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THE LEXICAL PHONOLOGY OF BAKOKO

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN LINGUISTICS

by

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"Unless the Lord builds a house,
the work of the builders is useless."

The Bible

ABSTRACT

This thesis aims at providing a detailed phonological analysis of Bakoko, a narrow Bantu language spoken in Cameroon. The main claim made here is that a stratally organized model of phonology is better suited to deal successfully with the segmental, syllabic and tonal phenomena displayed by the language. More specifically, it is argued that the phonology of Bakoko consists of two non cyclic lexical strata and a postlexical component which can be further subdivided into two strata: postlexical one (P1) and postlexical two (P2). Unlike P2, P1 is a postlexical stratum which is nevertheless sensitive to lexical information.

The thesis provides evidence that, prior to the affixation of stratum one formatives, the underived lexical item (root) is scanned by the phonology. Then, the stem (i.e. the root plus extensions or final vowel) and the suffixed tense markers are derived at stratum one. The pre-stem material, that is, the subject marker and the tense markers in the verb forms and the noun class prefixes in the nominal forms, undergo the stratum two rules. These two strata are claimed to be autonomous blocks with their own properties. Boundary tones are postulated for some tenses between the inflectional formatives and the stem. Such tones (when they are high) dock to the right, attracted by the root which is a prominent position.

Feature geometry systems have been motivated and used in the formulation of the segmental (consonants and vowels) processes. This provided illuminating insights into the content and organization of sounds. Moreover, the use of Feature Geometry enabled us to express all the segmental rules of the language in terms of **spreading** and **delinking** mechanisms only. The controversial **Obligatory Contour Principle** has been found reliable and productive in Bakoko where it fonctions as a constraint on the roots as well as on some vowel and tonal processes.

According to the claims of the Underspecification Theory, in a two-tone language with (Low and High tones), Low is the default value and must *ipso facts* be underlyingly unspecified. But we argue and demonstrate that in Bakoko both tones are underlying. (Only some morphemes have been claimed to be unspecified

for tone in the Underlying Representation). This fact has significant consequences for a review of the theory of underspecification.

Thus, this work has not only provided a *Lexical phonology* account of the phonological component of Bakoko grammar, but also contributes to elucidating theoretical issues affecting the frameworks of *Lexical Phonology, Underspecification* etc.

ACKNOWLEDGMENTS.

There are institutions and individuals who paved the way for the successful completion of this thesis. Mere words cannot really express the debt of gratitude I owe them. However, I will mention their names here as a token of my thankfulness. I wish to begin with the institutions.

First and foremost, I thank the University of Buea (and more particularly the Department of English) for providing me with a conducive environment for a doctoral programme. Next, I thank the Cameroon Association for Bible Translation and Literacy (CABTAL) and through CABTAL the Wycliffe Bible translators USA (WBT-USA) which provided me with a scholarship which saw me through during my stay in Buea. I also thank the Summer Institute of Linguistics and especially the staff of the Linguistics Department for their encouragement and support. The well-supplied library of this institution has been an invaluable help in an environment where linguistics books are scarce and expensive. Finally, I wish to thank the members of the Cameroon Student Bible Fellowship (CSBF) for their moral support during these years of hard work.

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insightfully argued for. At times, I must confess, I was stubborn in my opinions. But he has such a good grasp of the facts of Bantu languages that he always ended up convincing me that I was the one going the wrong way. I owe a great deal to Prof. Mutaka both for the analysis and the presentation of the facts discussed in this thesis.

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Thirdly, my sincere thanks go to Dr. Keith L. Snider. Keith would always find time to discuss my data with me, read and comment on my manuscripts, clarify my ideas, suggest alternative solutions to my proposals, etc. He has been as anxious as me to see this thesis completed. That is why, even back to Canada, he kept on interacting with me and sending me his feedback. *Thank you Keith!*

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language), he made very helpful suggestions. Dr. Tanda and Dr. Atindogbe (University of Buea) have been so friendly and always willing to help.

Finally, I would like to thank all my language helpers in Yaounde, Douala, Edea, and Mouanko for their special enthusiasm and willingness to provide relevant information whenever it was required. I also thank Jackie Mutaka for diligently typing out this thesis.

Last but not least, I wish to thank my parents, in-laws, and friends who always stood by me in the course of the realization of this major undertaking. To name them all, I would need another volume.

My final thanks go to Laure Angele-my dear wife-and our daughters Viviane Prisca, Perside Blessing, and Esther Glory for being such an invaluable support. Your daily sacrifices have not been fruitless. Thank you all.

I wish to reiterate my sincere thanks to all of you, at the same time, I wish to end this section by mentioning what Keith Snider told me: 'you have a good grasp of what phonology is all about.' I think he was right. However, any inadequacies found in this work lie, not in the linguists cited above, but in my inability to make use of all they taught me.

Abbreviations

1- Rules

AMD	:	Associative Marker Deletion
CCR	:	Coda Creation Rule
C Del	:	Unspecified Consonant Deletion
C.L.	:	Compensatory Lengthening
C.S.	:	Contour Simplification
DTM	:	Default Tone Mapping
ə-INS	:	Schwa Insertion
FCS	:	Falling Contour Simplification
FHR	:	Floating High Tone Relinking
FLR	:	Floating Low Tone Relinking
FLD	:	Floating Low tone Deletion
HTD	:	High Tone Deletion
HTL	:	High tone Linking
MR	:	Meeussen's Rule
LMR	:	Low Mapping Rule
NCR	:	Nucleus Creation Rule
OAR	:	Coda Augmentation Rule
O.R.	:	Onset Requirement
OCR	:	Onset Creation Rule
CAR	:	Coda Augmentation Rule
P.A.	:	Place Assimilation
PHL	:	Phrasal High Tone Relinking
PHS	:	Phrasal High Tone Spreading
PNV	:	Post Nasal Deglottalization
PNH	:	Post Nasal Hardening
PNV	:	Post Nasal Voicing

TR	:	Tone Replacement
T.S.	:	Tone Spreading
UAC	:	Universal Association Conventions
VPS	:	Vowel Place Spreading
V.R.	:	Vowel Reduction
U.T.	:	Underspecification Theory

2- Other

Adj	:	Adjective / Adjectival
AGR	:	*Agreement*
A.M.	:	Associative Marker
C	:	Consonant
C	:	Syllabic consonant
Cont.	:	Continuative
e.o.	:	each other
EXT	:	Extensions
F1	:	Recent Future
R2	:	Remote Future
FG	:	Feature Geometry
FV	:	Final Vowel
Hab.	:	Habitual
INFL	:	*Inflectional*
N	:	Nucleus
N1	:	Rhyme
N2	:	Syllable
NC	:	Noun class prefix
NEG	:	Negation
N.S.	:	Nominal Suffix

Num	:	Numeral
OCP	:	Obligatory Contour Principle
pl	:	plural
Poss	:	Possessive
Rt	:	Root
Sg	:	Singular
SM	:	Subject Marker
TBU	:	Tone Bearing Unit
T.M.	:	Tense Marker
UT	:	Underspecification Theory
V	:	Vowel
WU	:	Weight Unit

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Chapter I
Introduction

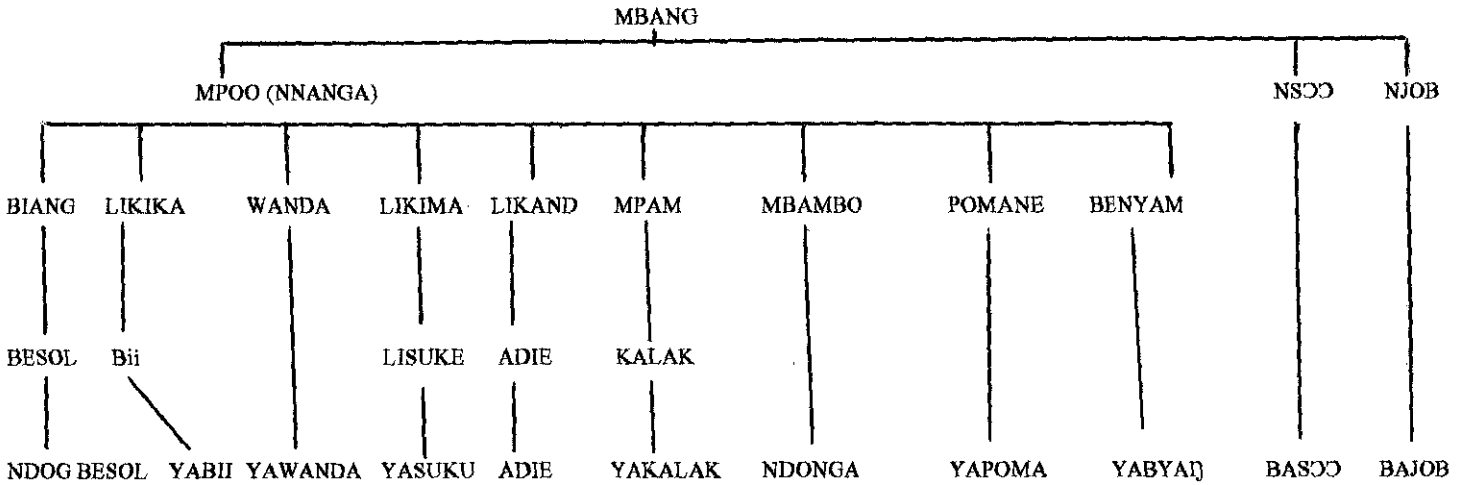
This introductory chapter is divided into three main sections. The first one deals with the information regarding the language and its speakers. The second section addresses the theoretical framework and the theoretical assumptions that underlie the analysis carried out throughout the thesis. The third section presents the organization of the whole work with a layout of each chapter.

1.1. The language and the people.

1.1.1. Identifying the Bakoko people.

The term Bakoko generally refers to people who call themselves ELOG - MPOO (1). Bakoko is the plural form of mùkókó (in Duala) and ŋ̀kóɣó (in Bakoko) which means " the sand". They were thus named by their neighbours (Duala and Malimba). Two interpretations have been given to this denomination. During the war between the Malimba and Yakalak
(a clan or sub-group of the Bakoko), the Malimba said (cf Dikoume 1977:1) "ɓe jiita ka mukoko" meaning "they are as much as the sand". On the other hand, the Duala people are said to have called the Yakalak, "Bakoko", meaning that they were an inferior tribe or that they were as small as the sand (2).

To the Malimba people, Bakoko simply referred to the Yakalak which is a subgroup of the Elog-Mpoo. The Elog Mpoo are a large community nowadays scattered in various areas of the Littoral and even the Centre provinces of Cameroon. According to Dikoume (1977: 23), the clans of the Elog-Mpoo are structured as follows:



Source : DIKOUME, C (1977:23)

In the literature, the Elog Mpoo have been referred to as the Bakoko. It is claimed in the works of Dugast (1949), Bouchaud (1944, 1952) among others that the Bakoko came from the Ngog Lituba region (in the Nyong and Kelle Division) where they lived together with the Pahouins and perhaps the Basaa. Some common patterns shared by the language of these people confirm this claim. But the point is still controversial as to whether the Basaa and Bakoko have a historical link. Dikoume (1977:14) declares that *"la distinction entre Bakoko et Basaa se fait toujours sur le critère linguistique et la parenté se fonde sur la communauté territoriale".*

For various reasons, all these communities left the Ngog Lituba area and migrated towards the South and Littoral directions. The sons of Mpoo (Elog-Mpoo or Bakoko) scattered in various areas of the Littoral Province of Cameroon (cf. geographic map No.1). The Yakalak clan of Elog Mpoo and their language will be our focus in this thesis.

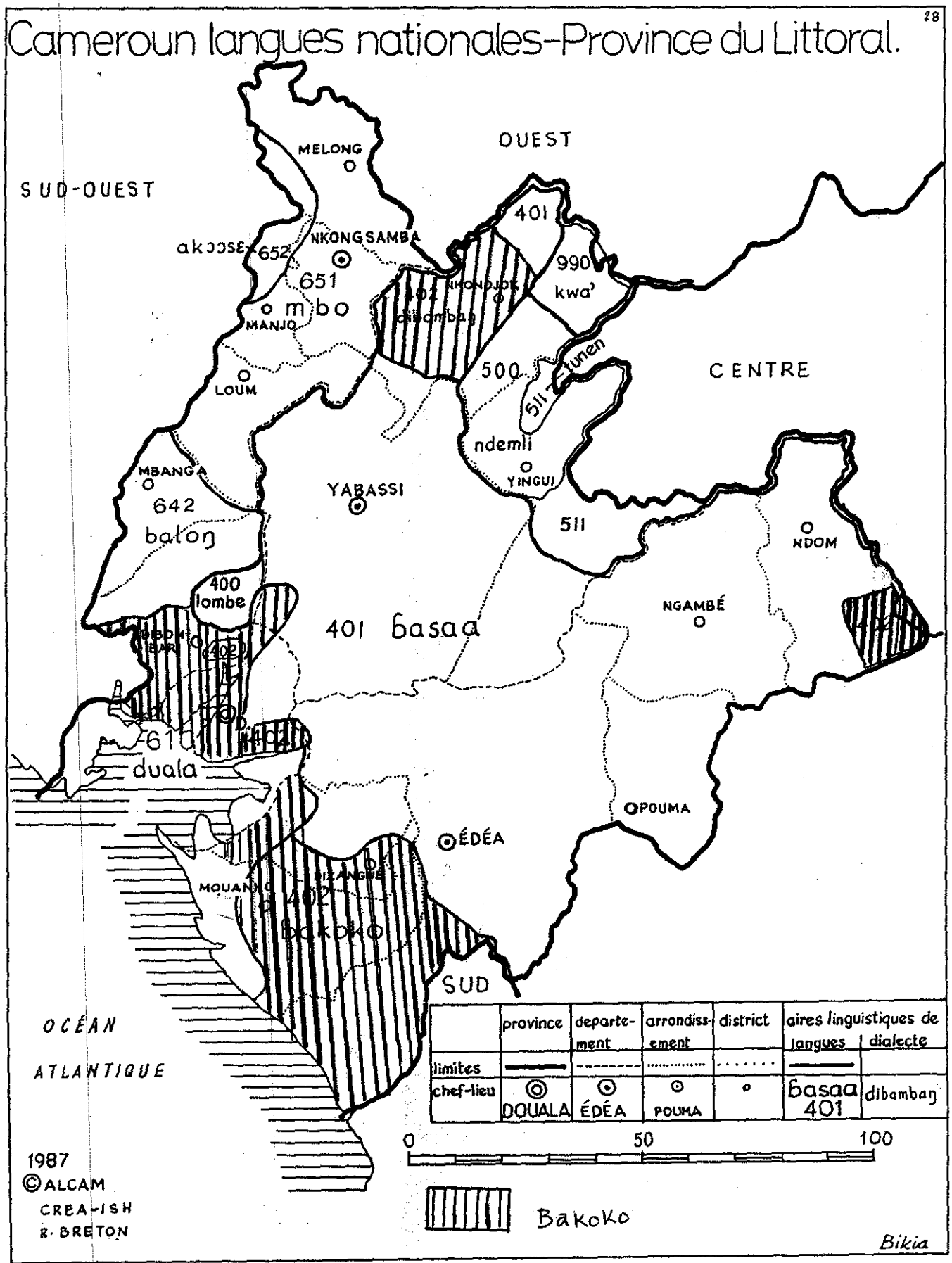
The Yakalak people today occupy the Mouanko and Dizangue subdivisions in the Sanaga Maritime division (cf. map No. 2). They seem to be the central or head subgroup of the Bakoko. Some people even thought that Bakoko solely referred to the Yakalak. Dikoume (1977:2) affirms: "*Dans l'esprit des Malimba, en réalité, cette appelation (Bakoko) ne désignait que le groupe yakalak et probablement yasuku, des embouchures du Nyong qu' ils connaissaient.*"

Moreover, the most important sociological studies carried out on the Bakoko tribe have dealt with the Yakalak. Among others, we can cite Dikoume (1977) and Bouchaud (1944, 1952).

1.1.2. Linguistic Classification

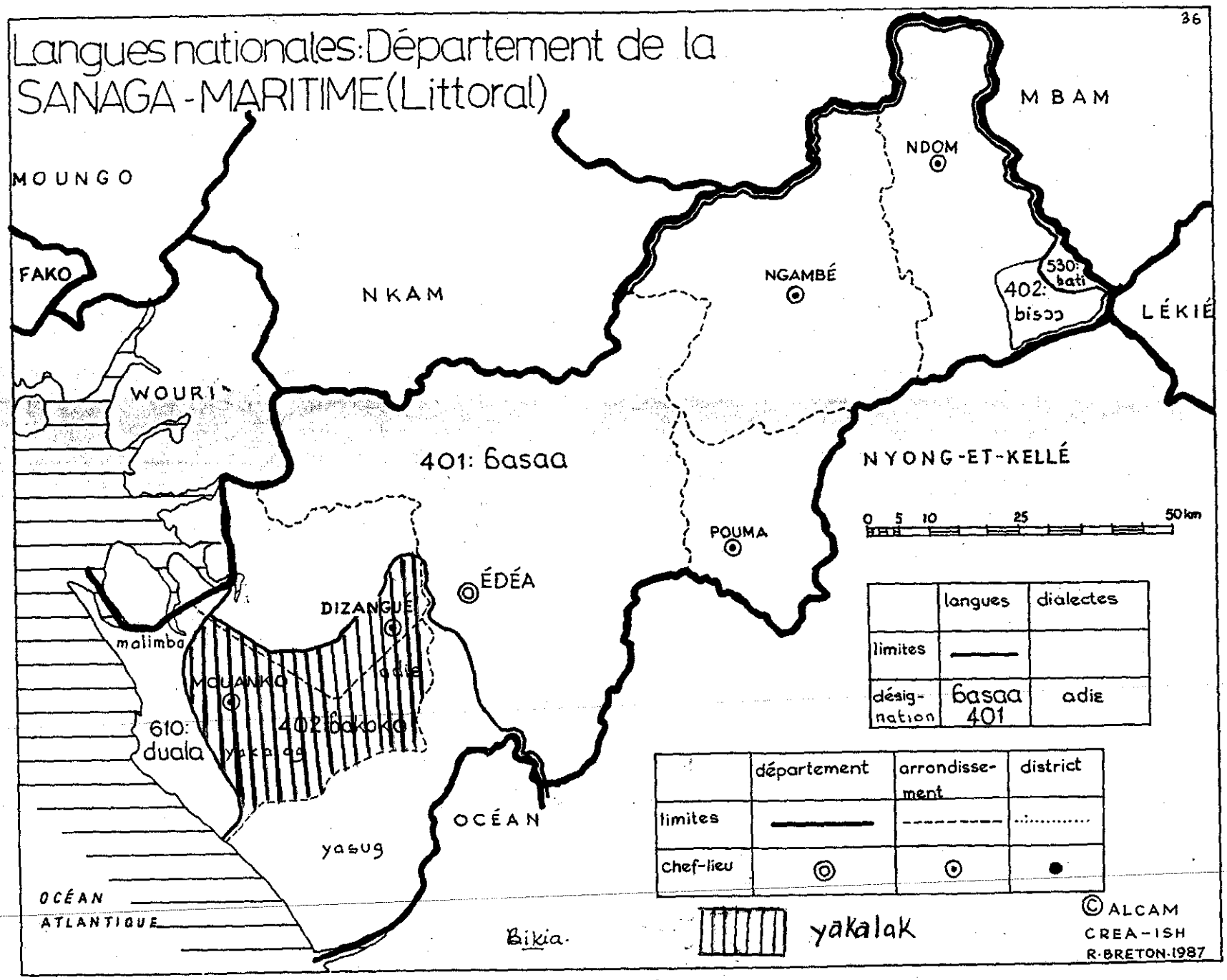
The various authors working on the classification of Bantu languages more or less agree on the classification of Bakoko. Bastin (1978), drawing from the works

Cameroun langues nationales-Province du Littoral.



	province	departement	arrondissement	district	aires linguistiques de langues	dialecte
limites	———	- - - - -	.....	.....	———	
chef-lieu	◎ DOUALA	⊙ ÉDÉA	⊙ POUMA	○	basaa 401	dibamba

Map n° 1


Langues nationales: Département de la SANAGA-MARITIME (Littoral)
MOUNGO
FAKO
NKAM
MBAM
NDOM
NGAMBÉ
530: bati
402: bisɔɔ
LÉKIÉ
WOURI
401: basaa
NYONG-ET-KELLÉ
POUMA
ÉDÉA
0 5 10 25 50km
DIZANGUE
malimba
MOUANKO
adie
610: duala
402: bakoko
yasug
OCÉAN
OCÉAN ATLANTIQUE
Bikia.
yakalak
langues
dialectes
limites
désignation
basaa 401
adie
département
arrondissement
district
chef-lieu
©ALCAM
CREA-ISH
R·BRETON·1987

Map n° 4

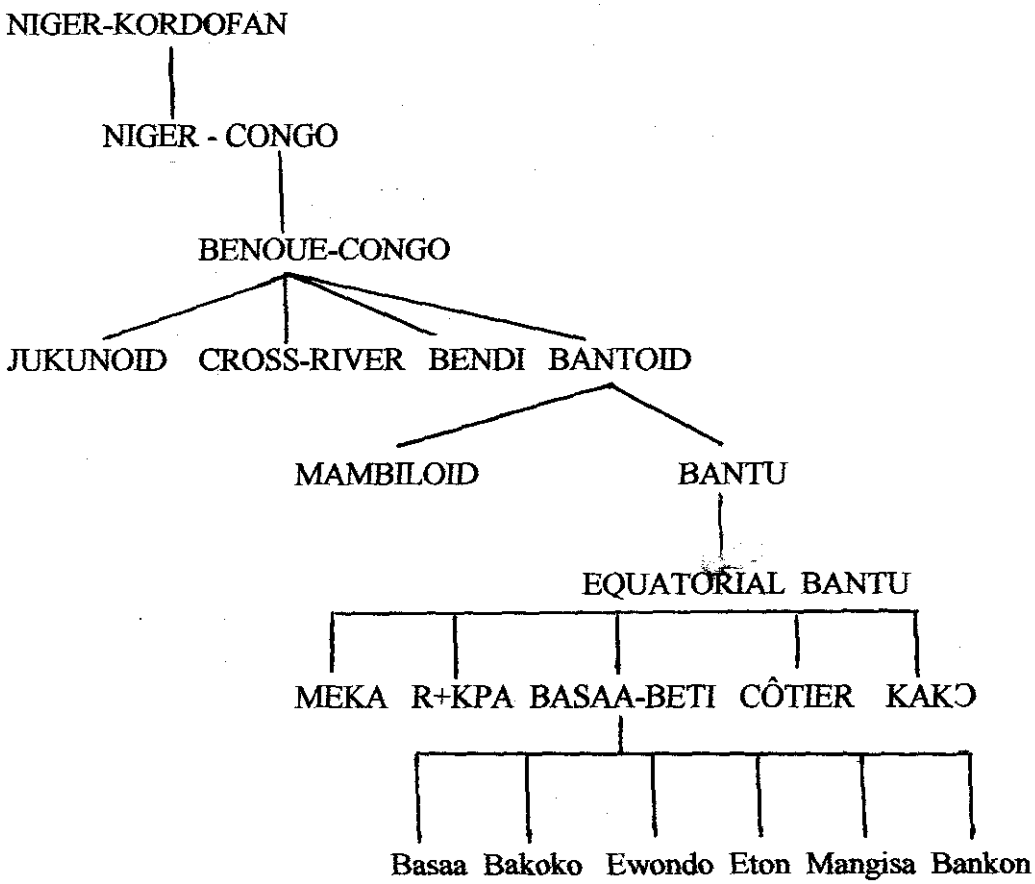
of Guthrie (1971) and Bryan (1959), comes to the conclusion that Bakoko belongs to the Basaa group. And this group is part of *stricto sensu* Bantu languages.

A. 40 Groupe Basa (Cameroun)

41 lombi (= rombi = barombi)
42 bankon (= bo = abo)
43 basaa (= basa)
43a mbene (ndokbele, yabasim ndikpenda, nyamtam dibeng, ndokama, bakem, mbang, dibum).
43b koko (= Bakoko)
44 nen
44a nen (= tunen)
44b otomp (poneck)
45 nyo'o (nyokon), fung
46 mande
46a mande (= lemande = numand)
46b nigi (= yambeta)
46c mese (= yambeta)
46d kibum (= yambeta)

The researchers working within the ALCAM project put Bakoko under the Basaa-Beti subgroup of the equatorial Bantu languages of Cameroon. This classification tends to better reflect the reality of Bakoko. In fact, the language has links with both Basaa and the Pahouin languages such as Ewondo, Eton, Mangisa, etc. Some researchers even claim that Bakoko is closer to the Pahouin languages (DIKOUME 1977). Its similarities with the Basaa may be a result of their territorial neighbourhood. The ALCAM classification can be summarized in the following diagram adapted from DIEU and RENAUD (1983:359).

GENETIC SITUATION OF BAKOKO.



Source: DIEU AND RENAUD (1983:359)

From this classification, it is obvious that Bakoko is a Bantu language. As a Bantu language, it displays the characteristics that BLEEK (1862), MEEUSSEN (1967) and other Bantuists have claimed for Bantu languages, especially the grouping of nouns into noun classes, the existence of concord morphemes or agreement between classes, the existence of tone, the verb form consisting of a Root and a Final vowel between which an extension may be inserted. But it will be demonstrated in this thesis that, although the Bakoko verb form comprises the final vowel and verbal extensions, both are mutually exclusive.

1.1.3. Background Literature on Bakoko.

Most of the studies that have dealt with the Bakoko belong to the field of ethnology and sociology: NICOL (1929), DIKOUME (1977), BUHAN (1979) among others. The significance of these studies lies in their ability to shed light on the origin of the Bakoko tribe, their social organization and their settlement on their actual geographical locations.

Bakoko as a language has not been the object of many studies. Buhan (1979) devotes a chapter of her book to the language because this was really useful for her task. EDIKA (1990) deserves much consideration. This is a " Maîtrise" dissertation bearing on the phonology of Bakoko. The study was carried out within a taxonomic approach. Moreover, EDIKA's work focuses on the variety of the language that is spoken in Dibombari (Moungo Division) i.e. the Yabyan dialect.

From the above literature review, it is apparent that a modern phonological description of this language remains a vital need. Such a study will be important in two respects: fact finding and testing of the validity of certain current frameworks elaborated for the description of other languages.

1.2. Theoretical assumptions

1.2.1. Choice of the Lexical Phonology framework.

The theory of *Lexical Phonology* as proposed by Kiparsky (1982,1985), Mohanan (1982), Pulleyblank (1983) among others is based on a conception of morphology which claims that the structure of a word is similar to that of an onion. Each layer of the "onion" called a level or stratum, is the domain of various morphological and phonological processes. For Goldsmith (1990 : 237) , "strata are small compartments in which affixation processes and phonological rules come

packaged together. They are linearly arranged, so that the first stratum has as its potential input the monomorphemic roots of the language." Within this perspective, phonology is no longer considered the interpretative component of the output of syntax. Rather, it has access to the lexicon make-up. Thus, the main claim made by Lexical Phonology is that phonological rules interact with morphological processes. We believe that this framework will provide illuminating insights into the analysis of the phonology of Bakoko and thus make it possible to solve some problems that would otherwise have been stumbling blocks for the earlier structuralist and generative paradigms (as it will be evident in due course). From the various proposals that have been made within Lexical Phonology, I will adopt what follows. Underived Lexical items (roots) undergo some phonological rules before getting to the morphology where they receive primary affixes. The lexical component of Bakoko is made up of two strata (both non cyclic). The postlexical component is further divided into Postlexical one (P1) and Postlexical two (P2) as proposed by Kaisse (1985). This organisation entails that some postlexical rules do not apply across the board but make reference to morphology.

1.2.2. Tiered Phonology.

The advent of Autosegmental Phonology (Goldsmith 1976) has shown that the adequate representation of the underlying representation (U.R) is not a linear string as claimed by the Sound Pattern of English (SPE) model. Rather, the UR is made up of multilinear strings linked by Association lines following some Universal Association Conventions (U.A.C.). Various proposals have been made as to how the lines are matched to yield the surface forms (Williams 1976, Goldsmith 1976, Leben 1973, Clements and Ford 1979, Pulleyblank 1983, Yip 1988, etc.). In this thesis, I assume Pulleyblank's (1983) version. Bakoko can convincingly demonstrate that multiple linkings of tones to Tone Bearing Units (TBU) occur only as a result of language specific rules. Pulleyblank (1983) rewrites the association conventions as follows:

Association Conventions.

Map a sequence of tones onto a sequence of TBU

a) from left to right

b) in a one to one relation

Wellformedness Condition

Association lines do not cross.

I will argue that the UAC applies at the root cycle to link tones unto Tone Bearing Units. Then after, when underlyingly toneless formatives are affixed at stratum one, the associated or linked tones do not spread unto them as it was stated in some previous versions (Goldsmith 1976). Rather, underlyingly toneless units receive tones by default. In the same line of thought, floating tones will be argued to reassociate by language-specific rule, rather than by the UAC, in order to create contour tones.

1.2.3. The Obligatory Contour Principle (OCP).

The OCP is a constraint on underlying representations with the effect of prohibiting adjacent identical elements. This principle was first introduced by Leben (1973) and has been successively examined by Goldsmith (1976), McCarthy (1986), Odden (1986), and Yip (1988) among others. Odden (1986) for instance carries out a cross linguistic study of the phenomenon and draws the following conclusion: " OCP as a universal principle is counter- exemplified" because the constraint does not hold for all languages. Moreover, its domain varies from language to language when it happens to apply. However, I will demonstrate that the OCP remains a reliable constraint on phonological representations in Bakoko. More specifically, all the roots of lexical items are controlled by the OCP. This constraint on Bakoko URs enables a straightforward account of a number of otherwise complex processes,

including the downstep of multiple phonetic and adjacent high tones, the deletion of a floating tone in the vicinity of a linked identical one, etc.

1.2.4. Underspecification Theory (UT).

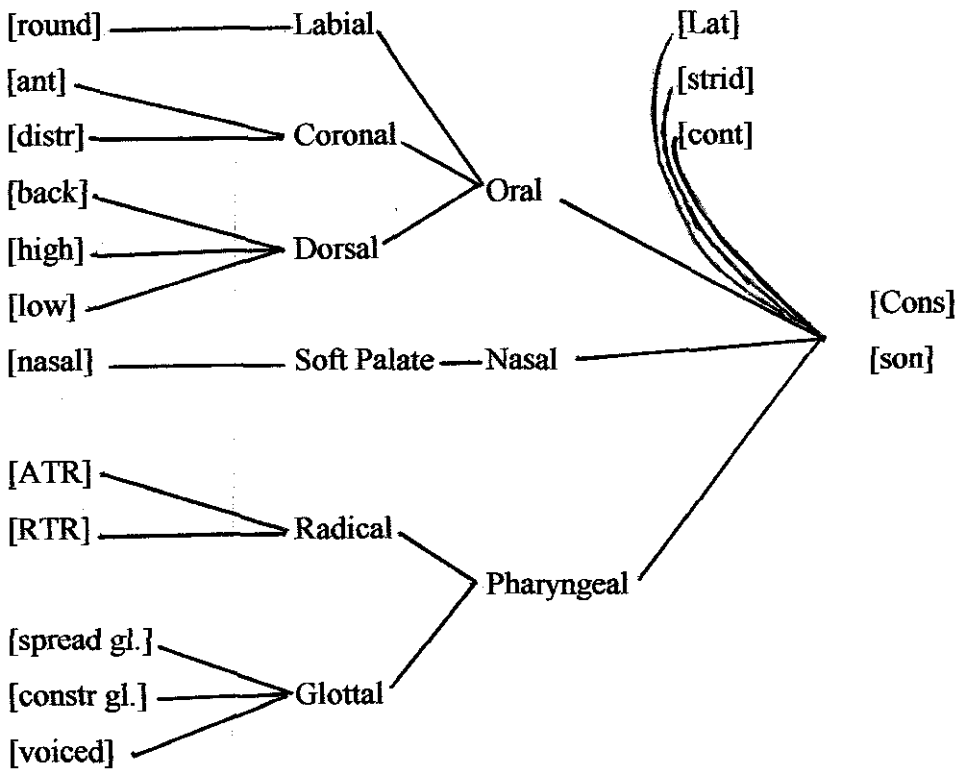
Within the Standard Generative Phonology paradigm, the UR of segments was conceived as fully specified feature matrices with all positive and negative values present. Although further proposals of the theory sought to eliminate redundancy in the UR, this was still unsuccessful. However, in Underspecification Theory, redundant values or features need not be represented underlyingly. The central claims of UT are presented by Kiparsky (1982, 1985), Archangeli (1984), Pulleyblank (1983), Archangeli and Pulleyblank (1983). Within UT, values are seen as marked or unmarked. Only marked values must be represented in the UR whereas unmarked values are costless with respect to language acquisition. Of course, this is not completely true of all UT. Archangeli and Pulleyblank (1994) allow cases of "markedness reversal" in which the unmarked value of a feature is represented in UR.

In the literature, UT has for the most part been applied to the analysis of vowels and tone. In this thesis, it is assumed that the front mid high ATR vowel [e] is the least specified segment in the vowel system (cf. 1.2.5.) Therefore, it sometimes exhibits the characteristics of an unspecified vowel. For instance, when vowels coalesce at the postlexical level, [e],which is relatively weak always deletes.

On the tonal side, it has been observed that Bakoko has two lexical tones: high (H) and low (L). By a universal convention (Pulleyblank 1983), L is the default value in a two tone language system. However, it will be argued that only verbal extensions and the final vowels are toneless (at the underlying level) whereas all other affixes and roots can bear an underlying low tone. Therefore, we must distinguish between High, Lexical Low and floating Low. Following Pulleyblank (1983) and Mutaka (1990:22) we will use the feature [+upper] for High, [-upper] for the default low and [-raised] for the Lexical Low.

1.2.5. Feature Geometry (FG).

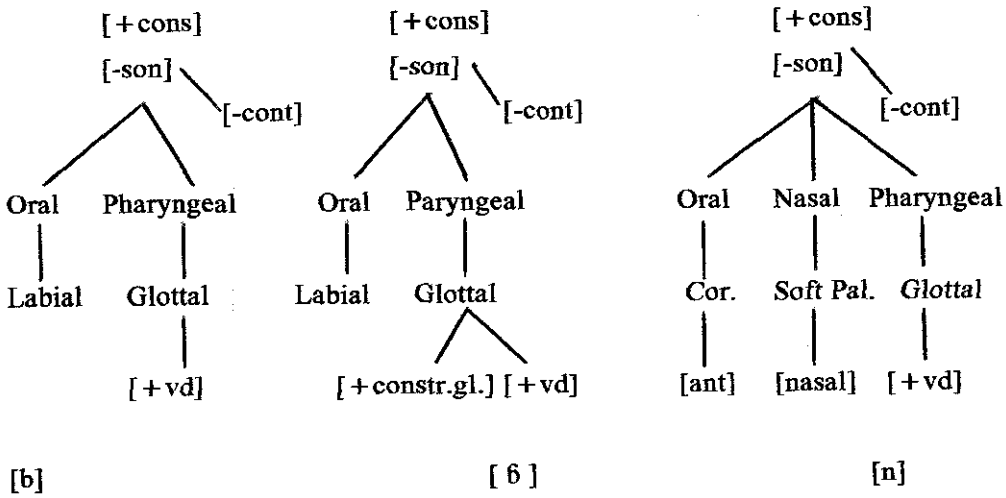
Feature Geometry as introduced by Clements (1985, 1989), Sagey (1986), McCarthy (1988), Yip (1988), Halle (1992) among others, is a further refinement of autosegmental representations applied to the description of features. Unlike previous feature systems, FG is an articulatory based theory, providing substantial justifications for features. In this work, I intend to use Halle (1992) version as summarized in Kenstowicz (1994:146)



Halle's version of feature geometry takes into account the main proposals and modifications that have been made on Clements (1985) which stands as the earliest

version that became widely known and cited in feature geometry. These modifications mainly include McCarthy (1988), Yip (1988) among others.

Within this feature system, sounds like [b], [6], [n] will be represented as follows:



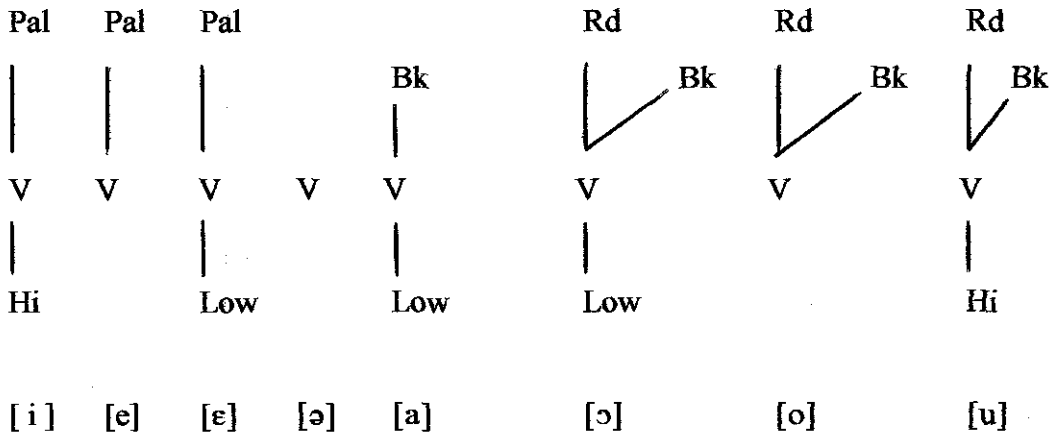
[b] [6] [n]

One of the benefits of using this representation is that it shows the insights of the featural organization of a sound. For instance, [b] and [6] are articulatorily very close sounds. Feature geometry tells us that the difference between them lies at the glottal level where one is [constricted glottis] i.e. produced by using the ingresive air stream mechanism and the other is not. This model will enable a simple and straightforward statement of the phonological processes that involve consonants. We will argue that spreading, delinking and the OCP are the only rules and constraint required to account for all the changes undergone by consonants.

The vowel features will also follow the autosegmental representation. The model used in this thesis is adopted from works such as Van der Hulst (1988), Snider (1989), Goldsmith (1985,1987 (a) and (b)) etc. Following these proposals, we assume the existence of at least the following three tiers: a horizontal tier, a body of the tongue tier and a vertical tier.

On the horizontal tier, we have two single valued features: palatal [pal] and round [rd]. These features are placed on the same tier because they are mutually exclusive i.e. a vowel cannot be palatal and round in Bakoko. Thus, features occupying the same tier may not co-associate, unless they are sequentially ordered. On the tongue body tier, we find the feature back [bk] which helps distinguish front from back vowels. On the vertical tier, we have the features Low [low] and high [Hi], then the CV tier anchors them.

Drawing from this, I characterize the Bakoko feature system as follows:



This feature system makes the following claims: -[e] and [ə] appear as the least specified vowels. Therefore, we will expect [e] and [ə] (3) to stand or behave as if they were underlyingly absent in phonological processes. - [ɛ] and [ɔ] combine the features [Pal] + [Low] and [Rd] [+Low] respectively. One will expect this to be manifested in the phonological processes of the language and this turns out to be the case as will be seen in chapter four section 4.4.3.2.2.2.

-The OCP is a constraint whose effect is to prohibit adjacent identical elements on the same autosegmental tier. One should normally expect OCP to operate in the vocalic processes, at least for some features, if our feature representation is correct.

One of the criticisms that can be raised against this feature system is that it sounds ad hoc i.e. it is solely meant for the description of a seven-type vowel

system, and unable to handle more complicated systems. In fact how can this feature representation account for the languages that display a set of nine vowels with tense /lax or advanced / retracted root distinctions manifested in [i] [I] and [u] [U] distinctions? In such cases, the feature system displayed above will simply be added a tongue root tier which is not relevant for Bakoko. On the tongue root tier, we will have the feature ATR or RTR depending on the language. Thus, on this tier, one would be able to distinguish between tense and lax high vowels.

I.2.6 Theories of syllabification.

Formerly jettisoned in the phonological study, the syllable has recently enjoyed considerable attention within the field of phonology. Several considerations have motivated the syllable in phonology. Among others, it appears that the syllable is the first element that organizes segments into the prosodic unit. Moreover, it has been observed in many languages that some phonological rules that might be thought to refer to the word (lexical item) for their environment can be adequately and more simply stated with respect to the syllable.

In the current literature on the topic, two competing theories are leading the discussion: the templatic model of syllabification (Itô 1986, 1989) and the rule driven model of syllabification (Levin (1985).

I.2.6.1 The templatic model

The templatic model as proposed in Itô (1986,1989) is a prosodic theory of syllabification rooted on the following four fundamental principles: maximality, directionality, prosodic licensing and extraprosodicity. The maximality principle requires that units (syllable in this case) be of maximal size. Itô (1989: 219) puts it this way: "units are of maximal size within the other constraints on their form". The model claims a basic or canonic and specific syllable shape for each language. This canonic syllable type, which is also called syllable template, applies iteratively on a

given sequence of consonants and vowels to yield syllables. Thus the directionality parameter indicates in which direction syllabification operates. It may be from left to right or from right to left depending on the language. According to Itô (1989: 220), the templatic model is superior to the rule driven model: " The hypothesis that syllabification is governed by the directionality parameter is clearly preferable to an approach which has recourse to ordering statements, because it brings the theory of syllabification in line with other areas of prosodic phonology where directionality is recognised as a fundamental and independently necessary principle of the theory". The prosodic licensing principle requires that all segments be parsed into syllables, then syllables into feet and feet into words, etc. This principle entails the fourth one. The extraprosodicity principle requires that peripheral segments (located on the edges of a domain) that are not parsed into prosodic units be declared extraprosodic, i.e. invisible to the prosodic constituents. Such segments will either resyllabify later on when the extraprosodicity is revoked or will be deleted as a last resort by the Stray Erasure principle.

Itô's prosodic theory of syllabification was mainly motivated and justified for the analysis of languages where epenthesis plays a crucial role. In fact, some languages avoid consonant clusters by inserting a vowel, or they insert a consonant between two vowels to resolve hiatus. The prosodic model of syllabification, instead of writing segmental rules for epenthesis, predicts the epenthesis site from the application of the above displayed principles of the theory. Itô (1989: 241) draws an example from Cairene and Iraqi (two Arabic dialects) to illustrate the phenomenon. In Cairene, an epenthetic [i] breaks up a triconsonantal C1C2C3 cluster between C2 and C3 whereas Iraqi splits the cluster between C1 and C2.

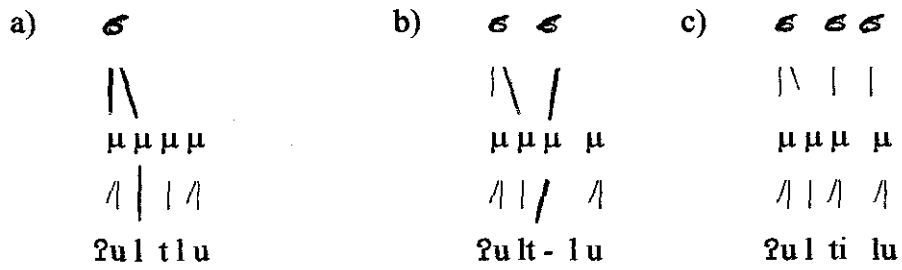
Cairene: c c c → c c i c

Iraqi: c c c → c i c c

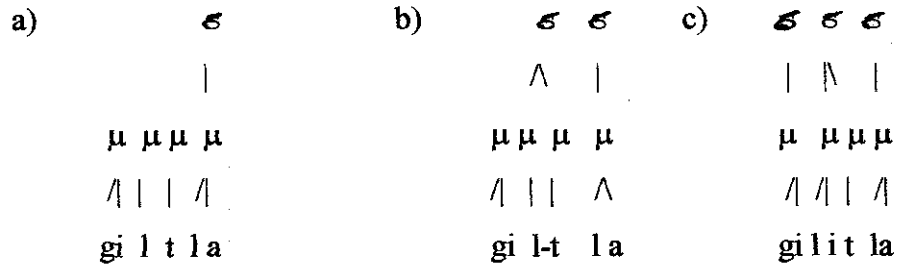
This phenomenon is elegantly accounted for when one considers the parameter setting for the directionality of syllabification, which is left-to-right for

Cairene but right-to-left for Iraqi. The following examples are drawn from Itô (1989: 246-247).

Cairene (Left-to-right syllabification)



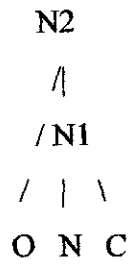
Iraqi (Right-to-left syllabification).



I.2.6.2. The Rule driven model of syllabification.

The rule driven model of syllabification is based on Levin' s dissertation entitled: *A Metrical Theory of Syllabicity.*

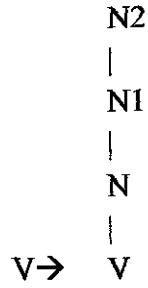
The theory advocates rules and the Sonority Sequencing Principle to build syllables. The overall model is constructed on the vowel (nucleus) which is the obligatory element of the syllable and thus deserves special status whereas the peripheral element (onset and coda) are optional. This conceptualization of the syllable can be summarized as follows:



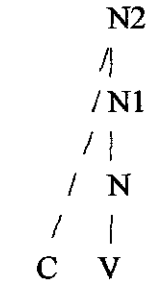
In this representation, O is the Onset, N the nucleus and C the coda. N1 stands for the rhyme, the constituent that dominates the nucleus and the coda and N2 stands for the entire syllable structure.

Given this formulation, one will need specific rules to organize a sequence of C's and V's into syllables. Because the theory is built on the nucleus and its various projections, Levin proposes the following rules:

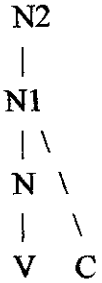
- The Nucleus Creation Rule



- The Onset Creation Rule



- The Coda Creation Rule



Depending on the type of syllable shapes that a given language presents, it may operate Onset and or Coda Augmentation Rules. Such rules take into account the Sonority Sequencing Principle which requires that within a syllable, sonority must rise from the margins to the peak or center.

There is no evidence from the facts of Bakoko that may force a choice of one model over the other. As I mentioned earlier, the prosodic theory of syllabification was justified by the analysis of epenthesis. But epenthesis seldom occurs in Bakoko as will become evident in due course. However, the thesis assumes the rule driven model as an arbitrary choice and also partly because the main theoretical framework (Lexical Phonology) adopted in the study is also rule governed.

1.2.7. The Nature of the Skeletal Core

Working on Semitic languages with their non-concatenative morphology, McCarthy (1979) motivated the skeleton as a mediating tier for all other tiers. Later on, Clements and Keyser (1983) came out with a more elaborated theory of the skeleton, arguing that it is made up of a sequence of C's and V's. Drawing evidence from Turkish, Finnish, French and many other languages, they addressed problems such as compensatory lenghthening, latent consonants, geminates, etc. They appealed to the evidence of " independence of the CV- tier and the segmental tier since phonological rules may apply to them independently and also to the fact that phonological rules may be sensitive to the difference between otherwise identical syllable trees which may differ in the composition of the CV-tier" (Clements and Keyser 1983: 115). They therefore concluded that these were the conclusive evidence for the existence of a CV-tier. Two of the basic functions of the CV-tier were to provide the value of syllabicity for segmental matrices (i.e. C = [-syll] and V = [+syll]) and to act as the core through which autosegmental tiers and prosodic units anchor.

