vowels on-going in the language.

In the structuring of syllables, processes such as vowel truncation and consonant deletion account for a reduction of the length of syllables so that they fit into the language especially when words are compounded. Aspiration lends a degree of breathiness to voiceless stops occurring at syllable initial position while glottalisation re-syllabifies cumbersome syllables into the language. Loanwords are also integrated into the language by processes such as consonant deletion or replacement, compensatory lengthening of vowels and vowel insertion (epenthesis).

In **Chapter Four**, we explored the nature and patterning of tones in the language. Tone is the use of relative pitch to create lexical and grammatical

contrasts in languages. We establish that Kusaal is a register tone language which has only level pitches and thus contrasts three tonemes – high (H), mid (M) and low (L). The language also differentiates between underlying high tones and downstepped high tones. Gliding pitches which occur in the language are considered as sequences of these level pitches which create rising or falling tones. Combinations of tone in the language also result in sequences of HH, HM, HL, MH, MM, ML, LH, LM and LL especially on disyllabic words.

We identified the mora as the tone bearing unit (TBU) in Kusaal because sequences of tones can only occur on heavy bimoraic syllables. Light monomoraic syllables always acquire another mora through compensatory lengthening in order to carry any sequence of tones. Within an autosegmental framework we discuss the functions of tone in the morphology and syntax of the language.

Morphologically, tone is used to differentiate between lexical items. In simple singular and plural forms, underlying tones are often retained while action or agentive nominals derived from verbs always acquire high tones. In associative constructions involving pronouns and nouns, recurring low tones on pronouns are raised to mid tones through LTR while nominal forms become high toned if they do not bear high tones already. In noun plus noun associative constructions, the underlying tones on these nouns are retained while the second nominal item is produced with a considerable rise in its pitch. Compound forms usually also retain their tones. Tone also plays a very crucial role in the syntax of the language. The various aspectual and modal systems of

the language are also often differentiated based on the underlying patterning of tone. The habitual, the progressive, the perfective and interrogative, the future and interrogative, the perfective and future negation and the imperative have underlying tonal perturbations that mark them as different, one from the other.

5.3   RECOMMENDATIONS

From the onset, we acknowledged that this study scratches only the surface. It is only the icing on a rich bulk of linguistic repertoire waiting to be tapped and savoured. There is therefore a lot more work that can be done on Kusaal. The language offers a range of options for researchers who are willing to venture into unconquered territory while taking in the serene countryside. Opportunities for developing or carrying out research on the language include the following:

- research into other relatively under-described linguistic fields of the language such as the morphology, syntax, semantics, pragmatics and sociolinguistics, etc.;

- explore the interfaces between phonology and syntax, phonology and morphology, tonology and syntax, tonology and morphology, etc.;

- investigate into the oral traditions of the people cached in their folklore including their proverbs, riddles, poems, songs, traditional prayers and short stories; couched

- undertake a comparative study of the Agole and Tonde dialects to determine how much they converge or diverge from each other and further ascertain the feasibility of a common orthography;

- compile and collate a lexicon/dictionary of the language for language users and other stake holders;

- establish why Kusaal appears to be deviating from the general trend in the Mabia cluster where the majority of languages simplify syllable final consonants;

- conduct a study to determine whether Yanga (also Yarse or Yan), spoken in Burkina Faso, is a dialect of Kusaal as purported by some or constitutes a different language altogether.

Language policy makers and interested stakeholders may also want to

- create a common and standard orthography that is accessible to all language users and learners and;

- develop the language by producing reading manuals and study materials that will be used in both formal and non-formal education settings.

5.4   CONCLUSION

To conclude, we will iterate that this study covers only the phonology of Kusaal and that there is a lot more that can be done on the language. Areas that could be researched into have been identified and listed. It is believed that a preliminary but comprehensive study of the phonology would inspire others to work on other aspects of the language. It is also hoped that this study would serve as a reference or resource for future researchers.

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