Further studies on the skeleton (Hyman 1985) depicted the weaknesses of the CV theory of the skeleton. Two of these are on the one hand its apparent difficulty in capturing the behavior of syllabic nasals and the related problem of how syllabic nasals lose their syllabicity when followed by a vowel. On the other hand, the claim made by the theory that an abstract consonant provokes compensatory lengthening was also challenged. In fact, one cannot logically explain how the theory links a consonant onto a C- slot. Such problems gave rise to two competing theories or the skeleton: The X-slot model and the Moraic model.

1.2.7.1. The X-Slot model.

Kaye and Lowenstamm (1984) and Levin (1985) are the main proponents of the X- slot theory. In their attempt to solve the above mentioned problems raised by the CV model, they proposed a skeletal core made up of bare or empty positions labeled X' s. Kenstowicz (1994:426) points out that "A prime motivation for this refinement is the observation that, under appropriate circumstances, a skeletal position may associate with a consonant or a vowel. "In this approach, each segment (consonant or vowel) is linked to an X-slot on the skeletal tier. However, although the model is able to handle syllable quantity, syllable weight and compensatory lengthening, it cannot explain why the deletion of a coda can be compensated when that of an onset is never compensated, whereas on the skeletal tier, the onset and the coda have the same status within the model. Along the same line, Zec (1995) has convincingly demonstrated that, depending on the language, some consonants can be moraic in the coda position and others not. And this difference, based on the sonority hierarchy is clearly represented on the skeletal tier. This issue constitutes another stumbling block for the X-slot theory.

1.2.7.2. The Moraic Model.

The moraic theory of the skeleton as proposed by Hyman (1985), Hayes (1989), Zec (1995) among others, has provided illuminating insights into the analysis of the skeleton. The theory in its original version (Hyman 1985) claims that each segmental unit is the bearer of a weight unit (or mora) on the skeletal tier. Within this mode, the phonological structure is organized as follows:

a) The universal central tier is a weight tier where each weight unit (W.U) or X stands for a potential beat (or mark of syllabicity).

b) The universal segmental tier consists of feature matrices headed by the feature [cons.] which... plays a special role in the theory.

c) There may, in addition, be language specific autosegmental tiers, especially in languages with tone, vowel harmony, nasal prosodies and the like.

Several rules can be motivated with such a representation. Some will be needed to account for the surface forms of the weight units, some others will change features, insert or delete segments, map autosegments onto weight units, etc.
The following set of rules relate directly to the weight units:

a) A universal Onset Creation Rule (OCR).

This rule automatically removes the WU of a [+cons] when it is followed by a WU dominating a [-cons] segment. The [+cons] feature matrix simultaneously associates onto the WU dominating the [-cons] segment to its right. Put differently, a consonant loses its mora when followed by a vowel, i.e. in the onset position of the syllable. This explains why the loss of an onset consonant is never compensated for by lengthening.

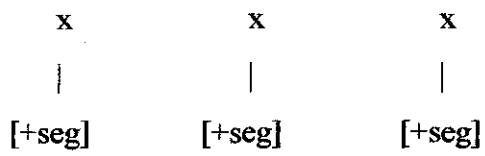
b) There are language specific Margin Creation Rules (MCR) which add [+cons] segments onto a preceding [-cons] WU, deleting the WU of the former as in the case of the OCR, but in mirror image.

c) There are language specific syllable formation rules which may build syllables out of the WU' s in a given language.

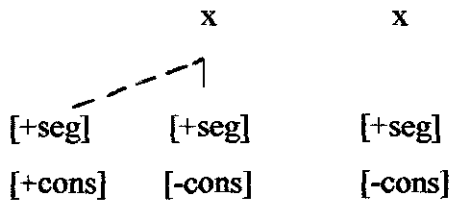
d) There are language specific Onset and Margin adjunction rules whereby WU's come to dominate consonant clusters either preceding and / or following the [-cons] segment.

For our purpose, all the above rules but (c) will be important. The OCR will explain why a nasal consonant loses its syllabicity when followed by vowel. The MCR is relevant here because I claim that codas are not moraic in Bakoko. The language specific onset adjunction rule (d) will handle consonant clusters in the onset position.

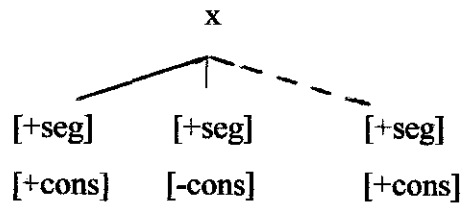
The theory works along the following lines. First, each segment is assigned a beat or WU before any rules apply:



If the first segment is a consonant ([+cons]) and the second a vowel ([-cons]), the universal OCR automatically applies to delete the beat of the [+cons] and attach the segment to the beat which dominates the [-cons] segment.

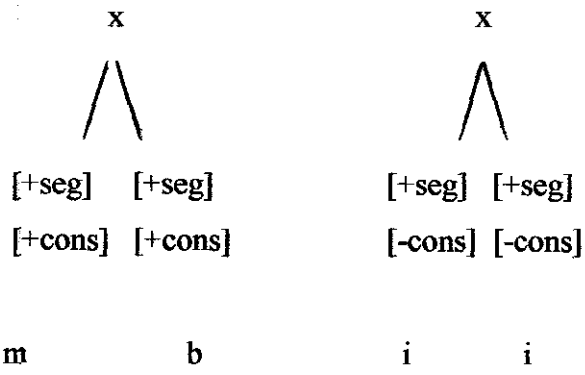


When, as in Bakoko, a language displays non moraic codas, the MCR applies to delete the beat on the last [+cons] segment and attach that segment to the preceding beat.



The margin creation parameter thus establishes the difference between light and heavy syllables.

In this perspective, prenasalized segments, long vowels and other such complex configurations are represented as two segments with identical values for [cons] attached to the same or single beat.



In this dissertation, I assume the moraic theory of the skeleton which seems better suited to handle the facts of Bakoko. However, I will have recourse to the CV theory (Clements and Keyser 1983) for the analysis of latent consonants in the onset position.

1.3. Overview of the Sound system of Bakoko.

In this section, I analyze the phonetic segments i.e. consonants and vowels as they occur in the surface forms. For clarity of presentation, I analyze consonants and vowels separately.

1.3.1. Consonants.

Bakoko operates a thirty-five consonant system at the phonetic level. These consonants are displayed in the chart below.

	Labial	Alveolar	Palatal	Velar	Glottal
Vl	p	t	tʃ	k	
Vd	b	d	dʒ		
implosives	ɓ	ɗ			
Nasals	m	n	ɲ	ŋ	
Prenasalized	mb	nd ndz	ndʒ	ŋg	
Labialized	mbw			kw / ŋgw	
Palatalized	pj bj mbj	dj			
Fricatives vl		s		x	h
Fricatives vd	v			ɣ	
Vibrant		r			
Glides			j	w	
Lateral		l			

Chart n° 1: Phonetic Consonants.

All the above sounds but [x] can occur in the initial position of the root or in the onset position of a syllable. In the intervocalic position, the inventory is limited to 24 consonants. And, in the absolute final position, we find only 9 sounds. This decreasing number of consonants from the initial to the final position in the root point to the fact that some consonants may be allophones of the same phoneme. This statement will be substantiated in the course of the analysis.

I.3.1.1. Consonant Sequences.

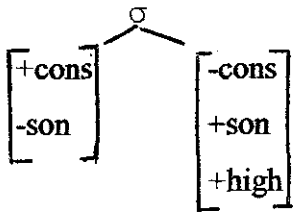
From the above chart, one can observe that the C+w and C+j sequences might be analyzed as a combination of two other consonants. Generally, these consonant clusters belong to the same syllable where they function as syllable onset. The sequences that behave this way are summarized in the following chart.

C1 \ C2	w	j	r
p		+	
b		+	
mb	+	+	
t			+
d		+	
k	+		
ŋg	+		

Chart n° 2: Consonant Sequences.

The sequence [tr] looks accidental in Bakoko for it occurs in the single loanword [ètrùkáŋ] 'lamp'. Therefore, I will not take it in consideration. When [tr] is set aside, it appears that the common denominator of C1C2 sequences is that C2 is always a glide. From this observation, one can write the following redundancy rule.

Rule1: If a sequence of consonants is attested within the same syllable, the second one is a glide.

R1 If ,then 

But one could wonder whether the sequences of consonants plus glides are not actually the surface instantiations of underlying sequences of consonants followed by a high (palatal or round) vowel. Although this is a logical possibility, the thesis does not hold it for the analysis of consonant sequences within the root. In fact, the data reveal that both consonants + glides and consonant + high or round vowels are attested in the roots as confirmed by the following data.

(1) - kwètè ' sweet potato'
- kwàmbà ' cassava'
- pjók ' depth'
- súá 'pan'
- túè 'sea'
- ŋgɔ́á 'wind'

If one were to claim that Cw and Cj are derived through glide formation, it would be difficult to explain why similar inputs can yield different outputs under the same phonological conditions at an identical morphological level. I therefore conclude that sequences of consonant + glide must be analysed as separate consonants, at least at the root level.

I.3.1.2. Prenasalized sounds

Prenasalized segments are sequences of two consonants (a nasal and an oral consonant) that combine to form a single sound. The following prenasalized sounds have been elicited in Bakoko: [mb, mbv, nd, ndz, ndʒ, ŋg, ŋgw] . The general characteristic of the digraphs that constitute a single sound is that they are

made up of a homorganic nasal followed by a voiced plosive consonant. This general pattern can be expressed in the following redundancy rule:

Rule 2: If two consonants combine to form a single sound, then the first one is a homorganic nasal and the second a voiced plosive consonant.

R2. If C , then C

/ \ / \

C_1 C_2 C_1 C_2

$$\begin{bmatrix} +\text{cons} \\ +\text{nas} \end{bmatrix} \begin{bmatrix} +\text{cons} \\ -\text{cont} \\ -\text{constr.gl} \\ +\text{vd} \end{bmatrix}$$

From what precedes and for other reasons that will become evident in due course, I conclude that although Bakoko operates a large number of phonetic consonants, the inventory of underlying sounds is highly limited. It is argued in this thesis that the phonemic consonants of Bakoko are the following:

p	t	tʃ	k	
ɓ	ɗ	ʤ		
m	n	ɲ	ŋ	
mb	nd	ndz	ŋg	
v	s		x	h
	l			
w		j		

Chart n° 3: Phonemic Consonants.

1.3.2. Vowels

Bakoko displays a vowel inventory where we find eight short and seven long vowels grouped as follows:

- A series of front vowels: i, e, ɛ, ii, ee, ɛɛ.
- A series of central vowels: ə, a, aa
- A series of back round vowels: u, o, ɔ, uu, oo, ɔɔ.

As one can notice, all vowels but the shwa [ə] have long counterparts. Moreover, [ə] and [e] are the least specified vowels in the feature system as mentioned earlier. In this thesis, for reasons that will become evident, the following claims hold for the vowels:

- The schwa is a purely phonetic vowel that optionally gets epenthesized to avoid or separate consonant clusters that are not allowed in the language.
- The front mid high vowel [e] sometimes behaves as if it were underlyingly absent. This occurs mainly when vowels coalesce at the postlexical level. Therefore, it shows the characteristics of an unspecified vowel.
- Sequences of two identical vowels fall within the same syllable. Such a syllable is bimoraic.
- Sequences of two different vowels never belong to the same syllable. Instead, each of them constitutes a syllable nucleus. Put differently, Bakoko does not exhibit diphtongs.

To sum up, the phonemic vowels assumed in this thesis for Bakoko are the following:

i/ii	u/uu
e/ee	o/oo
ɛ/ɛɛ	ɔ/ɔɔ
a/aa	

Chart n° 4: Phonemic Vowels.

1.4. Methodology

1.4.1. Data Gathering

The data presented in this work deal with the Yakalak dialect which is spoken in Dizangue and Mouanko in the Sanaga Maritime Division. They were collected during an extensive period of two years field work. Informants, both male and female, were native speakers of the language, recruited within the various age groups of the community. These data were elicited in two phases. Firstly, lexical items were collected in isolation. The main tool used during this phase was the 2000 Basic English Word List published by GREBE (1987). The words were thus translated and transcribed in Bakoko. Secondly, the lexical items were put in various contexts of inflectional and derivational morphology (plural formation, verb conjugation, compounding, nominalization, etc.) Because phonology within the Lexical Phonology perspective looks at the interface between phonology and morphology and phonology and syntax, we also elicited phrasal data, sentences and texts. Part of these data are presented in the second appendix. The main questionnaires used to achieve this aim were those of EBOBISSE(1988), COMRIE and SMITH (1987), BOUQUIAUX and THOMAS (1976), among others.

1.4.2. Data analysis.

Phonological processes come up as a result of sounds, syllables, morphemes and words coming together. The various alternations observed during the word formation process and above the lexical item level (phrasal level) led us to the postulation of segmental, suprasegmental, and syllabic rules to account for the changes displayed in the language. Following the

theory of Lexical Phonology as proposed by Pulleyblank (1983) among others, the processes identified have been grouped into phonological domains. Thus, the phonological rules described in Bakoko have been classified in terms of lexical and postlexical rules.

I.5. The Scope of the work.

Since the advent of generative phonology (Chomsky and Halle 1968, Dell 1973, etc), it has been widely agreed upon that the scope of a phonological study is no longer limited to the word as it was the case in the structuralist paradigm (Pike's work is of course an exception to this statement). Instead, the field of phonology encompasses morphology and even syntax (Zec and Sharon 1994).

This work will address all the segmental and tonological processes that take place when morphemes concatenate during word formation or when words come together in phrasal or sentential constituents. Though the theory used in this work, emphasizes morphology, the analysis is limited to the forms that entail phonological processes. Therefore, verb forms in the future tense, noun + demonstrative constructions, etc. will not be considered because they are not phonologically pertinent or interesting; e.g.

(2)	lì-kɛ̀	'to go'	màx	kɛ̀	lìhén	'I will see'
	lì-hɛ́n	'to see'	I	go	to see	
	lì-dí	'to eat'	àx	kɛ̀	lìdí	'He will eat'
			He	go	to eat	

In the above forms, the collocation of the various formatives in the future tense does not provoke any sound or tonal alternation.

As for the postlexical phonology, the details of the phonetics of tone will be ignored. More specifically, the very general tonal phenomena at

work in the language will be presented and analyzed, but the downdrift of tones with the various levels of a lowered high tone will not be considered.

1.6. Layout of Chapters.

Chapter Two surveys the morphology and syntax of Bakoko to help the reader understand the various morphological and syntactic constructions displayed within the work. The chapter examines the noun morphology (noun classification, concord morphemes, the structure of the morphemes and the verb morphology with special attention given to the various types of stems (stems consisting of just a root, stems made up of Root +FV, Root +extension, etc.) Still on the verb morphology, it analyzes the nature and the concatenation of the elements that build the verbal complex (tense and aspect markers, subject marker, negation marker etc.). Finally, it groups all the morphemes with respect to the levels or strata where they occur in the word formation process (stratum one or stratum two).

The introduction to the syntax of Bakoko in this chapter looks at the basic word order in the sentence and displays the various phrases (noun phrase, adjectival phrase, possessive, constructions, etc.).

Chapter three addresses the segmental phonology i.e. sound changes undergone by consonants and vowels such as vowel elision, vowel coalescence, consonant place spreading (homorganic nasal rule), voicing assimilation, etc. It is argued that some of these processes come about as a result of a resyllabification process interacting with some sequence structure constraints required by the language. It will also be demonstrated that these processes apply at various levels and components of the grammar.

Chapter four deals with the syllable and syllabification. More specifically, it describes the types of syllables displayed in the language

and determines the canonic shape of the Bakoko syllable. It also deals with the principles and rules that determine the way a Bakoko speaker syllabifies a given string of consonants and vowels.

Chapter five deals with tone. Suprasegmentals have been handled separately to render the presentation of facts clearer. Its purpose is to identify the tones of the language (lexical, grammatical, floating) and state the general processes that they undergo during word formation or when words are concatenated at the phrasal (postlexical) level. Of interest in this chapter is the analysis of how floating tones dock. This chapter also characterizes the general tonal phenomena such as contour simplification, spreading, tone relinking, Meeussen's Rule, downstep, etc.

Chapter six provides the conclusion which essentially summarizes the findings of this thesis and points to its contribution to the enhancement of linguistic knowledge. Put differently, it indicates the significance of the thesis in terms of fact finding and also in terms of theoretical implications.

1.7. Transcriptional notations.

Bakoko has two underlying tones: the high tone and the low tone. The high tone will be represented as H whereas the low tone will be represented as L. The H tone will be transcribed with an acute accent and the L tone with a grave accent as in páɣó "the paddle" and mùt " person, man". The exclamation mark before a tone or sequence of tones indicates downstep i.e. such a tone is realized with a lower pitch. For example, in èlɔ̀lɔ̀ ŋ!káálá, the sequence of high tones on káálá are realized lower than the preceding high.

The transcription of vowels and consonants assumes the proposal made in the International Phonetic Alphabet chart. Therefore, the following correspondence can be made with the Cameroon Alphabet as proposed by Tadadjeu and Sadembouo (1979).

Cameroon Alphabet	International Alphabet	Examples
C	tʃ	mitʃàà 'game'
J	dʒ	dʒàm 'thing'
gh	ɣ	ɔvèɣà 'creature'
ny [4]	ɲ	ɲàmà 'meat'
y	j	bíjà ' tears'

Endnotes for chapter one.

(1) In Bakoko, Elog or Ndog means " those of, or the descendants of" elog-Mpoo thus refers to the descendants of Mpoo.

(2) This consideration certainly explains why the Bakoko language and people did not receive any serious attention from the colonial administration and the missionaries. For example, Bakoko unlike Basaa and Duala has not been written by the missionaries. Moreover, the Bible has not been translated in this language as it is the case with the others.

(3) It turns out that [ə] which arises through epenthesis is highly variable in quality and short in duration i.e. it does not have the timing and stability associated with real vowels. Thus, [ə] can best be viewed as a purely phonetic transitional phenomenon. It will be observed in 4.4.5 that its occurrence is optional in fast delivery. To sum up, the insights of the schwa epenthesis can be better dealt with within a socio-linguistic study. Put differently, the forms with the schwa insertion and those that do not display the phenomenon all stem from the same UR. Some people produce it and others do not, within the same phonological conditions.

(4) This transcription would create a problem in languages that distinguish a sequence of alveolar nasal plus palatal glide from the palatal nasal. Such is the case for Bakoko as we observe the following data.

lìkànjè	[lì. kàn. jè]	' to rule'
ŋ̀kànjè	[ŋ̀. kàn. jè]	'ruler, chief'

Within a system that uses [ny], one cannot distinguish heterosyllabic [ny] from tautosyllabic [ny] sequences.

CHAPTER II

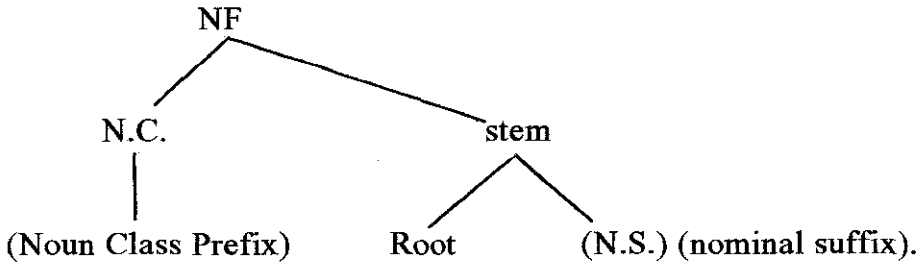
AN OVERVIEW OF MORPHOLOGY AND SYNTAX.

Bakoko displays all the morphosyntactic properties that define a typical Bantu language. It has a rich system of noun classes and agreement morphemes, and a complex verbal morphology that concatenates various tense and aspect markers and a number of extensions that modify the meaning of the verb stems.

2.1. Nominal Morphology.

The structure of the Bakoko nominal form assumed in this work can be schematized as follows:

(3)



The diagram reads as follows. The nominal form (NF) rewrites noun class prefix (N.C.) plus stem. The stem is in turn divided into a root plus an optional nominal suffix (N.S.).

Thus, the noun morphology can be divided into stem-formation and class morphology, the latter being richer than the former. In fact, only derived nouns or deverbatives display nominal suffixes. The main characteristic of this class of nouns is that they share their root with a

verbal form whereas non-derived nouns do not. Formation of noun stems is discussed under verbal morphology.

2.1.1. Noun Class Prefixes.

Bantu languages display a very rich nominal morphology. Works by Bleek (1862), Meinhof (1932), Meeussen (1967) Polome (1968), Guthrie (1967) among others have convincingly argued for the grouping of nouns into classes.

The class distribution proposed by these authors was based on morphological and semantic criteria. Classes are conventionally numbered 1-23. For example, the Bakoko noun *lìkàlà* 'doughnut' is composed of the stem- kàlà and the class 5 prefix lì-. Certain classes of nouns are intrinsically singular (e.g. 1,3,5,7,9 etc) and others plural (2, 4, 8 etc). But I will argue in this chapter that some other classes (e.g. 3) display both singular and plural nouns.

The basic noun class prefixes of Proto-Bantu, grouped in genders i.e. according to the singular / plural pairing by Meinhof (1932), Guthrie (1967), Polome (1968) are given below.

Semantic distribution	Guthrie	Polome	Meinhof.	
- Autonomous individualized beings, human nouns	mu-/ 6a-	me-/ ba-	mu-/v-a-	(1/2)
- Non - autonomous individualized beings; animistic concepts: parts of the body, plants; natural phenomena.	mu- / mi	mu-/me-	mu-/mi-	(3/4)
- One of the pairs of objects which come in pairs	di-	de-	li-	(5)
- Mass nouns indicating a non itemizable whole; pl. cl5.	ma-	ma-	ma-	(6)
- Inanimate objects	ki- / bi-	ke- / be-	ki- / bi-	(7/8)
- Objects or beings defined by their most characteristic feature	ɲ- / ɲ	ne- / di-, ne-	ni- / li-ni-	(9/10)
- Individualized objects numbering more than two	du-	do-	lu-	(11)
- Diminutives	ka-	ka-	tu-	(12)
- Abstracts	bu-	bo-	vu-	(14)
- Infinitives	ku-	ko-	ku-	(15)
- Definite Location	pa-	pa-	pa-	(16)
- Indefinite Location	ku-	ku-	ku-	(17)
- Location inside a place	mu- pi-	mu-	mu- pi- u- i-	(18) (19) (20) (21)

Other subclasses including [1a] with a zero [ø] prefix and (2a) with the prefix [ɓò-] have been proposed by Welmers (1973). Though some authors claim that they are not part of Proto Bantu, they will be considered in this thesis because they are relevant in Bakoko. Moreover, it will be demonstrated that some Proto- Bantu single classes are divided into two or three subclasses in Bakoko as a result of the phenomenon of class merger. Besides, the determination of class membership does not solely rely on the noun class prefix but also, on the pattern of agreement induced by the noun on the possessives, adjectives, relatives, etc. as well. Although the semantic criterion is not totally obsolete, it is no longer a reliable factor in the determination of classes.

Examples illustrating the Bakoko noun class prefixes are provided in (4).

(4)	class	Noun	Prefix	Stem	Gloss.
	1	mɔ̌n	m̀-	-ɔ́n	'child'
		màndíɣá	m̀-	-ndíxá	'woman'
		ǹtʃèn	m̀-	-tʃèn	'host'
	1a	kwètɛ̀	ø-	-kwètɛ̀	'potato'
		ɲ àà	ø-	-ɲ àà	'mother'
	2	ɓ ɔ́ n	ɓà-	-ɔ́n	'children'
		ɓàtʃèn	ɓà-	-tʃèn	'hosts'
		ɓàɲàà	ɓà-	-ɲàà	'mothers'
	2a	ɓòndíɣá [1]	ɓò-	-ndíxá	'women'
	3	m̀mím	m̀-	-mím	'heart'
		ŋ̀kóx	m̀-	-kóx	'sugar cane'
	3a	ànù	à-	-nù	'mouth'
		àɔ́ɔ́	à-	-ɔ́ɔ́	'ear'

3b	wɔ̀	w-	-ɔ̀	'arm'
	wélàn	w-	-élàn	'war'
4	mìmím	mì-	-mím	'hearts'
	mìkóx	mì-	-kóx	'sugar canes'
	mìnù	mì-	-nù	'mouths'
	mɔ̀ɔ́	mì-	-ɔ́ɔ́	'ears'
	mɔ̀	mì-	-ɔ̀	'arms'
	mélàn	mì-	-élàn	'wars'
5	lìsòŋ	dì-	-sòŋ	'tooth'
	dʒàm	dì-	-àm	'thing, affair'
	dĭh	dì-	-íh	'eye'
4	mìsòŋ [2]	mì-	-sòŋ	'teeth'
	màm	mì-	-àm	'things'
	mĭh	mì-	-íh	'eyes'
7.	èlɔ̀lɔ̀	è-	-lɔ̀lɔ̀	'duck'
	jálkà	è-	-álkà	'nail'
8.	bìlɔ̀lɔ̀	bì-	-lɔ̀lɔ̀	'ducks'
	bjálkà	bì-	-álkà	'nails'
9	ŋgɔ̀x	ɲ-	-kɔ̀x	'grinding stone'
9a	kɔ́ɔ́	ø-	-kɔ́ɔ́	'monkey'
10.	ŋgɔ̀x	ɲ-	-kɔ̀x	'grindings stones'
	kɔ́ɔ́	ø-	-kɔ́ɔ́	'monkeys'
11.	ɔ̀nɔ̀n	ɔ̀-	-nɔ̀n	'bird'
11a	vàŋgá	v-	-àŋgá	'sun'
16.	á ǹdɛ̃́ɛ́ [3]	á-	-(ǹ) dɛ̃́ɛ́	'to the house'
18	mú ǹdɛ̃́ɛ́	mú-	-(ǹ) dɛ̃́ɛ́	'in the house'
3c	ànɔ̀n	à-	-nɔ̀n	'birds'

Agreements with adjectives, verbs, possessives, etc. are determined by the selection of the noun class. In (5), we exhibit sentences made up of

Noun + Adjective + Verb. As can be noticed, the agreement prefix on the adjective and the subject prefixes on the verb vary with respect to the noun class.

(5) Class Examples

1. ǹ- jêxlè ǹ- tám à- só 'The other teacher came'
   N1 teacher AGR other AGR come
1a ø- ŋàà ǹ- tám à- só 'The other mother came'
   N1a mother AGR other AGR come
2. ɓà- jêxlè ɓà- tám bí- só 'The other teachers came'
   N2 teacher AGR other AGR come
2a ɓò- ndíɣá ɓà- tám bí- só 'The other women came'
   N2a woman AGR other AGR come
3 m̀-mú ń- tám á- lɛ̌ póló 'The other head is empty'
   N3-head AGR other AGR be empty
3a à- nù ǹ- tám á- lɛ̌ póló 'The other mouth is empty'
   N3a mouth AGR other AGR be empty
3b w- ɔ̀ ǹ- tám á- sál 'The other arm works'
   N3b arm AGR other AGR work
4. mì-mú mí- tám mí- lɛ̌ póló 'The other heads are empty'
   N4 head AGR other AGR be empty
5. lì- sòŋ lì - tám lí - sém tít 'The other tooth cuts the meat'
   N5 tooth AGR other AGR cut meat
7. è- lɔ̀lɔ̀ è- tʃéŋ é - só 'The big duck came'
   N7 duck AGR big AGR come
8. bì- lɔ̀lɔ̀ bì- tʃéŋ bí- só 'The big duck came'
   N8 duck AGR big AGR come
9. ɲ- àɣà è- tʃéŋ è- só 'The big cow came'
   N9 cow AGR big AGR come

9a.	ø- kóó è- tʃéŋ è- só	'The big monkey came'
	N9 cow AGR big AGR come	
10.	ɲ- àɣà é- tʃéŋ é- só	'The big cow came'
	N10 cow AGR big AGR come	
10a.	ø- kóó é- tʃéŋ é- só	'The big monkey came'
	N10 cow AGR big AGR come	
11	ɔ̀- nɔ̀n vì - tʃéŋ ví- díx	'The big bird burnt'
	N11 bird AGR big AGR come	
11a	v- éjá vì - tʃéŋ ví- díx	'The big fire burnt'
	N11a bird AGR big AGR burn	
3c	à- nɔ̀n à- tʃéŋ á - só	'The big birds came'
	N3c bird AGR big AGR come	

These examples show the typical Bantu pairing classes into singular and plural genders. Put differently, noun classes come in pairs referred to as genders: 1-2, 1a-2, 3-4, 5-4, 7-8, 9-10, 11-3c.

The assignment of a noun to a given class is based on a series of criteria set by linguists working on Bantu languages. One criterion is the phonological form of the noun class prefix which distinguishes [ɔ̀-] (class 11) from [mì-] (class 4) for example. Other properties include the singular / plural pairing (e. g. 1-2, 3-4, etc). Patterns of agreement induced by the nouns are the most important criterion that should govern the noun class distribution according to Kadima (1969). Although the semantic criterion is not out of use, it is less required in the process of assigning noun classes. To sum up, I will say that all these criteria must be put together because none of them, taken alone is absolutely reliable.

A glance at the data displayed in (5) reveals that the traditional Bantu 5-6 gender has been replaced by 5-4 in Bakoko. This situation indicates that there is a tendency for Bakoko to reduce the number of noun

classes. Drawing from this observation, the following statements can be made:

- The reduction of noun classes arises through prefixes' merger. For example, class 6 and class 4 have merged into one.

- The variety of prefixes within the same class is an indicator of class merger at a certain stage of the development of the language. For instance, class 3 nowadays displays three prefixes i.e. / m̀-, /w-/ and / à- /. Only the first one can be reconstructed from Proto Bantu whereas the others certainly result from classes that disappeared. Bot Ba Njock (1970:119) in his study of Basaa also realized that the prefix /w-/ has all its concord morphemes or agreements in class 3. However, he motivated a class 14 with / w-/ as prefix. But I put it in class 3 because I claim the pre-eminence of agreements over the form of the prefix in the determination of class membership.

To conclude, I indicate class pairings in the following table.

GENDER	Sg	Pl.	Examples	Gloss	No of Examples
1-2	m̀-	ɓà-	ŋ̀káálá / ɓàkáálá	white man	very many
	m̀-	ɓò-	màndíɣá / ɓòndíɣá	woman	2
1a-2	ø-	ɓà-	vǒm / ɓàvǒm	place	4
3-4	m̀-	mì-	m̀mím / mìmím	heart	very many
	à-	mì-	àsú /mìsú	face	3
	w-	mì-	wɔ̀- /mɔ̀	arm	3
5-4	dì-	mì-	lìsòŋ / mìsòŋ	tooth	very many
7-8	è-	bì-	èvèx / bìvèx	bone	very many
9-10	ɲ-	ɲ-	ndzèn / ndzèn	path	very many
	ø-	ø-	kɔ́ɔ́ / kɔ́ɔ́	monkey	very many

(9-4)	ɲ-	mìŋ-	ndzèn / mìndzèn	path	2
11-3c[4]	ɔ-	à-	ɔnɔn / ànɔn	bird	very many

Some of the above displayed genders deserve comments.

- Genders 3-4: Nouns with class 3 singulars and class 4 plurals generally refer to body parts. Class 3 displays three prefixes that cannot be analyzed as alternants of the same morpheme. Kadima (1969:31) provides information on the /w-/ prefix: "*En mbenga (A) et beo (C) le Ps cl. 1 atteste la forme pleine mu- alors que le Ps de la cl. 3 est de type vocalique, ụ- en mbenga, u- en beo [...]. En yambasa les deux préfixes sont vocaliques mais différents par le degré de la voyelle: ụ- pour le Ps cl.1 et u- pour le Ps cl.3*". It thus becomes more obvious that the /w-/ prefix is a reflex of the u- prefix displayed by other Bantu languages.
- Gender 5-4: Nouns with class 5 singulars and class 4 plurals do not show any common denominator at the semantic level. The class prefix has the following allomorphs:
  - -[lì-] before consonant initial roots
  - -[dʒ-] before non high vowel initial roots
  - -[d-] before high vowel initial roots.

All the cl. 5 words have their plurals in cl. 4 because the traditional class 6 prefix [mà-] does not show up in Bakoko. Even the mass and liquid nouns that traditionally belong to class 6 in Bantu languages have their noun class prefix and agreements in class 4.

(6) mì-ndím water

mì-tʃìì blood

mì-téɛ́ saliva

■ Gender 9-10.

The singular and plural forms have the same noun class prefixes. Only agreements help determine the difference between class 9 and class 10. The prefix of these classes shows two allomorphs, [ø-] and [ɲ-] which assimilates the point of articulation of the following consonant as exemplified below. It is not possible to predict whether a noun selects the [ø-] or [ɲ-] alternant because consonant initial stems may select either. Vowel initial stems regularly select [ɲ-].

(7) (i) ø- allomorph in C- initial stems.

tít 'meat, animal'

kɔ́ɔ́ 'monkey'

ká 'animal sp.'

(ii) ɲ- allomorph in consonant initial stems

ɲ-ɓɔ́làn → mbɔ́làn 'loss'

ɲ-pèlán → mbèlán 'reply, answer'

ɲ-kɔ̀x → ŋgɔ̀x 'grinding stone'

(iii) ɲ- allomorph in vowel initial stems.

ɲ-ɔɣí → ɲɔɣí 'swimming'

ɲ-ăt → ɲăt 'buffalo'

ɲ-ɔ́ → ɲɔ́ 'snake'

One could postulate or claim that only derived nouns select the [ɲ-] prefix. But the language also displays a good number of non-derived nouns with the same prefix.

(iv) mbɔ̀m	'forehead'	ŋgànd	'feast'
ndzàl	'hunger'	mbálɛ̀	'truth'
mbíí	'race'	ndzáàn	'fire'
ndzìx	'madness'	mbàmbá	'bamboo'

Drawing from these facts, these prefixes will be construed as distinct, at least on phonological grounds.

■ Gender 11/3c.

Class 11 singulars exhibit two prefixes that cannot be phonologically related. We observe [ɔ-] before C- initial roots and the labio-dental fricative [v-] before vowel initial roots. Only the first prefix [ɔ-] is very productive whereas [v-] is found in very few words that do not have plural forms.

(8) (i) C- initial roots

ɔ-nɔn	' bird'	ɔnɔn vì tám	'the other bird'
		bird AGR other	
ɔ- kwàà	'partridge'	ɔkwàà vì tám	'the other partridge'
ɔ-sóó	' river'	ɔsóó vì tám	'the other river'

(ii) v-initial roots.

v-ɔ̀l	'laughter'	vɔ̀l vì tám	'the other laughter'
v-éjá	'fire'	véjá vì tám	'the other fire'
v-àŋgá	'sun'	vàŋgá vì tám	'the other sun'

This [v-] prefix certainly derives from the loss of a class in a preceding stage of the development of the language. One could possibly argue that [v-] is the locative prefix for the following reason: the locatives in Bakoko tend to have [v-] as their marker.

(9)	ɔ̀x kɛ̀ véé	'where are you going to?'
	you go where	
	vá à lɛ̌ póló	' it is empty here'
	Here it be empty	
	váŋà à lɛ̌ póló	' it is empty there'
	There it be empty	
	vɔ́ŋɔ̀ à lɛ̌ póló	'now, it is empty'
	Now, it be empty	

However, it is problematic to postulate a locative prefix [v-] in Bakoko. In fact, the word for 'place or spot' is "vǒm" but its plural is "ɓàvǒm". It thus belongs to class 1a and makes all its agreements within this class.
It may be concluded on the basis of the foregoing that the complexity of the noun class prefixes in the current stage of the development of Bakoko results from the loss or merger of pre-existing and autonomous classes.

2.1.2. AGREEMENT PATTERNS.

The division of nouns into classes is mainly determined by the pattern of agreement induced by nominal heads. The agreement morphemes for adjectives are distinct from associative markers, which differ in turn from verbal subject agreement, etc. It thus becomes obvious that distinct patterns of agreement must be recognized for each type of collocation.

2.1.2.1. Noun + Adjective

The adjective as a part of the speech is very poor in Bakoko for it comprises only three elements. Put differently, there are only three real or pure adjectives in Bakoko i.e. tám 'other', tɔ́ɣà 'small', tʃɛ́ŋ 'big'. Apart

from these, Bakoko makes use of qualificative nouns. But when a qualificative noun is collocated with another noun, it yields an associative construction. Consider for example (9)

(9)	èvívínɛ̀	'the blackness'	èvívínɛ̀ é m̀mím blackness of heart	'a black heart'
	èpúpúɛ̀	'the whiteness'	èpúpúɛ̀ é m̀mím whiteness of heart	'a pure heart'
	èdĭdìtɛ̀	'the weight'	èdĭdìtɛ̀ é mɔ̌n weight of child	' heavy child'

The following data show that, when real adjectives are collocated with nouns, the concord morpheme varies with respect to the class of the head noun.

(10) 1 mɔ̌n ǹ - tɔ́ɣà → mɔ̌n ń!tɔ́ɣà 'a small child'

chid AGR small

1a	vɔ̌m ǹ-tám →	vɔ̌m ń!tám	' another place'
2	ɓɔ̌n ɓà-tɔ́ɣà →	ɓɔ̌n ɓátɔ́ɣà	' small children'
3	m̀mín ǹ-tám →	m̀mín ń!tám	'another heart'
3a	ànù ǹ-tám →	ànù ǹtám	'another mouth'
3b	wɔ̀ ǹ-tám →	wɔ̀ ǹtám	'another arm'
4.	mìnù m̀-tám →	mìnù mìtám	'other mouths'
5	lìsòŋ lì-tɔ́ɣà →	lìsòŋ lìtɔ́ɣa	'a small tooth'
7	èlɔ̀lɔ̀ è-tʃén →	èlɔ̀lɔ̀ ètʃén	'a big duck'
8	bìlɔ̀lɔ̀ bì-tʃén →	bìlɔ̀lɔ̀ bìtʃén	'big ducks'
9	tít è-tám →	tít é!tám	'another animal'
10	tít é-tám →	tít étám	'other animals'
11a	ɔ̀nɔ̀n vì-tʃéŋ →	ɔ̀nɔ̀n vìtʃéŋ	'the big bird'
11a	vɔ̀l vì-tám →	vɔ̀l vìtám	'the other laughter'
3c	ànɔ̀n à-tʃéŋ →	ànɔ̀n àtʃéŋ	'big birds'

2.1.2.2. Associative constructions.

Associative constructions also exhibit concord morphemes (associative markers) whose nature and shape are induced by the head noun.

(11)

1	mǒn à mùt →	mòn á mùt	'the person's child'
	child of person		
1a	kwètè à mǒn →	kwèt à mǒn	'the child's potato'
2.	bǒn bí mùt →	bǒn bí mùt	'the person's children'
3	mmím á mùt →	m̀mím ámùt	'the person's heart'
3a	ànù á mùt →	ànù á mùt	'the person's mouth'
3b	wɔ̀ á mùt →	wǎ mùt	'the person's arm'
4	mɔ̀ mí mùt →	mɔ̀ mí mùt	'the person's arms'
5.	lisòŋ lí mùt →	lìsòŋ lí mùt	'the person's tooth'
7.	èlɔ̀lɔ̀ é mùt →	èlɔ̀lɔ̀ mùt	'the person's duck'
8.	bìlɔ̀lɔ̀ bí mùt →	bìlɔ̀lɔ̀ bí mùt	'the person's ducks'
9.	mbɔ̀m è mùt →	mbɔ̀m è mùt	'the person's forehead'
9a	póŋ è mùt →	póŋ è mùt	'the person's brain'
10.	mbɔ̀m é mùt →	mbɔ̀m é mùt	'the person's foreheads'
10a.	póŋ é mùt →	póŋ é mùt	'the person's brains'
11	ɔ̀nɔ̀n ví mùt →	ɔ̀nɔ̀n ví mùt	'the person's birds
11a	vàŋgá ví mùt →	vàŋgá ví mùt	'the person's sun'
3c	ànɔ̀n á mùt →	ànɔ̀n á mùt	'the person's birds'

2.1.2.3. Numerals

When the noun is collocated with a numeral from one to six, one observes a concord morpheme that always varies with respect to the noun classes.

Class.

(12)	1-	mɔ̌n ù - a	→	mɔ̌n wà	'one child'
		Noun AGR Num	→		
	2-	ɓɔ̌n bí-ɓă		ɓɔ̌n bíɓă	'two children'
	3-	m̀mím ú- a	→	m̀mím wà	'one heart'
	4-	mìmím mí-ɓă	→	mìmím míɓă	'two hearts'
	5-	lìsòŋ dí-a	→	lìsòŋ dʒá	'one tooth'
	4-	mìsòŋ mí-ɓă	→	mìsòŋ míɓă	'two teeth'
	7-	èlɔ̀lɔ̀ é-a	→	èlɔ̀lɔ̀ já	'one duck'
	8-	bìlɔ̀lɔ̀ bí-ɓă	→	bìlɔ̀lɔ̀ bíɓă	'two ducks'
	9-	tít è - a	→	tít jà	'one animal'
	10-	tít é – ɓă	→	tít éɓă	'two animals'
	11-	ɔ̀nɔ̀n ví-a	→	ɔ̀nɔ̀n vá	'one bird'
	3pl-	ànɔ̀n á-ɓă	→	ànɔ̀n áɓă	'two birds'

2. 1.2.4. Verbal Prefixes

As in other Bantu languages, the agreement element between the subject and the verb is also determined by the class of the head noun.

Class

(13)	1-	mɔ̌n à-dí	→	mɔ̌n à dí	'the child eats'
	1a-	vɔ̌m à-lɛ̌ póló	→	vɔ̌m à lɛ̌ póló	'the place *is empty*'
	2-	ɓɔ̌n bí-dí	→	ɓɔ̌n bí !dí	'the children eat'
	3-	m̀mú á-bíjé vòŋ	→	m̀mú á bíjé vòŋ	'the head has hair'
	4-	mìnù mí-tíɣì	→	mìnù mí tíɣì	'the mouths are small'
	5-	lìsòŋ lí-sém tít	→	lìsòŋ lí sém tít	'the tooth cuts the meat'
	4-	mìsòŋ mí-sém tít	→	mìsòŋ mí sém tít	'the teeth cut the meat'
	7-	èlɔ̀lɔ̀ é-ɲú mìndím	→	èlɔ̀lɔ̀ ɲú míndím	'the duck drinks water'

8- bìlɔ̀lɔ̀ bí-ɲú → bìlɔ̀lɔ̀ bí ɲú míndím 'the duck drink water'

9- mbú è - ɓóm → mbú èɓóm 'the dog barks'

10- mbú é-ɓóm → mbú é ɓóm 'the dogs bark'

11- ɔ̀nɔ̀n ví pùplè → ɔ̀nɔ̀n ví pùplè 'the bird flies'

3pl-ànɔ̀n á pùplè → ànɔ̀n á pùplè 'the birds fly'

2.1.2.5 Possessives.

The expression of the possession in Bakoko also makes use of concord morphemes induced by the head noun.

	Class				
(14)	1-	mɔ̌n	ú - àmà	'my child'	mɔ̌n wàmà
		N	AGR poss		
	2-	ɓɔ̌n	ɓá- àmà	'my children'	ɓɔ̌n ɓàmà
	3-	ànù	ú - àmà	'my mouth'	ànù wámà
	4-	mìmù	mí - àmà	'my mouth'	mìmù mámà
	5-	lìsòŋ	dí - àmà	'my tooth'	lìsòŋ dʒámà
	4-	mìsòŋ	mí - àmà	'my teeth'	mìsòŋ mámà
	7-	èlɔ̀lɔ̀	é - àmà	'my duck'	èlɔ̀lɔ̀ jámà
	8-	bìlɔ̀lɔ̀	bí - àmà	'my ducks'	bìlɔ̀lɔ̀ ɓámà / bjámà
	9-	tít	è - àmà	'my animal'	tít jàmà
	10-	tít	é - àmà	'my animals'	tít jámà
	11-	ɔ̀nɔ̀n	ví - àmà	'my bird'	ɔ̀nɔ̀n vámà / vjámà
	3c-	ànɔ̀n	ú - àmà	'my birds'	ànɔ̀n wámà

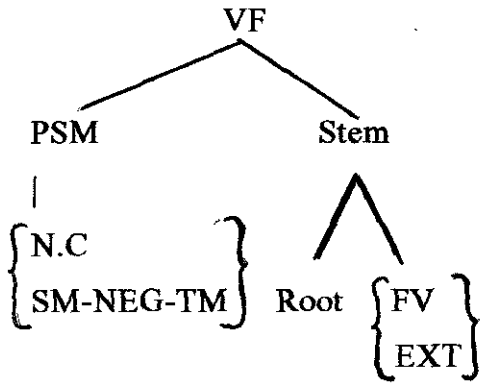
To sum up, the following table presents the various noun classes, their respective prefixes and the concord morphemes that they induce.

CLASS	N.Pref	Adj. Pref	Verb.Pref	Num. Pref	Poss. Pref.	Ass. Marker
1	m̀-	Ǹ-	à-	ù-	ú	à-
1a	ø-	Ǹ-	à-	ù-	ú	à-
2	ɓà-	ɓà-	bí-	bí-	bí-	bí-
2a	ɓà-	ɓà-	bí-	bí-	bí-	bí-
3	m̀-	Ǹ-	á-	ú-	ú-	á
3a	w-	Ǹ-	á-	ú-	ú-	á
3b	à-	Ǹ-	á-	ú-	ú-	á
4	mì-	mì-	mí-	mí-	mí-	mí
5	dì-	lì-	lí-	dí-	dí-	lí
7	è-	è-	é-	é-	é-	é-
8	bì-	bì-	bí-	bí	bí-	bí
9	ɲ-	è-	è	è-	è-	è-
9a	ø-	è-	è	è-	è-	è-
10	ɲ-	é-	é	é-	é-	é-
10a	ø-	é-	é	é-	é-	é-
11	ɔ̀-	vì-	ví-	ví-	ví-	ví-
11	v-	vì-	ví-	ví-	ví-	ví-
3c-	à-	à-	á-	á-	á-	á-

Chart n° 5: Concord Morphemes

2.2. VERBAL MORPHLOGY.

This section on the verbal morphology will be divided into the stem morphology and the tense - aspect morphology. The tree diagram below indicates the overall hierarchical structure of the verb.



The diagram reads as follows: a verbal form is made up of a pre stem material plus a stem. The pre stem material is either a Noun Class prefix when the verb is in the infinitive form (recall that in Bantu, the infinitive form of the verb is a nominal that generally belongs to class five) or a sequence of SM-(NEG)-TM when the verb is rewritten root plus Final Vowel (FV) or Extension (EXT). The verb root is generally monosyllabic.

2.2.1. Stem Morphology.

The stem in Bantu languages refers to the verbal root plus the 'extensions' and /or 'final vowel'.

Stem → Root + (EXT) + (FV)

Some languages such as Basaa (see Bitjaa 1990) may combine a sequence of extensions in the same verb. In Bakoko, however, the extension and final vowel are mutually exclusive as it will be demonstrated later on. The Bakoko stem must therefore be rewritten as follows:

$$\text{stem} \rightarrow \quad \text{Root} + \begin{Bmatrix} \text{EXT} \\ \text{FV} \end{Bmatrix}$$

2.2.1.1. The Final Vowel (FV)

In Bakoko, the FV is an unspecified vowel that displays the following features:

(i) It is always identical to the root vowel as evidenced by the following data:

(16)	lì-tíx-V	→	lìtíɣì	'to be small'
	lì-ém-V	→	lì émè	'to be pregnant'
	lì-ɓèx-V	→	lìɓèɣè	'to carry'
	lì- tàk-V	→	lìtàkà	'to suffer'
	lì-vúŋg-V	→	lì vúŋgù	'to blow'
	lì-lóx-V	→	lì lóɣò	'to graze'
	lì-óŋ-V	→	lìóŋɔ̀	'to remember'

(ii) It never shows up when an extension is attached to the root. For instance, when the applicative suffix /-lè/ attaches to the roots tàk- 'to suffer'or ɓèx- 'to carry', it does not yield * tàklèà or * ɓèxlèè as it would be expected in some other Bantu languages. Instead, we obtain tàklè 'to suffer for' and ɓèxlè 'to carry for'.

(iii) The selection of the FV is morphologically governed. For example, when the stems ɓèx-V and tàk-V (where V stands for FV) are put in the remote past tense, we obtain (17).

(17)	à	ɓèx - léé	'he carried'
	SM	carry P2	
	à	tàk - léé	

(iv) It has no intrinsic meaning i.e. it does not modify the valence of the verb.

2.2.1.2. The Extensions.

Extensions in Bantu languages and especially in Bakoko are optional affixes which modify the valence of the verb root. Their shapes may be -V,-VC,-CV, -CVCV, etc. Various extensions have been identified for Bakoko.

2.2.1.2.1. The Applicative.

The applicative marker is the suffix /-le /. When added to a root, it indicates that the action expressed by the verb is directed towards somebody or profits to somebody.

(18)	lì-lám	'to cook'	lìlámlè	'to cook for'
	N5 cook			
	lì-áá	'to carry water'	lì áálè	'to carry water for
	lì-tʃìì	'to write'	lì tʃììlè	'to write to / for'
	lì-tàk-V	'to suffer'(lìtàkà)	lìtàklè	'to suffer for'
	lì-ɓèx-V	'to carry' (lìɓèɣè)	lì ɓèxlè	'to carry for'

Illustrations of the applicative, i.e. action accomplished for the benefit of someone, are found below.

(19)	màx	lámlè	ǹdǒm	wàmà	'I cook (food) for my husband'
	I Pst	cook for	husband	my	
	àx	tʃìilè	mɔ̌n	wɛ́ɛ́	'He writes to his child'

He Pst write to child his

Besides this applicative marker, we find another one (less productive) /-lene/, which implies that the action expressed is accomplished on behalf of someone or at some one's expenses.

(20) lì dí 'to eat' àx dí 'he eats'
lì dílè 'to eat for' àx dílè mɔ̀n 'he eats for the child'
lì dílènè 'to swindle' àx dílènè mɔ̀n 'he swindles the child'
lì tʃìì 'to write' màx tʃìì 'I write'
lì tʃììlè 'to write for/to' màx tʃììlè mɔ̀n 'I write to the child'
lì tʃììlène 'to write on behalf of' màx tʃììlènè mɔ̀n 'I write on behalf of the child'

2.2.1.2.2. The associative or reciprocal

The associative or reciprocal marker has the shape /-lan /. It is used for usual reciprocal function (i.e. to each other). This morpheme is identical to that reconstructed for Proto Bantu by Guthrie (1967: 34). It is also phonetically similar to the reciprocal marker identified by ITTMAN (1978: 197) for the Duala language.

(21) lì tʃìì 'to write' lìtʃìì-làn 'to write to each other'
lìɓàt 'to ask' lì ɓàt-àn 'to ask each other'
lì óx 'to hear' lì óx-làn 'to listen to each other'

2.2.1.2.3. The Causative

Bakoko distinguishes two types of causative: the direct and indirect. The difference that lies at the semantic level is also reflected on their morphology. In the direct causative, V causes someone to perform something without any pressure. This extension is marked by /-hane/.

(22)	lì ɔ̀l	'to laugh'	lìɔ̀lhànè	'to make s.o. laugh'
	lì sál	'to work'	lìsálhànè	'to make s.o. work'
	lì pɔ́t	'to talk'	lìpɔ́thànè	'to make s.o. talk'
	lì ɔ́m	'to send'	lì ɔ́mhànè	'to make s.o. send'

For the indirect causative, someone performs an action under an external pressure. This extension is marked by / -jɛ̀ /

(23)	lì tɔ̀ɔ̀	'to sit'	lìtɔ̀ɔ̀jɛ̀	'to oblige s.o. to sit'
	lì tél-V	'to stand' (lìtélɛ̀)	lìtéljɛ̀	'to oblige s.o. to stand'
	lì káx	'to tie'	lìkáxjɛ̀	'to oblige s.o. to tie'
	lì pɔ́t	'to talk'	lìpɔ́tɛ̀ ·lìpɔ́tjɛ̀	'to oblige s.o. to talk'

2.2.1.2.4. The Reflexive.

In this case, the speaker performs an action on himself. This situation is morphologically expressed by the suffix /-ɓan /.

(24)	lìsɔ̀	'to wash'	lìsɔ̀ɓàn	'to take a bath'
	lìtʃìì	'to write'	lìtʃìì ɓàn	'to register'
	lìɓàt	'to ask'	lì ɓàtɓàn	'to wonder'
	lìlɔ́x	'to beat'	lìlɔ́xɓàn	'to beat oneself'
	lìdìŋ	'to love'	lì dìŋɓàn	'to love oneself'

2.2.1.2.5. The Passive

The passive indicates a situation where the subject undergoes the action described by the verb. It is marked by / -ɓɛ̀ / or / -/lɛ̀ / [6]

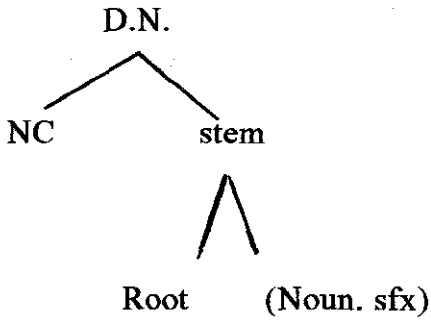
(25)	lìdìŋ	'to love	lìdìŋɓɛ̀	'to be loved'
	lìsɔ́ŋg-v	'to count'	lìsɔ́ŋglɛ̀	'to be counted'
	lìɓáh-v	'to split'	lìɓáhlɛ̀	'to be split'
	lìáŋ	'to fry'	lìáŋɓɛ̀	'to be fried'

To conclude, it appears that some of the extensions reconstructed by Meeussen (1967) for Proto Bantu such as the neuter, the stative, the contactive and the reversive no longer show up in Bakoko.

2.2.2. Verb Nominal Stems.

In this section, the analysis centers on derived nouns commonly referred to as deverbatives. Meeussen (1967:91) declares that: 'In Proto Bantu, productivity must have been from nominal to verbal, although in the present day languages, the direction appears to be the reverse." In Bakoko, derivation from nominal to verbal does not seem to be productive.

Derived nouns in Bakoko have the following structure.



Though the deverbal nominalization is a well-known morphological operation in Bakoko, it is not easy to establish the patterns of productivity as it is the case in the languages of the Bantu C zone. However, deverbatives in Bakoko can belong to any noun class. The nominal suffixes have the shapes -V, -VC, -CV, etc. Unlike verbal extensions that are underlyingly unspecified for tone, nominal suffixes may have a high or low tone.

2.2.2.1. The -V shape.

(26)	- ɓál	'to borrow'	èɓálɛ́	'a loan'
	- vɔ́l	'to clean'	èvɔ́lɔ̀	'a cleaner'
	- vɛ̀x	'to create, measure'	ɔ̀vɛ̀ɣà	' meter, measure'
	- ɔ́x	'to swim'	ɲɔ̀ɣí	' swimming'

2.2.2.2. The -VC shape

This suffix is not productive in Bakoko. However, it can be observed in the following items:

(27)	- ɓàt	'to ask'	m̀ɓàtáx	'a question'
	- ɓɔ́l	'to lose'	mbɔ́lán	'a loss'
	- pùn	'to resemble'	mbùnán	'resemblance'

2.2.2.3. The CV shape.

The CV suffix is the most productive one in Bakoko.

(28)	- vɛ̀x	'to create'	èvɛ̀xlé	' creature'
	- ɓòt	'to begin'	lìɓòtlè	'beginning'
	- jéx	'to learn'	ǹjêxlè	'teacher'
	- tʃìì	'to write'	ǹtʃìílè	'writer'

As it will become evident later on, derived nouns constitute a class of pertinent data to phonology because affixation processes that come into play during their formation also entail phonological processes.

2.2.3. TENSE - ASPECT MORPHOLOGY.

Like any other narrow Bantu language, Bakoko has a rich morphological structure of tense-aspect distinctions. The main inflectional distinctions are between recent and remote future, present, recent and remote past, habitual.

2.2.3.1. The present tense. (Po)

The present tense marker is a residual [-x] consonant that attaches to the verbal prefix and a floating low tone. The velar fricative [-x] has been identified by Guthrie (1970:232) in the languages of the B81, K14, M22, R31 groups for some tenses only.

(29)	mà - x		hén	mùt	'I see a person'
	I Po		see	person	
	ɔ̀ - x		hén	mùt	'you see a person'
	you Po		see	person	
	à - x		hén	mùt	'he sees a person'
	He Po		see	person	
	bǐ - x	!	hén	mùt	'we see a person'
	we Po		see	person	
	mìní -x	!	hén	mùt	'you see a person'
	you Po		see	person	
	bí - x	!	hén	mùt	'they see a person'
	they Po		see	person	

The floating low tone provokes the downstep in the plural forms of the verb.

2.2.3.2. The Recent Past tense (P1)

The recent past tense marker consist of [a] and a floating high tone, both located between the verbal prefix and the verb root. The floating high-tone docks onto the verb root whereas the [-a] marker forms part of the verbal prefix as evidenced by the following data.

(30)	mì	a ´	dìŋ	mɔ̌n	→	mà dîŋ mɔ̌n	'I loved the child'
	I	TM	love	child			
	ɔ̀	a ´	dìŋ	mɔ̌n	→	wà dîŋ mɔ̌n	'you loved the child'
	â	a ´	dìŋ	mɔ̌n	→	à dîŋ mɔ̌n	'he loved the child'
	bǐ	a ´	dìŋ	mɔ̌n	→	ɓǎ dìŋ mɔ̌n	'you loved the child'
	mìní	a ´	dìŋ	mɔ̌n	→	màná dìŋ mɔ̌n	'we loved the child'
	bí	a ´	dìŋ	mɔ̌n	→	ɓá dìŋ mɔ̌n	'they loved the child'

In this thesis, the P1 floating H- tone will be construed as a boundary tone between the stem domain and the inflectional (INFL) domain. That is why it can be influenced by elements of both domains. The following data on the negative form illustrate the phenomenon.

(31)	mì	´ a ´	dìŋ	mɔ̌n	ɓémà	→ mǎ dìŋ mɔ̌n ɓémà	'I didn't love'
	I	NEG1 TM	love	child	NEG2		
	ɔ̀	´ a ´	dìŋ	mɔ̌n	ɓé	→ wǎ dìŋ mɔ̌n ɓé	'you didn't love'
	I	NEG1 TM	love	child	NEG2		

As one observes (31), it appears that the P1 H- tone does not show up as it is the case in (30). It will be argued in this thesis that such a floating tone gets deleted under OCP on the INFL word.

2.2.3.3. The Remote Past tense (P2)

The P2 marker is an abstract CV́V́ suffix whose instantiation depends on the nature of the verb stem. In fact, it comes out:

- as a two vowel sequence after a CVC stem that lacks a FV. This vowel sequence takes its features from the root vowel.

- as - léé when preceded by a stem made up of a root plus Final Vowel.

- as one mora when preceded by a stem formed by a root plus extension.

2.2.3.3.1. When the stem equals a (C) VC root.

(32)	lì-mìn	'to swallow'	à mìn - íí	'he swallowed'
			He swallow TM	
	lì- ɓèn	'to refuse'	à ɓèn - éé	'he refused'
			He refuse TM	
	lì- sɛ́m	'to split'	à sɛ́m - ɛ́ɛ́	'he split'
			He split TM	
	lì- sùŋ	'to save'	à sùŋ - úú	'he saved'
			He save TM	
	lì- tʃóx	'to chew'	à tʃóɣ - óó	'he chewed'
			He chew TM	
	lì-ɔ́x	'to swim'	à ɔ́ɣ - ɔ́ɔ́	'he swam'
			He swim TM	
	lì- làl	'to sleep'	à lál - áá	'he slept'
			He sleep TM	

2.2.3.3.2. When the stem is Root + FV

(33) lì- níŋg -V 'to enter' (lìníŋgì) à níŋg -léé 'he entered'
He enter TM

lì- jéx-V 'to learn' (lìjéɣè) à jéx - léé 'he learned'
He learn TM

lì- ɓèx- V 'to carry' (lìɓèɣè) à ɓèx- léé 'he carried'
He carry TM

lì- vúŋg- V 'to blow' (lìvúŋgù) à vúŋg- léé 'he blew'
He blow TM

lì- lóx -V 'to graze' (lìlóɣò) à lóx - léé 'he grazed'
He graze TM

lì- ɔ́ŋ -V 'to remember (lìɔ́ŋɔ̀) à ɔ́ŋ - léé 'he remembered'
He remember TM

lí- àx-V 'to scratch' (lìàɣà) à àx - léé 'he scratched'
He scratch TM

2.2.3.3.3. When the stem is a root + EXT.

(34) lì-ɓàt-àn 'to ask each other' bí ɓàtáán 'They asked each other'
lì-ɓàt-ɓàn 'to wonder' à ɓàtɓáán 'He wondered'
lì-sùŋ-ɓè 'to be saved' à sùŋɓéé 'He was saved'
lì-sál-hànè 'to make s.o. work' à sálháné 'He made s.o. work'

The Remote Past tense (P2) provided us with a very interesting class of data for the phonological analysis of Bakoko. The various alternations observed in the realization of the P2 marker will be accounted for in due course.

2.2.3.4. The Indefinite Past (P3).

This tense marker indicates that the action has been performed in the past without any special reference with respect to the present. The P3 marker is a sequence formed by the vowel -u and a floating high tone.

(35)	mì	u ´	dìŋ	mɔ̌n	→	mù	dîŋ	mɔ̌n	'I liked the child'
	ɔ̀	u ´	dìŋ	mɔ̌n	→	wù	dîŋ	mɔ̌n	'you liked the child'
	à	u ´	dìŋ	mɔ̌n	→	ɔ̀	dîŋ	mɔ̌n	'he liked the child'
	bǐ	u ´	dìŋ	mɔ̌n	→	bǔ	dìŋ	mɔ̌n	'we liked the child'
	mìní	u ´	dìŋ	mɔ̌n	→	mùnú	dìŋ	mɔ̌n	'you liked the child'
	bí	u ´	dìŋ	mɔ̌n	→	bú	dìŋ	mɔ̌n	'they liked the child'

2.2.3.5. The Near Future. (F1)

To form the Near Future (F1), one must put the verb to go in the present tense and have it followed by the infinitive form of the main verb.

(36)	màx	kɛ̀	lìhén	mùt	'I will (soon) see the person'
	I Po	go	see	person	
	ɔ̀x	kɛ̀	lìhén	mùt	'you will see the person'
	àx	kɛ̀	lìhén	mùt	'he will see the person'

The (F1) does not show any particular interest, especially as far as the phonological processes are concerned.

2.2.3.6. The Remote Future tense (F2).

This tense is marked by the morpheme / ŋgá / which is prefixed to the stem. The tense is not particularly pertinent for the purpose of phonology because it does not trigger sound or tonal alternations.

(37) mì ŋgá hɛ́n 'I will see'
à ŋgá ɓɛ̀ɣɛ̀ 'he will carry'
bí ŋgá dí 'they will eat'

2.2.3.7. The Habitual (Hab).

The habitual marker is an aspect that behaves like a tense marker in Bakoko. Unlike some languages that distinguish the present habitual, past habitual, etc, Bakoko expresses the habit whether past or present the same way. The Hab. Marker is the morpheme ŋgà + H.

(38) à ŋgà ˊ ɓàt → à ŋgà ɓât 'He asks'
He hab. ask
mùt à ŋgà ɓèghɛ̀ → mùt à ŋgà ɓéɣè'The person carries'
person he Hab carry
mɔ̌n à ŋgà ˊhɛ́n → mɔ̌n à ŋgà hɛ́n 'the child sees'
mɔ̌n à ˊ ŋgà ˊ ɓɛ̀ɣɛ̀ ɓé →
child He NEG, HAB. carry NEG2
mɔ̌n ă ŋgà ɓéɣ è ɓé 'the child does not see'

2.2.3.8. The Continuative.

The continuative marker is a discontinuous string ŋgí --- -ví or ŋgí -láx. Stems with a FV select the [-ví] suffix. In this case, the unspecified V takes its features from the root vowel.

(39) à ŋgí dímíx 'he keeps on extinguishing'
He CONT1, extinguish CONT2
à ŋgí lèɣ. éx 'he keeps on closing'
à ŋgí séndéx 'he keeps on shaving'

à	ŋgí	wùnúx	'he keeps on growing old'
à	ŋgí	óm óx	'he keeps on sending'
à	ŋgí	tɔ̀mb ɔ́x	'he keeps on being tired'
à	ŋgí	wáh áx	'he keeps on tearing'

When the stem is made up of a root +FV, the [láx] suffix, is selected as evidenced by the following data.

(40)	lì-níŋg-V	'to enter'	à ŋgí níŋgláx	'he keeps on entering'
	lì-jéx-V	'to teach'	à ŋgí jèxláx	'he keeps on teaching'
	lì-lɛ́ŋ-V	'to flap'	à ŋgí lɛ́ŋláx	'he keeps on flapping'
	lì-vúŋg-V	'to blow'	à ŋgí vúŋgláx	'he keeps on blowing'
	lì-lóx-V	'to graze'	à ŋgí lóxláx	'he keeps on grazing'
	lì-kɔ̀ŋ-V	'to peel'	à ŋgí kɔ̀ŋláx	'he keeps on peeling'
	lì-tàk-V	'to suffer'	à ŋgí tàkláx	'he keeps on suffering'

2.2.3.9. The imperative

The imperative marker is a morpheme that gets suffixed to the stem. The singular marker is a H - tone that docks onto the final TBU of the verb stem. The plural marker is an abstract consonant plus 'án' (Cán). The unspecified C- element gets deleted when preceded by a specified consonant. Otherwise it is realized as [|].

(41)	lì - ɓàt	'to ask'	ɓăt	' ask!' (sg)	ɓàtán	'ask!' (pl)
	lì - ɓát	'to add'	ɓát	' add!' (sg)	ɓátán	'add!'(pl)
	lì-tàk- a	'to suffer'	tàká	'suffer! (sg)	tàklán	'suffer!' (pl)
	lì-ɓèx-ɛ	'to carry'	ɓèɣɛ́	'carry!' (sg)	ɓèxlán	'carry!' (pl)

lì-ɓàt-ɓan 'to wonder' ɓàt ɓán 'wonder!'(sg) ɓàt ɓáán 'wonder!'(pl)

lì-tàk-le 'to suffer for' tàklé 'suffer for! (sg) tàkláán 'suffer for!'(pl)

2.2.3.10. The subjunctive and conditional.

These moods are grouped together because they display similar characteristics at the morphological level.

2.2.3.10.1. The subjunctive

When a verb is used in the subjunctive, the stem receives a high tone specification. Consider the following.

(42)

lì-ɓèx-è: màx sòmò né àx ɓéɣé àlòò 'I want him to carry wood'
I Po want that he carry wood

lì-ɓàt-an: í ɓàt né bíx ɓátán mìkàlà
It ask that they ask each other doughnut
'it is necessary that they ask each other doughnuts'

lì- ɔ́ŋ-ɔ: í ɓàt né àx ɔ́ŋɔ́ mɔ̌n 'it is necessary that he remember the child'.

lì-sém í ɓàt né àx sém àlòò 'it is necessary that he split wood.

lì-nùŋ-u í ɓàt né àx núŋú mbɔ́tí 'it is necessary that he buy cloth.

In these data, the H- tones do not seem to undergo any change. But all the L - tones are replaced by H-tones and the unspecified TBU receives high tone specifications. Put differently, the low-toned roots 'ɓàt-', 'ɓèx-' and 'nùŋ-' become high whereas the high-toned roots i.e. 'ɔ́ŋ-' and 'sém' do not change.

2.2.3.10.2. The Conditional.

In the conditional form, the verb displays the same behaviour observed for the subjunctive.

(43) lì- ɓèx-ɛ : kí à ɓéɣé líkúɓé, àx kè lìwú 'if he carries banana,
If he carry banana He go die he will die'

lì-ɔ́ŋ-ɔ : kí à ɔ́ŋɔ́ mɔ̌n, ax kè lìkɔ̀n 'if he thinks of the child,
he will be sick'

lì-sɛ́m : kí à sɛ́m àlòò, àx kè lìkɔ̀n 'if they ask each other
doughnuts, they will be sick'

lì-ɓàt-an : kí bí ɓátɓán mìkàlà, bíx kè lìkɔ̀n 'if they ask each other
doughnuts, they will be sick'

2.2.3.11. The Past Participle.

The past participle goes along with the auxiliary lì-ɓɛ́ 'to be' conjugated in the present or past tenses. The general form of the participle is N-Root-V̂X. The vowel of the suffixed element takes its features from the root vowel.

(44) lì-sɔ́ 'to come' à lɛ̌ ńsɔ́ɔ̂x 'he has come'
He is come
à m̀ɓɛ́ ńsɔ́ ɔ̂x 'he had come'

lì-dix 'to rot' tít è lɛ̌ ńdíɣîx 'the meat has rotten'
tít è m̀ɓɛ́ ńdíɣîx 'the meat had rotten'

lìkɔ̀n 'to be sick' mɔ̌n à lɛ̌ ŋ̀kɔ̀nɔ̂x 'the child is sick'
mɔ̌n à m̀ɓɛ́ ŋ̀kɔ̀nɔ̂x 'the child was sick'

As it can be observed here, the inflection of the auxiliary 'ɓé' is very special. It comes out as / lè-/ in the present tense form and takes an m̀- marker in the past tense. The nasal consonant that is prefixed to the stem is homorganic with the following consonant.

2.3. Syntactic structure

This section provides a brief introduction to the syntax of Bakoko with a special look at the basic word order and the phrase internal structure.

2.3.1. Basic word order.

Baker (1989) sets a parameter of word order for natural languages. According to him languages are divided into two groups: SVO and SOV. The basic word order for Bakoko is SVO as evidenced by the following sentences.

(45) mɔ̀n à ´ sɔ́ 'the child came'
child he TM come
mɔ́n à ´ ɓéɣɛ̀ lìkúɓé 'the child carried the banana'
child he TM carry banana
kíné ɔ̀ à ´ hén mɔ̀n wàmà
Inter. You TM see child my ' have you seen my child?'

Ditransitive verbs such as 'give' require an indirect and a direct object complement. In this case the indirect object must precede the direct object.

(46) Ngàŋgò à tíì mà lìkúɓé 'Ngango gave me the banana'
Ngango he TM give me banana
Màx tíì mɔ̌n wàmà lìkàlà 'I give doughnuts to my child'
I TM give child my doughnut

When the verb contains an applicative or a causative extension, the number of postverbal arguments can be increased.

(47) àx lámlè ǹɗóm wéɛ́ kón 'she cooks beans for her husband'
she cook for husband her beans
màx lámhànè màndíɣá tít 'I make the woman cook the meat'
I make cook woman meat

In the sentence, the verb can also be followed by all sorts of adjuncts and arguments that indicate the circumstances (location, time, manner etc).

(48) Ngàŋgò à kɛ̂ á ŋ̀kɔ̀ŋ 'Ngango went to the village'
Ngango he TM go Loc. Village
Ngàŋgò à sɔ́ vá pùh ètʃèk 'Ngango came very recently'
Ngango he TM come Loc. Adj time
Màndíɣá à lám kón mú ǹ dɛ̃́ɛ́
Woman he TM cook beans loc-house
'the woman cooked beans in the house'

2.3.2. The Phrase - internal structure.

Within the phrase, heads are initial. This can be observed with NPs where almost all modifiers must follow the head noun and agree with that head.

(49) èlɔ̀lɔ̀ jàmà 'my duck' *jámà èlɔ̀lɔ̀
duck my
mɔ̌n wàmà 'my child' * wàmà mɔ̌n
child my
èlɔ̀lɔ̀ ètám 'the other duck' * ètám èlɔ̀lɔ̀
duck other
mɔ̌n ǹtɔ́ɣə̀ 'the small child' * ǹtɔ́ɣə̀ mɔ̌n
child small
èlɔ̀lɔ̀ já 'one duck' * já èlɔ̀lɔ̀
duck one
bìlɔ̀lɔ̀ bíɓă 'two ducks' * bíɓă bìlɔ̀lɔ̀
ducks two
However, the demonstratives are allowed to precede the head noun.

(50) ɲɔ́ŋ mɔ̌n 'this child' or ɲɔ́ŋ mɔ̌n ɲɔ́ 'this child'
this child
ɲɔ́ŋɔ́ mɔ̌n 'that child' or ɲɔ́ŋ mɔ̌n ɲɔ́ŋɔ́ 'that child'
that child
ɲúŋ m̀mú 'this head' or ɲúŋ m̀mú ɲú 'this head'
ɲúŋú m̀mú 'that head' or ɲúŋ m̀mú ɲúŋú 'that head'

When the order is reversed, the meaning changes.

(51) mɔ̌n ɲɔ́ 'This is the child'
child this
mɔ̌n ɲɔ́ŋɔ́ 'That is the child'
child that
m̀mú ɲú 'This is the head'
head this
m̀mú ɲúŋú 'That is the head'

But when the noun has two modifiers, the demonstrative comes in the last or final position.

(52) bìlɔ̀lɔ̀ bìtám bíŋ 'these other ducks'
ducks other these
mɔ̌n ńtɔ́ɣà nyɔ́ŋ 'this small child'
child small this
èlɔ̀lɔ̀ ètám jéŋé 'that other duck'
duck other that
ǹdɛ̃́ɛ́ ńtám ɲúŋ 'this other house'
house other this

2.4. Conclusion

To conclude this chapter of morplology and syntax, I make assumptions as concerns the organization of the above described morphemes into phonological domains.

Following Myers (1987), Goldsmith (1987), Mutaka (1990), I assume two phonological domains for the lexical phonology of Bakoko, both non cyclic.

More specifically, it is assumed in this work that the noun class prefixes as well as the adjectival, possessive, numeral prefixes attach to their respective stems to yield the corresponding forms at the stratum two of Lexical Phonology.

Besides, the elements of the verbal morphology concatenate in the following order:
SM - NEG1, - TM1, - STEM - TM2 - NEG2. It is assumed in this thesis that the verbal complex is divided into two phonological domains. The first domain which corresponds to stratum one groups the [STEM + TM2] . The pre-stem material builds the second stratum otherwise called INFL

word by Myers (1987). It is also claimed that some tenses (i.e. present, P1, P3, and habitual) display boundary tones i. e. tones that occur in between the above established phonological domains. It is argued in this thesis that boundary tones either associate to the root vowel because of its prominence or they delete under the OCP as it will become evident in due course.

Endnotes for chapter 2

(1) Only two words have been identified with this prefix. ɓò-ndíɣá ' women' and ɓò-t 'men'. Therefore, no special attention will be given to this prefix.

(2) All classes 3 and 5 words in Bakoko have their plurals in class 4. This situation indicates that Proto-Bantu class 6 (the traditional gender counterpart of class 5) and class 4 have merged in this language.

(3) The locative prefixes á-and mú- have a very special status because they do not attach to a root to yield a nominal form. Instead, they occur at the postlexical level.

(4) Roderic Casali pointed out (personal communication) that the [v-] can have originally just been [ɔ-] before consonant and vowel initial roots. Then, this [ɔ-] underwent glide formation to [w] which then after underwent hardening to [v]: ɔ-éjá > wéjá >véjá. Though this historical argument sounds plausible on phonological grounds, it has to be confirmed by comparative evidence.

(5) It is hard to state the distribution of -làn and -àn. Drawing from the facts observed here, one could claim an alveolar consonant. Such a rule would be making the claim that the language does not permit sequences of alveolar consonants, at least in the stem. But this claim is contradicted by the following.

lì- pɔ́t	'to talk'	lì- pɔ́t - le	'to talk to'
N5 talk		N5 talk EXT	
lì-mìn	'to swallow'	lì - mìn -le	'to swallow for'
N5 swallow		N5 swallow EXT	

(6) The data displayed in (25) indicate that the stems made up of root +FV select /-lɛ̀ / whereas the others select /-ɓɛ̀ /.

CHAPTER III

SEGMENTAL PHONOLOGY.

This chapter aims at considering the Bakoko segmental phonological processes i.e. phonological rules that do not involve prosodic or suprasegmental elements such as the syllable structure or tone. These important issues will be handled in the subsequent chapters. Some vocalic processes such as glide formation, vowel coalescence, compensatory lengthening etc., due to the fact that they entail syllable structure adjustments will not be considered here. The structure of the chapter stands as follows. The first section considers the Nasal plus consonant interactions that yield processes such as Place Assimilation (P.A), Delateralisation (Del), Post Nasal Hardening (PNH), Post Nasal Voicing (P.N.V.), Post Nasal Deglottalisation (PND). The second section examines the processes that are triggered by the class 5 prefixation. These are Lateralisation (Lat.) and Affrication (Affr.). The third and fourth sections look at the general processes of Voicing and Deglottalisation (Deg.) respectively. The fifth, analyzes the Floating Consonant Deletion rule ((C) Del) while the sixth section deals with the process of Vowel Place Spreading (VPS).

3.1. Nasal + Consonant Interactions.

A good number of noun class prefixes in Bakoko are nasal consonants. When such prefixes attach to a root, a series of phonological phenomena can be observed. These phenomena are generally triggered by the root initial consonant.

3.1.1. Place Assimilation.

All the nasal prefixes in Bakoko share the same place of articulation with the root initial consonant. The following sets of data display consonant initial root

nouns (53) and vowel initial roots (54), both belonging to classes 1 and 3. The singular and plural forms of nouns have been given in order to facilitate the identification of the noun class markers.

53 (a)	m̀-ɓɛ́là	'rich person'	b)	ɓà-ɓɛ́là	'rich people'
	ǹ-ɗɛ́ɛ́	'house'		mì-lɛ́ɛ́	'houses'
	ǹ-jɔ́ŋ	'slave'		ɓà-jɔ́ŋ	'slaves'
	ŋ̀-kɔ̀lɛ̀	'cricket'		ɓà-kɔ̀lɛ̀	'crickets'
	m̀-mím	'heart'		mì-mím	'hearts'
	m̀-pɔ́t	'tongue'		mì-pɔ́t	'tongues'
	ǹ-sòn	'flesh'		mì-sòn	'flesh'
	ŋ̀-kɔ̀ŋ	'village'		mì-kɔ̀ŋ	'villages'
	ŋ̀-kàŋ	'root'		mì-kàŋ	'roots'

(54)	m-ɔ̌n	'child'	ɓ-ɔ̌n	'children'
	m-ěn	'owner, proprietor;	ɓ-ěn	'owners, proprietors'

The data in (53) and (54) reveal that the above nouns have a nasal prefix whose allomorphs are:

- [m̀-] before labial initial roots;
- [m-] before vowel initial roots
- [ǹ-] before coronal initial roots
- [ŋ̀-] before velar consonant initial roots.

The problem at this level is that of the choice of the basic alternant. If [ǹ-] or [ŋ̀-] are postulated as underlying forms, one would be able to derive the other alternants that occur in front of consonant initial roots through a rule of place assimilation. But then, it would be difficult to derive the labial allomorph that occurs before vowel initial roots. Any additional rule stated

to the effect of changing the above postulated URs into a bilabial nasal would be extremely ad hoc.

Another tentative solution is to posit a nasal archiphoneme /N-/ as it is the case in many other Bantu languages. But still, the derivation of the vowel initial root forms would remain a stumbling block for the place assimilation rule.

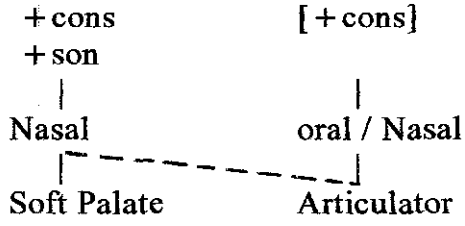
Drawing from what precedes, the bilabial syllabic nasal /m̀-/ is adopted as the basic alternant for all cl 1 and cl 3 nouns. Then, a rule of Place assimilation accounts for the various allomorphs. The vowel initial roots do not satisfy the condition for the application of the rule; so it does not apply. The derivation of the forms with bilabial initial consonants will be satisfied by a vacuous application of the rule. Moreover, an Onset Creation Rule removes the tone of the noun class prefix when it is followed by a vowel. The choice of this alternant also agrees with the proto-form /mù-/ that has been reconstructed for cl.1 and cl.3 by Meeussen (1967) and Guthrie (1967). The current shape /m̀-/ simply indicates that the prefix vowel truncated in a previous stage of the language's evolution.

Place Assimilation (P.A): the nasal prefix shares the place of articulation of the following consonant.

In Feature Geometry terms, the P.A. rule can be stated as follows:

The articulation node of the following consonant spreads to the preceding nasal consonant.

As a consequence of this rule of spreading, the original place node of the nasal consonant deletes because a consonant cannot have two primary places of articulation. In formal terms, the rule is stated as follows:

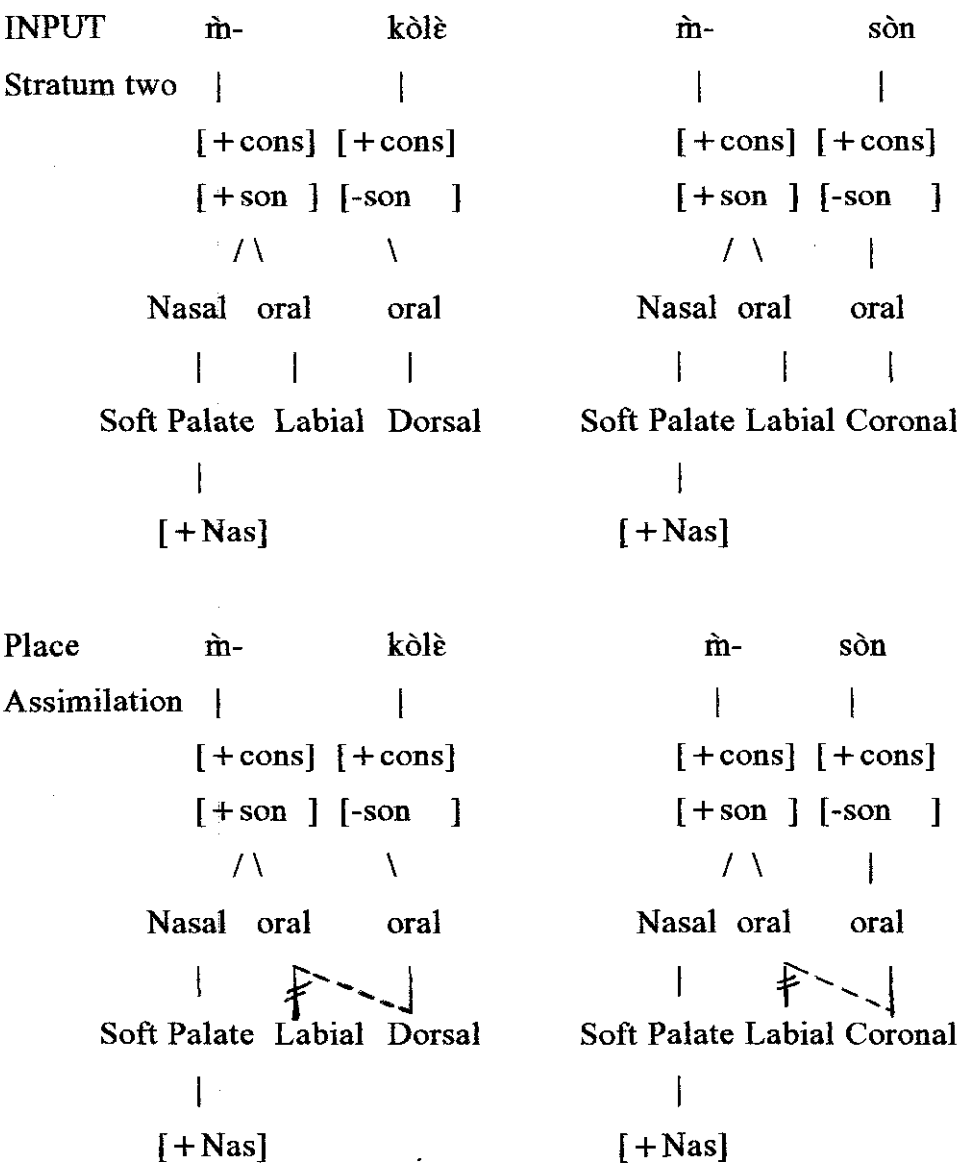


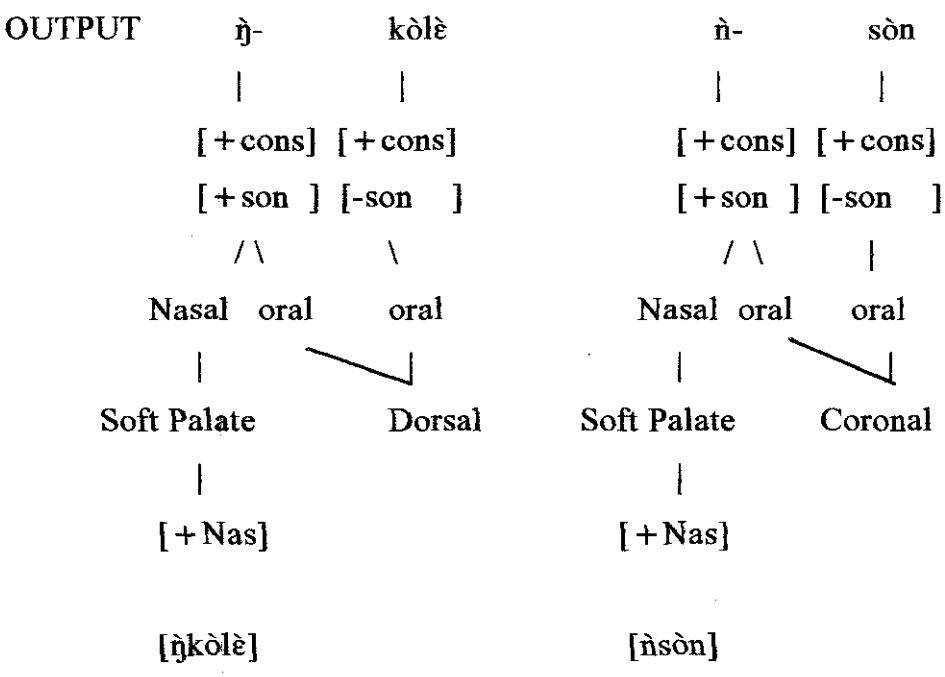
It is thus claimed that the data in (53) and (54) above have an underlying bilabial nasal prefix. Below is a sample of underlying forms:

/ m̀-ɓélà /, / m̀- dɛ́ɛ́ / , / m̀-jóŋ /, / m̀-kòlɛ̀ / , / m̀-sòn /.

As a sample of derivation, let's consider the words /m̀-kòlɛ̀/ 'cricket' and /m̀-sòn/ 'flesh'

(55)





A strict and general application of this rule would ban at the surface level any N+C clusters that do not share the same place of articulation. However, a class of nouns has been identified in the data wherein the place of articulation is not shared by the nasal and the following consonant. Consider the illustrative sample of the data below.

(56)	lì+lám+le →	lìlámlè	'to cook for'	not	lìlánlè
	lì +dìŋ +ɓè →	lìdìŋɓè	'to be loved'	not	lìdìmɓè
	lì +dìŋ+ɓàn →	lìdìŋɓàn	'to love oneself'	not	lìdìmɓàn
	lì +tìŋ +ɓàn →	lìtìŋɓàn	'width'	not	lìtìmɓàn

The morphological analysis of this class of lexical items reveals that they are made up of a prefix, a root and a verbal extension /or nominal suffix.

(57) Examples.

lì+lám + le 'to cook for'(applicative benefactive).

N5 Root EXT

lì + tìn + ɓan 'width'

N5 Root N.S.

The failure of the Place Assimilation Rule to apply here stands as a major problem for the Chomsky and Halle (1968) *Sound Pattern of English* model. According to these authors, the structure of a phonological rule is the following:

A → B / -C

In this format, A stands for the structural description, B for the structural change and -C for the context or environment. To them, the context could be stated in terms of syllable, morpheme or word boundary. But now, the problem with the data in (56) is that we still have a morpheme boundary as in (53) and (54) because we are dealing here with a suffix. All things being equal, one expects the Place of Assimilation Rule to apply because identical causes within the same system must yield identical effects. But this does not happen.

However, the model of Lexical Phonology as proposed by Kiparsky (1982,1985), Mohanan (1982), Pulleyblank (1983) among others provides a natural solution to the problem. In fact, the theory claims that during the morphological construction of a word, the various affixes (prefixes, suffixes, infixes and other clitics) do not attach to the root simultaneously. Therefore, the word formation is made up of strata where the output of each morphological process is scanned by the phonological rules available at that level. Following this proposal of Lexical Phonology in general and the claims made by Goldsmith and Sabimana (1984), Myers (1987), Hyman (1990), Mutaka (1990) among others, we claim that verbal extensions and noun class prefixes do not attach to the root at the same level. It is held in this thesis that the lexicon is divided into two strata:

- a first stratum where verbal extensions, final vowel, suffixed tense markers and nominal suffixes attach to the root;

- a second stratum where nominal prefixes and prefixed tense and aspect markers (INFL) attach to the root.

Drawing from this, it is thought that the Rule of Place assimilation does not apply in the first stratum. Rather, it applies on the second stratum when the suffixes have already been linked to the root to form the stem. That's why N + C clusters in (53) and those in (56) display different properties.

3.1.2. Delateralisation

Delateralisation refers to a phonological process that changes the lateral consonant [l] into a corresponding stop consonant when it is preceded by a nasal noun class prefix marker. The following data display alternations between ɗ ~l as one observes the singular and plural forms of the voiced coronal initial roots.

(58) a)	ǹ- ɗàl	'grandson'	b)	ɓà-làl	'grandsons'
	ǹ-ɗɛ́ɛ́	'house'		mì-lɛ́ɛ́	'houses'
	ǹ-ɗɔ́m	'male, husband'		ɓà-lɔ́m	'male, husbands'
	ǹ-ɗɛ́ŋ	'walk, trip'		mì-lɛ́ŋ	'trips'
	ǹ-ɗɔ́n	'shout'		lì-lɔ́n	'to shout, cry out'
	ǹ-ɗɔ́ɔ́	'fish hook'		lì-lɔ́ɔ́	'to fish'

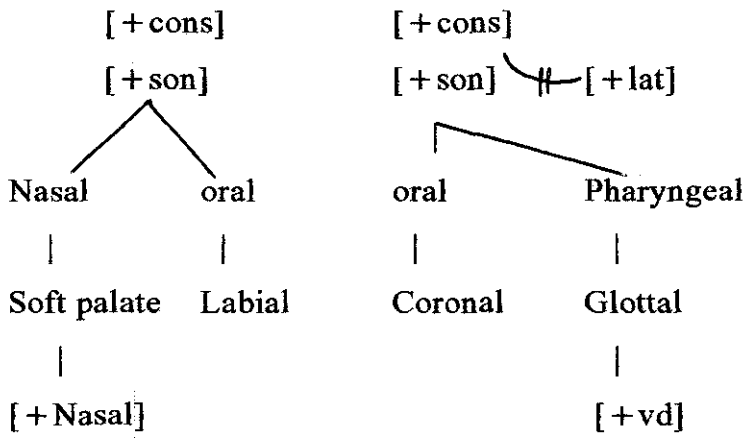
It should be recalled that the l~ ɗ alternation is a feature of Yakalak, the variety of Bakoko that is spoken in Mouanko and Dizangue. Other dialects realize the (58b) forms with [ɗ]. But if we set apart the variation problem, one can postulate two tentative solutions for the underlying representations.

The first hypothesis is to posit [ɗ] as the basic alternant. In this case, one would need a rule of lateralisation to transform the voiced coronal stop [ɗ] into a liquid [l]. Though this solution is logically acceptable, one can

still question the conditioning factor or the phonetic motivation of such a process. Moreover, the lateral consonant [l] occurs elsewhere whereas the occurrence of [d] is restricted to the postnasal environment. To conclude, such a solution is not desirable.

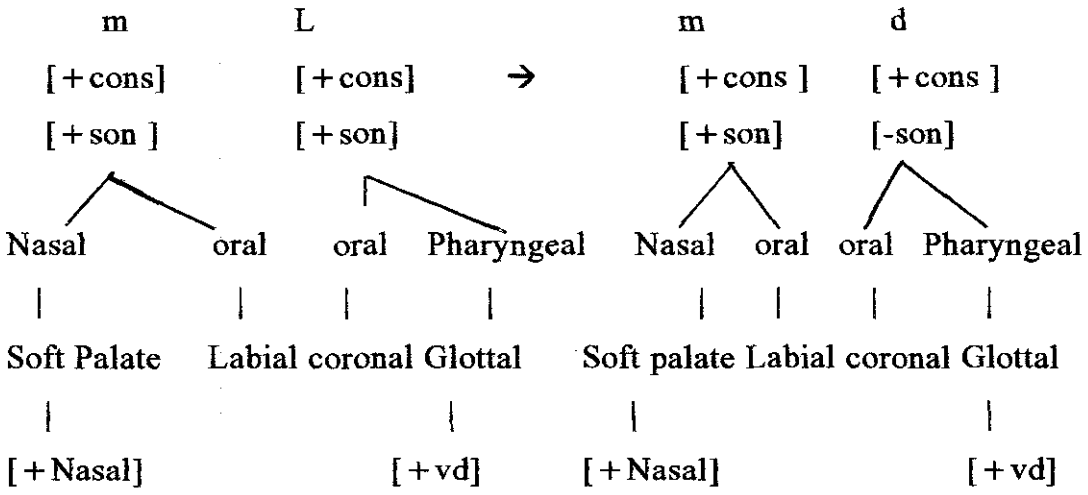
The second hypothesis posits [l] as the underlying form. Thus, to derive the [d] forms, one would need to delete the lateral node when the lateral consonant is preceded by a nasal consonant.

Delateralisation: A lateral coronal becomes the corresponding stop when preceded by a nasal consonant.



Consonantal sonorants in Bakoko are either [+nasal] or [+lateral]. The immediate consequence of applying the delateralisation rule is that we get an ill-formed consonantal sonorant which is neither nasal nor lateral. This segment that will be conventionally notated as L must be repaired with the feature [-sonorant]. The repair rule yields a well-formed segment of the language (i.e. [d].)

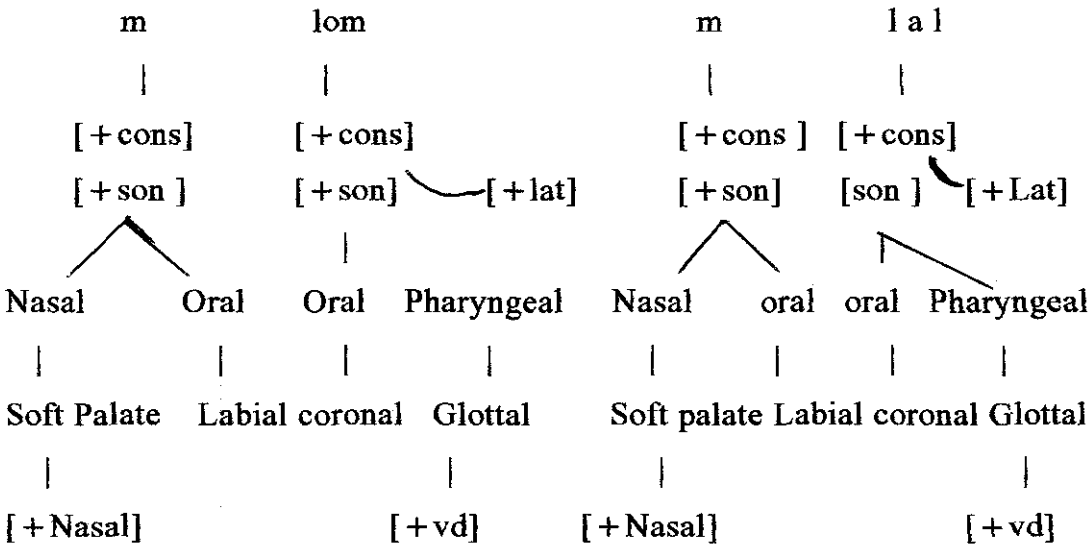
REPAIR: An abstract [-nasal], [-lateral] consonant L becomes [-sonorant].



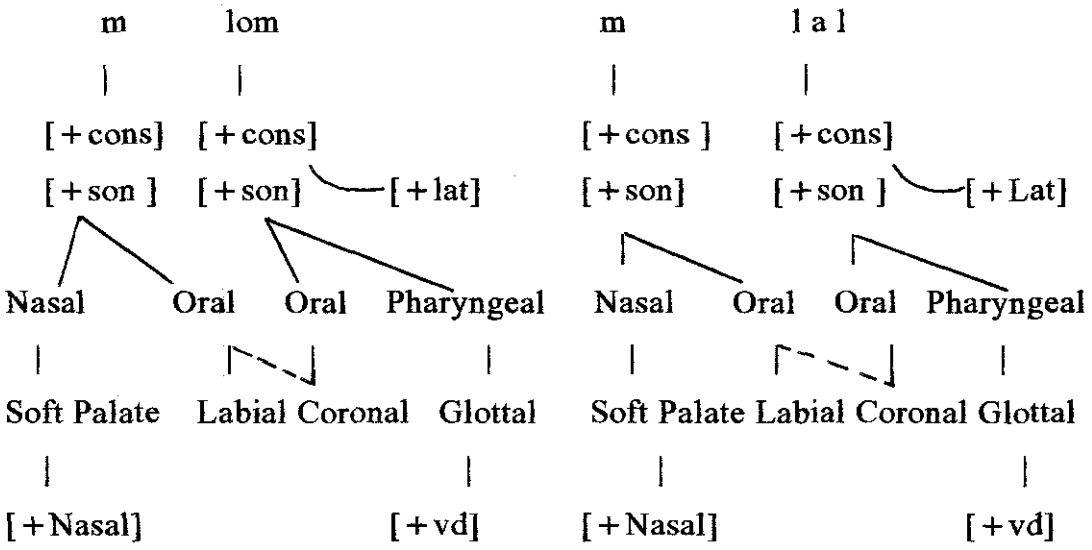
It must be recalled that the delateralisation process takes place during the prefixation which is a level two operation. It must also be borne in mind that the voiced coronal plosive [d] does not occur in the phonemic inventory. Thus, the result would violate the structure preservation principle. Structure Preservation is a principle of Lexical Phonology with the effect of banning allophones from the lexical component of grammar. Kenstowicz (1994:221) puts it in the following terms: "According to Structure Preservation, representations within the lexicon may only be composed of elements drawn from the phonemic inventory. The phonemic inventory thus constrains the kinds of phonological rules that may apply in the lexicon. If a rule introduces or refers to a non contrastive segment, then, by Structure Preservation, that rule can only apply postlexically." In order not to violate Structure Preservation, the repair rule will also create and attach a [+constricted glottis] feature to the glottal node.

To sum up, below is provided a sample derivation of the forms in (58a) .

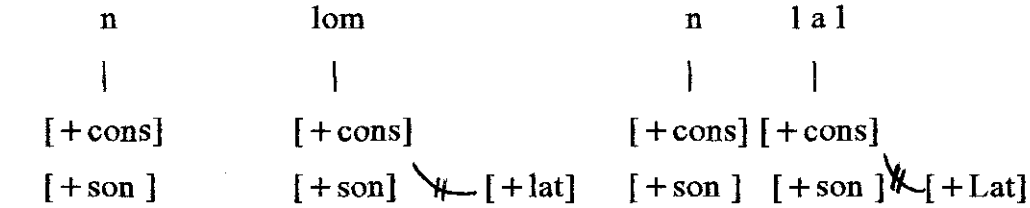
INPUT Stratum two.

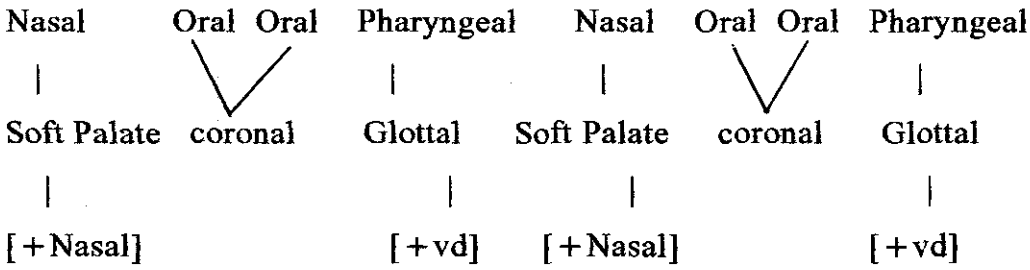


PLACE ASSIMILATION.

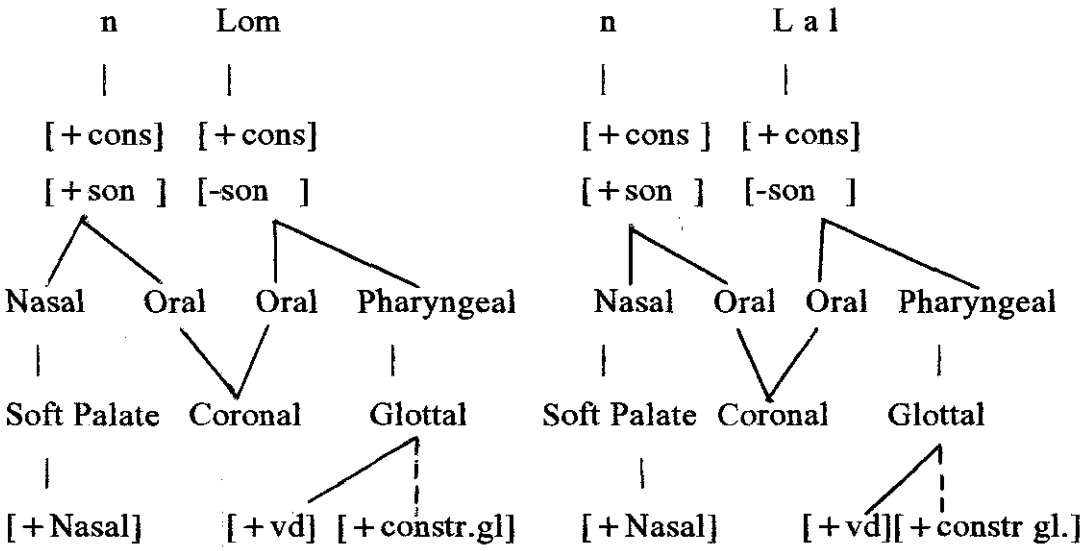


DELATERALISATION





REPAIR.



OUTPUT [ǹ dǒm] [ǹ dà̀l]

3.13. Post Nasal Hardening.

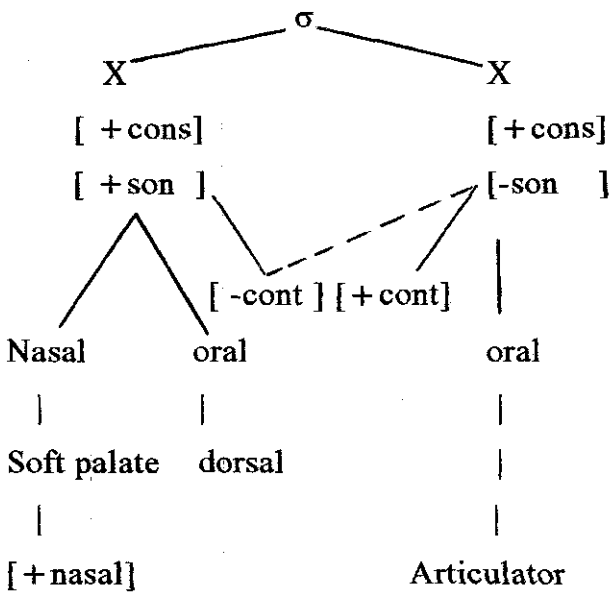
It has been observed that classes 9 and 10 words have two prefixes, one of which is a non syllabic palatal nasal consonant. That palatal nasal always assimilates the place of articulation of the following consonant, (i.e. root initial consonant.) A more interesting observation about the class of nouns that bear this prefix is that the prefix is never followed by a fricative sound. The couple of derived nouns that have been identified in our corpus confirm this tendency for fricatives to undergo a strengthening process after a non syllabic nasal.

(59) lì-vèx	'to create'	mbvèx	'creator'
lì-vèèɓan	'to breathe'	mbvèèɓàn	'breathing'
		ndzìŋ	'smell'
		ndzàl	'hunger'
		ndzèn	'path'
		ndzòx	'elephant'
		ndzân	'fire'

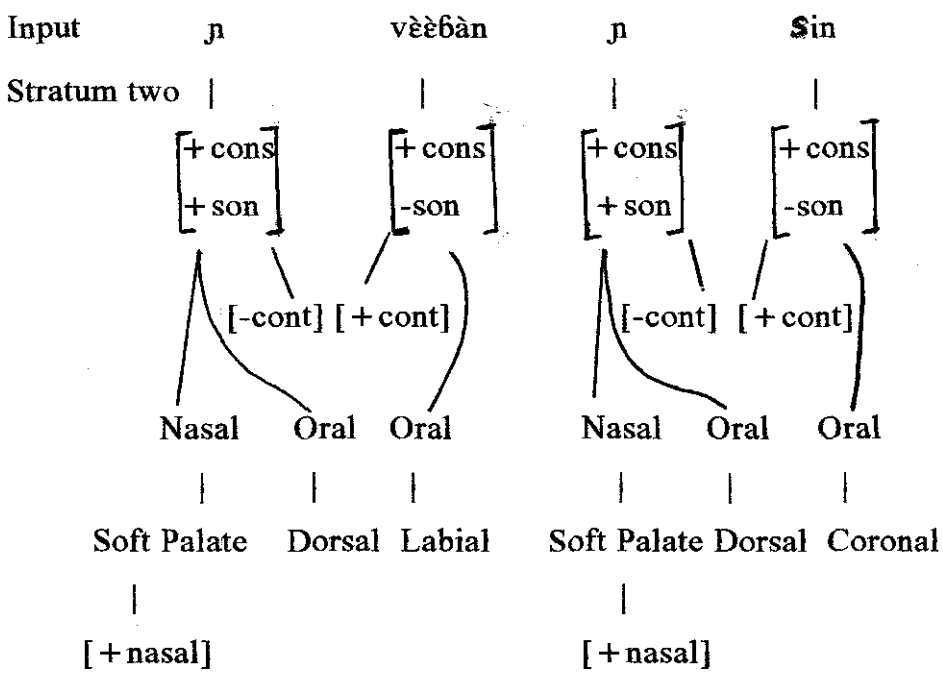
Because sequences of non syllabic nasal plus fricatives have not been identified, it is claimed that fricatives become their corresponding affricates when preceded by non syllabic nasals. The process called Post Nasal Hardening (PNH) can be stated as follows:

Post Nasal Hardening: A fricative consonant is strengthened after a non syllabic nasal. (PNH)

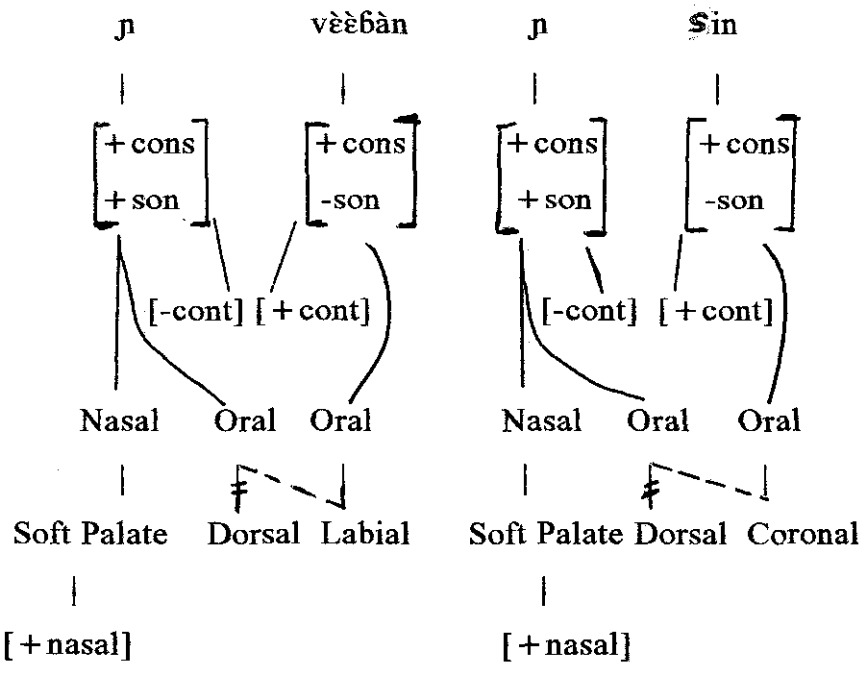
In Feature Geometry terms, this rule (PNH) implies the spreading of the feature [-cont] from the non syllabic nasal onto following [+cont] consonant. As a result of this process, an affricate is formed.



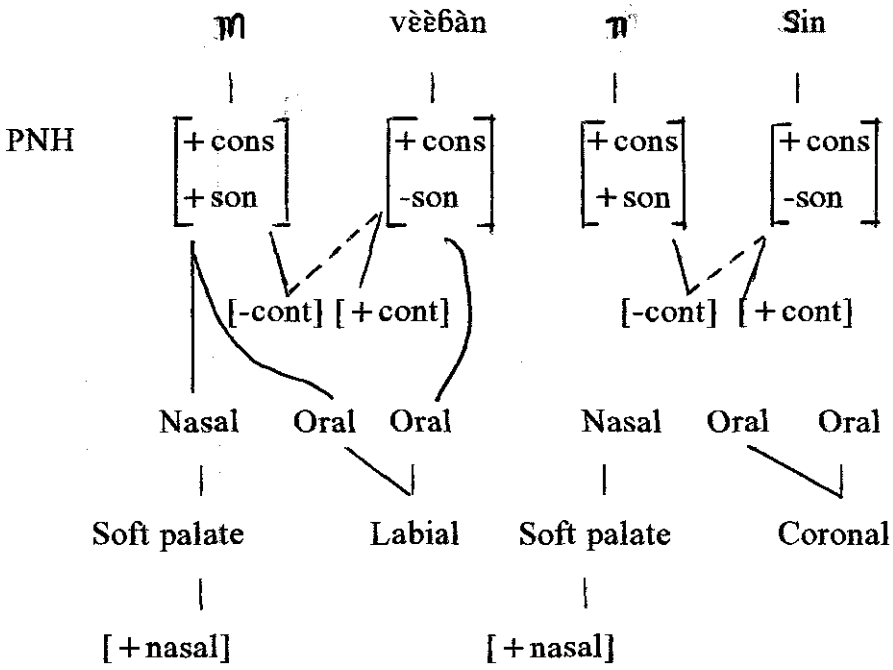
The PNH process operates as follows:



Place Assimilation



Post lexically



Output [mbvèèɓàn] [ndzin]

3.1.4. Post Nasal Voicing.

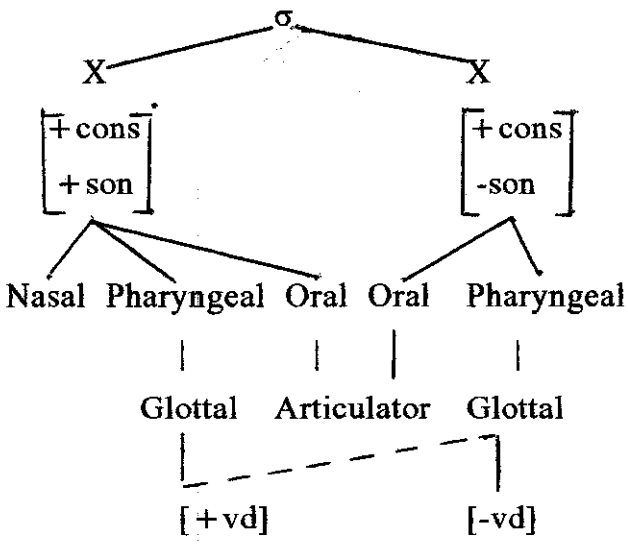
Still within the environment of a non syllabic nasal followed by a consonant, it has been noticed that voiceless stops become voiced as evidenced by the derived nouns displayed below. The same set of data also shows that even non-derived nouns never display any case of non syllabic nasal plus voiceless stop that form a prenasalized sound.

(60) a) lì-pùn-an 'to resemble each other b) mbùnán 'resemblance'
lì-pèl-e 'to answer' mbèlán 'answer'
lì-kɔ̀x 'to grind' ŋgɔ̀x 'grinding stone'
ǹ-tʃǐŋgànɛ́ 'roundness' ndʒìŋgàn 'round'
ndím 'blindness'

ndóx	'deafness'
mbɔ̀m	'snake(sp)'
mbú	'dog'
ŋgɔ̀m	'drum'
ŋgùù	'pig'

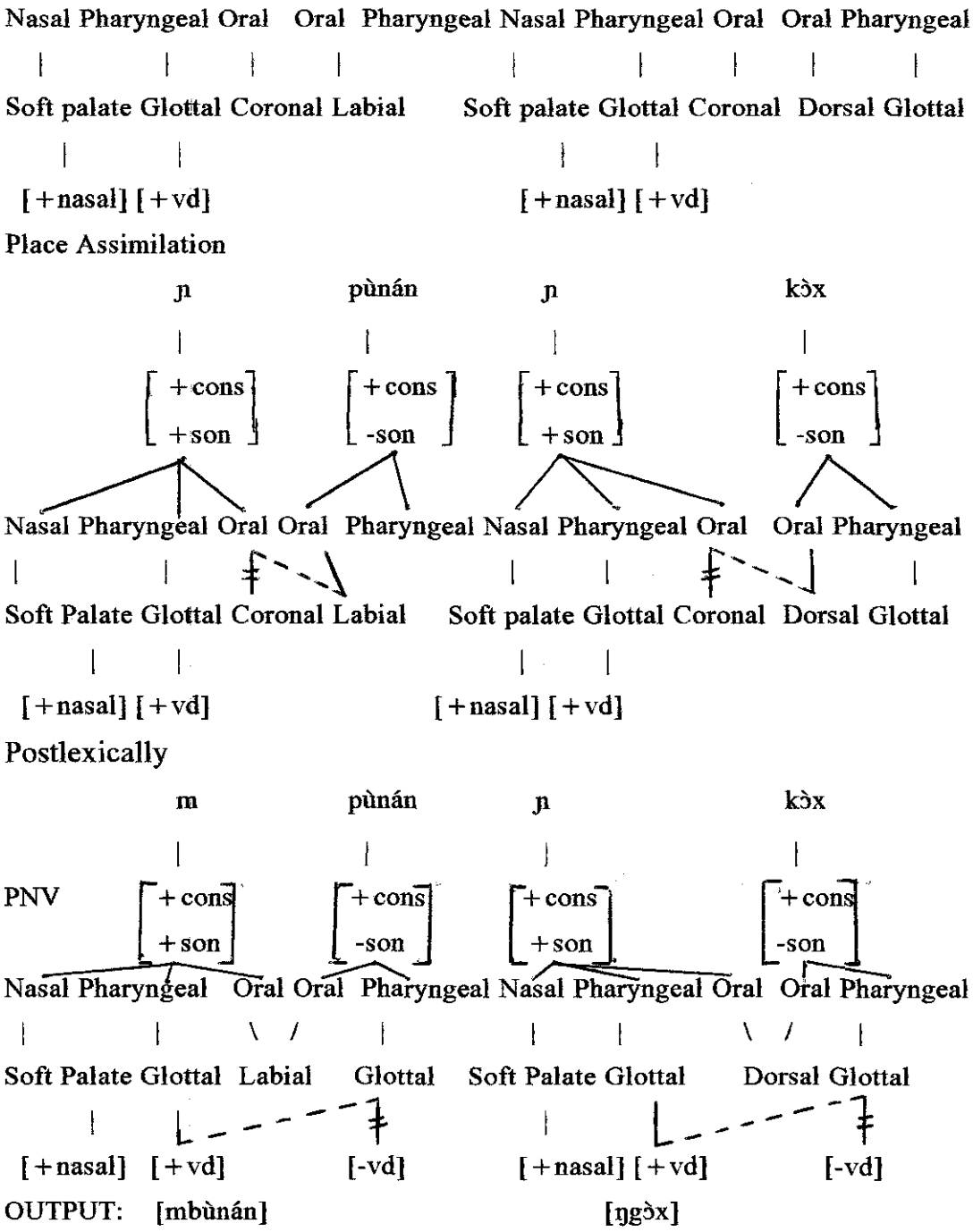
From the observation of the whole set of data, the following general voicing process can be stated:

Post Nasal Voicing: A stop becomes voiced when preceded by a non syllabic nasal. (PNV)



Below is a sample derivation of the items in (60b). Since they are class 9 nouns, they take a [ɲ-] prefix at the underlying level.

Input	ɲ	pùnán	ɲ	kɔ̀x
Stratum two	|	|	|	|
	+cons +son	+cons -son	+cons +son	+cons -son



3.1.5. Post Nasal Deglottalization.

Besides PNH and PNV, sequences of non syllabic nasals plus consonant also display a process of deglottalization. The oral part of a NC

cluster deglottalizes when the nasal consonant is not syllabic, i.e. does not bear a tone. It has been observed that the language does not show any case of Nasal + Implosive that form a prenasalized sound. The data below illustrate the phenomenon.

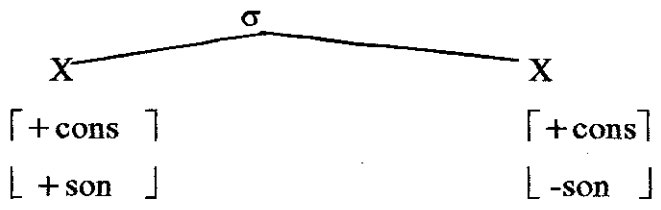
(61) a)	lì-ɓɔ́l-an	'to lose'	mbɔ́lán	'loss'
	lì-ɓàt	'to ask'	mbàtáx	'question'

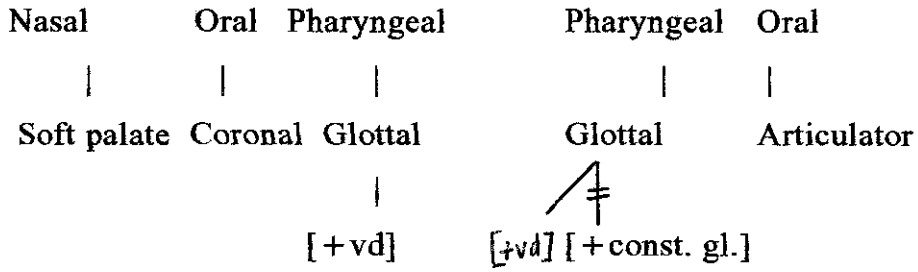
Further examples of derived nouns that show the deglottalization process have not been observed. However, sequences of m+b or n+d abound in Bakoko. But one cannot conclude in a straightforward manner that [b] and [d] when found after a non syllabic nasal originate from their implosive counterparts. Likewise, they may derive from their voiceless counterparts through PNV within the same context. Anyway, the couple of derived nouns displayed in (61) prove that at least some surface mb and nd sequences originate from a nasal + implosive concatenation at the underlying representation. The Post Nasal Deglottalization rule can thus be stated as follows:

Post Nasal Deglottalization: An implosive consonant deglottalizes when preceded by a non syllabic nasal.

The above rule predicts that *mbɔ́lán* 'loss' and *m̀ɓélà* 'proprietor' will syllabify respectively as mbɔ́-lán and m̀-ɓé-là.

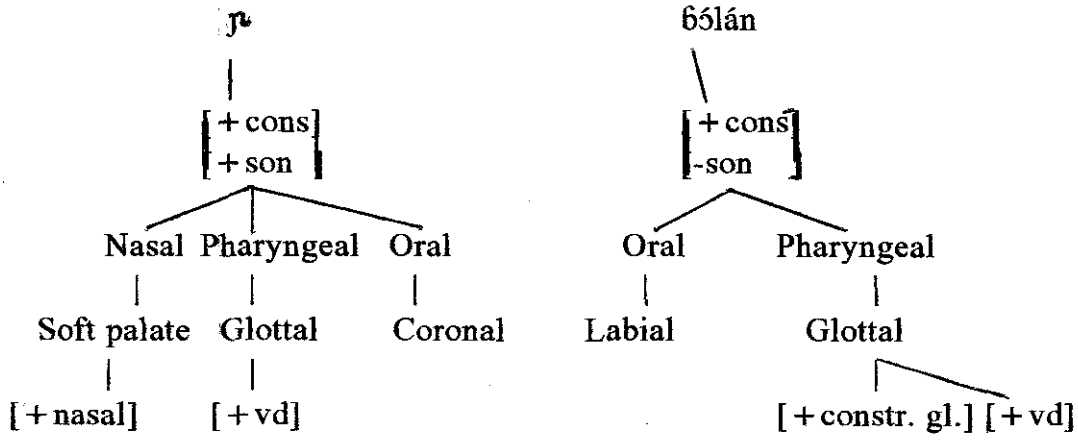
In formal terms, the PND process implies the delinking of the [+constricted glottis] feature as shown by the following representation.



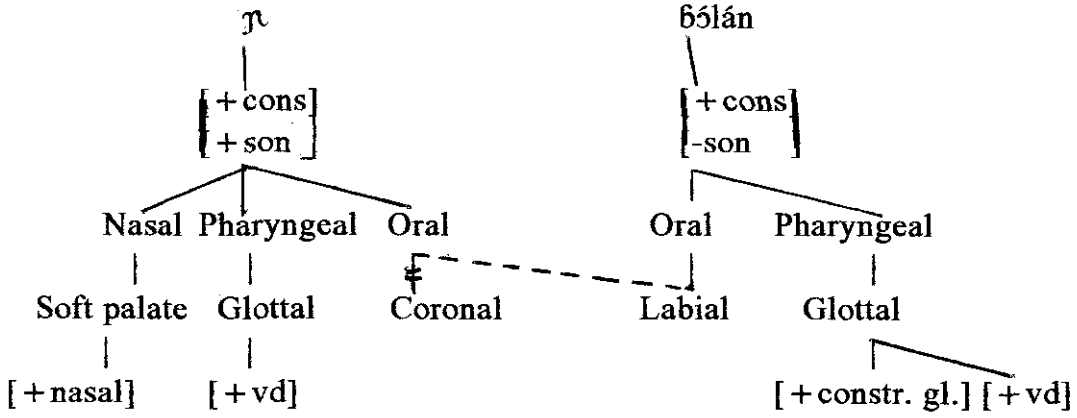


As a sample of derivation, the transformation of / ɲ-bólán / into [mbólán] is provided below:

INPUT Stratum two

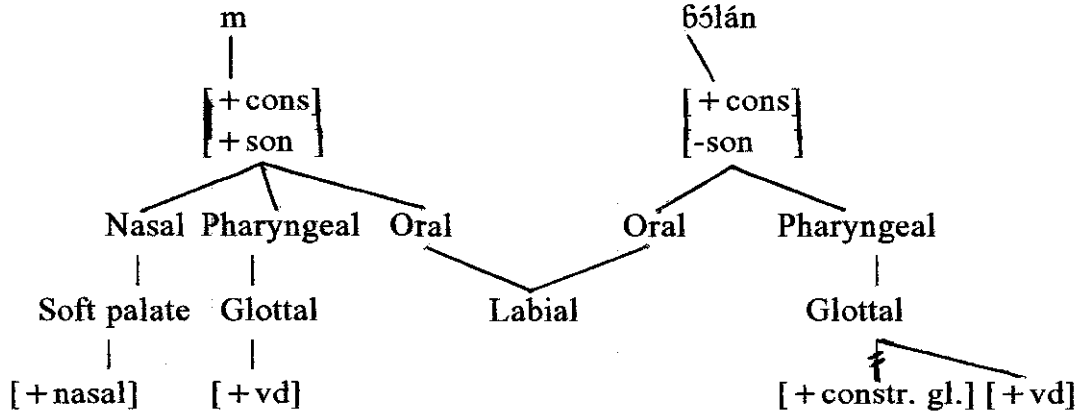


PLACE ASSIM.



Postlexically

P.N.D.



OUTPUT [mbólán]

To sum up, it can be noticed that the Nasal + consonant environment yields five phonological processes, two of which are lexical (Place Assimilation and Delateralisation) and three postlexical (Post Nasal Hardening, Post Nasal Voicing and Post Nasal deglottalisation). Though the N-element attaches to the stem at level 2 of the morphology, it must be observed that PNH, PNV and PND produce phonetic sounds (i.e. mb, nd, ŋg). These processes have thus been removed from the lexical component in order to meet the requirements of *Structure Preservation*.

Moreover, as it will become evident in the next chapter, it is claimed that each morpheme comes along with its underlying syllable structure, though alterations may intervene at the end of each stratum of the grammar. At the postlexical level where PNH, PNV and PND apply, resyllabification has already taken place at the end of stratum two to link the non syllabic nasal (class 9 marker) to the root initial consonant. As a consequence, a modified sound (prenasalised consonant) is formed. Thus the conditions for the application of PNH, PNV and PND are met and they are not shared by the sequences that undergo Place Assimilation and Delateralisation only (i.e. Syllabic nasals +consonant).

3.2. The class 5 noun class prefix.

The prefixation of the class 5 marker /dì-/ to the root gives rise to a series of phonological processes. Among these are lateralisation and affrication. Lateralisation is a process that changes the coronal stop [d] into a lateral consonant before a consonant initial root. Affrication transforms the prefix [dì-] into a palatal affricate before a non high vowel initial root. The following nouns illustrate both phenomena. The singular and plural forms of each noun have been given to help isolate the prefixes. The forms in (a) display high vowel root initials, those in (b) non high vowel root initials and those in (c) show the consonant initial roots.

62. a)	d-ɪ̀h	'eye'	a) m-ɪ̀h	'eyes'
	d-ìh	'fireplace'	m-ìh	'fireplaces'
	d-ùwɛ̀	'trip, walk'	m-ùwɛ̀	'trips, walks'
b)	ʤ-ɔ̀t	'boil'	b) m-ɔ̀t	'boils'
	ʤ-ǒl	'nose'	m-ǒl	'noses'
	ʤ-ɔ̀ɣà	'part'	m-ɔ̀ɣà	'parts'
	ʤ-ámbò	'marsh'	m- ámbò	'marshes'
c)	lì-kàlà	'doughnut'	c) mì-kàlà	'doughnuts'
	lì-sòŋ	'tooth'	mì-sòŋ	'teeth'
	lì-bùm	'belly'	mì-bùm	'bellies'
	lì-kúɓé	'banana'	mì-kúɓé	'bananas'
	lì- ɓémbá	'flock'	mì-ɓémbá	'flocks'

The class 5 prefix displays three allomorphs with the following distribution:

-[d-]before high vowel initial roots

-[ʤ-] before non high vowel initial roots

-[lì-] before consonant initial roots.

If [d-] is posited as the basic form, the following rules would be required to yield the various surface forms:

- a rule of [i] epenthesis between the prefix and the root.
- a rule of [i] deletion before high vowels.
- a rule of glide formation leading to affrication before non high vowels.
- a rule of lateralisation changing [d] into [l] before consonant initial roots.

Though this alternant is theoretically acceptable, one can still question the psychological reality of the various rules stated here. Put differently, does the child need to learn four rules to acquire or master the class 5 prefix ? Such a grammar would be too complex for a child who generally masters the rules that govern a language within a few years.

If [dʒ] is postulated as underlying form for the prefix, one would need at least two rules to yield the various outputs. The first rule would change an affricate (palatal) into a voiced coronal stop before high vowels. The second rule transforms an affricate into [li-] before consonant initial roots. Such rules would be highly unreliable; they sound extremely ad hoc and lack naturalness. Moreover, there is no phonetic motivation to these rules.

If [lì-] is chosen as the basic alternant, this solution would be superior to the alternatives analyzed above. First of all, from a statistical point of view, the lexical items displaying [lì-] as prefix are by far superior to those that have [d-] or [dʒ-]. Moreover, Kadima (1969:39), in a cross-linguistic and comparative study of the noun morphology of Bantu languages declares about class 5 that "[lì-] est le représentant CV- le plus répandu". Taking all these facts into consideration, the postulation of the alternant would require the following rules:

-A rule that changes [l] into [d] before vowel initial roots. This "delateralisation"rule would feed the following other processes.

-A rule of [i] deletion before high vowel initial roots

-A rule of glide formation followed by affrication before non high vowel initial roots.

Though this alternative accounts for the data in a better fashion, it is worth pointing out that the "delateralisation" rule lacks naturalness because it is not phonetically motivated.

However, if an abstract [dî-] is posited as basic form, one would need to write a rule of lateralisation to change [d] into [l] before consonant initial roots. This rule would stand as a form of dissimilation, a process that sounds familiar to some languages of the coastal Bantu zone of Cameroon. For example, in Pongo, a coastal Bantu language spoken in the Moungo division, the class 5 prefix [di-] displays two allomorphs: [d-] before vowel initial roots and [i-] before consonant initial roots as evidenced by the data in (63) below. In (a), vowels initial root items are displayed whereas (b) shows the consonant initial roots.

63. a)	d-ísɔ̀	'eye'	b) ì-tàkà	'to suffer'
	d-ɔ́ŋgɛ́	'yawn'	ì-dùnà	'to grow old'
	d-àŋgwà	'to walk'	ì-bùm	'belly'
	d-êm	'pregnancy'	ì-wìnà	'pus'
			ì-yɔ́	'sleep'

The (b) forms reveal that Pongo does not tolerate [d-] in the prefix before consonant initial roots. In order to take care of this situation, the consonant of the prefix deletes.

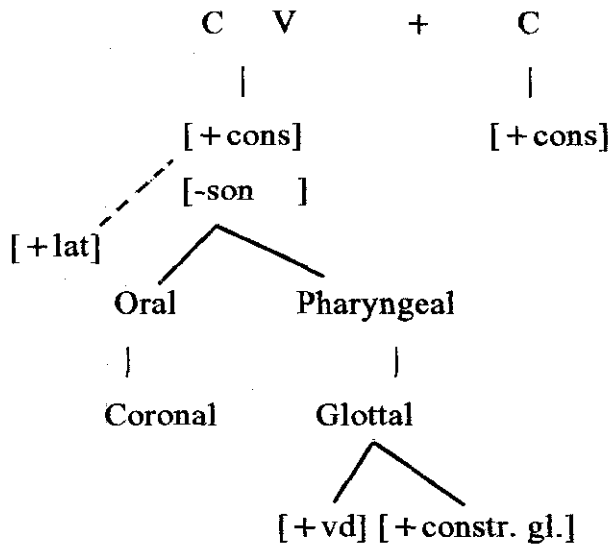
It is claimed that the situation displayed in (62a-c) is similar to that described on Pongo. Whereas Pongo simply drops the coronal stop, Bakoko weakens [d] by transforming it into a lateral consonant [l]. The derivation of the forms in (62a-c) requires the following rules: lateralisation, affrication, and vowel deletion. The latter will be examined in the next chapter because of the prosodic changes that it provokes.

3.2.1. Lateralisation.

Because [*dì*-] has been posited as the underlying form for the class 5 noun prefix, the derivation of the (c) forms in (62) require a rule that changes [d] into [l]. This rule called Lateralisation is formulated as follows:

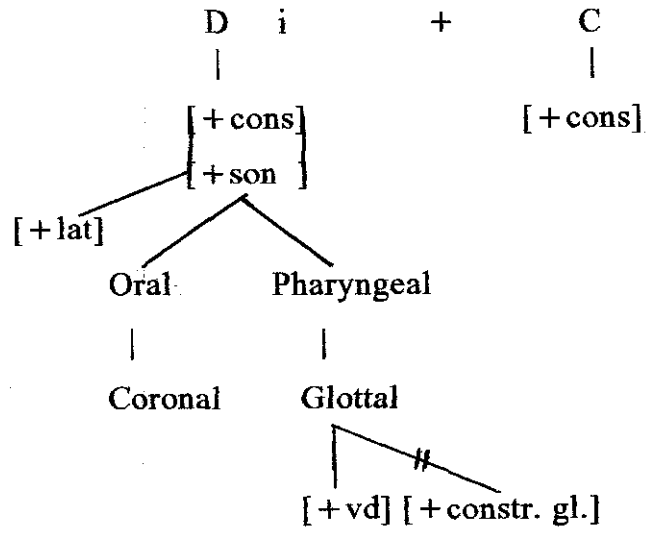
Lateralisation: A voiced coronal stop becomes lateral when it precedes a consonant initial root.

The feature geometry statement of the rule is provided below:

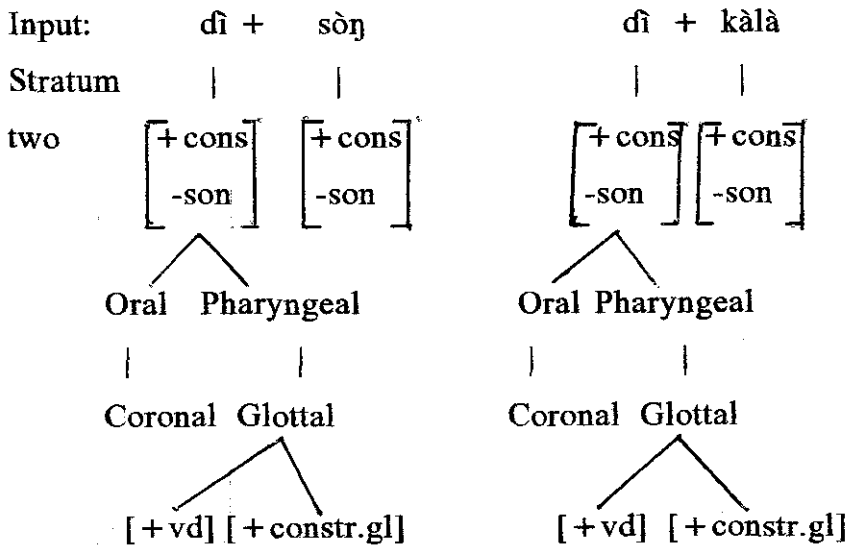


The creation of a lateral node motivates the statement of a repair rule. In effect, the sound system of Bakoko does not show any case of non sonorant and glottalised lateral. Such a sound that will be conventionally transcribed as [D] requires a [+son] feature and the delinking of the [+constr. gl.] node.

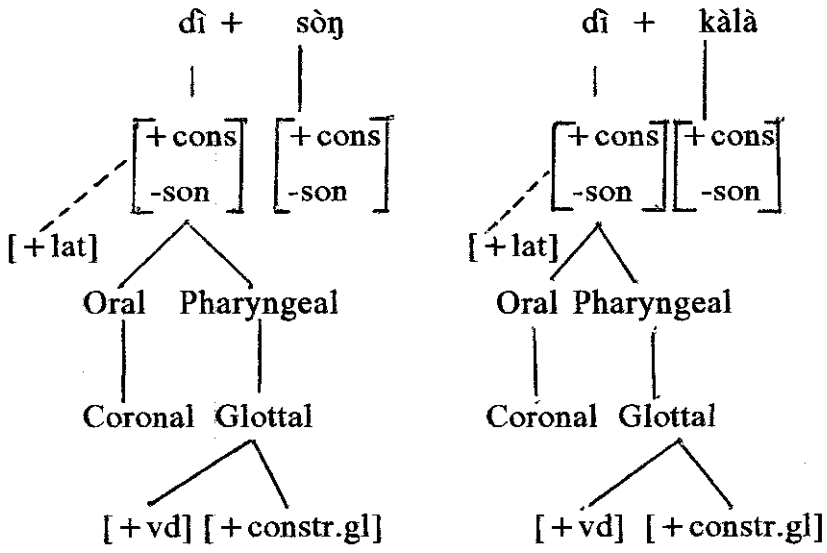
Repair: An abstract coronal lateral becomes a sonorant sound produced with the pulmonic egressive airstream mechanism.



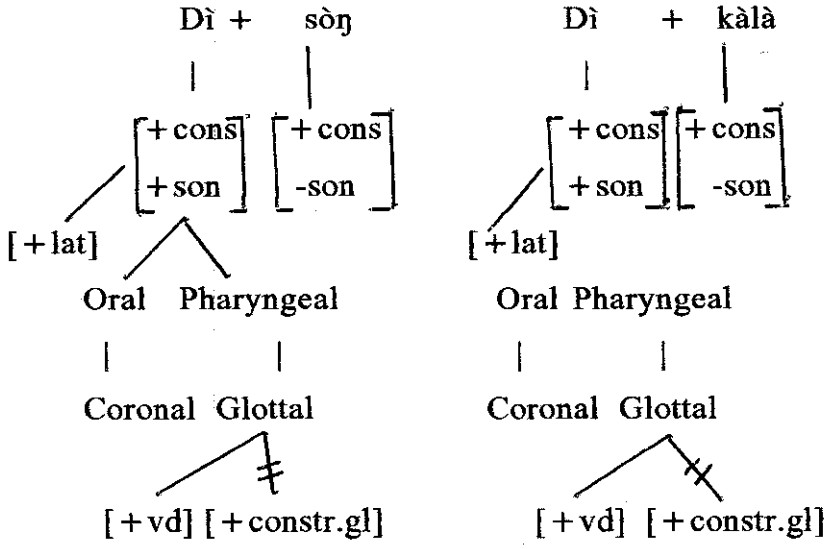
The derivation of lìsòŋ 'tooth' and lìkàlà 'doughnut' from /dìsòŋ/ and /dìkàlà/ is provided below:



Lateralisation



Repair:



Postlexically

Output: [lìsòŋ] [lìkàlà]

A class of data that stands as exceptions to the lateralisation process has been identified in Bakoko. Though they surface with a vowel initial

root, they show the [lì-] allomorph of the prefix. Thus, they behave as if they were consonant initial roots. A sample of these data is provided below:

64. lì-én 'palm tree'
lì-ól 'to kill'
lì-áŋ 'to fry'
lì-óx 'to hear'
lì-óŋ 'to build'

If the UR that was posited for class 5 prefix , i.e. /dì-/ is correct, then, one can really wonder why the same rule applied to similar underlying representations can yield different surface forms. The True Generalisation Condition (TGC) stated in Hooper (1976) was a constraint with the effect of prohibiting rules that are not general enough to account for all surface forms. She writes that 'all rules should express transparent surface generalisations that are true for all surface forms and that furthermore, express the relation between surface forms in the most direct manner possible'(see Durand 1990:135). A consequence of the TGC is that lìól 'to kill' and dʒǒl 'nose' cannot be claimed to stem from the same UR /dì-ól/.

In effect, the claim made in this thesis is that the data in (64) are consonant initial at the underlying level. This is the main fact that led us to assume both the moraic and the CV theories of the skeleton in this thesis. Clements and Keyser (1983) providing arguments for the recognition of a CV tier advocated cases where one may find C-slots at the CV level that do not dominate any unit at the segmental level. A former statement of such a situation was found in Malmberg (1972:140) who analyzed the liaison consonants in French as follows:

"Au point de vue fonctionnel, on peut regarder les consonnes de liaison comme des phonèmes latents qui demandent certaines conditions pour se réaliser."

The concept of 'latent' consonant was thus understood as a C-slot that exists at the underlying level but that does not necessarily surface phonetically. Along the same line of thought, Clements and Keyser (1983:107) construed the aspirated 'h' in French as a latent consonant. They write:

"This consists of a class of words which begin with phonetic vowels but which behave phonologically as if they began with consonants."

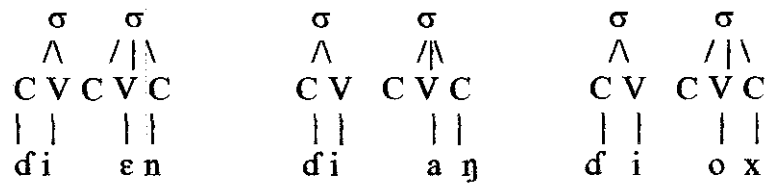
To illustrate this, they argue that the French phrases 'petit homme' and 'petit héros' do not have the same underlying representations, especially as far as the skeleton is concerned.

65. a)

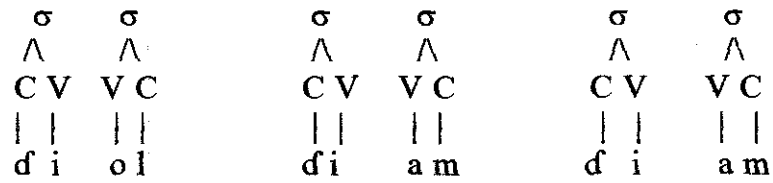
In their analysis, Clements and Keyser claim that the presence of latent C-slot in (b) blocks the manifestation of the liaison consonant. On the other hand (65a), the absence of the latent consonant favors the liaison.

It appears that the data in (64) behave phonologically like those that start with an aspirated 'h' in French. In other words, it is claimed that although they are vowel initial roots at the surface level, they are consonant initial at the underlying level. As stated earlier, the [lì-] alternant of the class 5 prefix is found before consonant initial roots. Therefore, the data in (64) will have the UR in (66a) whereas those in (62b) will have their UR in (66b)

66. a)



b)



The CV- tier provides evidence that the conditions for the application of the lateralisation rule are met in (66a) but not in (66b). Thus the common pattern of these words (vowel initial roots) is apparent.

Evidence in support for this analysis comes from the comparison with neighbouring languages. On the one hand, it is observed that most of the words that have a latent consonant in the root initial position are consonant initial in neighbouring Basaa. Consider the data in (67) below.

67. English	Basaa	Bakoko
to hear	-nɔ́k	-óx
to laugh	-nɔ̀l	-ɔ̀l
to fry	-wáŋ	-áŋ
to remember	-hɔ́ŋ ɔ̂l	-ɔ́ŋɔ̀

Studies on Basaa (Bot Ba Njock 1970, Bitjaa Kody 1990 among others) reveal that most of the class 5 nouns have lost their prefixes in the current stage of the development of the language.

The postulation of latent consonants in some class 5 nouns help account for some apparent exceptions to devocalisation as it will become evident in the next chapter. In fact, it has been observed that the class 7

prefix / è- /, the class 8 prefix /ɓì-/ and the subject prefix / ɔ-/ 'you' devocalise when followed by another vowel at the second stratum of lexical phonology. But some lexical items stand as exceptions to the devocalisation process. Consider the data in (68) below.

68.	è-ón	'island'	[èón]	not	[jŏn]
	è-ót	'gluttony'	[èót]	not	[jŏt]
	ɔ-ám	'trap'	[ɔ́ám]	not	[wăm]
	bì-é	'trees'	[bìé]	not	[bjĕ]
	bì-ót	'gluttonies'	[bìót]	not	[bjŏt]

It is claimed that the words that behave as counterexamples to devocalisation are consonant initial roots. Facts from comparison with related languages demonstrate that the class of words that violate devocalisation are consonant initial. This can be shown by comparison with roots in Ewondo as evidenced by the data in (69) below.

69. English	EWONDO	BAKOKO
island	è-lŏn	è-ón
tree	è-lé	è-é
trap	ò-lám	ɔ-ám
to build	à-lóŋ	lì-óŋ
to send	à-lóm	lì-óm
to swim	à-dzɔ́x	lì-ɔ́x
to follow	à-tòŋ	lì-òŋ
to hear	à-wɔ́k	lì-ɔ́x

Drawing from the facts of comparison, it is claimed that the URs of the class 7 words èót 'gluttony' and jŏm 'thing' are not identical. The former has a latent consonant whereas the latter does not. Consider the underlying forms of èót and jŏm in (a) and (b) below respectively.

a)

σ	σ		
|	/|		
V	CVC		
|	| |		
e	o t	[èót]	

b)

σ	σ		
|	/\		
V	VC		
|	| |		
e	o m	[jŏm]	

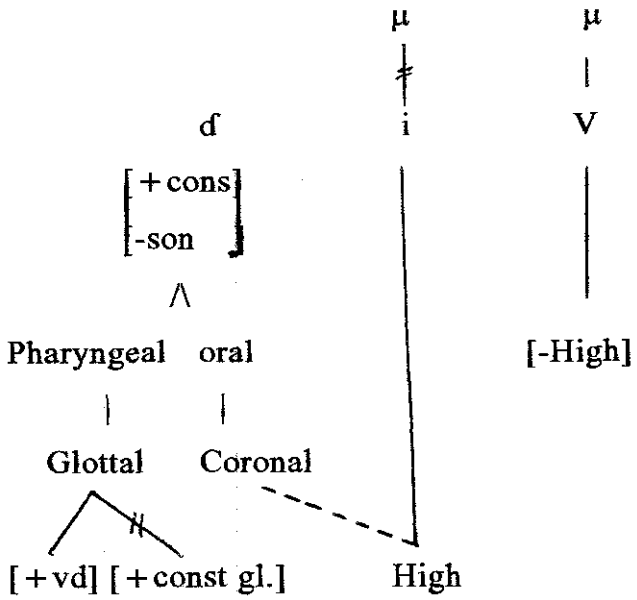
To conclude it appears that the postulation of latent consonants in Bakoko is independently motivated to account for the apparent exceptions to the lateralisation and devocalisation processes.

3.2.2. AFFRICATION.

It has been observed in (62b) that the phonetic realisation of the class 5 prefix is [dʒ-] before non high vowel initial roots. The derivation of this form is fed by the devocalisation rule which is a well established phonological process in the language (see chapter4). The output of the devocalisation rule which is the sequence [dj] thereafter coalesces to yield the palatal affricate [dʒ].

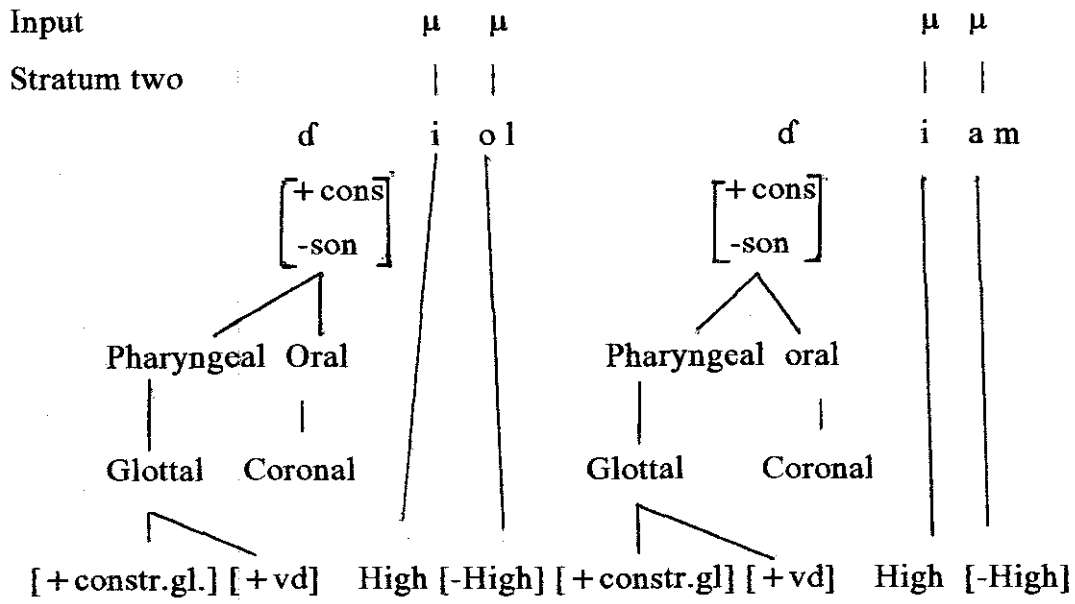
Affrication: A sequence of d+j become a palatal affricate before a non high vowel.

In geometry terms, affrication is achieved via the spreading of the feature [high] of the palatal glide onto the preceding coronal node.

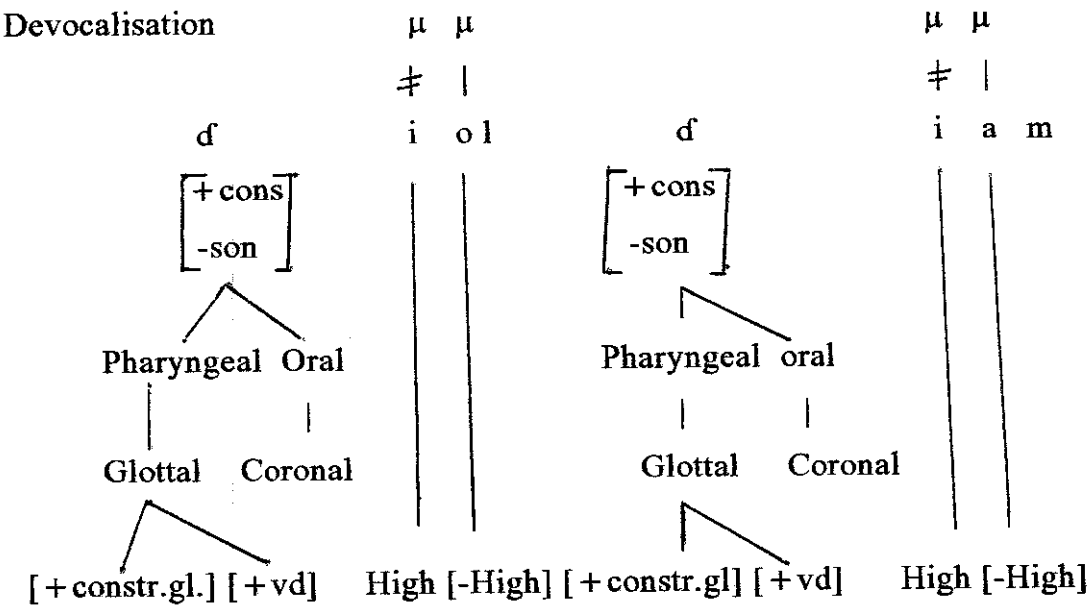


Because natural languages seldom show implosive affricates, the spreading of the [high] feature onto the coronal node automatically provokes the delinking of the [+constr. gl.] feature.

The derivation of dʒǒl 'nose' and dʒàm 'thing' from /dî-ól/ and /dî-àm/ respectively is provided below

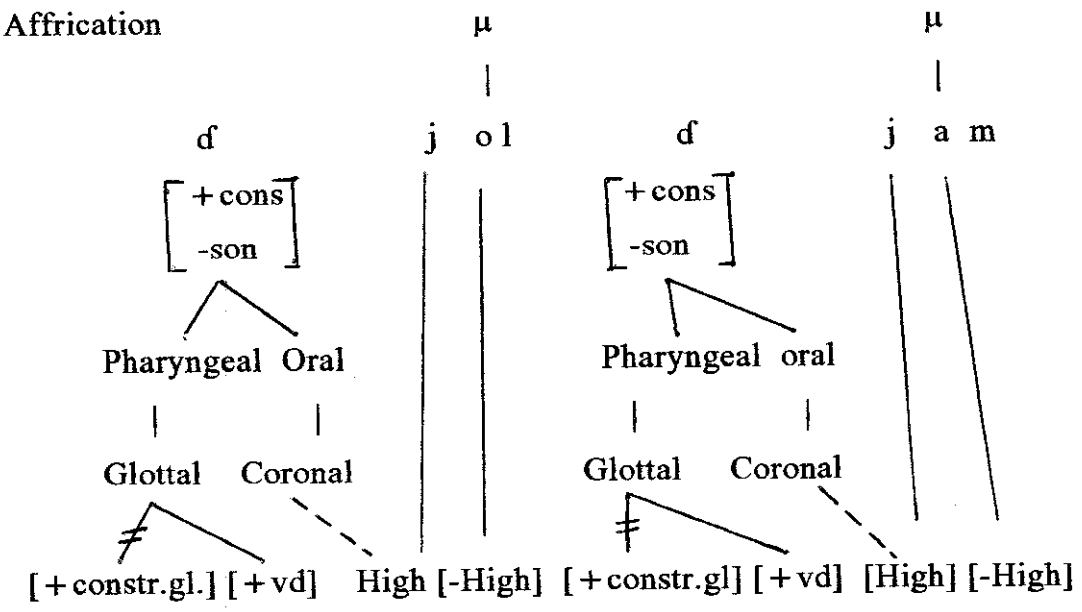


Devocalisation



Postlexically

Affrication



Other Rules —— ——

OUTPUT [d ʒŏl] [dʒàm]

To conclude, it must be recalled that lateralisation and affrication are typical level two processes. In effect, they have not been attested at the stem level (stratum one). For instance, the word è-dìdjà ' wall' surfaces as [èdìdjà] instead of èdìdʒà. Along the same line, the word lì-dùpsè 'to baptize' is realised as lìdùpsè instead of lìlùpsè. Put differently, if affrication and lateralisation were to apply at stratum one, èdìdjà and lìdùpsè would have surfaced as èdìdʒà and lìlùpsè respectively.

3.3. VOICING.

This process involves a velar fricative which becomes voiced in intervocalic position. Facts of Bakodo concerning voicing are best revealed by derived nouns where the contrast can be easily observed.

70. a)	lì-ɔ́x	'to swim'	b)	ɲ-ɔ̀ɣ-í	'swimming'
	lì-vèx	'to create'		ɔ̀-vèɣ-à	'creature'
	lì-díx	'to warm up'		è-dídíɣ-è	'warmth'
	lì-jêxlè	' to teach'		lì-éɣ-è	'to learn'
	è-àxlà	'itching sensation'		lì-àɣ-à	'to itch'

The voicing process is also observed when a word ending with the voiceless fricative is collocated with another one and requires a vocalic concord marker. Consider for instance the data below.

71. a)	ŋ̀kàx	'back'	b)	ŋ̀kàɣ á ndzòx	'the elephant's back'
				back of elephant	
	m̀bjáx	'twin'		m̀bjáɣ à mìndíɣá	'the woman's twin'
	èɓàx	'hoe'		èɓàɣé mìndíɣá	'the woman's hoe'

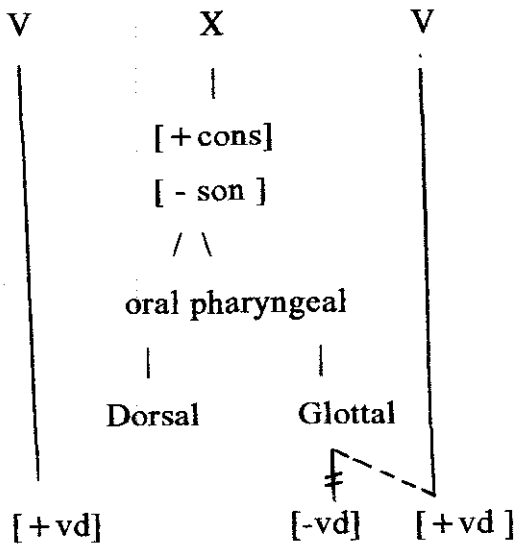
This complementary distribution between the voiced and voiceless velar fricatives is also observed within the underived lexical items as evidenced by the following data.

72. a) ŋ̀kàx 'back' b) ɲàɣà 'cow'
àwúx 'marriage' páɣó 'paddle'
lìɓóx 'dance' èkóɣɔ̀ 'cough'
lìkɔ̀x 'to grind' sìɣà 'generation'
m̀péx 'bag' kóɣá 'sand'

The facts displayed in the above data testify that voicing is a very general process in the language. It applies at all levels of the grammar. However, because the rule yields an allophone, voicing must be construed as a postlexical process in order to satisfy the Structure Preservation principle.

Voicing: A velar fricative becomes voiced in intervocalic position.

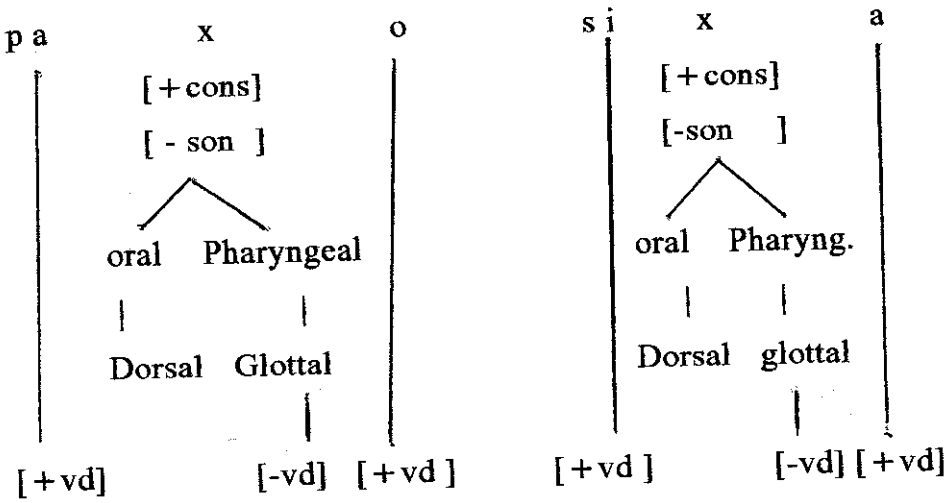
In Feature Geometry terms, the voicing process implies the spreading of the feature [+voiced] from the vowel to the right onto the glottal node.



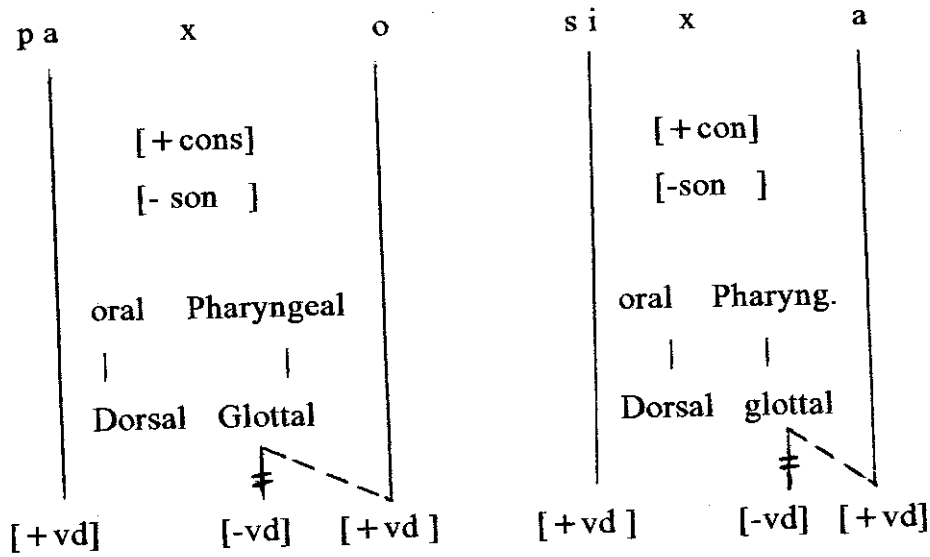
The derivation of páɣó 'paddle' and sìɣà 'generation' from / pàxó/ and /sìxà / respectively is provided below.

Input

Postlexically



Voicing.



OUTPUT [páɣó] [sìɣà]

3.4. Deglottalisation.

Deglottalisation is a process that transforms implosives i.e. consonants produced with the ingressive airstream mechanism into consonants using the pulmonic egressive airstream mechanism. This is a very common process that applies whenever the phonetic conditions are met.

It has been observed that the implosive stops [ɓ],[ɗ] and their non implosive counterparts occur in mutually exclusive environments. The distribution stands as follows:

- [b] and [d] before high vowels
- [ɓ] and [ɗ] before non high vowels or elsewhere.

This phenomenon is a well-known pattern of coastal Bantu languages of Cameroon. It has been observed, among other languages in Akoose, Bakaka, Duala, Pongo, Bankon as reported by Atindogbe (1996). The following data display the facts as observed in Bakoko.

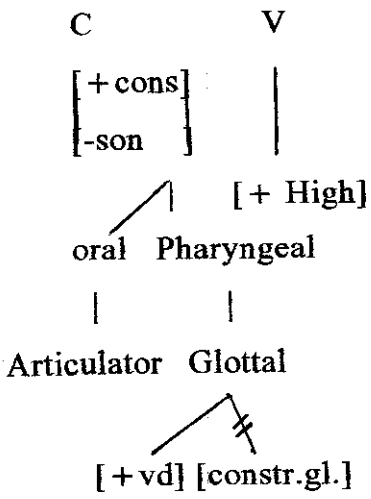
72. a)			b)		
	èbìbì	'sweat'		è ɓàpá	'width'
	àbí	'excrement'		lìɓòm	'to hit'
	búmè	'tree (sp)'		lìɓɔ̀m	'catarrh nose
	ɲàmàbùlú	'rheumatism'		lìɓélà	'to have'
	ɔdìɓà	'key'		lìyéɓè	'to accept'
	àdíx	'heat'		ǹ-ɗàl	'grandson'
	ɔdùtù	'abscess'		ǹ-ɗɔ́m	'husband, male'
	èdùt	'cold'		ǹ-ɗɛ́ɛ́	'house'
				ǹ-ɗèè	'frontier'

The crucial problem here is that of choosing the basic alternant for both pairs of sounds. If [b] and [d] are postulated as underlying forms, a rule of glottalisation will be required to derive the data in (b). The advantage with such a solution is that it fits the requirements of Universal Grammar where implosives are rather marked. But, with this solution, it would be difficult to solve some alternations that have been observed in derived nouns. For example, lìpùnàn 'to resemble each other' alternates with mbùnán 'resemblance.' In the same manner, lìɓólàn 'to lose' alternates with mbólán 'loss.' If [b] is chosen as basic, it would be hard to explain why it surfaces as [p] in one case and [ɓ] in another when the phonetic environment is identical. From another point of view, it appears that the opposition between [p] and [ɓ] is neutralised in postnasal contexts in favour of [b]. In the same way, the opposition between [ɗ] and [l] is neutralised in postnasal environments in favour of [d]. Thus, the problems raised by the postulation of [b] as underlying form also hold for [d].

The solution adopted in this thesis is that the implosive alternants are underlying. Though the solution is marked with respect to Universal Grammar, it handles in an elegant manner the problems that were stumbling blocks for the first hypothetical solution. In fact, through the rules of Post Nasal Voicing and Post Nasal Deglottalisation, one can easily derive the forms that appear in post non syllabic nasal context. Another argument for the postulation of the implosives as basic comes from the facts of distribution. It is observed that the non implosive stops occur before high vowels whereas the implosives occur elsewhere.

The derivation of the (72a) forms would thus require a rule of deglottalisation stated as follows:

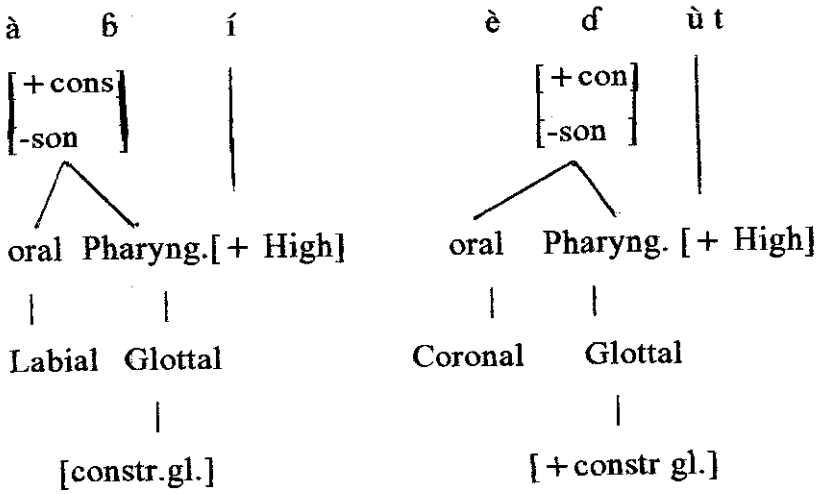
Deglottalisation: An implosive consonant deglottalises when followed by a high vowel.



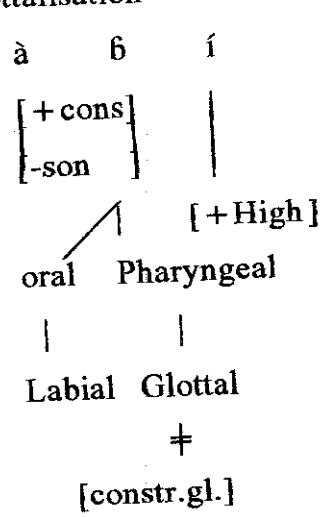
Through the application of this rule, the derivation of àbí 'excrement' and èdùt 'cold' (as a sample) from / àɓí / and / èɗût / respectively is provided below.

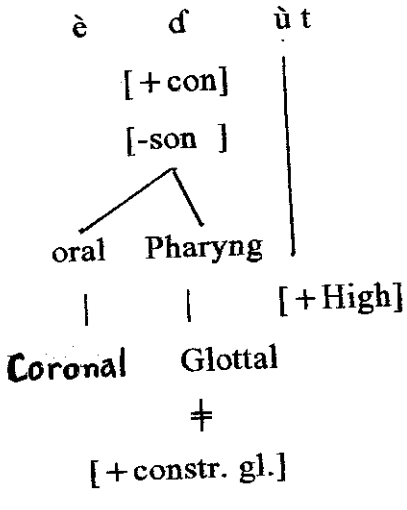
Underlying Form

Postlexically



Deglottalisation





OUTPUT [àbí] [èdùt]

To conclude, it is worthwhile observing that, although the rule smoothly derives the correct outputs, one can still question its motivation. In terms of grounding conditions, this rule ought to be motivated by a phonetic correlation existing between non high vowels and implosives or an incompatibility between high vowels and implosives. But for the time being, this thesis is unable to provide an explanation for the phenomenon.

3.5. THE VERB STEM FORMATION.

The main claim made about the structure of the verb is that it is organised into two phonological domains. The first one which corresponds to stratum one of lexical phonology encompasses the root plus all suffixed elements. The second stratum (second phonological domain) is made up of the pre-stem material otherwise called by Myers (1987) INFL. It shall be argued later on that each of these domains is a phonological word.

Several phonological processes have been observed during the stem formation. Among these are a rule that deletes an unspecified C-slot and a

rule of vowel spreading. The other phenomena observed in this domain entail syllable structure adjustments. They will therefore be considered in the next chapter.

3.5.1. The unspecified Consonant Deletion (C Del.). (1)

This process affects a consonant that is not linked to a segmental unit. It has been observed during the suffixation of the P2 and the Imperative Plural to the stem. Namely when the stem is monosyllabic and ends in a consonant, the unspecified C-slot gets deleted. Facts concerning this phonological process are displayed below. In (74a), we find CVC stems, their P2 and their imperative plural forms. In (74b), we have the CVCV stems with their P2 and imperative plural forms. Cases of CVCVC stems and others shall be handled in a subsequent section where it will be argued that the P2 and imperative plural markers show a different behaviour.

	INFINITIVE	P2	Imperative Plural
74. a)	lì-dìŋ 'to love'	à dìŋíí 'he loved'	dìŋán 'love!'
	lì-ɓèn 'to refuse'	à ɓènéé 'he refused'	ɓènán 'refuse!'
	lì-sɛ́nd 'to shave'	à sɛ́ndɛ́ɛ́ 'he shaved'	sɛ́ndán 'shave!'
	lì-káp 'to catch'	à kápáá 'he caught'	kápán 'catch!'
	lì-wùn 'to grow old'	à wùnúú 'he grew old'	wùnán 'grow old!'
	lì-tʃóx 'to chew'	à tʃóɣóó 'he chewed'	tʃóɣán 'chew!'
	lì-ɔ́x 'to swim'	à ɔ́ɣɔ́ɔ́ 'he swam'	ɔ́ɣán 'swim!'
b)	lì-íŋgì 'to enter'	à níŋgléé 'he entered'	níŋglán 'enter!'
	lì-lèɣè 'to open'	à lèxléé 'he opened'	lèxlán 'open!'

lì-ɓɛ̀ɣɛ̀ to carry'	à ɓɛ̀xléé 'he carried'	ɓɛ̀xlán 'carry!'
lì-vúŋgù 'to blow'	à vúŋgléé 'he blew'	vúŋglán 'blow!'
lì-lóɣò 'to graze'	à lóxléé 'he grazed'	lóxlán 'graze!'
lì-kɔ̀ŋɔ̀ 'to peel'	à kɔ̀ŋléé he peeled'	kɔ̀ŋlán 'peel!'
lì-tàkà 'to suffer'	à tàkléé 'he suffered'	tàklán 'suffer!'

As we compare (a) and (b), we realize that the P2 and the imperative plural have the following alternants V́V́ ~ léé for the P2 and án ~ lán for the imperative plural. The V́V́ sequence as used here refers to the P2 double vowel slots that are always identical to those of the root. What is then the basic alternant?

If we consider the (b) alternants as underlying, this solution would require:

- a rule that deletes the liquid [l] after a CVC stem.
- a rule of vowel assimilation that leads the [ee] remaining slot to assimilate all the features of the preceding vowel.

Though the solution seems acceptable, it will soon run into problems when more data come in later on. Besides, one can still question the deletion of the second vowel of the stem or wonder why the rule of assimilation or spreading does not operate as in (a). All these problems that are hard to solve at this stage will be addressed in the next section.

If we posit the (a) forms as underlying, taking into consideration the (b) allomorphs, we can postulate the following abstract morphemes for the P2 and imperative plural respectively: $C^{\mu\mu}$ and C án. As it shall be argued in the next section the second vowels of the (b) stems copy their features from the root vowel. Thus, it appears that, though the surface forms share apparent similarities, they are quite different at the level of the UR. Consider for instance the underlying forms of the following.

Underlying forms Surface forms.

```
        μ    μ μ
        |    ⁄⁄
/ V     CVCCV /        →    [ à wùnúú ]
  |     | | |
  a     wu n
```

```
        μ  μ  μ μ
        |  |  ⁄⁄
/ V     CVCVCV /       →    [ à ɓèxléé]
  |     | ||
  a     ɓ ɛ x
```

```
        μ     μ
        |     |
/       CVCCVC /       →    [dìŋán ]
        | ||  ||
        d i ŋ  a n
```

```
        μ  μ  μ
        |  |  |
/       CVCVCVC /      →    [ lèxlán]
        | ||   | |
        l e x  a n
```

A look at the URs leads us to realize that when an unspecified consonant follows a specified one, it gets deleted. Then after, default features and other rules come into play to derive the other forms.

Therefore, the derivation of the (a) forms proceeds through the following rule called Unspecified Consonant Deletion or C Del.

Unspecified Consonant Deletion:

An unspecified consonant gets deleted when preceded by another C-slot that is linked to a segmental unit.

```
   C     C
   |     ↘
[+seg]   ø
```

The derivation of séndéɛ́ 'shaved' and dìŋán 'loved'

```
   μ   μ μ        μ   μ
   |   /          |   |
```

from /CVCCV / and / CVCCVC/ respectively is provided below.

```
    | | |          | | |  | |
    sénd           d i ŋ  a n

 μ    μ μ   μ  μ  μ μ   μ   μ    μ  μ  μ
 |    /     |  |  /     |   |    |  |  |
CVC CV    CVCVCV   CVC CVC   CVCVCVC
| | |     | | |    | ||  ||  | ||   ||
s ɛnd     ɓ ɛ x    d i ŋ  a n  t a k  a n

 μ    μ μ
 |    /
CVC C V        CVC C  V C                C Del.
| | | ↘        | || ↘  | |
Sɛnd  ø  ——    diŋ  ø a n    ———

                                        Other rules
[séndéɛ́]  [ɓèxléɛ́]  [dìŋán]   [tàklán]   OUTPUT
```

Some of the above data, namely those in (74b) shall be dealt with in the subsequent sections.

3.5.2. Vowel Place Spreading (VPS).

It has been observed that when an unspecified V-slot is suffixed to the verb root, it tends to copy the features of the root vowel. This statement holds for the Final Vowel (FV), the second Past tense marker (P2), the continuative marker (cont.), the prohibitive imperative marker (P.IMP).

3.5.2.1. The Final Vowel (FV)

In Bakoko, the FV is an unspecified V-slot that is always identical to the root vowel at the surface. Consider the following data.

75.	dî - tíx - V	→	lìtíɣì	'to be small'
	N5 Rt FV			
	dî- ém-V		lìémè	'to be pregnant'
	dî-ɓèx-V		lìɓèɣè	'to carry'
	dî-tàk-V		lìtàkà	'to suffer'
	dî-vúŋg-V		lìvúŋgù	'to blow'
	dî-tóx-V		lìlóɣò	'to graze'
	dî- ɔ́ŋ-V		lìɔ́ŋɔ̀	'to remember'

3.5.2.2. The Second Past tense.

The P2 marker as argued in the previous section is an unspecified CVV sequence. The same formative surfaces as two V-slots when preceded by a CVC root. Like the FV, that V-slots take their features from the root vowel. When found before stems made up of Root +FV, the CVV formative takes default features at the surface. Such forms will be analysed

in chapter 4 when the deletion of the unspecified vowel at stratum one will be considered. Data on P2 marker are provided below.

76.	li-dím	'to extinguish'	à	dím - íí	'he extinguished'
			He extinguish P2		
	li-ɓèn	'to refuse'	à ɓènéé		'he refused'
	li-sɛ́nd	'to shave'	à sɛ́ndɛ́ɛ́		'he shaved'
	li-sùŋ	'to save'	à sùŋ-úú		'he saved'
	li-cóx	'to chew'	à cóɣ-óó		'he chewed'
	li-tɔ̀mb	'to be tired'	à tɔ̀mb-ɔ́ɔ́		'he got tired'
	li-káp	'to catch'	à káp-áá		'he caught'

Our analysis claims that the unspecified C-slot of the P2 marker deletes when preceded by another consonant (cf. 3.5.1.)

3.5.2.3. The Continuative marker.

The continuative marker is a discontinuous morpheme made up of ŋgí.... V́x or ŋgí ...láx

The first element of the morpheme ŋgí precedes the root whereas the second element {V́x} or {láx} is suffixed to the root. The distribution stands as follows: the [-V́x] allomorph (an unspecified vowel followed by a voiceless velar fricative) occurs after the stems that have neither FV nor extension. The [-láx] allomorph is found after the stems made up of Root +FV. These two allomorphs are hard to derive from the same UR in a natural way. Data on both formatives shall be presented but they will be handled separately in the analysis. Namely, the second allomorph shall be dealt with in chapter 4 when it comes to the unspecified vowel deletion.

77.	li-dím 'to extinguish'	à ŋgí dím-íx 'he keeps on extinguishing'
	li-ɓèn 'to refuse'	à ŋgí ɓèn-éx 'he keeps on refusing'
	li-sénd 'to shave'	à ŋgí sénd-éx 'he keeps on shaving'
	li-sùŋ 'to save'	à ŋgí sùŋ-úx 'he keeps on saving'
	li-cóx 'to chew'	à ŋgí cóɣ-óx 'he keeps on chewing'
	li-tɔ̀mb 'to be tired'	à ŋgí tɔ̀mb-ɔ́x 'he keeps on being tired'
	li-káp 'to catch'	à ŋgí káp-áx 'he keeps on catching'

As evidenced by these data, the unspecified V-slot takes its features from the root vowel.

3.5.2.4. The Prohibitive Imperative (P.IMP.)

The prohibitive imperative marker is a - ́vx suffix whose V-slot copies features from the root vowel.

78.	lì-dìŋ 'to love'	dìŋ -íx ɓé 'Don't love!'	
		Rt P. IMP. NEG.	
	lì-vèx 'to measure	vèx-éɣ ɓé	'Don't measure!'
	lì-sém 'to cut'	sém -éx ɓé	'Don't cut!'
	lì-wùn 'to grow old'	wùn-úx ɓé	'Don't grow old !'
	lì-sóm 'to buy'	sóm-óx ɓé	'Don't buy !'
	lì-ɲɔ̀ŋ 'to take'	ɲɔ̀ŋ-ɔ́x ɓé	'Don't take !'
	lì-káp 'to catch'	káp-áx ɓé	'Don't catch !'

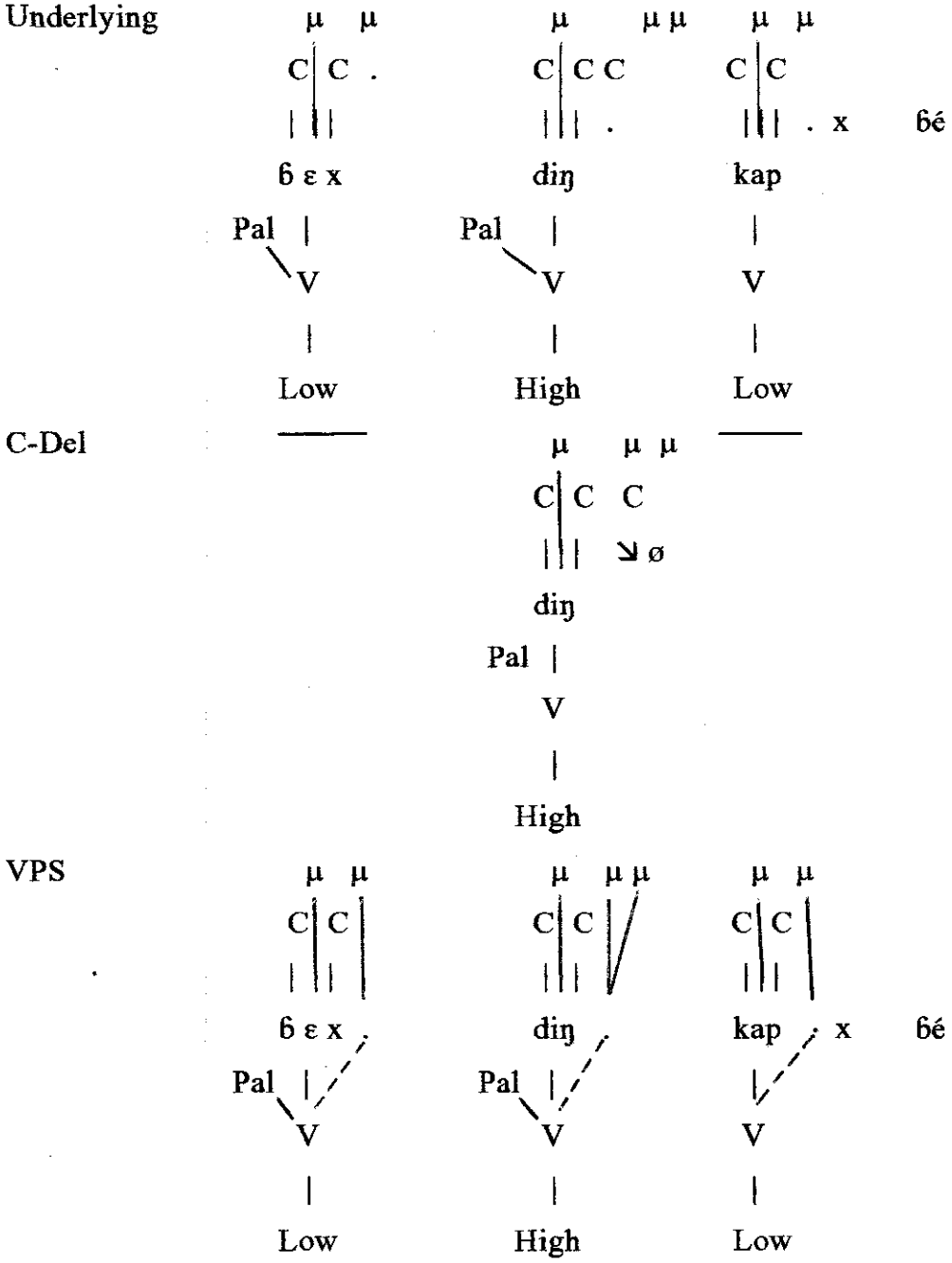
The data displayed in (75,76,77,) and (78) can be accounted for by the following rule.

VOWEL PLACE SPREADING (VPS).

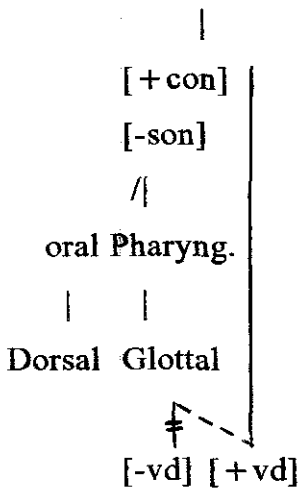
The vowel place of a verb root spreads onto a suffixed unspecified V-slot

The derivation of ɓèɣè (in lìɓèɣè), dìŋíí, kápá x ɓé as a sample -from

μ μ μ μμ μ μ
/ ɓɛx /, /diŋ^{C} / and / kap x ɓé / repectively is provided below. (2)



VOICING ɓ ɛx ɛ —— ——



Default tones.

OUTPUT [ɓèɣè] [dìŋíí] [kápáx ɓé]

The above VPS rule raises a question about the organisation of the stem. It has been argued in chapter two that the FV and the extension are mutually exclusive in Bakoko i.e. both cannot co-occur on the same stem. Besides, it has been claimed and demonstrated in other Bantu languages (e.g. Kinande (Mutaka 1990), Shona (Myers 1987) among others) that the tense aspect morphology comes into play when the stem is already formed. But it is being observed here that the tense markers that are suffixed to the stem undergo the very rules that are active in the stem formation (e.g. Vowel Place Spreading). By so doing, suffixed tense markers fall within the stem phonological domain.

But then, the organisation of the stem domain or stratum one is questionable. Namely, is it cyclically organised or not? A cyclic approach to stratum one would envisage an EXT / FV cycle and a tense markers' cycle whereas a non-cyclic view would concatenate the EXT /FV and suffixed tense markers before the application of any stratum one rule.

Let us consider an alternative cyclic approach. In order to analyze the cyclic approach to stratum one, we will first of all consider further data where the extension or final vowel and a tense marker are likely to co-occur. To achieve this, we will observe the P2 forms of the stems that have the shape Root+FV.

79.

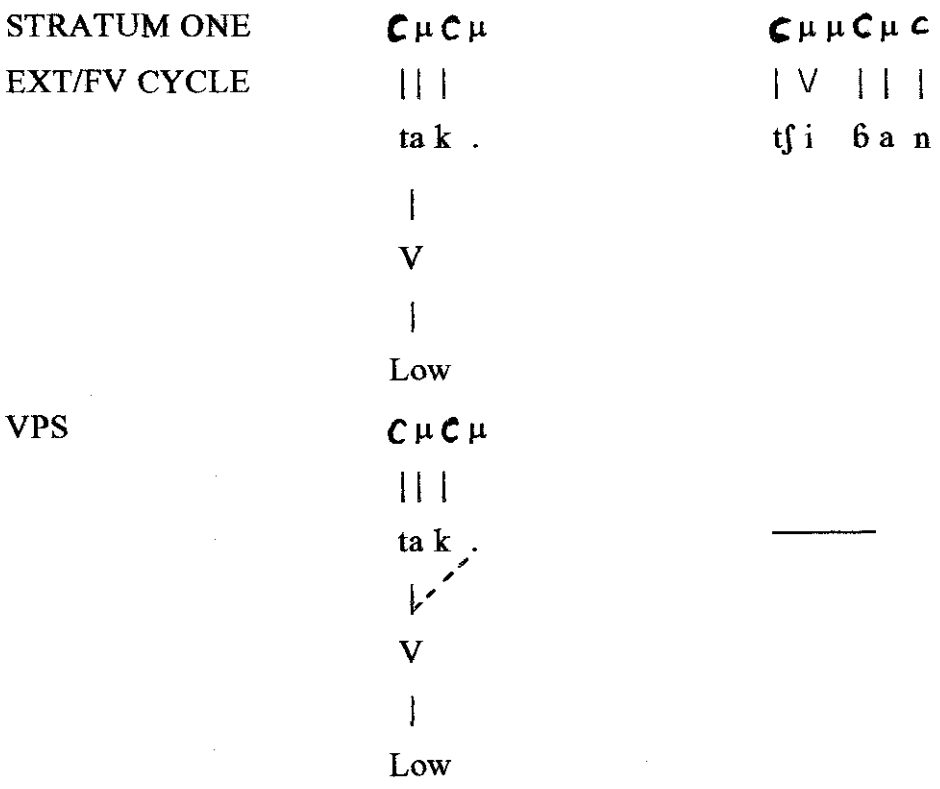
lì-tàk-a	'to suffer'	à	tàkléé	'he suffered'
lì-ɓèx- ɛ	'to carry'	à	ɓèxléé	'he carried'
lì-níŋg-i	'to enter'	à	níŋgléé	'he entered'
lì-lèx-e	'to open'	à	lèxléé	'he opened'
lì-vúŋg-u	'to blow'	à	vúŋgléé	'he blew'
lì-lóx-o	'to graze'	à	lóxléé	'he grazed'
lì-kɔ̀ŋ-ɔ	'to peel'	à	kɔ̀ŋléé	'he peeled'

In (80) below, we consider a case where a stem made up of a root + extension receives a P2 marker.

80. lì-ɓàt-an 'to ask each other' (e.o)
bíx ɓàtáán mí!kúɓé 'They ask e.o. bananas'
lì-dìŋ-ɓɛ 'to be loved' à dìŋɓéé 'he was loved'
lì-tʃìì-ɓan 'to register oneself' à tʃììɓáán 'he registered himself'

Under a cyclic approach, the derivation of the above forms proceeds as follows, with the VPS applying each time that a morpheme with an unspecified V-slot is suffixed at the morphological level. The derivation of tàkléé 'suffered and tʃììɓáán 'registered' from /CuCμCμμ /and / CμμCμCCμμ /

is provided below.


STRATUM ONE
EXT/FV CYCLE
C μ C μ
ta k .
V
Low
C μ μ C μ C
V
tʃ i ɓ a n
VPS
C μ C μ
ta k .
V
Low
TM CYCLE.
C μ C μ C μ μ
ta k a
V
Low
C μ μ C μ C C μ μ
V
tʃ i ɓ a n .
V
Low
C Del
C μ μ C μ C C μ μ
V
tʃ i ɓ a n ø a
V
OUTPUT
* [tàkàláá]
* [tʃìɪɓánáá].

The outputs arrived at within the cyclic approach are not attested in the language. It could be argued that the failure of the rule to apply at the TM cycle is due to the fact that the root vowel is the one that spreads whereas that of EXT/FV does not. But such an explanation would be phonologically undesirable. It could also be argued, in view of (79) that the FV and the TM are mutually exclusive. But the data in (80) show a situation where the extension receives an additional mora from the P2 marker. This constitutes a proof that the EXT/FV precede the TM in this morphological array. Moreover, as it will become evident in chapter 4, the sequence [-léé] stands for the default consonant and vowel. Recall that the P2 marker is -Cμμ. Thus, without going into the details of the derivation that yields the correct outputs here, it is obvious that the cyclic approach does not suit the analysis of stratum one.

3.6. The Stem + Suffixed TM as a phonological domain.

It is claimed and argued in this thesis that the stem or the stem and the suffixed tense markers form a phonological word with the following constraint:

the stem or the stem + suffixed tense markers must have a maximum of two syllables. It shall be demonstrated in the next chapter that the various vowel deletion processes that also entail syllable reduction at stratum one conspire to meet this requirement. As for now, data will be motivated for this phonological word. The various sets of data below show that all the forms that could surface as trisyllabic are reduced to two syllables.

3.6.1. Weak Syllable Vowel Deletion.

This process involves a situation where the FV is found between the root and the suffixed P2 or imperative plural markers. The data below describe two kinds of stems: monosyllabic and disyllabic (Root + FV).

3.6.1.1. Monosyllabic stems.

This refers to situations where the stem equals the root. The forms in (b) and (d) argue that the imperative marker (singular or plural) and the P2 marker are suffixed to the stem.

	a) INFINITIVE		b) P2 FORMS		
81.	lì-ɓàt	'to ask'	à	ɓàt-áá	' he asked'
	lì-ɓát	'to add'	à	ɓát-áá	' he added'
	lì-díŋ	'to love'	à	dìŋ-íí	' he loved'
	lì-hɛ́n	'to see'	à	hɛ́n-ɛ́ɛ́	' he saw'
	lì-ɔ́x	'to swim'	à	ɔ́x-ɔ́ɔ́	'he swam'

c) IMPERATIVE SINGULAR		d) IMPERATIVE PLURAL	
ɓăt	'ask!' (sg)	ɓàt-án	'ask!' (pl)
ɓát	'add!' (sg)	ɓát-án	'add!' (pl)
dĭŋ	'love!' (sg)	dìŋ-án	'love!' (pl)
hɛ́n	'see!' (sg)	hɛ́n-án	'see!' (pl)
ɔ́x	'swim!' (sg)	ɔ́x-an	'swim!' (pl)

The data in (81) above do not raise any discrepancy with respect to the prosodic requirement on the stem plus suffixed elements since all the forms show at most two syllables.

3.6.1.2. Disyllabic stems.

Disyllabic stems refer to those made up of a root + FV or EXT. The case of Root + EXT. will be considered in the next section.

	a) INFINITIVE		b) P2 FORMS	
82.	lì-ɓèx-ɛ	' to carry'	à ɓèx-léé	'he carried'
	lì-tàk-a	'to suffer'	à tàk-léé	'he suffered'
	lì-níŋg-i	'to enter'	à níŋg-léé	'he entered
	lì-lóx-o	'to graze'	à lóx-léé	'he grazed'

c) IMPERATIVE SINGULAR		d) IMPERATIVE PLURAL	
ɓèx-é	' carry!'	ɓèx-lán	'carry!'
tàk-á	' suffer'	tàk-lán	'suffer!'
níŋg-í	' enter'	níŋg-lán	' enter!'
lóx-ó	' graze'	lóx-lán	' graze!'

The forms in 82 (c) reveal that the various elements of the verbal complex concatenate in the following order: Root -FV -TM. In this case, the imperative marker is a floating H-tone that docks onto the FV which is underlyingly toneless. This implies that the TM attaches to the stem when the FV which is unspecified underlyingly has already received its vocalic features. In the (b) and (d) forms, we notice that when the imperative plural and P2 markers come in, the FV deletes. It will be argued in chapter five that the root is a prominent position. It therefore projects a foot in the metrical grid. In the (b) and (d) forms then, the first and third syllables are

the strong ones. So, the weak syllable nucleus is the one that deletes so as to satisfy to disyllabicity constraint on the so-called domain.

3.6.2. P2 and imperative plural markers deletion.

In this section, we address the stems made up of root + extension.

83. a) INFINITIVE b) P2 FORMS

lì-ɓàt-an 'to ask each other' bí ɓàtáán míkàlà they asked e.o. doughnuts

lì-ɓàt-ɓan	'to ask oneself'	à ɓàt ɓáán	'he wondered'
lì-dìŋ-an	'to love each other'	bí dìŋáán	'they loved each other'
lì-dìŋ-ɓan	'to love oneself'	à dìŋɓáán	'he loved himself'

c) IMPERATIVE SINGULAR		d) IMPERATIVE PLURAL	
ɓàtán	'ask each other'	ɓàtáán	'ask each others (pl)
ɓàtɓán	'ask yourself'	ɓàtɓáán	'ask yourselves'
dìŋán	'ask each other'	dìŋáán	'love each others'
dìŋɓán	'ask yourself'	dìŋɓáán	'love yourselves'

When one considers the (81b) (82b) (83b) and (81d), (82d) (83d) above, it appears that the variants of the P2 and imperative plural markers are respectively μ́ μ́ ~ léé ~ μ́ and án ~lán ~ μ́. One notices that the markers of these tenses are fully realized when the prosodic requirement on the domain is not violated in the input. It is argued in this thesis that the prosodic requirement is checked on the stem form before the affixation of TM. When the prosodic requirement is already satisfied in the stem, the verbal complex no longer admits an additional syllable. In the reverse case, the various phonological and morphological processes apply and the prosodic requirement is checked once again at the end of the derivation.

This check may give rise to vowel deletion processes in order to avoid any violation of the constraint at stratum one.

3.6.3. The FV deletion.

Bantu languages generally display a rich morphology with an array of various formatives. The canonic structure of the verb stem has been established as follows: Root-Ext-FV. Some Bantu languages such as Basaa as reported by Bitjaa (1990) may show more than one extension on the same verb stem. But as mentioned earlier the extension and final vowel are mutually exclusive in Bakoko. Put differently, when the meaning of a verb with a Root +FV stem is modified through the addition of a verbal extension, the FV necessarily drops.

In Duala for example, we may have:

83. tìl - à 'to write'
Root FV
tìl - è -à 'to write to' (applicative)
Root EXT FV

But Bakoko never allows an EXT and a FV to co-occur on the same stem. Otherwise, the prosodic requirement on the stem would be violated since this would yield a trisyllabic stem. Below is a sample of data that show the incompatibility between the EXT and FV on the same stem.

84.	lì-tàk -a	'to suffer'	b) lì-tàk-lè	'to suffer for'	* lìtàklèà
	lì-ɓèx- ɛ	'to carry'	lì-ɓèx-le	'to carry for'	* lìɓèxlèè
	lì-jéx -e	'to learn'	lì-jéx-le	'to teach'	* lìjéxlèè
	lì-kɔ̀ŋ-ɔ	'to peel'	lì-kɔ̀ŋ-lè	'to peel for'	* lìkɔŋlèɔ̀

The claim made here is that the FV drop aims at meeting the requirement on the phonological word under consideration. In other words, if both the EXT. and FV. were to coexist on the same stem, it would yield trisyllabic stems which are undesirable and unacceptable in the language.

3.6.4. The syllable structure of derived nouns.

The last evidence for the bisyllabic requirement on the stems is provided by derived nouns. While trisyllabic non derived nouns are quite common in Bakoko, trisyllabic derived nouns are rare, disyllabicity being the common pattern of the nouns that stem from verbs. The data below display a sample of derived nouns as opposed to non derived nouns.

Non- derived trisyllabic roots.

85. è - tàtàŋgà 'butterfly'
ø - ndèmbìjè 'example'
ø - tómbèlì 'glass'
ø - síŋgìhì 'cat'
w - áŋgìhì 'handkerchief'
dʒ - áŋgòlò 'mango'

Derived nouns

86.

bì- síŋgá	'hatred'	mì-làxsàn	'forgiveness'
bì-kímá	'blame'	è - kɔ́xhɛ̀	'punishment'
ǹ -tʃ ììlè	'writer'	mì- ɟéxlán	'advice'
ǹ - ɟéxlè	'teacher'	mì-tàmlàn	'greetings'
ŋ̀ - kááhè	'lawyer'	è - àxlà	'itching sensation'

Some of these derived nouns (b) have consonant clusters that could require a vowel epenthesis to yield a more natural CV syllable structure. But Bakoko copes with these consonant clusters because an epenthesis rule would create a third and undesirable syllable in the stratum one domain. In the mean time, the English word 'tumbler' appears in the language as tómbèlì, showing a vowel epenthesis to break a consonant cluster. This process occurs during the borrowing because we are dealing with a non derived noun.

3.7. Conclusion

To sum up, this chapter has analyzed the various segmental processes that operate in the Phonology of Bakoko. If has been argued that consonants and vowels undergo changes provided that specific conditions are met. The various segmental processes described in this work fall within three phonological domains. The first one which corresponds to stratum one is made up of the stem plus the suffixed tense markers. The Vowel Place Spreading (VPS), Unspecified Consonant Deletion (C Del.) and Weak Vowel Deletion for example have been construed as stratum one processes. The second stratum which is made up of the pre-stem material is the domain of Place Assimilation, Delateralisation, Lateralisation etc. The various processes that yield allophones fall within the postlexical component (third phonological domain). These comprise the Post Nasal Hardening, Post Nasal Voicing, Post Nasal Deglottalisation Voicing etc.

Endnotes for Chapter 3.

(1) An abstract C-slot has been postulated in the P2 and Imperative plural formatives. But when one considers the (74a) and (74b) forms, it appears that there is a l~ ø alternation in that very C-position. Thus one can question the motivation of an abstract consonant when a rule of [l] deletion can be stated to account for the (74a) forms. In fact, such a solution would predict that the language does not tolerate sequences of consonants where the second is [l]. But it turns out that Bakoko does.

e.g.	lìpɔ́tlè	'to talk for someone'
	lì ɔ́ŋlè	'to build for someone'
	lì ɔ́xlè	'to listen to someone'

The True Generalization condition would ban the above consonant clusters.

On the other hand, the solution argued for in this section requires a rule which inserts [l] as a default consonant under an empty C-slot. But the facts available to us do not enable us to draw a conclusion on the status of [l]. For the time being, [l] seems to have an ambiguous status. It is present in the phonemic inventory and also acts as a default consonant. But further research will have to shed more light on the question.

(2) The P2, Continuative and Prohibitive Imperative have previously been referred to as CV́V́, V́X and V́X respectively using the CV model of the skeleton. In this derivation, the moraic model of the skeleton is used because of the feature geometry system adopted for the representation of the vowels. In other words, the use of the CV model here would have created some confusion because of V-slots arrayed on various tiers. It should be obvious that CVV and $C^{\mu\mu}$ for example refer to the same morpheme.

CHAPTER IV
SYLLABLE AND SYLLABIC PHONOLOGY.

4.0. Introduction

For a long period, the concept of syllable has been jettisoned - for various reasons- in phonological theory. However, within the current approaches to phonology, the notion has gained an official recognition for a Series of reasons summarized in Kenstowicz 1994 (250-252). *"Three kinds of justification have been offered for the syllable. First the syllable is a natural domain for the statement of many phonotactic constraints. Second, phonological rules are often more simply and insightfully expressed if they explicitly refer to the syllable. Finally, several phonological processes are best interpreted as methods to ensure that the string of phonological segments is parsable into syllables."* These motivations for the syllable also hold for the facts of Bakoko where some phonological rules explicitly refer to the syllable.

The structure of the chapter stands as follows. The first section handles the generalities on the syllable, the second section looks at the typology of syllables in Bakoko; the third section examines the principles of syllabification and the fourth one treats syllabic phonology.

4.1. Generalities on the Syllable.

4.1.1. Syllable shapes of affixes.

The basic claim that underlies this section is that affixes (prefixes and suffixes) and roots are assigned syllable structure at the underlying level.

After the application of word formation rules, syllable adjustments are bound to take place. These adjustments take place through such syllabification processes like resyllabification which operate at various stages of the lexical and postlexical components.

This thesis assumes the definition of the syllable stated in Durand (1994:431) as follows: "*A standard view of the syllable is that it is an uninterruptible unit of spoken language which typically consists of a vowel sound flanked by one or more consonants. Thus, the English word cat [kæt] is an example of one-syllable word or monosyllable, catkin [kætkin] is an example of a two-syllable word, and speakers of English would generally agree that the word democratic (deməkrætik] is made up of four syllables. The presence of consonants flanking the syllable is not however necessary to have a well-formed syllable as is shown by monosyllabic words as English a [ə] or French ou [u] which are made up of vowels alone. And in a number of languages, it is possible to have syllables built around a consonant which is said to be syllabic.*" This view of the syllable fully agrees with the notion of syllable in Bakoko. But unlike English which displays a syllabic lateral or Imdlawn Tashlhiyt Berber (cf Dell and Elmedlaoui (1985)) where any consonant can be syllabic, only nasal consonants can be syllabic in Bakoko. Besides, it is worth pointing out that Bakoko is a tone language. Thus, a fundamental element that defines a syllable is tone. There is no syllable without a tone (at least at the phonetic level) though tones may exist without syllables. Each time a tone or a sequence of tones associate to a tone bearing unit, a syllable is formed. For example, the sonorant nasal consonant [m] when it bears a tone becomes a syllable. Therefore, the tone stands as an index that enables the identification of syllables.

4.1.1.1. The Prefixes.

The prefixes in this section refer to the noun class markers that generally precede nominal roots or verb stems and the pre-stem material in the conjugated verb forms. The noun class prefixes and INFL formatives have been put together because both are level two affixes as it will become evident in due course. Thus, they are scanned by the same phonological rules.

i) The V-Shape.

87.	à-(noun class3)	examples.	
		à-nù	'mouth'
		à-nɔ̀n	'birds'
		à-kɔ̀ŋgɔ̀	'weapons'
	ɔ̀- (subject Prefix)	ɔ̀-ɓèxléé	'you carried'

ii)The CV Shape.

88. ɓà-(noun class2)	ɓà-tʃ èn	'hosts'
bì-(noun class 8)	bì-lɔ̀lɔ̀	'ducks'
mì-(noun class4)	mì-léé	'houses'
mì-(subject Prefix)	mì ɓèxléé	'I carried'

iii) The Ç Shape

89. m̀- (noun class 3)	m̀-mím	'heart'
ǹ- (noun class 1)	ǹ-ɗóm	'male, husband'
ŋ̀-(noun class 3)	ŋ̀-kwàmbà	'cassava'

iv) The CVCV Shape.

90. *mìní* - (you pl.)	mìní hɛ́n	'you see'

4.1.1.2. The Suffixes.

The suffix as used here is a cover term to refer to verbal extensions, final vowels, and nominal suffixes. It is assumed that all suffixes attach to the root at the first stratum of lexical phonology.

V) The V Shape.

The following vowels have been identified as nominal suffixes though it has not been easy to predict their occurrence. When they are suffixed to a verb root or stem, they yield a derived noun.

91.	[i]	lì-óx	'to swim'	ɲ-ɔ̀ɣ-í	'swimming'
	[a]	lì-vèx	'to measure'	ɔ̀-vèɣ-à	'meter'
	[ɔ]	lì-vɔ́l	'to clean'	è-vɔ́l-ɔ̀	'cleaner, broom'
	[ɛ]	lì - ɓál	'to borrow'	è-ɓál-é	'loan'

Besides, all the vowels of the inventory can surface as FV in the verbal forms. In fact, the FV is an unspecified V-slot which copies all the features of the root vowel. This is evidenced by the data below.

92.	[i]	lì-tíx-V	lì-tíɣ-ì	'to be small'
	[e]	lì-ém-V	lì-ém-è	'to be pregnant'
	[ɛ]	lì-ɓèx-V	lì-ɓè ɣ -è	'to carry'
	[u]	lì-vúŋg-V	lì-vúŋg-ù	'to blow'
	[o]	lì-lóx-V	lì-lóɣ-ò	'to scratch'
	[ɔ]	lì-ɔ́ŋ-V	lì-ɔ́ŋ-ɔ̀	'to remember'
	[a]	lì-tàk-V	lì-tàk-à	'to suffer'

vi) The CV Shape.

This syllable shape is found in derived nouns and verbal forms as well.

93.	lì-vèx	'to create, measure'	è-vèx-lé	'creature'
	lì-tʃìì	'to write'	ǹ-tʃìì-lè	'writer'
	lì-lám	'to cook'	lì-lám-lè	'to cook for'
	lì-dìŋ	to love'	lì-dìŋ-ɓè	'to be loved'

vii) The VC Shape.

94.	lì-ɓàt	'to ask'	m̀-ɓàt-áx	'question'
	lì-ɓàt	'to ask'	lì-ɓàt-àn	'to ask each other'
	lì-pùn	'to resemble'	lì-pùn-àn	'to resemble e.o'

viii) The CVC Shape.

This suffix is less productive than those mentioned before

95.	lì-jéɓ-è	'to answer'	ǹ-jéb-ján	'answer'
	lì-dìŋ	'to love'	lì-dìŋ-ɓàn	'to love oneself'

ix) The CVCV Shape.

The disyllabic suffix is also less productive in Bakoko. It is believed that these suffixes are borrowed from other neighbouring languages. When they attach to a monosyllabic stem they yield trisyllabic structures that stand as exceptions to the general constraint on the stratum one stated in the previous chapter.

96.	lì-sál	'to work'	lì-sál-hànè	'to make s.o. work'
	lì-tʃìì	'to write'	lì-tʃìì-lènè	'to write for s.o.'

4.1.1.3. The Roots

The verb roots are generally monosyllabic whereas noun roots may be polysyllabic.

x) The V-Shape.

The V-syllable shape is very scarce in Bakoko.

97. -é 'tree'

-ɔ́ɔ́ 'ear'

-ɔ̀ɔ̀ 'yes'

xi) The CV Shape

This is the most productive syllable shape in Bakoko.

98. -nù 'mouth'

-dí 'eat'

-sɔ́ 'come'

xii) The CVC Shape.

This shape is also very productive in Bakoko.

99. -sòn 'flesh'

-bùm 'belly'

-kɔ̀n 'sickness'

-hén 'see'

xiii) The CCVC Shape.

100. -pjók 'depth'

xiv) The CVCV Shape.

101. sèsé 'whistlè'

-pùmá 'orange'

-pàpá 'paper'

xv) The CVCVC Shape.

102. -kàmàt 'goat'
-kòɓát 'crocodile'

xvi) The CVCVCV Shape.

103. -tàtàŋgà 'butterfly'
-tómbèlì 'glass'
-síŋgìhì 'cat'

xvii) The VCVCV Shape.

104. -áŋgòlò 'mango'
-áŋgìhì 'handkerchief'

Tetrasyllabic roots are either reduplicates or compounds. Special attention will be given to these morphological processes in chapter five.

To sum up, the elicitation of the shapes of the various affixes is crucial for the study of syllabification during the word formation process. For example, how is initial syllabification altered in the following environments?

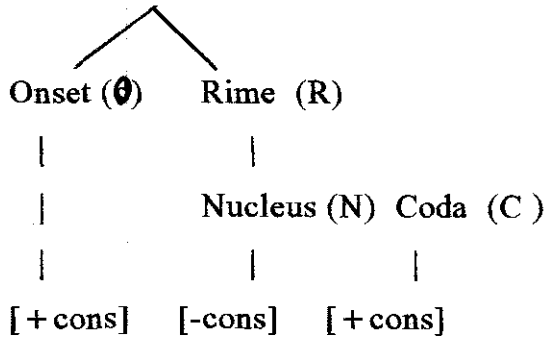
a) Prefix + Root	B) Root + Suffix.
CV + VC	CV + V
CV + CV	CVC + CV
Ç + VC	CVC + VC
etc.	etc.

4.1.2. The internal structure of the syllable.

The syllable as a phonological unit is not easy to define. However, its structure is well agreed upon. It is made up of an obligatory element called nucleus or peak of the syllable. This nucleus is preceded by an optional consonantal onset and may be followed by an optional consonantal

coda. The nucleus and the coda form a closer bond than the onset and nucleus. This subconsituent of the syllable is referred to as the rime. The importance of the rime lies in that it helps determine syllable quantity and syllable weight. The overall structure of the syllable, together with examples are presented in (106) below:

106.



ø	à	ø	'he'
ø	m̀	ø	'noun class prefix 1 and 3'
s	í	ø	'earth'
t	í	t	'animal, meat'

Though the onset and coda are optional, it appears that at the surface level, syllables made up of Nucleus plus Coda are scarce whereas onset + nucleus abound.

Besides, the cases of N+C that have been identified will subsequently be interpreted as having an underlying onset. To conclude, the canonical form of the syllable stands as follows; (C) (C) V(C). In other words, syllables may have complex onsets but there is no complex coda in the language. However, a restriction has to be made on the complex onsets; only glides can be allowed as second consonant in the onset position. Thus, the structure of the syllable can best be formulated as (C) (G) V (C), (G standing for a glide consonant).

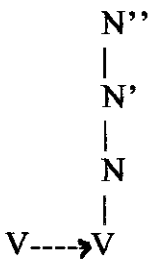
Drawing from the obligatory status of the nucleus within the syllable, Levin (1985) constructed a model of syllable called: *A Metrical*

theory of Syllabicity. Her hypothesis is summarized in Kenstowicz (1994:253) as follows: *"[...]. The evidence thus suggests that the nucleus is the syllable's essential core. This idea is formally reflected in the theory of syllabic representation developed by Levin (1985) in which the syllable is a projection of single primitive category 'nucleus', represented by N [...]. We can define the coda as the complement (right sister) of the nucleus, dominated by the first projection N'. The onset may be defined as the 'Specifier' of the syllable left sister node dominated by the second- level projection N" . On this view, the syllabic constituent 'rime' is then nothing but the first projection N'. (Just as a noun may constitute an NP in the absence of a complement or specifier, so a nuclear vowel may function as a syllable in the absence of an onset or coda...)."*

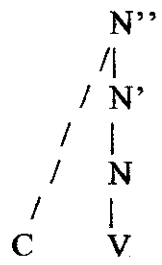
Levin' s conception of the syllable is thus schematized as follows:

She writes the following rules to account for the grouping of segments into syllables.

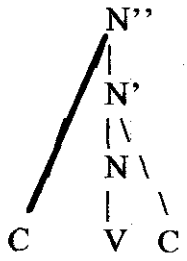
a) Nucleus Creation Rule. (NCR)



b) Onset Creation Rule (O C R)



C) Coda Creation Rule (C C R)



d) Onset Augmentation Rule (O A R)

e) Coda Augmentation Rule (C A R)

The OAR and the CAR apply with respect to the facts of languages under the provision of the Sonority Sequencing Principle.

4.2. Typology of Syllables.

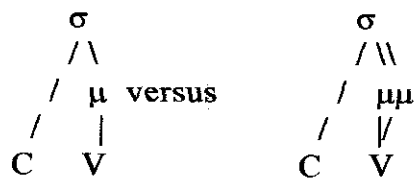
Traditionally, syllables are divided into light and heavy for a series of phonological reasons. In this section, it is argued that Bakoko displays both types of syllables. More specifically, it is claimed that a heavy syllable consists of a sequence of two identical vowels and that coda consonants are not moraic.

4.2.1. Status of Vowel Sequences.

The following minimal pairs evidence the contrastive nature of vowel length in Bakoko.

107. i /ii	-dí	'to eat'	u /uu	-kú	'widow'
	-díí	'to surround'		-kúú	'hen'
ɛ /ɛɛ	-kɛ̀	'to go'	o/oo	-pó	'bottle'
	-kɛ̀ɛ̀	'south'		-póó	'wound'
a/aa	-là	'and'	ɔ/ɔɔ	-tɔ̀	'to clean'
	-làà	'length'		-tɔ̀ɔ̀	'to sit down'

To account for the above contrast, one is logically led to assume that light syllables have only one mora at the skeletal tier whereas heavy syllables are bimoraic. Put differently, the above minimal pairs can be characterized as follows:



It also appears that sequences of underived identical vowels always surface with a high or low level tone.

More appealing is the situation of sequences of identical vowels that result from morpheme concatenation. The question to answer here is: do such vowels fall within the same syllable or not? It has been previously observed that the FV always takes the features of the root vowel. Thus, when a CV root takes a FV, this yields a CVV sequence with identical vowels. But as one observes the CVV stems when put in the imperative singular form, one is unable to distinguish those that are underlyingly a single V slot i.e.,

μ μ		μ μ
| /	from those that are	| |
C V	underlying two V-slots. i.e.	CV+V.

Consider for example the following data.

108. a)	lì-tíî	'to give'	b)	tíí	'give!'
	lì-tʃîì	'to write'		tʃîí	'write!'
	lì-wèè	'to walk'		wèé	'walk!'
	lì-lòò	'to cross'		lòó	'cross!'
	lì-pàà	'to shine'		pàá	'shine!'
	lì-lèè	'to cry'		lèé	'cry!'

It has been earlier observed that an underlying bimoraic vowel does not display gliding tones. Thus, it is more evident that the stem tíî 'give' results from morpheme concatenation. The status of the other sequences in (a) is difficult to establish as both vowels bear the same tone. Besides, if the second V-slot were a FV, then it would surface with a default low tone.

The claim made here is that underlying CVV and CV+V sequences surface as a unique syllable. If such were not the case, we would have expected the forms

L L H

| |/

with underlying L-tones to surface as CVV in the imperative form. But such a case never shows up. The absence of such surface forms indicates that all the CVV sequences in (b) are parsed into the same syllable. Otherwise such unattested forms would have violated the 'syllable structure constraint on tonal contours' stated in Hyman (1988:51) as follows: "within contour tone syllables, no tone may be multiply linked". We thus conclude that sequences of identical vowels that are assigned to different morphemes will be parsed into two syllables in the initial syllabification. But some readjustments will take place later on to merge them into one syllable.

Whereas sequences of identical vowels are construed as monosyllabic, sequences of different vowels are disyllabic.

The first evidence which is perceptual or phonetic-based is that a sequence of two identical vowels is perceived as produced at a time whereas sequences of different vowels can clearly be identified as two V-slots.

Secondly, it appears that underlying $\overset{\mu\ \mu}{\vee}$ (as opposed to the phonetic long vowels that are provoked by tonal contours) always bear the same tone. On the other hand, sequences of different vowels with identical tones have not been identified.

109. (a)	túè	'sea'	b)	péà	'drunkenness'
	ŋgɔ̀á	'wind'		èpúpúè	'whiteness'
	mìyàó	'joy'		èvóvóè	'sharpness'

Some of these vowel sequences (in (b) for example) result from morpheme concatenation whereas others (a) are underlying. In the latter class, some words can be recognized as resulting from C1VC2V where C2 has undergone a syncope process. For instance, the word túɛ̀ is realized in some neighbouring languages (e.g. Duala) as túɓɛ̀ 'sea'.

Finally, it appears that the concatenation of different vowels at stratum one never provokes coalescence or deletion. This implies that the underlying syllabification which assigns each vowel to a syllable is not altered. Thus, it can be concluded that sequences of different vowels do not yield heavy syllables but they fall within two light syllables. Put differently, Bakoko does not allow a diphtong analysis of sequences of different vowels.

4.2.2. The Status of the Coda Consonant.

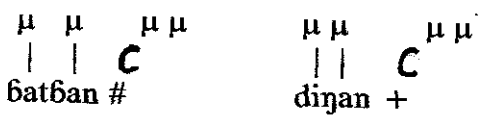
Languages vary with respect to whether they have moraic coda consonants or not. It can be readily estabished that Bakoko does not have moraic codas. This is substantiated by the P2 verb forms. It has been previously observed that verb stems made up of Root +EXT select a mora as their P2 marker.

110. (a) lì-ɓàt-ɓan 'to ask oneself' b) à ɓàtɓáán 'he asked himself'
lì-dìŋ-an 'to love each other' bí dìŋáán 'they loved each other'

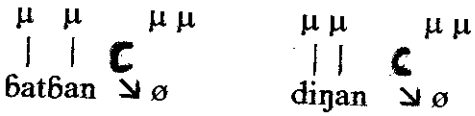
The derivation of the (b) forms is presented in (110c) below:

c)

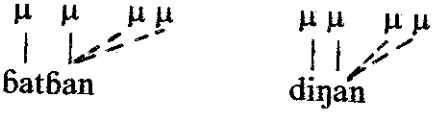
INPUT



C.Del



Floating Mora Landing



Mora Trimming

OUTPUT [ɓàtɓáán] [dìŋáán]

The Mora trimming rule is independently motivated because the language does not exhibit super heavy syllables.

From the above derivation, it becomes evident that if the coda consonants were moraic, then the landing of the floating mora on the vowel would have violated the association conventions as stated in non-linear phonology and namely the well-formedness condition which prohibits the crossing of association lines. Besides, Zec (1995) in a cross-linguistic study on sonority constraints within the syllable concludes persuasively that if a language has moraic obstruents in the coda position, then all codas in such a language are moraic. In fact, bearing on the sonority hierarchy where one finds in a crescendo order Obstruents - Nasals - Liquids - Glides and Vowels, she argues that the most sonorous segments are more likely to be moraic in the coda position. Thus, in Bakoko, if the nasals that belong to the class of sonorant sounds are not moraic, if glides never occur in the coda position , it implies that there is no moraic consonant in the coda environment.

To sum up, it appears that Bakoko displays light and heavy syllables. Light syllables are either CV or CVC whereas the only heavy syllable is represented with a sequence of two vowels.

a) σ σ b) σ

/ \ /|\ /|\

/ μ / μ \ / μ μ

/ | / | \ / |/

C V C V C C V

4.3. Principles of Syllabification.

Within the generative conception of grammar, it is believed that the native speaker of a given language masters a finite set of principles or rules that enable him to produce an infinite set of grammatical utterances on one hand, and on the other to recognize all well-formed utterances of its language. As to what concerns syllabification, it is believed that the native speaker of Bakoko possesses a set of syllable building rules that apply to any string of his language. Put differently, there are principles that govern the grouping of segments into syllables. All consonants but 'ŋ' can occur in the syllable onset position. But only a subset of these appears in the coda position.

It is assumed that syllable structure is assigned in the lexicon, each morpheme coming along with its syllabic constituency. The main claim made about syllabification in Bakoko is that syllable building is not a static process taking place at some specific level of grammar. Rather, it is thought that:

α) Syllabification is a dynamic or continuous process, each morpheme coming along with its syllable structure.

β) At each stratum, when morphological and phonological processes operate, syllable adjustments or resyllabification take place to satisfy the basic requirements of the Bakoko syllable.

ω) Given the rules of syllabification stated by Levin (1985), the following rule ordering holds for Bakoko. NCR > OCR > OAR > CCR.

γ) Both in the phonological and phonetic representations, a syllable has a maximum of two moras; and both moras must dominate the same segment.

More specifically, syllabification proceeds as follows: each segment is primarily linked to a mora or 'weight unit' at the skeletal tier. Then the [-cons] slots (vowels and syllabic nasals) are assigned an N projection. The OCR automatically deletes the mora of an onset consonant. A language specific property of codas is that they are not moraic. Therefore, the CCR also deletes the 'weight unit' of a coda consonant. The rules of syllabilification in the lexicon can thus be stated as follows:

a) Assign one vocalic segment to the nucleus of the syllable.
b) Create an onset on the left sister node when a consonant is available.
c) Create a coda on the right sister node when a consonant is available.
d) Augment the onset if it is a glide preceded by another non sonorant consonant.

This will be illustrated in subsequent discussions where the above ordered stages will be evident in the syllabification and resyllabification processes.

4.3.1. Evidence for Continuous Syllabification.

Evidence for continuous syllabification in Bakoko will be provided by verb stems made up of Root +EXT, disyllabic stems at the P2 and post lexical data.

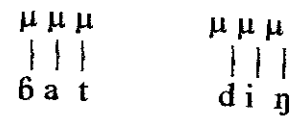
4.3.1.1. Evidence from verbal extensions.

Coda consonants in CVC roots become syllable onsets when the root is added a VC extension. The data below illustrate the phenomenon.

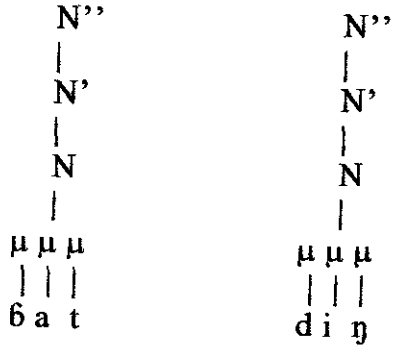
110	a) lì-ɓàt	'to ask'	(b)	lì-ɓà-tàn	'to ask each other'
	lì-dìŋ	'to love'		lì-dì-ŋàn	'to love each other'

The (b) forms are derived through the following syllabification and resyllabification processes at various stages.

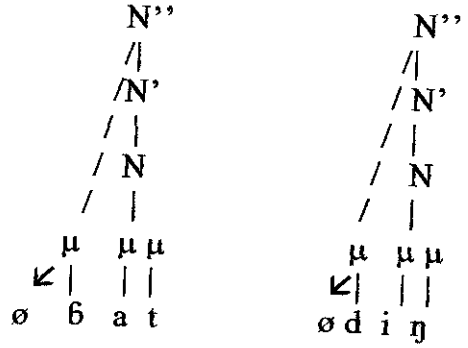
Underived items Lexical



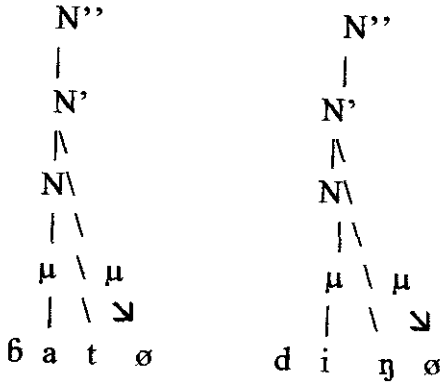
NCR



OCR

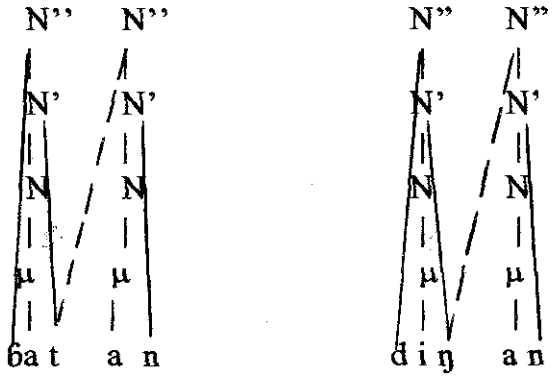


C C R

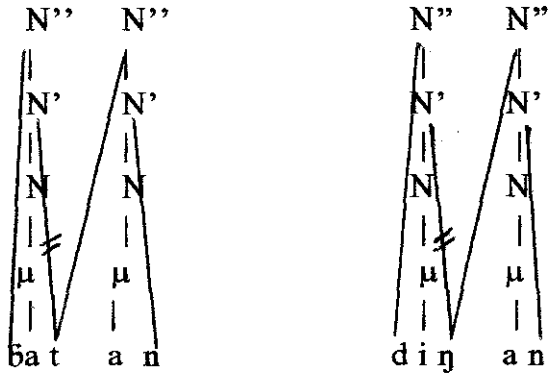


STRATUM ONE

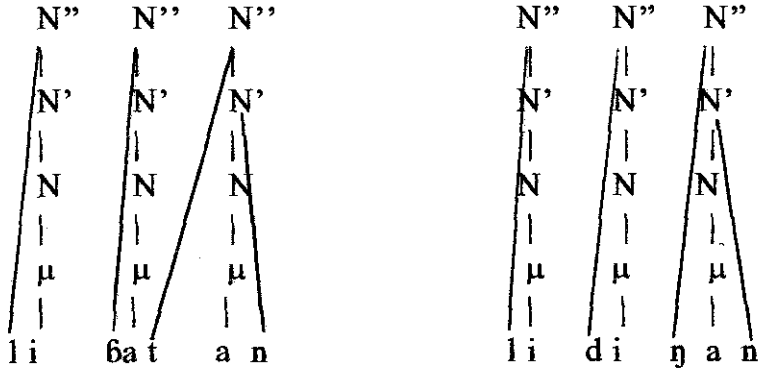
ONSET REQUIREMENT



CODA DELINKING



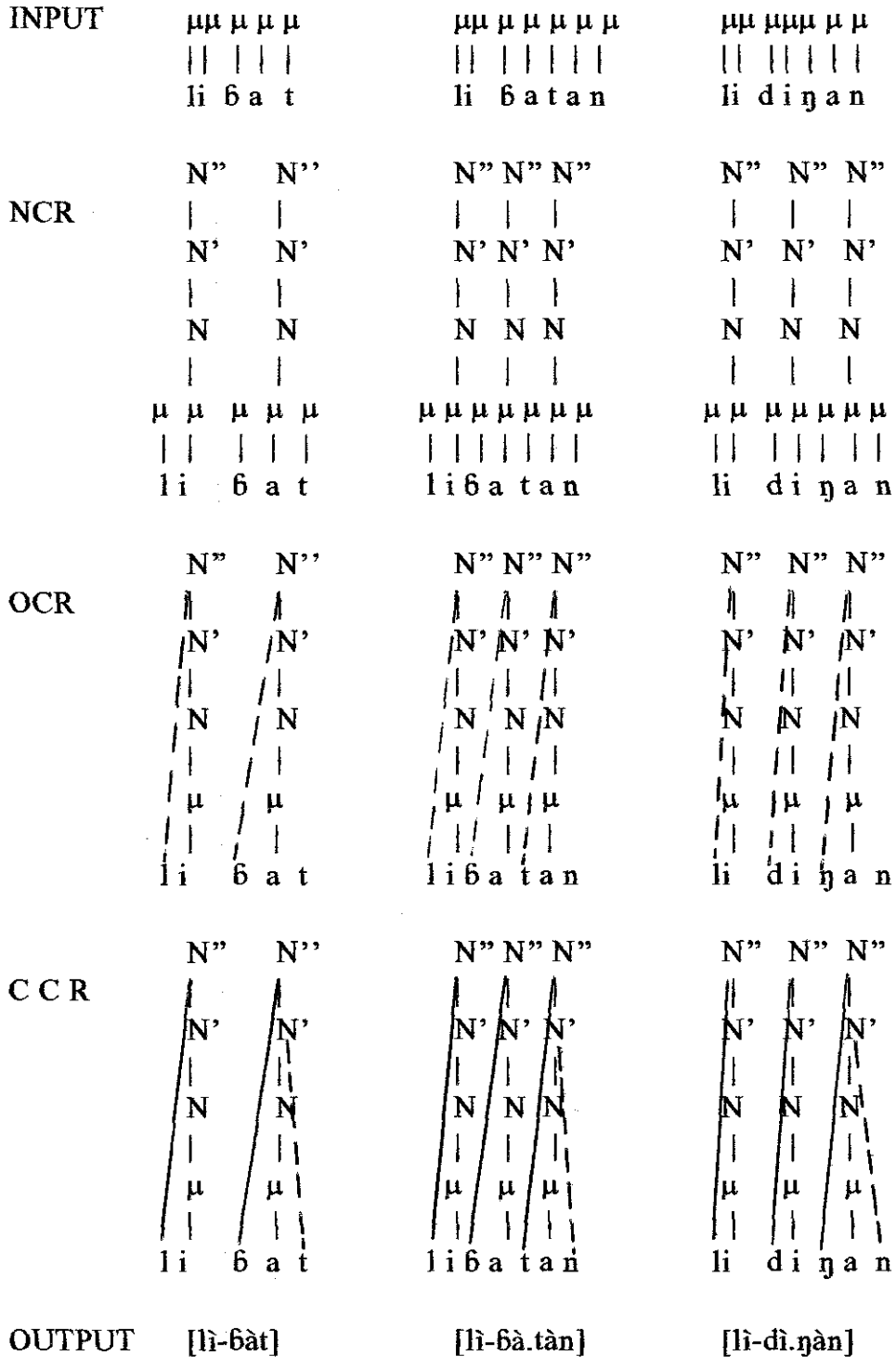
STRATUM TWO



OUTPUT [lì.ɓà.tàn] [lì.dì.ŋàn]

But an alternative analysis could claim that syllabification applies to the output of the lexical component. In this case, the CCR operates in the

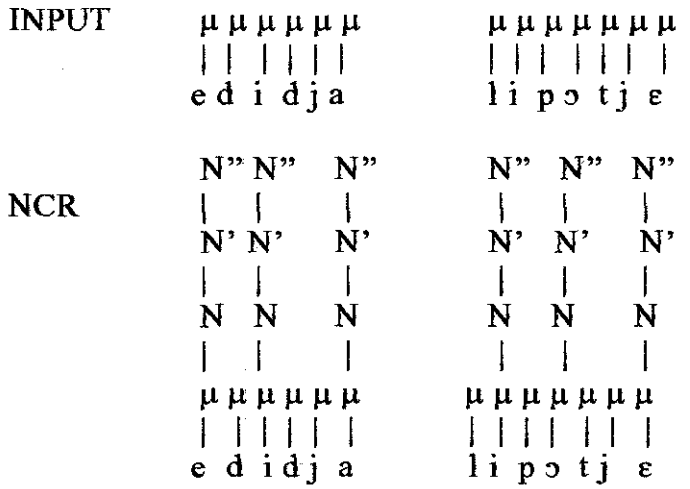
last resort, when there is no following vowel to make it an onset. Following this proposal, the derivation takes place as follows.



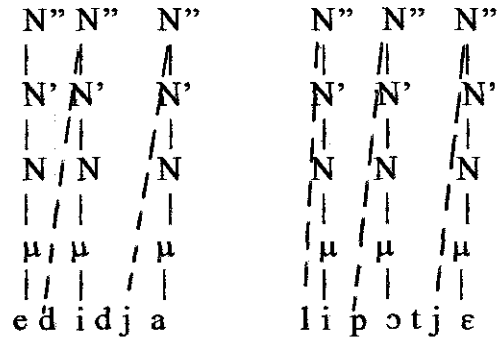
This solution seems preferable to the first one because it is simpler and more elegant. In effect, it does not require as many rules as the first alternative. But further data will contradict such an approach. Consider the data in (111) for example.

111. a)	è-dìdjà	'wall'	b)	lì-pɔ́tjɛ̀	'to make someone talk'
	è-sɛ̀ŋgwɛ̀n	'sieve'		lì-kànjɛ̀	'to rule, to govern'
	ø-pjók	'depth'		lì-káxjɛ̀	'to oblige'
	ŋ̀-kwàmbà	'cassava'			

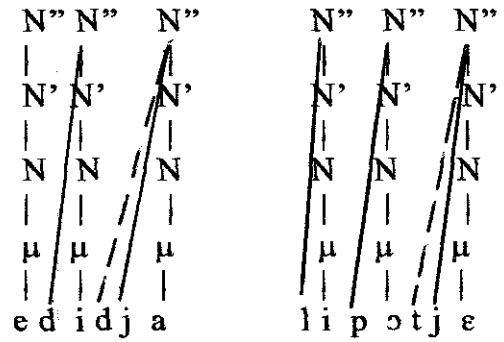
(a) displays non-derived nouns (i.e. stems equal the root) whereas (b) displays derived verbs made up of a root plus a verbal extension (causative). The data in 111 (a and b) shows sequences of consonants that fit the conditions for the application of the Onset Augmentation Rule. But we notice that (a) forms have complex-onsets (e.g. è-di.dja, è.sè.ŋgwèn) whereas (b) forms do not (e.g. li-pɔ́t-jɛ̀, li-kan.jɛ̀ etc). A static approach to syllable building i.e. a view of syllabification as applying at a specific level of grammar would fail to account for the facts observed here. Below is a sample of syllabification of the strings under a static approach to syllable construction.



O C R



O A R



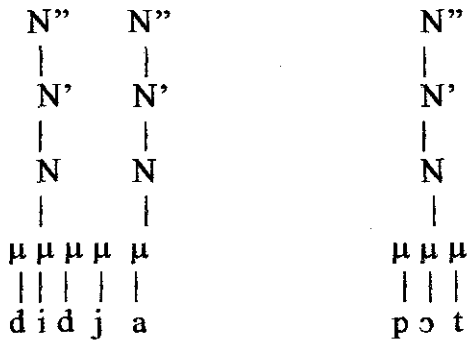
OUTPUT [e.di.dja] *[li.pɔ́.tjɛ̀]

The application of the syllable building rules yield the correct output in one case and a wrong output in the other. In effect lìpɔ́tjɛ̀ 'to make some one talk' is syllabified as lì-pɔ́t.jɛ̀. Another way of solving this problem could consist in having the coda creation rule precede Onset Augmentation. In this approach, we would derive the correct output lì-pɔ́t.jɛ̀. But at the same time, the rule ordering would yield the wrong output for è.dìd.jà. This constitutes a proof that all items are not derived at the same level of grammar.

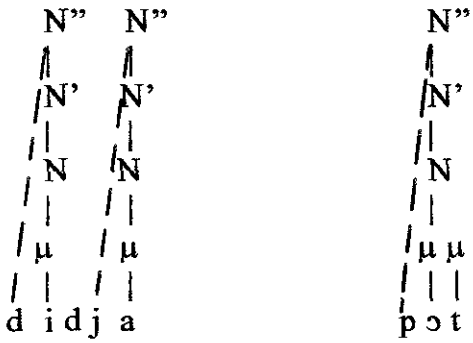
A continuous approach to syllabification would yield the correct outputs as evidenced by the following derivation.

Und. Lex. Items. μ μ μ μ μ μ μ μ
| | | | | | | |
d i d j a p ɔ t

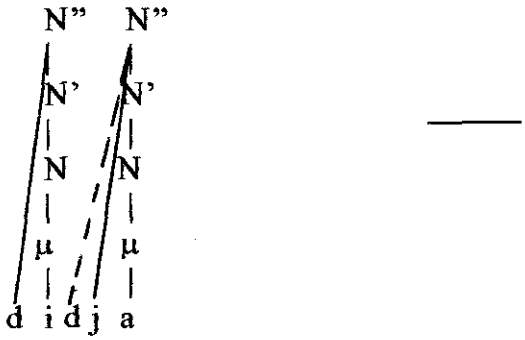
NCR



OCR



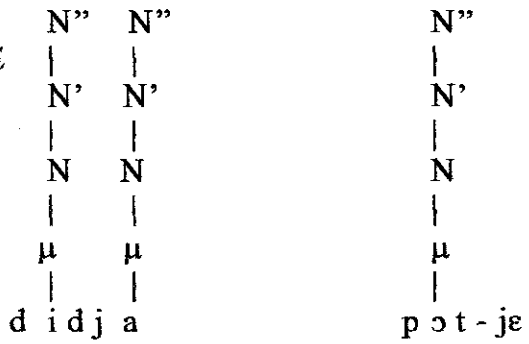
O A R



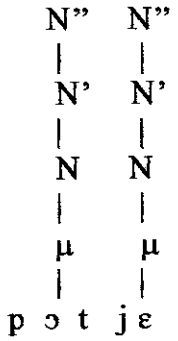
C C R

STRATUM ONE

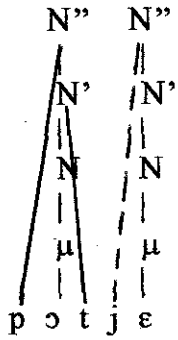
VERBAL EXTENSION



NCR

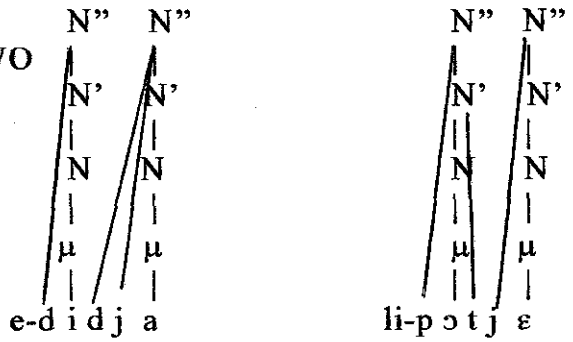


O C R

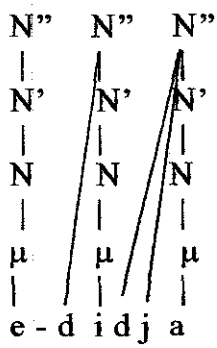


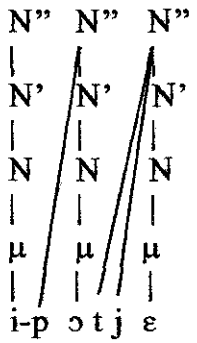
STRATUM TWO

Noun class Prefix

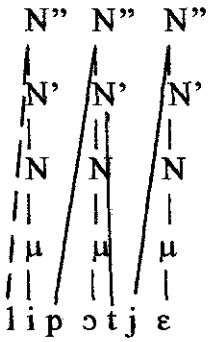


N C R





O C R



OUTPUT [è.dì.djà] [lì-pɔ́t.jɛ̀]

4.3.1.2. Evidence from disyllabic verb stems.

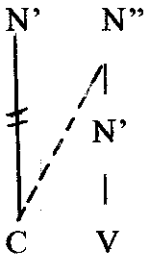
It has been previously observed that monosyllabic verb stems select a CVV P2 marker or a Cán imperative plural marker whereas disyllabic verb stems (stems made up of root plus verbal extension) select a mora as P2 or imperative plural markers. Data have been provided in (3.6.) to show that the maximum number of syllables required at the first stratum is two. It has been argued that several phonological processes conspire to ensure that this requirement is satisfied. If disyllabic verb stems do not allow more syllables, it simply means that at the level where the P2 marker and the imperative plural markers attach to the stem, syllabification has already taken place and keeps on applying. If syllabification did not apply in a continuous or staged manner, then disyllabic stems would have admitted the P2 and imperative plural markers in their full forms so as to look for

ways of satisfying the prosodic requirement on the first stratum at the end of the derivation.

4.3.1.3. Evidence from Postlexical data.

Even at the postlexical level where words are fully formed and parsed into syllables, syllabification remains active in the form of syllable adjustments. There are two conditioning factors of syllable adjustment at the postlexical level. First, vowel deletion or coalescence may provoke the reorganisation of the syllable structure. Such phenomena will be examined in the next section. Secondly, when a coda consonant is followed by an onsetless syllable at the syntactic level, the Onset requirement causes a resyllabification process. The Onset Requirement (O.R.) states that, at any level, onsets must be created whenever possible. The O.R. which is an OCR subrule entails the delinking of a pre-existing coda node on a consonant. The following data illustrate the phonomenon.

Onset Requirement (O.R).



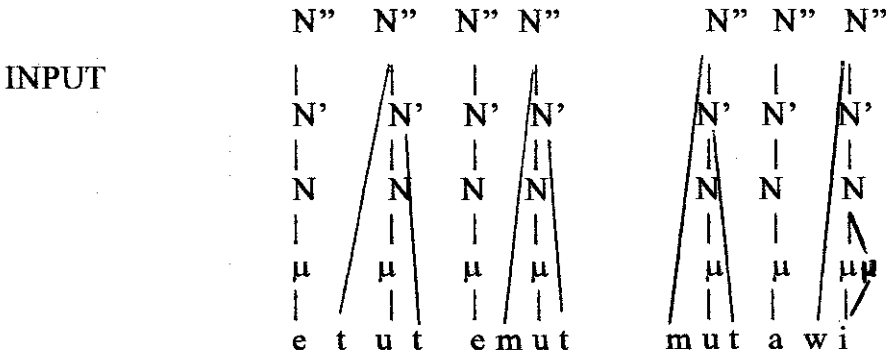
112. ètút é mùt [è.tú.té.mùt] 'the shoulder of the person'
shoulder of person

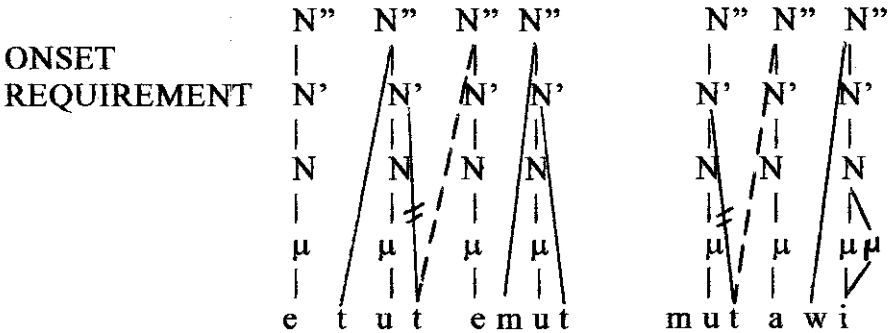
mùt à wìí [mù.tà.wìí] 'the thief'
person of theft

mɔ̌n à mìndíɣá [mɔ̀.ná.mí.ndí.ɣá] 'the woman's child'

child	of	woman	
m̀mím	á	kúú	[m̀.mí.má.kúú] 'the hen's heart!'
heart	of	hen	

The derivation of [è.tú.té.mùt] 'the person's shoulder' and [mù.tà.wìí] 'the thief' as a sample from [è.tút.é.mùt] and [mùt.à.wìí] respectively is provided below.





OUTPUT [è.tú.té.mùt] [mù.tà.wìí]

The O.R. as a process makes the claim that Bakoko prefers syllables endowed with onsets. Therefore, onsetless syllables are simply tolerated by the language.

4.4. SYLLABIC PHONOLOGY.

The theory of the syllable adopted in this thesis emphasizes the obligatory presence of the vowel. Therefore, phonological rules that conflate sequences of vowels inevitably entail some adjustments of the syllable structure. This section is aimed at analyzing such processes. Special attention will be paid to devocalisation, vowel deletion, vowel contraction, vowel epenthesis, compensatory lengthening, etc.

4.4.1. Devocalisation.

One of the most general vocalic processes of Bakoko is devocalisation. The process turns palatal vowels [i] and [e] or round vowels [u] and [ɔ] into [j] and [w] respectively before non identical vowels. In this subsection, we motivate application of devocalisation in a number of morphological contexts. Namely, devocalisation can be found in the following environments.

- Noun class prefix + Root
- Subject prefix + Tense Marker
- Numeral prefix + Root
- Adjectival prefix + Root
- Possessive prefix + Root

4.4.1.1. Noun Class Prefix + Root

The noun class prefixes that have underlying palatal vowels are mi- (4), dì- (5), è- (7), bi- (8). The class 5 prefix shows a lì- allomorph before consonant initial roots. When these prefixes precede a consonant, they surface as such. But when preceding a non-identical vowel, the prefix

vowel desyllabifies. Then after, the desyllabification is not compensated i.e. the floating mora deletes.

It has been observed that Bakoko does not display sequences of Nasal or Liquid + Glide within the same syllable (complex onset position). Because of the ban on such sequences, we claim the vowel in mì- and lì- undergoes the general glide formation process normally. Then after, the Sonority Dispersion Principle within the syllable applies to delete the glide. The Sonority Dispersion Principle (SDP) as formulated by Clements (see Kenstowicz 1994: 283) is a sort of violation of the Sonority Sequencing Principle (SSP) which bans consonant clusters that are adjacent on the sonority scale. He formulates an equation that generates the following ranking for initial two position demisyllables. (V = Vowel, G = Glide, L = Liquid, N = Nasal, O = Obstruent).

CCV:OLV >ONV; OGV>NLV; NGV >LGV.

In simple terms, the hierarchy means that the sequence pla or pra is more natural than pma or tni; the sequence kwa or twa is more natural than nla or mra; and nwa is more natural than lwa. As Kenstowicz (1994: 283) puts it *"OLV spans the sonority gamut from O to V and places its second element squarely in the middle of the five position (O- N- L- G- V) scale [...] NLV and NGV are worse still since they fail to span the scale; LGV is the worst of all because it comprizes three successive positions at the high end of the scale."*

Given this, it is claimed that the devocalisation process feeds the SDP which causes the glide to drop. This solution is preferable to an alternative that would simply ban glide formation in front of nasals and liquids. As a matter of fact, such a solution would suffer the lack of explanation of what is taking place in the language.

The following data show class 4 nouns before consonant initial roots (a) and vowel initial roots (b)

113.	(a)	mì-mím	'hearts'	(b)	m-àm	'things, affairs'
		mì-sòŋ	'teeth'		m-ɔ̀t	'boils'
		mì-tìlà	'lines'		m-áŋgòlò	'mangoes'
		mì-lɛ́ɛ́	'houses'		m-ámbò	'swamps'
		mì-pɛ́x	'bags'		m-ɔ̌	'names'

It is believed that the derivation of the (b) data mediates through mjàm, mjɔ̀t, mjáŋgòlò, mjámbò and mjɔ̌ respectively.

The data below display class 5 prefixes before consonant initial roots (a) and vowel initial roots (b). Our analysis claims that the derivation of the affricate mediates through glide formation.

114.	(a)	lì-kàlà	'doughnut'	(b)	dʒ-àm	'thing, affairs'
		lì-sòŋ	'tooth'		dʒ-ɔ̀t	'boil'
		lì-bùm	'belly'		dʒ-ámbò	'swamp'
		lì-pàpá	'paper'		dʒ-ɔ̌l	'nose'

The sets of data below show the class 7 prefix before consonant initial roots (a) and vowel initial roots (b).

115.	(a)	è-ɬɔ̀lɔ̀	'duck'	(b)	j-álkà	'nail'
		è-kàlà	'scale'		j-ɔ̀ŋgó	'chameleon'
		è-dìŋ	'love'		j-ǎ	'song'
		è-dìdjà	'wall'		j-ɔ̌m	'object'
		è-píl	'debt'		j-íɓè	'darkness'
		è-pó	'bottle'			

Below are class 8 prefixes before consonant initial roots (a) and vowel initial roots (b).

116. (a)	bì-lɔ̀lɔ̀	'ducks'	(b)	bj-álkà	'nails'
	bì-kàlà	'scales'		bj-ɔ̀ŋgó	'chameleons'
	bì-dìdjà	'walls'		bj-ă	'songs'
	bì-píl	'debts'		bj-ŏm	'objects'
	bì-káá	'grass'			

One could possibly claim that the allomorphs for class 7 and 8 noun prefixes are respectively è ~ ø and bì- ~ b. In support for such a hypothesis, it can be argued that the data in (115b) and (116b) are glide initial roots. Put differently, the underlying forms for the (b) sets would be / è +jálkà / nail and / bì +jálkà / 'nails' for instance. Thus, one would have to write a palatal vowel deletion rule before a palatal glide to account for the surface forms in (9b). But this is not the solution adopted for the analysis of class 7 and class 8 noun prefixes in this thesis. Part of the evidence that the above mentioned forms are e+ vowel (class7) or bi+ vowel (class 8) is provided by the word jíɓè (class 7) 'darkness'. When this word is put in the plural form, it comes out bíɓè (class 8) with the class 8 prefix [bì] having undergone deletion under identity with the vowel initial root.
If the glide [j] were not derived from the vowel, the plural form of jíɓè would have been bìjíɓè. But this is not the case.

From the data above, devocalisation can be defined as a process that changes a front palatal vowel into a corresponding consonant. But further data prove that devocalisation also involves round vowels.

4.4.1.2. Subject Prefix + Tense Marker.

The P1 marker is a formative made up of the low vowel [a] and a floating H tone. When this formative is preceded by a palatal or a round vowel, conditions are met for devocalisation to apply. In the data below,

the subject Prefix (SP) can be observed in its unaltered form in (a) whereas (b) shows instances of devocalisation.

117. (a)				(b)			
	mì	hénéé	'I saw'		m à	hén	'I saw'
	I	see P2			I P1	see	
	ɔ	hénéé	'you saw'		w à	hén	'you saw'
	à	hénéé	'he saw'		à	hén	'he saw'
	bǐ	hénéé	'we saw'		ɓă ~bjă	hén	'we saw'
	mìní	hénéé	'you saw'		màná	hén	'you saw'
	bí	hénéé	'they saw'		ɓá ~bjá	hén	'they saw'

When one contrasts (a) and (b) forms, one notices the following alternations: ɔ ~ w, bi ~bj (optionally). mì- and mìní do not alternate with mj-and minj-respectively because SDP prohibits sequences of two sonorants in a demisyllable at the surface. The second person plural SP (màná) where the TM replaces all the vowels of the SP could lead to the postulation of a vowel tier where vocalic processes interact. But consistent data have not been found to that effect.

Below is a set of data in the P3 form contrasted with the P2. Once again, they show an ɔ ~ w alternation.

118.(a)				(b)			
	mì	hénéé	'I saw'		m ù	hén	'I saw'
					I P3	see	
	ɔ	hénéé	'you saw'		w ù	hén	'you saw'
	à	hénéé	'he saw'		ɔ	hén	'he saw'
	bǐ	hénéé	'we saw'		b ŭ	hén	'we saw'
	mìní	hénéé	'you saw'		mùnú	hén	'you saw'
	bí	hénéé	'they saw'		b ú	hén	'they saw'

Besides the ɔ ~ w alternation, we notice that ɑ+u yield ɔ at the third person singular. Moreover, devocalisation does not operate when the

conflating vowels are high. These facts shall be accounted for in a subsequent section.

4.4.1.3. Numeral Prefix + Root.

The root of the numeral for 'one' in Bakoko is a toneless vowel [a]. when it takes a prefix that ends in a palatal or round vowel, devocalisation takes place. In the plural forms, the numeral root is consonant initial and thus, does not provide room for devocalisation as evidenced in the (a) forms of 119 below.

	Plural forms			Singular forms.		
119.(a)	bɔ̌n	bí-bă (2)	'two children'	mɔ̌n	w-à (1)	/mɔ̌n ù-a /
	mìmím	mí- bă (4)	'two hearts'	mmím	w-á (3)	/ m̀mím ú-a /
	bìlɔ̀lɔ̀	bí - bă (8)	'two ducks'	èlɔ̀lɔ̀	j-á (7)	/èlɔ̀lɔ̀ é-a /
	tít	é - bă (10)	'two animals'	tít	j-à (9)	/tít è-a /
	ànɔ̀n	á - bă (3pl)	'two birds'	ɔ̀nɔ̀n	v-á (11)	/ ɔ̀nɔ̀n ví-a /
	mìsɔ̀ŋ	mí - bă (4)	'two teeth'	lìsɔ̀ŋ	dʒ-á (5)	/ lìsɔ̀ŋ dǐ-a /

The singular forms displayed in (b) reveal that the prefixes that were postulated for the numeral in the second chapter undergo the following changes:

u → w / -a

dǐ → dj→ dʒ / -a

e → j / -a

4.4.1.4. Possessive Prefix + Root.

The root morpheme of the possessive varies with respect to the person as demonstrated in the second chapter and repeated here.

120. - àmà 'first person singular' -áhá 'first person plural'
- ɔ̀ɔ̀ 'second person singular' - ánà 'second person plural'
- ɛ́ɛ́ 'third person singular' - áɓá 'third person plural'

To these roots, the following prefixes can be added, depending on the class of the head noun or possessor.

121. cl.1: u- cl.7: e-
cl.2: bi- cl.8: bi -
cl.3: u- cl.9: è-
cl.4: mi- cl.10: é-
cl.5: ɗi- cl.11: vi-

Apart from the cl.9 and 10 prefixes which are underlyingly specified for tone, the other prefixes are assigned the opposite value of the last tone of the head noun through a process of polarisation. This issue shall be dealt with in more details in chapter five.

From the observation of the above prefixes, it appears that they all end either in a palatal or a round vowel. When they are added to the vowel initial roots elicited in (122), devocalisation takes place. Below is a sample of data of possessive forms.

122. (a)mùt (1) w-ámà 'my person' (b) m̀mím (3) w-àmà 'my heart'
mùt w-ɔ́ɔ̀ 'your person' m̀mím w-ɔ̀ɔ̀ 'your heart'
mùt w-ɛ́ɛ́ 'his person' m̀mím !w-ɛ́ɛ́ 'his heart'

mùt	w-áhá	'our person'	m̀mím	!w-áhá	'our heart'
mùt	w-áná	'your person'	m̀mím	!w-áná	'your heart'
mùt	w-áɓá	'their person'	m̀mím	!w-áɓá	'their heart'

(c) mìnù (4) m-ámà 'my mouths' (d) lìsòŋ (5) dʒ-ámà 'my tooth'

mìnù	m-ɔ́ɔ̀	'your mouths'	lìsòŋ	dʒ-ɔ́ɔ̀	'your tooth'
mìnù	m-éɛ́	'his mouths'	lìsòŋ	dʒ-éɛ́	'his tooth'
mìnù	m-áhá	'our mouths'	lìsòŋ	dʒ-áhá	'our tooth'
mìnù	m-áná	'your mouths'	lìsòŋ	dʒ-áná	'your tooth'
mìnù	m-áɓá	'their mouths'	lìsòŋ	dʒ-áɓá	' their tooth'

(e) èlɔ̀lɔ̀ (7) j-ámà 'my duck' (f) tít (9) j-àmà 'my animal'

èlɔ̀lɔ̀	j-ɔ́ɔ̀	' your duck'	tít	j-ɔ́ɔ̀	' your animal'
èlɔ̀lɔ̀	j-éɛ́	' his duck'	tít	!j-éɛ́	'his animal'
èlɔ̀lɔ̀	j-áhá	'our duck'	tít	!j-áhá	' our animal'
èlɔ̀lɔ̀	j-áná	' your duck'	tít	!j-áná	' your animal'
èlɔ̀lɔ̀	j-áɓá	' their duck'	tít	!j-áɓá	'their animal'

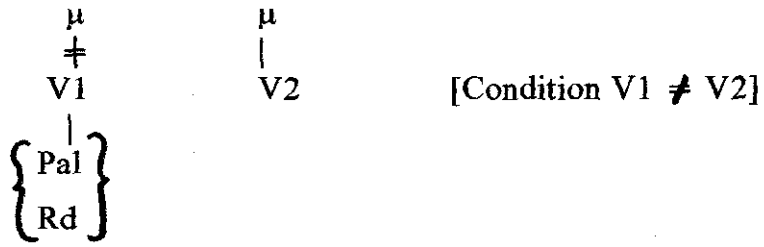
(g) bìlɔ̀lɔ̀ bj- ~ ɓ-ámà ' my ducks' (h) ɔ̀nɔ̀n (11) vj- ~ v-ámà ' my bird'

bìlɔ̀lɔ̀	bj- ~ ɓ-ɔ́ɔ̀	' your ducks'	ɔ̀nɔ̀n	vj- ~ v-ɔ́ɔ̀	' your bird'
bìlɔ̀lɔ̀	bj- ~ ɓ-éɛ́	'his ducks'	ɔ̀nɔ̀n	vj- ~ v-éɛ́	'his bird'
bìlɔ̀lɔ̀	bj- ~ ɓ-áhá	'our ducks'	ɔ̀nɔ̀n	vj- ~ v-áhá	'our bird'
bìlɔ̀lɔ̀	bj- ~ ɓ-áná	'your ducks'	ɔ̀nɔ̀n	vj- ~ v-áná	' your bird'
bìlɔ̀lɔ̀	bj- ~ ɓ-áɓá	'their ducks'	ɔ̀nɔ̀n	vj- ~ v-áɓá	' their bird'

Facts from the possessive tell us that palatal vowels [i] and [e] devocalise into [j] and the round vowel [u] become [w] when followed by a non high vowel.

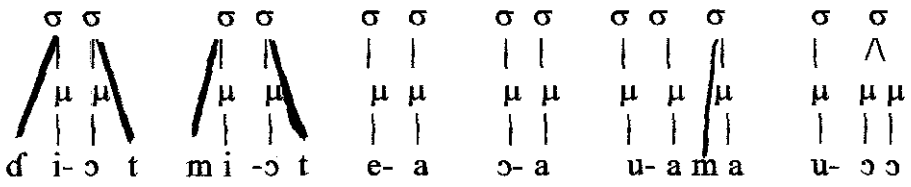
The glide formation process observed during the concatenation of the noun class prefix + root, subject marker + tense marker, numeral prefix + root and possessive prefix + root can be summarized in the following rule of devocalisation.

Devocalisation: The front palatal vowels and back round vowels devocalise when followed by non identical vowels.



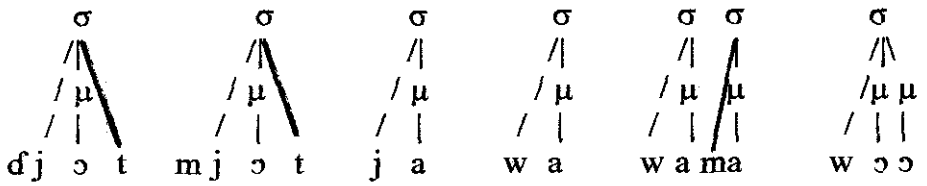
The devocalisation process detaches a prevocalic palatal or round vowel from its mora. This results in a non moraic V-slot which must be phonetically interpreted as a glide. By a general principle, the mora node set afloat by this operation does not re-associate. It thus remains floating or gets deleted. Put differently, the loss of a vowel is not compensated, at least at stratum two where the above mentioned morphological processes operate. A sample derivation of the data above is provided below. It should be observed that devocalisation necessarily entails some syllable structure adjustments. In order to achieve simplicity in the representations, we will ignore for the time being the N and its projections.

INPUT TO DEVOCALISATION

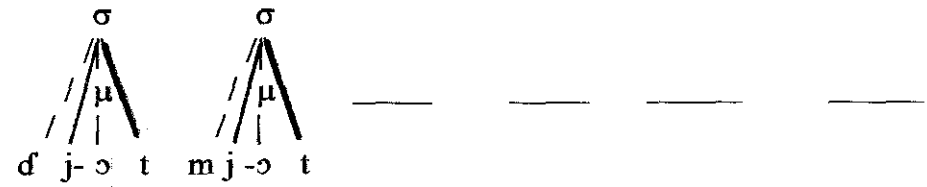


DEVOCALISATION

RESYLLABIFICATION (OCR)



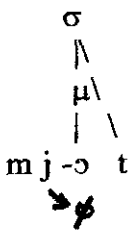
O A R



AFFRICATION

d ʒɔt

SDP



Tone Rules.

OUTPUT [dʒɔ̀t] [m ɔ̀t] [jă] [wà] [wàmà] [wɔ̀ɔ̀]

To conclude, it becomes apparent that devocalisation inevitably provokes syllable adjustments. Besides, it is worth pointing out that devocalisation is a typical level two process. Though roots (i.e. underived lexical items) with complex onsets have been identified (e.g. -kwà.mbà 'cassava', -dìdjà

'wall' etc.), one cannot easily conclude that they derive from underlying sequences of round or palatal vowel plus another vowel. In fact, roots that ought to yield the same outputs if this hypothesis were postulated in the language also exist. Examples of these are ŋgɔ̀á 'wind' and túè 'sea'. But they do not surface as [ŋgwă] or [twê]. Moreover, when a suffix is added to a root at level one of lexical phonology, devocalisation never applies. Evidence comes from the existence of surface structures such as -vó+è 'to hurry', -púpú+è 'whiteness', vóvó+è 'sharpness' pé+à where the round or palatal vowels do not undergo glide formation. At the postlexical level, glide formation does not operate. We discuss this in details in a later section.

4.4.2. Vowel Coalescence.

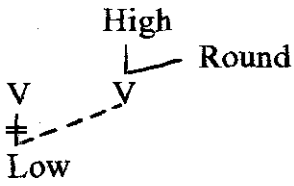
Coalescence refers to a situation where two vowels merge to form a third vowel that combines the features of the conflating units. Coalescence is not a productive process in Bakoko. In the current state of the language, it has been observed in the P3 forms.

123.	i)	/mì ú hén /	→	[mù hén]	'I saw'
	ii)	/ ɔ ú hén /	→	[wù hén]	'you saw'
	iii)	/ à ú hén /	→	[ɔ́ hén]	'he saw'

In the third form, we realize that the low vowel [a] plus the high round vowel [u] yield a mid low round vowel. To account for this process, the following rule will be stated.

Coalescence: the Low Vowel [a] plus the high round vowel [u] merge to form a mid low round vowel.

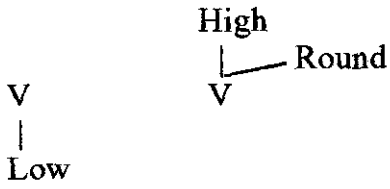
In Feature Geometry terms, this process involves the spreading of the [a] Low feature onto [u]. This spreading is followed by the delinking of the first V-slot. In other words, the merger is not compensated by lengthening.



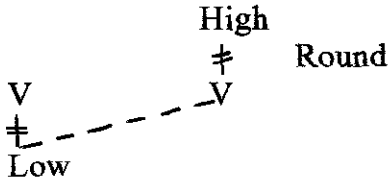
The form in (iii) above will thus be derived as follows:

INPUT TO COALESCENCE

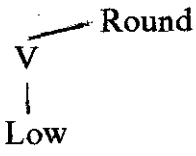
a # u



Coalescence



Floating Elements Deletion



OUTPUT [ɔ]

This is the only case of coalescence observed in our corpus. Because it applies during the affixation of the pre-stem material, it is considered as a level two process. But the mid low vowels [ɔ] and [ɛ] seem to have evolved from sequences of a + u and a + i respectively. Part of evidence for

this assumption is provided by the synchronic form of the word 'saliva' which is mìtéé. The Proto-Bantu form reconstructed by Meeussen (1969) for this word is -tai . But one cannot conclude in a straight forward manner that all [ɛ] and [ɔ] are derived in this way.

4.4.3. Vowel Contraction.

Under the cover notion of contraction, we intend to study vocalic processes such as vowel reduction and vowel deletion in various morphological contexts, both in the lexical and postlexical components of grammar.

4.4.3.1. Vowel Reduction.

This process reduces to one mora a bimoraic vowel that is followed by another vowel. The phenomenon has been encountered in derived nouns as evidenced by the data below.

124.	lì-péé 'to be drunk'	b)	péà	'drunkeness'
	lì-vóó 'to be sharp'		èvóvóè	'sharpness'
	lì-púú 'to be white'		èpúpúè	'whiteness'

From (a) to (b), one realizes that the bimoraic vowels interpreted phonetically as a sequence of two V-slots reduce to one when followed by another vowel.

Vowel Reduction. (V.R.)

A bimoraic vowel reduces to one when followed by another vowel.

In Feature Geometry terms, this rule implies the delinking of a mora node as shown by the representation below.

σ σ
∧ |
μ μ μ
∨ |
V V

When applied to the data in (124), the rule operates as follows to derive for example péà 'drunkenness' and èvóvóè 'sharpness' from /péé-à / and /èvóvóó-è / respectively.

INPUT TO V.R.	pee	#	a		evovoo	#	ε	
	σ		σ		σ		σ	
	∧		|		∧		|	
	μ μ		μ		μ μ		μ	
	\ /		|		\ /		|	
	V	#	V		V	#	V	
Vowel Reduction	σ		σ		σ		σ	
	∧		|		∧		|	
	μ μ		μ		μ μ		μ	
	\≠		|		\≠		|	
	V	#	V		V	#	V	
	σ		σ		σ		σ	
OUTPUT	|		|		|		|	
	μ		μ		μ		μ	
	|		|		|		|	
	V	#	V		V	#	V	
	[péà]				[èvóvóè]			

It is assumed that V.R. applies in an across-the-board manner to ban any sequence of three uninterrupted moras. The data displayed above are derived at stratum one where suffixes attach to roots. At the second stratum, sequences of three uninterrupted moras have not been identified. The only word available in our corpus is à-ɔ́ɔ́ 'ear'. This lexical item stands as an exception to V.R. But as argued in chapter three, the word à-ɔ́ɔ́ is consonant initial root at the underlying level. Therefore, it does not meet the

conditions of the application of the V.R. rule. At the postlexical level, one realizes that all trimoraic sequences are reduced to two. Data on three successive syllables reducing to two will be provided in the next section.

For the time being, we give a sample of data showing bimoraic vowels that reduce when followed by another vowel at the postlexical or phrasal level.

125. ǹdíí á sɔ̀ŋ → [ǹdí á sɔ̀ŋ] 'graveyard, cemetery'
field of grave
ǹdɛ̀è á ŋ̀kɔ̀ŋ → [ǹdɛ̀ á ŋ̀kɔ̀ŋ] 'the village frontier'
frontier of village
à ɔ́ɔ́ á mɔ̌n → [àɔ́ɔ́ á mɔ̌n] 'the child's ear'

4.4.3.2. Vowel Deletion.

Vowel deletion refers to a situation where one of two neighbouring vowels drops. This is a well-known process in Bakoko, attested at all components of the grammar. Thus, to handle the phenomenon in an ordered way, vowel deletion shall be considered during prefixation (stratum two) and word concatenation (postlexical level).

4.4.3.2.1. Prefixation and Vowel Deletion.

It has already been argued that when a palatal or round vowel is followed by another vowel, it undergoes glide formation. Vowel deletion then involves cases where the prefix vowel is either identical to that of the root or the prefix vowel is neither palatal nor round. The prefixes concerned by this operation are ɓà-(2), mì-(4), dì-(5), è- (7) and ɓì- (8). The following data present the main facts about deletion at stratum two.

In (a) and (b) below, we display class two nouns with consonant initial roots and vowel initial roots respectively.

126. a)	ɓà-káálá	'white men'	b)	ɓ-ǒn	'children'
	ɓà-lóm	'males, husbands'		ɓ-ěn	'rich people'
	ɓà-tʃɛ̀n	'hosts'			

The class two prefix takes a [ɓ] allomorph before a vowel initial root.

The data below show class 5 and class 4 nouns with consonant initial roots in (a) and vowel initial roots in (b). It appears that the prefix loses its vowel before a high vowel initial root.

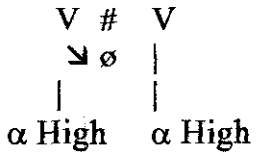
127. (a) lì-sòŋ	'tooth'	b)	d-ĭh	'eye'
lì-bùm	'belly'		d-ìh	'fire spot'
lì-kàɓò	'yam'		d-íɓè	'night'
lì-kàlà	'doughnut		d-ùwè	'trip, walk'
mì-sòŋ	'teeth'		m-ĭh	'eyes'
mì-bùm	'bellies'		m-ìh	'fire spots'
mì-kàɓò	'yams'		m-íɓè	'nights'
mì-kàlà	'doughnuts'		m-ùwè	'trips, walks'

Class 7 and class 8 nouns do not really display illustrative data for vowel deletion during prefixation. The only word identified in class 7 with surface identical vowels has been construed as having a latent consonant in the root initial position. In class 8 the single word b-íɓè 'nights' which is the plural form of j-íɓè has been identified.

At the first glance, it appears that the condition for vowel deletion to operate at stratum two is that both vowels must share the same feature for height. This explains why [i] gets deleted in dì-ùwè for instance.

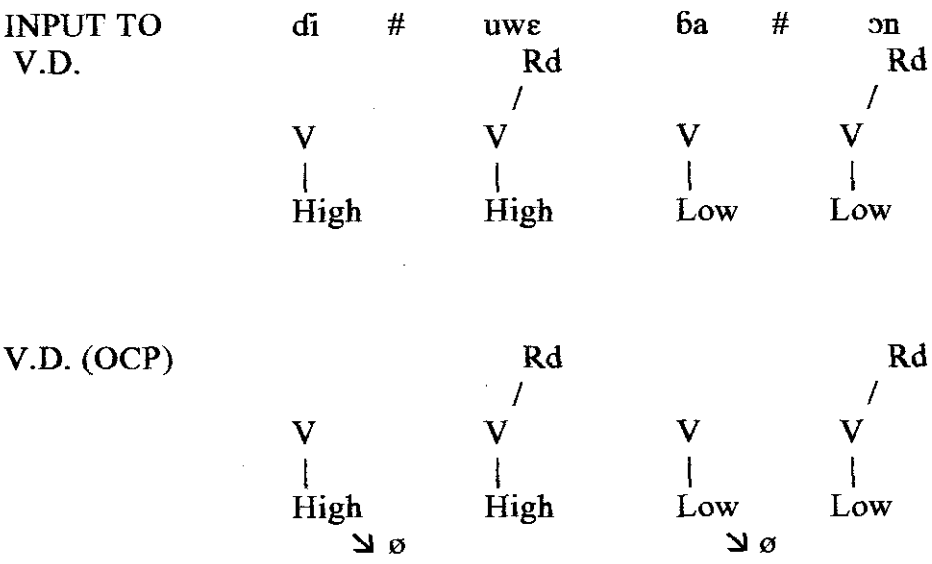
Vowel Deletion (V.D)

The first of two vowels deletes when both are either high or low.

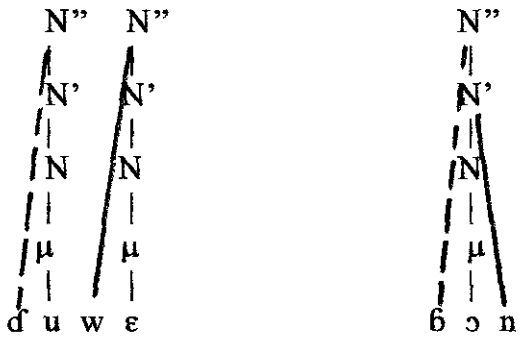


Binary features have not been used in the description of vowels. Thus, in this α notation, [+high] refers to high whereas [-high] refers to the feature low.

This rule can be construed as a sort of OCP effect on [High] or [Low]. In this perspective, it can be claimed that there is a dependency relationship between features. Thus, [High] will be considered as the head feature for [i] and [u] whereas low is the head feature of [ɛ], [a] and [ɔ]. In this view, the deletion of the head feature will entail the deletion of the whole segment. Thus, vowel deletion at stratum two is an OCP effect on the features [High] and [Low]. Given this, the derivation of ɓɔ̌n 'children' and dùwɛ̀ 'trip' from /ɓà-ɔ́n / and /dì-ùwɛ̀ / respectively is provided below.

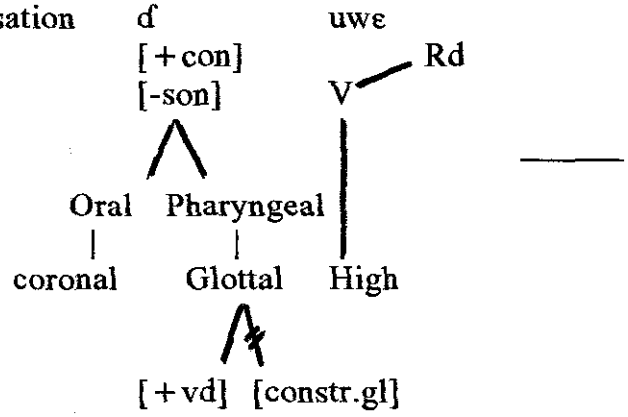


Resyllabification (O C R)



Postlexically.

Deglottalisation



Tone Rules

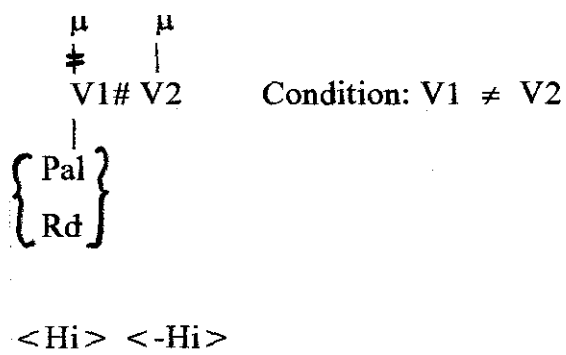
OUTPUT [dùwɛ̀] [ɓɔ̃n]

The process of vowel deletion as stated above raises two problems with respect to the rule of devocalisation as previously stated. First, it was observed in the P1 forms that ɔ+a yields [wa] just as ɔ+u yields [wu] in the P3 forms at the second stratum of Lexical Phonology. But V.D. would delete [ɔ] in front of [a] because both segments are low. This problem finds a solution if Devocalistion is ranked higher or ordered before Vowel Deletion. Secondly, devocalisation as previously stated does not prevent dì # ùwɛ̀ 'trip' from becoming dj-ùwɛ̀ then dʒùwɛ̀. This situation imposes the revision of Devocalisation in its former statement. The only condition for this rule to apply was that the second vowel had to be different from the

first one. But now, it must be stipulated that if the devocalising vowel is [High], then the following vowel must not be [High].

Devocalisation revised.

Palatal and round vowels devocalise when followed by non identical vowels. But if the first vowel is high, the second must not be.



The feature [-Hi] as used here is an ad hoc notation to refer to any vowel that is not high.

4.4.3.2.2. Word Concatenation and Vowel Deletion.

At the syntactic level, when words concatenate to build sentences and phrases, one observes instances of two or three vowels conflating. At this level, vowel deletion is a very interesting phenomenon that general principles can be stated to account for. Postlexical data on vowel deletion will be divided into two sets: phrasal and utterance level.

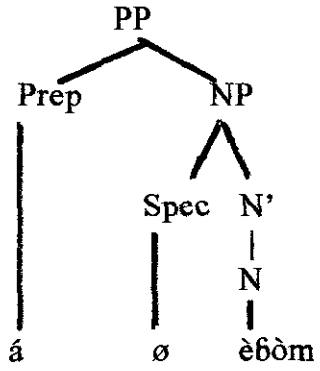
4.4.3.2.2.1. Phrasal Data.

The phrasal data that display vowel deletion are made up of two vowels where the first (V_1) is generally a preposition or part of a preposition and the second (V_2) is the class prefix of the following noun.

The following combinatory possibilities are available in the language. In (a), we have the underlying form which corresponds to a slow delivery whereas (b) forms equal to normal or even rapid delivery.

	(a)	(b)
128.	àx sál á èɓòm	àx sál áɓòm
	He TM work Prep market	'He works at the market'
	mɔ̌n à èlɔ̀lɔ̀	mɔ̌n àlɔ̀lɔ̀ 'the duck's child'
	child of duck	
	mɔ̌n à ɔ̀nɔ̀n	mɔ̌n ànɔ̀n 'the birds' child'
	child of birds	
	ènɔ̀ŋ é èlɔ̀lɔ̀	ènɔ̀ŋ élɔ̀lɔ̀ 'the duck's bed'
	ènɔ̀ŋ é ɔ̀nɔ̀n	ènɔ̀ŋ ónón 'the bird's bed'
	ènɔ̀ŋ é ànɔ̀n	ènɔ̀ŋ ánón 'the birds' bed'
	lìsòŋ lí èlɔ̀lɔ̀	lìsòŋ lí lɔ̀lɔ̀ 'the duck's tooth'
	lìsòŋ lí ɔ̀nɔ̀n	lìsòŋ lónɔ̀n 'the bird's tooth'
	lìsòŋ lí ànɔ̀n	lìsòŋ lánɔ̀n 'the birds' tooth'
	mìsòŋ mí èlɔ̀lɔ̀	mìsòŋ mí lɔ̀lɔ̀ 'the duck's teeth'
	mìsòŋ mí ɔ̀nɔ̀n	mìsòŋ mónɔ̀n 'the bird's teeth'
	mìsòŋ mí ànɔ̀n	mìsòŋ mánɔ̀n 'the birds' teeth'
	bìnɔ̀ŋ ɓí èlɔ̀lɔ̀	bìnɔ̀ŋ bí lɔ̀lɔ̀ 'the duck's bed'
	bìnɔ̀ŋ ɓí ɔ̀nɔ̀n	bìnɔ̀ŋ ɓónɔ̀n 'the bird's bed'
	bìnɔ̀ŋ ɓí ànɔ̀n	bìnɔ̀ŋ ɓánɔ̀n 'the birds' beds'

The above data, excepting the first example, are associative constructions wherein we find $Noun_1$ -Associative Marker-$Noun_2$ (N_1-AM-N_2). The concatenating vowels here are those of the associative marker and the N_2 prefix. The AM and N_2 form a prepositional phrase headed by the AM.



From the observation of these data, the following statements are in order:

- When the high palatal vowel [i] is followed by a non high vowel, it deletes. Unlike the situation observed at stratum two during the prefixation, the high vowel elides, no matter whether it is preceded by a high or a low vowel.

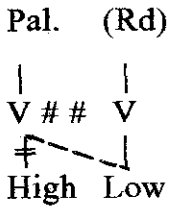
- When two vowels that share the low feature concatenate, V_1 elides.

- The palatal [e] which is the least specified vowel in the feature system behaves as if it were phonetically absent. In fact, whether in V_1 or V_2 position, it always deletes.

If we consider the rule of vowel deletion whose main effect was to reduce sequences of High or Low vowels, we realize that it still accounts for the elision of a Low V_1 when V_2 is also low. It thus appears that [Low] is the main active feature at the phrasal level. Drawing from this, we claim that the deletion of a high V_1 operates through the spreading of V_2 [Low] feature onto V_1, thus creating the conditions for V_1 deletion. The process is termed V- Low spreading to avoid any confusion with tonal processes.

V-Low Spreading. (V-Low Spread).

The feature [Low] of V_2 spreads onto a preceding high vowel.

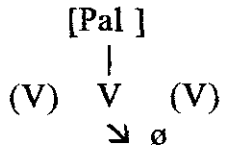


The V- Low Spreading process inevitably provokes the delinking of the [High] feature because a vowel cannot display both features at the same time. As it was stated earlier, this rule creates the conditions for the application of vowel Deletion.

Still at the phrasal level, we need a rule to delete the least specified vowel [e] which in fact behaves as if it were unspecified.

Weak Vowel Deletion (W.V.D.)

The least specified vowel [Pal] deletes in the vicinity of another vowel.

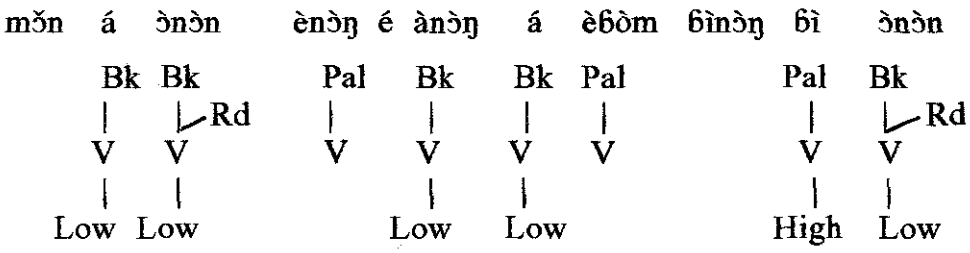


Another approach could have been to claim that [e] surfaces after the application of postlexical rules. In this view, the WVD process would be unnecessary. But this solution does not hold because [e] has been identified as the class 7 marker undergoing devocalisation in the lexical component. This process does not allow us to construe the straightforward deletion of [e] as following from its under-specification. If [e] undergoes glide formation at the lexical component, it implies that the segment has already received a featural content at the underlying level. Rather, its straightforward deletion is provoked by its 'weakness, i.e. it is the least specified vowel in the system. In this perspective, the interaction between concatenating vowels can be viewed as a 'strength' matter. Thus, vowels that have the larger number of features are stronger than those that have fewer.

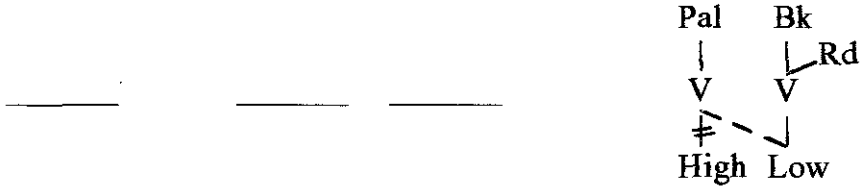
Through the application of the above stated rules, the derivation of mɔ̌n ɔ̀nɔ̀n 'the bird's child', ènɔ̀ŋ ánɔ̀n 'the birds' beds', áɓɔ̀m 'at the

market' and bìnɔ̀ŋ ɓɔ́nɔ̀n from / mɔ̌n à ɔ̀nɔ̀n /, / ènɔ̀ŋ é ànɔ̀n/, /á èɓɔ̀m / and / ɓìnɔ̀n ɓì ɔ̀nɔ̀n / respectively is provided below.

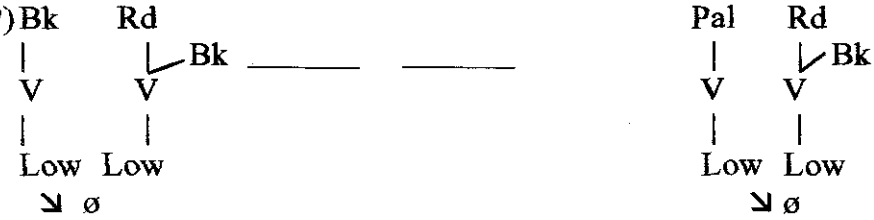
INPUT



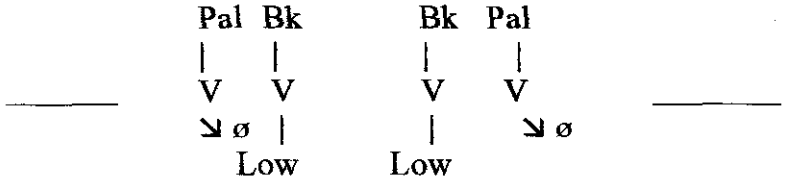
V-Low Spread



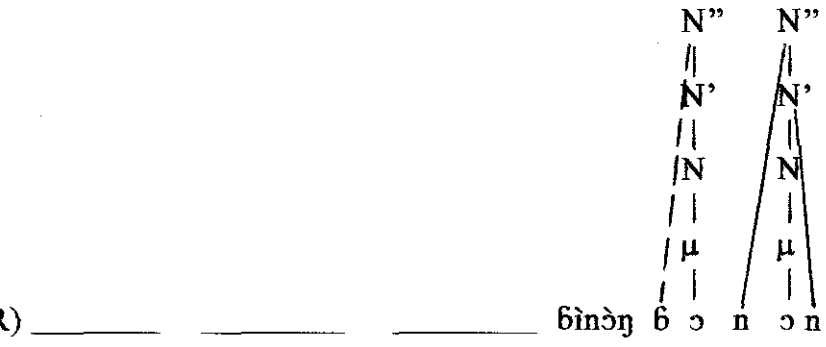
V-Del (OCP)



W.V.D.



Resyll. (OCR)



Other Rules

OUTPUT [mɔ̌n ɔ̀nɔ̀n] [ènɔ̀ŋ ánɔ̀n] [àɓɔ̀m] [bìnɔ̀ŋ ɓɔ́nɔ̀n]

WVD and V. Low Spreading are typical postlexical rules. In other words, their application in the lexical component (e.g. during the prefixation at stratum two) would yield the wrong output.

4.4.3.2.2.2. The Intonational Phrase Level Data

The intonational phrase as understood here is a syntactic structure that encompasses the phrase, though it may be a larger phrase by itself. Below is a sample of utterances in Bakoko.

àx kè á èɓòm	'He goes to the market'
He TM Prep market	
èkáká é ɔnɔn	'The bird's kidney'
Kidney of bird	

Utterances give a possibility for three vowels to come together. When this happens, the rules of W.V.D, V- Low Spreading, V. Del. stated so far apply, provided a certain rule ordering is respected. Below are three classes of data with three coalescing vowels at the utterance level. In (i) we have the underlying forms that obtain in the slow delivery; (ii) is the product of a normal delivery and (iii) results from a rapid delivery.

129.

(i)	(ii)	(iii)	
èbìbì é èlɔ̀lɔ̀	èbìbì élɔ̀lɔ̀	èbìbì ílɔ̀lɔ̀	'The sweat of the duck'
éɓé é èlɔ̀lɔ̀	éɓé élɔ̀lɔ̀	éɓé élɔ̀lɔ̀	'The lip of the duck'
èvívínè é èlɔ̀lɔ̀	èvívíné[1] élɔ̀lɔ̀	èvívíné[1] élɔ̀lɔ̀	'The blackness of the duck'
ètàndó é èlɔ̀lɔ̀	ètàndó élɔ̀lɔ̀	ètàndó ólɔ̀lɔ̀	'The duck's insect'
èlɔ́ é èlɔ̀lɔ̀	èlɔ́ élɔ̀lɔ̀	èlɔ́ ɔ́lɔ̀lɔ̀	'The thorn of the duck'

èkáká é èlɔ̀lɔ̀	èkáká élɔ̀lɔ̀	èkáká álɔ̀lɔ̀	'the kidney of the duck'
èbìbì é ànɔ̀n	èbìbì ánɔ̀n	èbìbì ánɔ̀n	'the sweat of the birds'
èɓé é ànɔ̀n	èɓé ánɔ̀n	èɓé ánɔ̀n	'the lip of the birds'
èvívínɛ̀ é ànɔ̀n	èvívínɛ̀ánɔ̀n	èvívíná! ánɔ̀n	' the blackness of birds'
ètàndó é ànɔ̀n	ètàndó ánɔ̀n	ètàndó ánɔ̀n	'The insect of birds'
èlɔ́ é ànɔ̀n	èlɔ́ ánɔ̀n	èlɔ́ ánɔ̀n	'The thorn of birds'
èkáká é ànɔ̀n	èkáká ánɔ̀n	èkáká ánɔ̀n	'the kidney of the bird'
èbìbì é ɔ̀nɔ̀n	èbìbì ónɔ̀n	èbìbì ónɔ̀n	'the sweat of the birds'
èɓé é ɔ̀nɔ̀n	èɓé ónɔ̀n	èɓé ónɔ̀n	'the lip of the birds'
èvívínɛ̀ é ɔ̀nɔ̀n	èvívínɛ̀ónɔ̀n	èvívínó! ónɔ̀n	' the blackness of birds'
ètàndó é ɔ̀nɔ̀n	ètàndó ónɔ̀n	ètàndó ónɔ̀n	'The insect of the bird'
èlɔ́ é ɔ̀nɔ̀n	èlɔ́ ónɔ̀n	èlɔ́ ónɔ̀n	'The thorn of the bird'
èkáká é ɔ̀nɔ̀n	èkáká ónɔ̀n	èkákó ónɔ̀n	'the kidney of the bird'
àbí á èlɔ̀lɔ̀	àbí álɔ̀lɔ̀	àbí álɔ̀lɔ̀	'the excrement of the duck'
àsú á èlɔ̀lɔ̀	àsú álɔ̀lɔ̀	àsú álɔ̀lɔ̀	'the face of the duck'
àɓòlò á èlɔ̀lɔ̀	àɓòlò álɔ̀lɔ̀	àɓòlò á lɔ̀lɔ̀	'the acne of the duck'
wɔ̀ á èlɔ̀lɔ̀	wɔ̀ álɔ̀lɔ̀	wà álɔ̀lɔ̀	'the arm of the duck'
àɓé á èlɔ̀lɔ̀	àɓé álɔ̀lɔ̀	àɓé álɔ̀lɔ̀	'the wickedness of the duck'
àtɛ́ á èlɔ̀lɔ̀	àtɛ́ álɔ̀lɔ̀	àtá álɔ̀lɔ̀	'the stars of the duck'
ǹtàndá á èlɔ̀lɔ̀	ǹtàndá álɔ̀lɔ̀	ǹtàndá álɔ̀lɔ̀	'the length of the duck'
àbí á ɔ̀nɔ̀n	àbí ónɔ̀n	àbí ónɔ̀n	'the excrement of the bird'
àsú á ɔ̀nɔ̀n	àsú ónɔ̀n	àsú ónɔ̀n	'the face of the bird'
àɓòlò á ɔ̀nɔ̀n	àɓòlò ónɔ̀n	àɓòlò ónɔ̀n	'the acne of the bird'
wɔ̀ á ɔ̀nɔ̀n	wɔ̀ ónɔ̀n	wɔ̀ ónɔ̀n	'the arm of the bird'
àɓé á ɔ̀nɔ̀n	àɓé ónɔ̀n	àɓé ónɔ̀n	'the wickedness of bird'
àtɛ́ á ɔ̀nɔ̀n	àtɛ́ ónɔ̀n	àtɔ́ ónɔ̀n	'the stars of the bird'
ǹtàndá á ɔ̀nɔ̀n	ǹtàndá ónɔ̀n	ǹtàndó ónɔ̀n	'the length of the bird'

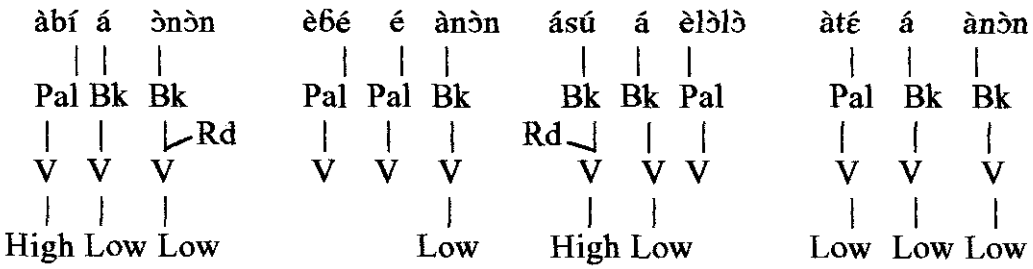
àbí á ànɔ̀n	àbí ánɔ̀n	àbí ánɔ̀n	'the excrement of the birds'
àsú á ànɔ̀n	àsú ánɔ̀n	àsú ánɔ̀n	'the face of the birds'
àɓɔ̀lɔ̀ á ànɔ̀n	àɓɔ̀lɔ̀ ánɔ̀n	àɓɔ̀lɔ̀ ánɔ̀n	'the acne of the birds'
wɔ̀ á ànɔ̀n	wɔ̀ ánɔ̀n	wà ánɔ̀n	'the arm of the birds'
àɓé á ànɔ̀n	àɓé ánɔ̀n	àɓé ánɔ̀n	'the wickedness of birds'
àtɛ́ á ànɔ̀n	àtɛ́ ánɔ̀n	àtá ánɔ̀n	'the stars of the birds'
ǹtàndá á ànɔ̀n	ǹtàndá ánɔ̀n	ǹtàndá ánɔ̀n	'the length of the birds'

The above data show sequences of three vowels: V1 V2 V3. V1 stands for the root vowel of a preceding noun or verb, V2 is a preposition and V3 is the class prefix of a following noun. It can be observed straightforwardly that the sequence of three vowels reduce to two. Generally, the vowels that drop are either V2 or V3 and in some few cases, V1 gets assimilated by the following vowel. Namely, the assimilation process takes place when both vowels share the feature low.

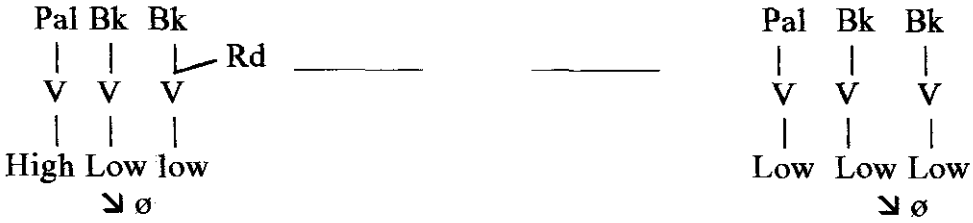
It is assumed that the forms in (ii) are derived at the phrasal level through the application the vowel deletion and weak vowel deletion rules stated above. As a sample derivation, consider the following:

130.	àbí á ɔ̀nɔ̀n	'the stool of the bird'
	èɓé é ànɔ̀n	'the lip of the birds'
	àsú á èlɔ̀lɔ̀	'the face of the duck'
	àtɛ́ á ànɔ̀n	'the stars of the birds'

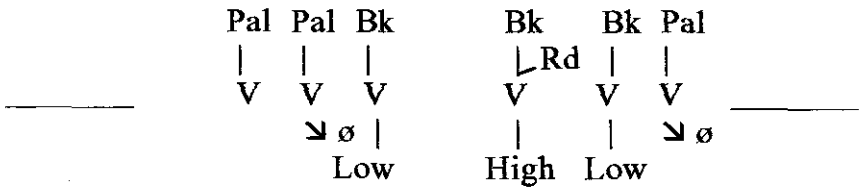
INPUT



V-Del (OCP)



WVD



Seg. Resyll.
Tone rules

OUTPUT [àbí ɔ́nɔn] [èɓé ánɔn] [àsú álɔlɔ] [àtɛ́ ánɔn]

The outputs arrived at in the forms in (129) (ii) constitute the input to those in (129) (iii). As one observes the latter class of data, the following statements can be made:

α- [e] gets deleted in the prefix position when preceded by any other vowel.

β - When two vowels that share the feature [low] come together, the first one gets deleted under the application of V-Del.

ω -When a vowel drops in 129 (iii), the deletion is compensated by the lengthening of the vowel that provoked the elision process.

ɣ -When [e] is in V1 position i.e. final vowel of the root, it never undergoes deletion.

Drawing from the above statements, it can be argued that the root is a strong position where a vowel is not easily affected. Meanwhile, the prefix environment is a weaker position. This falls in line with Casali's (1996:x) assumptions about vowel elision in his cross linguistic analysis of hiatus resolution. "My analysis preserves features occurring in certain phonetically or semantically prominent positions (e.g. in roots). Corresponding to these are a series of position-sensitive faithfulness constraints requiring preservation of features in these positions". The preservation of [e], the weakest vowel in V1 position is a result of the root prominence. Therefore, the Weak Vowel Deletion (WVD) as previously stated must be constrained to avoid an over generation capacity. The WVD will thus be modified as follows:

Weak Vowel Deletion (Revised).

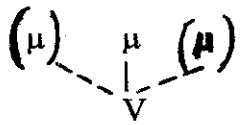
The palatal vowel [e] gets deleted in the vicinity of another vowel, provided it is not in the root position.

$$(V)\quad \overset{\text{Pal}}{\underset{\searrow \emptyset}{V\ (V)}}\quad \textit{Condition:}\ \overset{\text{Pal}}{V}\ \notin\ \text{Root}$$

Prominence is not, however, the only active factor that governs vowel elision. Features also play an important role in this process. Evidence comes from the fact that some vowels get deleted, though belonging to the root. The general observation about the third class of data 129 (iii) is that, when V1 (root vowel) is low, it gets deleted when followed by another low vowel. Another observation about the utterance level data or rapid delivery data is that the loss of a vowel is always compensated (cf. statement ω on page 184 above). This requires the writing of a rule that causes the floating mora to land on the subsequent vowel at the utterance level. This is a typical mirror-image rule because the direction of the floating mora landing does not matter.

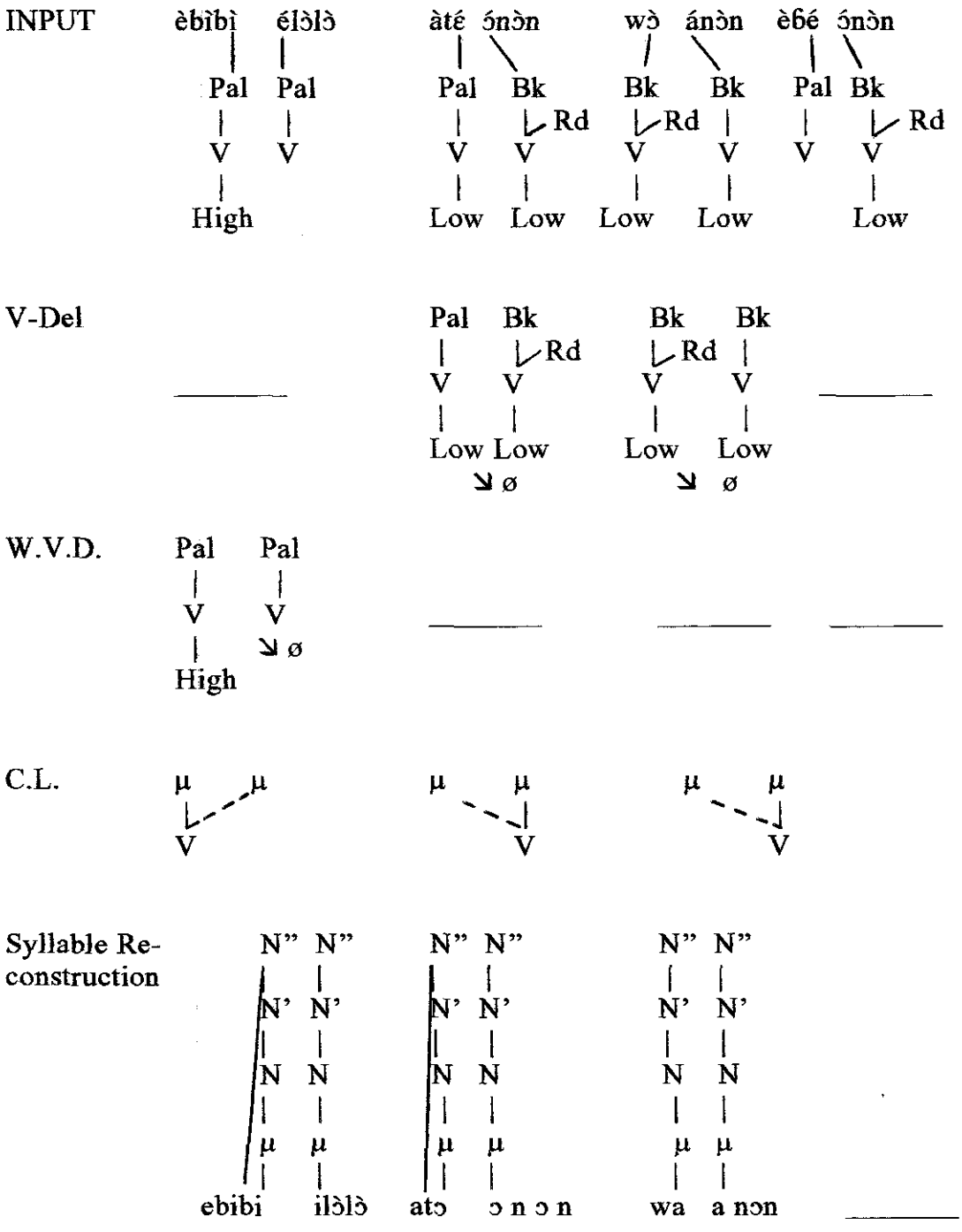
Compensatory Lengthening. (C.L.)

A floating mora lands on the neighbouring V-slot.



The resulting bimoraic vowel is represented as a sequence of two vowels.

For the purpose of illustration, [èbìbì ílɔ̀lɔ̀] 'the duck's sweat', [àtɔ́ɔ́nɔ̀n] 'the bird's stars'and [wàánɔ̀n] 'the birds' hand' are respectively derived from èbìbì élɔ̀lɔ̀, àtɛ́ ɔ́nɔ̀n and wɔ̀ ánɔ̀n as follows. For clarity's sake, the features of the vowels are not arrayed in the statement of compensatory lengthening.



Tone Rules

Output	[èbìbì ílɔ̀lɔ̀]	[àtɔ́ ɔ́nɔ́n]	[wàánɔ̀n]	[èɓé ɔ́nɔ̀n]

A problem that can be raised against this solution is that of the multiple application of the V-Del. and W.V.D. at the Postlexical component. In fact, one of the fundamental principles of Lexical Phonology is that the postlexical component is non cyclic. Moreover, it is assumed that postlexical rules apply across the board (cf. Pulleyblank 1983). However, it is claimed here that the above solution does not contradict the principles of Lexical phonology fundamentally. The multiple application of V. Del and W.V.D. i.e. at the phrasal and utterance levels are due to the fact that we are dealing here with rate delivery rules. Thus, they are by definition optional because the same speaker cannot produce the output of the normal delivery and that of the rapid delivery at the same time. Besides, the rapid delivery form necessarily implies the telescoping of intermediate forms.

Another way of looking at the class (iii) data of 129 could be to claim that they derive from the underlying forms without mediating through the (ii) stage. This hypothesis requires the statement of rules that yield the data in (iii) in a straightforward way from the URs. Below is a summary of the possibilities of vowel deletion at the utterance level. Their common denominator is the reduction of a sequence of three vowels into two as illustrated in (131) below:

(131) (a)	(b)	(c)	(d)
i e e → i i	i e a → i a	i e ɔ → i ɔ	i a e → i a
e e e → e e	e e a → e a	e e ɔ → e ɔ	e a e → e a
a e e → a a	ɛ e a → a a	ɛ e ɔ → ɔ ɔ	ɛ a e → a a
u e e → u u	a e a → a a	a e ɔ → ɔ ɔ	a a e → a a
o e e → o o	u e a → u a	u e ɔ → u ɔ	o a e → o a
ɔ e e → ɔ ɔ	o e a → o a	o e ɔ → o ɔ	o a e → o a
	ɔ e a → a a	ɔ e ɔ → ɔ ɔ	ɔ a e → a a

(e)	(f)
i a a → i a	i a ɔ → i ɔ
e a a → e a	e a ɔ → e ɔ
ɛ a a → a a	ɛ a ɔ → ɔ ɔ
a a a → a a	a a ɔ → ɔ ɔ
u o a → u a	u a ɔ → u ɔ
o a a → o a	o a ɔ → o ɔ
ɔ a a → a a	ɔ a ɔ → ɔ ɔ

An observation of the above rows reveals that:

-[e] deletion applies across the board, provided that it is not in V_1 position. A double application of the rule is noticed in (a).

-A low vowel deletes when followed by another low vowel as observed in (f). The observation of forms such as ɛ a ɔ and ɛ e ɔ surfacing as ɔ ɔ shows that V_2 deletion takes precedence over V_1 deletion.

Without going into more details, it appears that the hypothesis envisaged here requires a multiple application of the same rules at the postlexical level. To do this, one needs to specify the respective environments of the first and second application of the rules. Such problems are among those that led to the recognition of a phrasal and an intonational phrase level.

To sum up, the Bakoko postlexical data motivate the specification of various domains at the postlexical level as proposed by Selkirk (1986).

4.4.4. The Associative Marker Deletion (A.M.D.)

The Associative Marker Deletion is a delivery related process. It involves the deletion of a vowel (associative marker) located between two consonants where the first is the last segment of N1 and the second the first

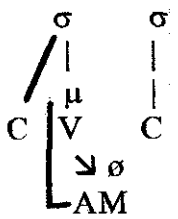
segment of N2. The following vowels may undergo the rule: à- (cl.1), á- (cl. 3), é- (cl. 7), è- (cl. 9), é- (cl. 10). The data below illustrate the phenomenon.

(132) a) mɔ̌n à mùt	→	b) mɔ̌n mùt	'the child of the person'
child of person			
mùt à mùt	→	mùt mùt	'the person of the person'
m̀mím á mɔ̌n	→	m̀mím mɔ̌n	'the heart of the child'
àkɔ̀n á bɔ̌n	→	akɔ̌n bɔ̌n	'the diseases of children'
èkòm é mìndíɣá		èkɔ̌m mɔ́n!díɣá	'the woman's barrenness'
èván é pâm	→	èván pâm	'the fiancée of the man'
tít è kɔ́ɔ́	→	tít !kɔ́ɔ́	'the animal of the monkey'
póŋ è mɔ̌n	→	póŋ mɔ̌n	'the child's brain'
tít é péé	→	tít péé	'the animals of the forest'
póŋ é mùt	→	póŋ mùt	'the brains of the person'

The (b) forms are realized in a rapid delivery whereas the (a) forms are obtained in a slow or normal delivery. The latter forms also correspond to the underlying representations. From the observation of the (b) forms, the phenomenon at play is obvious: the associative marker elides.

Associative Marker Deletion (A.M.D.)

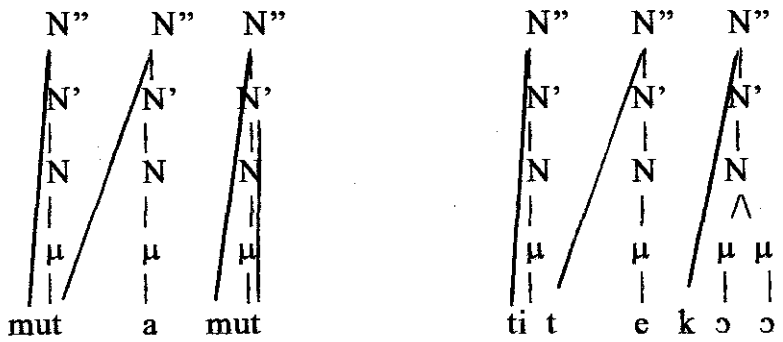
The associative marker (which is a V-slot) deletes between two consonants in the rapid delivery.



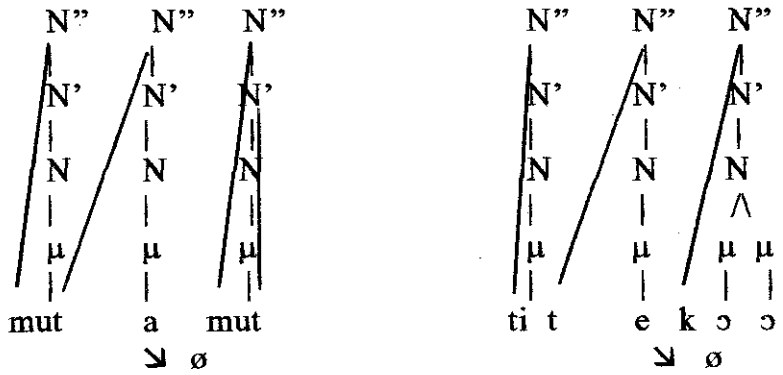
[Condition: Rapid delivery]

The derivation of [mùt mùt] 'the person of the person'and [tít kɔ́ɔ́] 'the animal of the monkey' from /mùt à mùt/ and /tít è kɔ́ɔ́/ is provided below.

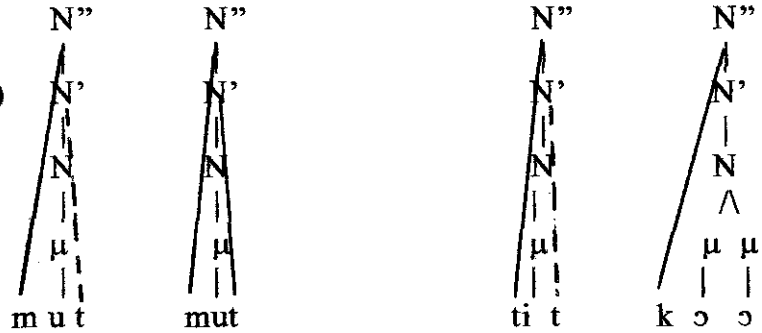
INPUT



A.M.D.



RESYLL. (CCR)



Other rules

OUTPUT [mùt mùt] [tít kɔ́ɔ́]

The effect of this rule is to reduce a sequence of three syllables into two. The vowel being the essential or obligatory element of the syllable, its deletion necessarily entails that of the syllable.

4.4.5. The Schwa Epenthesis.

The schwa epenthesis or (ə-ins) is an optional phonetic implementation rule with the effect of separating consonant sequences that are hard to realize. The following data display the phenomenon.

(133) /m̀-ndíɣá/ [màndíɣá] or [ǹndíɣá] → 'woman'

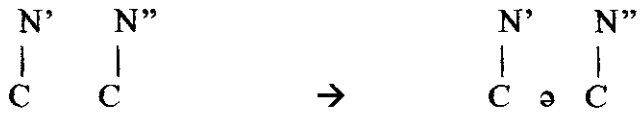
N1 woman

póŋ mùt	[póŋə́ mùt]	→	'the brain of the person'
brain of person			
tít kɔ́ɔ́	[tít ə́ kɔ́ɔ́]	→	'the animal of the monkey'
animal of monkey			
ǹmím tít	[m̀mím ə́ tít]	→	'the heart of the animal'
heart of animal			

This schwa is an extra short segment that takes its tone from the preceding tone bearing unit as it will be demonstrated in due course. The ə-INS process provokes syllable adjustments. In fact, the vowel being the obligatory element of the syllable, the insertion of a nucleus implies that of a syllable.

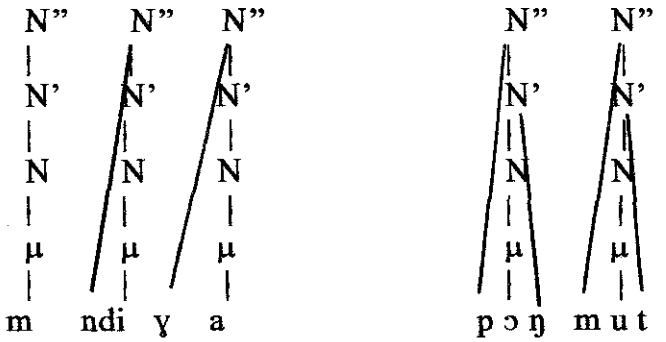
Schwa Epenthesis

An extra short schwa is optionally inserted between consonant clusters.

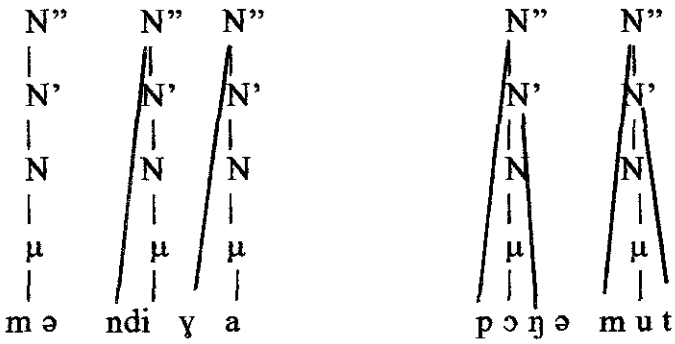


The derivation of màndíɣá 'woman' and póŋəmùt 'the brain of the person' from / m̀ ndíɣá/ and /póŋ mùt/ respectively is provided below.

INPUT TO ə-INS.

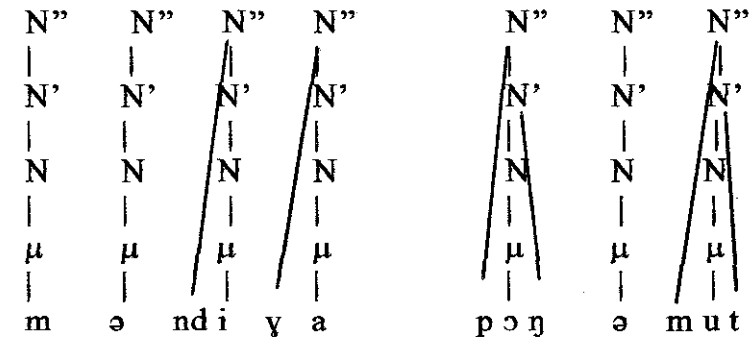


ə-INS.



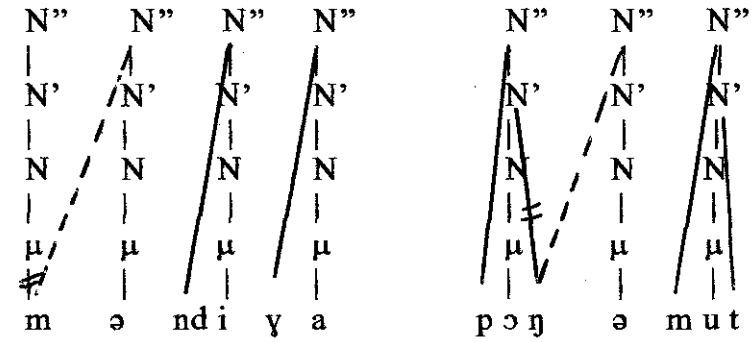
RESYLL.

NCR



OCR and

Contour Simpl.



[mə.ndí.ɣá] [pɔ́.ŋɔ́.mùt.]

Recall that in chapter one (cf. endnote 3), the schwa has been construed as a purely phonetic and transitional phenomenon. Moreover, it does not have the timing and stability associated with real vowels.

4.5. Conclusion

This chapter has analyzed the syllable, syllabification and syllabic phonology. It has become evident that the maximum size of the syllable in Bakoko is CCVC. Besides, it has been argued that syllabification is a continuous process in Bakoko. Put differently, each morpheme comes along with its syllable structure. Therefore, syllable building rules have been postulated at various levels of the grammar. The various phonological rules that entail syllable adjustments have been formulated and their application to relevant data discussed under syllabic phonology. These include devocalisation, vowel coalescence, vowel deletion etc.

CHAPTER V
TONAL SYSTEM

5.0. Introduction

This chapter investigates the tone and the tonal processes that operate in Bakoko. It is a well-known fact that Bakoko (an A43 Bantu language) is a tone language. As a matter of fact, almost all Bantu languages are tone languages. This implies that the difference in musical height placed on a syllable is distinctive i.e. Tone is an indicator of meaning in the same way as phonemes. The chapter is organized thus: part one deals with lexical tone; part two analyzes the tonological processes within the lexicon; part three looks at the tonal phenomena that occur at the phrasal or higher levels of the language.

5.1. Lexical Tone.

Pike (1948:3) defines lexical tone as a prosodic feature, a suprasegmental unit endowed with a distinctive effect. He writes; "When pitch is lexical, it distinguishes the meaning of words." In Bakoko, there are minimal pairs wherein the distinction is marked by the pitch. Consider for example the following data where the high tone is represented with an acute accent [´] and the low tone with a grave accent [`].

(134) - ɓát 'to add'
- ɓàt 'to ask'
- vɔ́l 'to clean'
- vɔ̀l 'laughter'

Each syllable, at the phonetic level shows at least one tone that may be high or low. Below, I investigate the tonal melodies on the roots (noun and verb), analyze the tone of the affixes, the floating tones and the status of contour tones.

5.1.1. Tonal melodies on the noun root.

(135) a) H-melody.

Monosyllables		Disyllables		Trisyllables	
- mú	'head'	- sɛ́há	'baldness'		
- tít	'meat, animal	- kɛ́lɛ́	'smallpox'		
- sóŋ	'moon, month'	- mbémbí	'measles'		
- lɔ́	'day'	- wándá	'young boy'		

b) L- melody

-bùm	'belly'	- wònà	'groundnut'	- tàtàŋgà	'butterfly'
-sòn	'flesh'	- kɔ̀ndɔ̀	'banana (sp)'	- ndèmbìjè	'example'
-vè	'bone'	- vùhà	'error'	- ɗàlɓòè	'spider'
-nù	'mouth'	- kwètè	'potato'		

c) HL-Melody

-d î	'spirit'	-tómbè	'goat'	-tómbèlì	'tumbler'
-sê	'fish'(sp)	-ɓásì	'ring'	-síŋgìhì	'cat'
-kâŋ	'guinea fowl'	-kúmbà	'pride'	-áŋgòlò	'mango'
-p âm	'male'	-kúkè	'cook'	-áŋgìhì	handkerchief'

d) LH -Melody

-ɲŭ	'gray hair'	-tàmbá	'cap'
-ŏl	'nose'	-ɓɛ̀lá	'chair'

-ĭh	'eye'	-pùmá	'orange'
		-sèsé	'whistle'

As observed in the data in (135) above, it is obvious that trisyllabic and polysyllabic noun roots are rare in the language. No instance of trisyllables has been recorded in the H and LH melodies. However tetrasyllables do exist in Bakoko. As it will become evident later on, tetrasyllables result from compounding and reduplication. They are construed as made up of two roots put together. This explains why they have not been included in (135) above. It is argued later that some tonological processes conspire to maintain the above fundamental tonal melodies. For example, it will be shown that Bakoko has developed a tonal rule whose effect is to preempt a LHL melody on the root.

5.1.2. Verb Roots.

Unlike noun roots that may be more than one syllable, verb roots are monosyllabic. Gliding melodies such as HL or LH are not attested here.

(136)

a)	H-Melody	b)	L-Melody
-hén	'see'	-sò	'wash'
-ɓát	'add'	-kɔ̀n	'be sick'
-ɔ́x	'swim'	-vèx	'be sick'
-káx	'tie'	-tʃìì	'write'
-sénd	'shave'	-ɓàt	'ask'

Given the assumptions of UT, one can question the marking of the low tone on the root. Pulleyblank (1983) convincingly argues that L is the default value within a system that has H and L. It is argued in this work that both H and L as underlying tones must be specified on the roots. The existence of contour tones (HL and LH) on the noun roots constitutes evidence that the

L must be explicitly specified underlyingly. Moreover, it will be argued later on that when the imperative marker which is a floating H lands on a low tone root, it yields a gliding tone.

5.1.3. Tone of Suffixes.

This section investigates nominal and verbal suffixes.

5.1.3.1. Nominal Suffixes.

Nominal suffixes refer to derivational affixes that attach to verb roots during nominalization, agent creation, etc. They may either bear a H or a L tone as evidenced by the following data which illustrate High tone suffixes (137) and L tone suffixes (138).

(137)	lì- vèx	'to create'	—	è-vèx-lé [(1)]	'creature'
	N5 Root				
	lì- ɔ́x	'to swim'	—	ɲ-ɔ̀ɤ-í	'swimming'
	N5 Root				
	lì- pùn	'to resemble'	—	mbùn-án	'resemblance'
	N5 Root				
	lì- sɔ́ŋg-	'to count'	—	ǹ-sɔ̀ŋg-í	'arithmetics'
	N5 Root				
	lì- kím-	'to rebuke'	—	bì-kím-á	'a blame'
	N5 Root				
	lì- síŋg-	'to hate'	—	bì-síŋg-á	'hatred'
	N5 Root				

(138)	lì-tʃìì	'to write'	—	ǹ-tʃìì-lè	'writer'
	lì-vɔ́l	'to clean'	—	è-vɔ́l-ɔ̀	'cleaner, broom'
	lì-vèx	'to measure'	—	ɔ̀-vèɣ-à	'meter'
	lì-jéx	'to teach'	—	ǹ-jéx-lè	'teacher'
	li-àx-	'to be itching'	—	è-àx-là	'itching sensation'

It is believed that both H and L are underlying in the nominal suffixes. This assumption is confirmed by the landing of a floating tone as evidenced below. In associative constructions, the associative marker (AM) (when it is a vowel) deletes if preceded by a noun that ends in a vowel. When such a situation arises, the resulting floating tone lands on the preceding vowel following the Stranded Tone Principle.

(139)	èvɔ́lɔ̀	é	mùt	->	èvɔ́lɔ̌ mùt	'the person's broom'
	broom	AM	person			
	èàxlà	é	mùt	->	èàxlă mùt	'the person's itching'
	ítching	AM	person			

The phonetic realization of the associative constructions provides evidence that the low tone suffixes are underlying. If the low tone were assigned by default, then a rising contour tone would not be formed when the stranded tone lands. It shall be argued in 5.2.1.1 that noun stems are assigned tones at the lexical component.

5.1.3.2. Verbal Suffixes.

The verbal suffix is a cover term to refer to the various elements that can follow a verb root. These elements are the final vowel (FV) or the extensions. As a reminder, it has been observed that the FV is always

identical to the root vowel and always surface with a low tone as illustrated in the data below:

(140) lì - níŋg- ì 'to enter'
N_5 Root FV
lì - ém - è 'to be pregnant'
N_5 Root FV
lì - ɓèɣ - è 'to carry'
N_5 Root FV
lì - tàk - à 'to suffer'
N_5 Root FV
lì - vúŋg - ù 'to blow'
N_5 Root FV
lì - lóɣ - ò 'to graze'
N_5 Root FV
lì - ɔ́ŋ - ɔ̀ 'to remember'
N_5 Root FV

The verbal extensions behave alike. They surface with a low tone.

(141)	lì-lám	'to cook'	lì - lám - lè	'to cook for'
	N_5 Root		N_5 Root Ext	
	lì-ɓàt	'to ask'	lì - ɓàt - àn	'to ask each other'
	N_5 Root		N_5 Root Ext	
			lì - bàt - ɓàn	'to ask oneself'
			N_5 Root Ext	
	lì - ɔ̀l	'to laugh'	lì - ɔ̀l - hànè	'to cause s.o. to laugh'
	N_5 Root		N_5 Root Ext	
	lì - tɔ̀ɔ̀	'to sit'	lì - tɔ̀ɔ̀ - jè	'to cause s.o. to sit'
	N_5 Root		N_5 Root Ext	

lì - dìŋ	'to love'	lì - dìŋ - ɓɛ̀	'to be loved'
N_5 Root		N_5 Root Ext	

I claim that the FV and verbal extensions are toneless at the UR and take a default tone at the surface level. Evidence for this claim is provided by the imperative form of the verbs. Dubois et al. (1973:251) define imperative as follows: "un mode exprimant un ordre donné à un ou plusieurs interlocuteurs (dans les phrases affirmatives) ou une défense dans les phrases négatives)." In Bakoko, the imperative (singular) is marked by a floating H tone that docks leftwards onto the FV, the extension or the root vowel if the stem equals the root. Consider the following data:

(142)a.	lì-mìn	'to swallow'	mĭn	' swallow'
	lì-ɓàt	'to ask'	ɓăt	'ask'
	lì-ɔ̀l	'to laugh'	ɔ̆l	'laugh'
	lì-ɓɛ̀l	'to plant'	ɓɛ̆l	'plant'
b.	lì-sɔ́	'to come'	sɔ́	'come'
	lì-hén	'to see'	hén	'see'
	lì-pɔ́t	'to talk'	pɔ́t	'talk'
c.	lì-níŋg-ì	'to enter'	níŋgí	'enter'
	lì-ém-è	'to be pregnant'	émé	'be pregnant'
	lì-ɓèɣ-è	'to carry'	ɓèɣé	'carry'
	lì-tàk-à	'to suffer'	tàká	'suffer'
	lì-vúŋg-ù	'to blow'	vúŋgú	'blow'
	lì-lóɣ-ò	'to graze'	lóɣó	'graze'
	lì-ɔ́ŋ-ɔ̀	'to remember'	ɔ́ŋɔ́	'remember'

d.	lì-lám-lè	'to cook for'	lámlé 'cook for'
	lì-ɓàt-àn	'to ask each other'	ɓàtán 'ask each other'
	lì-ɓàt-ɓàn	'to ask oneself'	ɓàtɓán 'ask yourself'
	lì-sál-hànè	'to make s.o. work'	sálháné 'make s.o. work'

An observation of the data above calls for the following remarks:

-In (a), we have stems that equal a low tone root. When put in the imperative form, the root vowel receives a H tone. Thus a rising contour is formed.

-In (b), we have stems that equal a high tone root. When put in the imperative form, the root undergoes no change. It will be argued later on that the imperative marker gets deleted under OCP.

-In (c), we have stems that are made up of a root and a FV. When put in the imperative form, the FV receives a H tone specification. Of interest is the fact that the FV unlike the low tone roots does not receive a contour tone.

-In (d), we have stems formed by a root plus an extension. Once again, it appears that the extension receives a H tone specification.

From the above observations, I claim that the FV and the extension low tones are not underlying. Otherwise, a rising contour would have been formed as is the case of the low tone roots. To sum up, I propose that the FV and extensions are toneless at the underlying level and receive a default low tone on the surface. Instead, the roots and nominal suffixes bear a H or a L tone in the UR.

5.1.4. Tone of Prefixes.

As in normal Bantu languages, each noun in Bakoko is preceded by a noun class prefix. The classes vary from one to eleven, some being the plural of others. Besides noun class prefixes, grammatical categories such as possessive, numeral, adjective, verb, demonstrative, etc, are also

preceded by concord markers that are called prefixes in Bantu linguistics. This section investigates the tone of these various types of prefixes.

5.1.4.1. Noun class prefixes.

It is claimed in chapter two that all noun class prefixes, except 9 and 10, bear a low tone at the underlying level. Two arguments support this claim: contour tone formation and downstep.

When a noun class prefix is followed by a root initial vowel that bears a high tone, a rising contour is formed. Consider for example the following data:

(143) a.	m̀-ɔ́n	→	mɔ̌n	'child'
	m̀-ɛ́n	→	mɛ̌n	'rich person'
b.	dì-íh	→	dǐh	'eye'
	dì-ól	→	dʒɔ̌l	'nose'
	è-ɔ́m	→	jɔ̌m	'thing'

In 143 (a) syllabification creates an onset when the prefix is added to the root. In consequence, the nasal consonant desyllabifies. Then, the resulting floating low tone docks on the root initial vowel, yielding a contour tone. In (b), when vowel deletion or glide formation operates, it leaves the noun class prefix tone floating. Then this tone docks and attaches to the nearest tone bearing unit. The argument here is that, if the noun class prefix tone were not underlying, i.e. assigned by default at the surface level, contour formation would not have taken place.

The second evidence that prefixes bear a low tone at the UR is provided by downstep. As it will become evident in due course, downstep in Bakoko is provoked by the presence of a floating low tone between high tones. The data below show a situation where the H tones of the root are

lowered when the noun class prefix takes a high tone via a high tone spreading rule. The landing of the H onto the prefix provokes the delinking of the underlying low tone which then remains floating and creates the conditions for downstep to occur. Consider the data below.

(144) ŋ̀-káálá 'white man'

èlɔ̀lɔ́ é ŋ̀káálá → [èlɔ̀lɔ̃ ŋ̀¡káálá] 'the white man's duck'
duck of white man

mə̀-ndíɣá woman'

èlɔ̀lɔ́ é məndíɣá → [èlɔ̀lɔ̃ mən¡díɣá] 'the woman's duck'

tám 'other'

ɓɔ̃n ɓà tám → [ɓɔ̃n ɓá¡tám] 'the other children'

ǹdɛ́ɛ́ 'house'

àdìɓà á ǹdɛ́ɛ́ → [àdìɓă ń¡dɛ́ɛ́] 'the keys of the house'

The claim made here is that, if the prefixes were toneless at the UR, then the spreading of the high tone would not yield a downstep. Put differently, downstep is provoked by the presence of a floating low that originates from the prefix.

5.1.5. Lexical floating tones.

One of the early problems faced by the generative framework was that of the representation of tone. Was tone to be considered a segmental or suprasegmental feature? Did tone belong to syllabic segments (i.e. vowels) or to larger units (i.e. syllables)? Many proposals have been made in the literature. WANG (1967:95) considers tone a syllabic unit whereas Chomsky and Halle (1968) treat it as a segmental feature.

But Leben (1973) argued that some tonal phenomena could not be construed within a segmental approach to the analysis of tone. He therefore

proposed a suprasegmental representation of tone. Along the same line, Goldsmith (1976), drawing from some tonal phenomena proposed an autosegmental representation of tone.

The evidence of floating tones played a crucial role in the postulation of autosegmental representation. As a matter of fact, if tone were inherently linked to segmental units, then the deletion of a tone bearing unit would absolutely entail that of the tone. But such is not the case all the times.

A floating tone is a suprasegmental unit that is not linked to a tone bearing unit underlyingly. It thus lands or surfaces when specific conditions are met. Bakoko operates a distinction between lexical and grammatical floating tones. Whereas grammatical floating tones convey a meaning, lexical floating tones do not. Lexical floating tones seem to derive from the deletion of a tone bearing unit in a preceding stage of the evolution of the language. The landing of the lexical floating tones varies depending on whether the tone is high or low.

5.1.5.1. The lexical floating H.

The manifestation of the lexical floating H can be observed in the data below. As one compares the (a) and (b) forms, one notices that the first noun (N_1) remains unchanged in (a). Instead, the N_1 in the (b) forms receive a H tonal specification. Of interest here is the fact that the floating H does not surface when the word is in isolation.

(145) a.	mùt (1)	'person'	mùt wámà	'my person'
	mbèŋ (9)	'rain'	mbèŋ è ǹkɔ̀ŋ	'the rain of the village'
			rain of village	
	kɔ̀h (9)	'fish'	kɔ̀h è mɔ̌n	'the child's fish'
			fish of child	

b. ǹtʃɛ̀n (1)	'host'	ǹtʃɛ̌n wàmà	'my host'
		host my	
ndzèn (9)	'path'	ndzěn è ŋ̀kɔ̀ŋ	'the path of the village'
		path of village	
ɲɛ̀mb (9)	'death'	ɲěmb è pápá	'A sudden death'
		death CM sudden	

As stated above, the words in isolation bear a low tone. But when they collocate with other words, the (b) forms take a rising tone while the (a) forms do not undergo any change. I thus conclude that the items in (b) have a floating H that does not show up in a peripheral context. This leads to the statement of the following principles that govern the matching of a floating H unto a tone bearing unit in Bakoko.

Principle A: A lexical floating H tone does not associate to a root in a peripheral context.

Following this principle, I posit the following UR for the items in (b)

(146) ǹ-tʃɛn → ǹtʃɛ̀n //

| |

L LH

ndzen → ndzèn //

|

L H

ɲɛmb → ɲèmb //

|

L H

Principle A is a constraint that influences the association conventions. In fact, it shall be argued that multiple linking is highly constrained at the root level.

The above stated principle can lead someone to question the monosyllables listed in (135d) that bear a rising tone. It is held in this thesis that association conventions solely apply on the underived lexical items or roots. Then, the various affixes come along with their inherent tone. When an affix is unspecified for tone at the UR as evidenced in (52212), it receives a default tone at the surface. It is therefore argued that monosyllables with a LH melody are not derived at the root level. Instead, they are obtained at the second stratum of lexical phonology where a floating L associates rightwards onto a H tone root.

Principle B. A lexical floating H tone hooks leftwards onto a tone bearing unit at the phrasal or postlexical level.

Following this second principle, the inputs and the surface forms of the data in (b) stand as follows.

(147) Sample derivation

ntʃɛn wama	→	ntʃɛn wama		'my host'
L LH L		L L H L		
ndzen e ŋ-kɔŋ	→	ndzen e ŋ- kɔŋ		'the path of the village'
LH L L L		L H L L L		
ɲɛmb e papa	→	ɲɛmb e papa		'the sudden death'
LH L H		L H L H		

5.1.5.2. The lexical floating L.

The source of the lexical floating L is either the deletion of the noun prefix or that of the last vowel of the root. This elision process might have happened in a preceding stage of the development of the language or it might be synchronic. The data below exhibit the behaviour of the lexical floating low tone. In (a), we have a floating low in the final position of the word whereas (b) displays cases of floating Ls that originate from the noun class prefix drop.

(148) a.	èdî	'spirit'	b.	dĭh	'eye'
	pâm	'male'		dʒŏl	'nose'
	sê	'fish (sp)'		dʒŏ	'name'
	kâŋ	'guinea fowl'			

The underlying representations and the surface forms of the above data are as follows [(2)].

(149)

e di	→	e di →	edi	'spirit'
| |		| ᚴ	| Λ	
L HL		L HL	L HL	
pam	→	pam →	pam	'male'
|		ᚴ	Λ	
H L		H L	H L	
sɛ	→	sɛ →	sɛ	'fish (sp)'
/		/ᚴ	Λ	
H L		HL	HL	

The derivation of the forms in (b) deserve particular attention. We return to it in subsequent sections of this work.

To sum up, the discrepancies observed in the behaviour of unlinked tones do not favour the Automatic Multiple Linking as proposed by Goldsmith (1976). Instead, they confirm Pulleyblank's (1983:79) assumption: "Although Goldsmith (1976) proposed that free tones should be automatically linked, Williams (1971), Clements and Ford (1979) and Halle and Vergnaud (1982) have suggested that linking (if any) in such a case should be by language-specific rule." Facts of Bakoko convincingly show that both multiple linking and spreading are rule governed, i.e. they are not automatic, as proposed in Goldsmith's (1976) version of association conventions.

5.1.6. The status of contour tones.

Our analysis reveals that contour tones (rising and falling) are not indivisible units. Instead, gliding tones are made up of level tones as evidenced by the following:

5.1.6.1. Contour tones arising from the deletion of a contiguous vowel.

When a vowel elides, the tone that it bore does not automatically delete. Such is one of the arguments that motivated the autosegmental treatment of tones (Goldsmith 1976). The stranded tone therefore docks onto the neighboring vowel, creating a contour tone. Below is a sample of data that display such instances.

(150)

m-ɔ́n	syllabification	mɔn	STP	mɔn	→	[mɔ̌n]	'child'
| |	------->	|	----->	/^			
L H		L H		L H			
di-ih	V.Deletion	dih		dih	→	[dǐh]	'eye'
| |	------->	|	----->	/^			
L H		LH		L H			
di-ol	coalescence	dʒol		dʒol	→	[dʒǒl]	'nose'
| |	------->	|	----->	/|			
LH		LH		L H			
di-o	coalescence	dʒo		dʒo	→	[dʒǒ]	'name'
| |	------->	|	----->	/|			
L H		LH		L H			

The floating tone responsible for the contour tone formation in the above data derives from a synchronic process of vowel deletion, coalescence or syllabification (onset creation rule). But the floating tone may also originate from a historical loss of a tone bearing unit. Below is a sample of monosyllables whose proto-forms (Meeussen 1969) are disyllables that bear two level tones.

(151)

Proto-Bantu	Bakoko	Gloss
-dímù	- dî	'spirit'
-játì	- ăt	'buffalo'
-jínà	- ŏ	'name'
-káŋgà	- kâŋ	'guinea-fowl'
-júdù	- ŏl	'nose'

Three plausible hypotheses can help account for the reversal of tones on some of the above roots. The first and most acceptable one is that the low tone that enters the creation of the contour tone comes from the noun class prefix (through vowel deletion). The second hypothesis is that of a historical process of tonal metathesis. Given this explanation, one can postulate the following diachronic process:

(152)

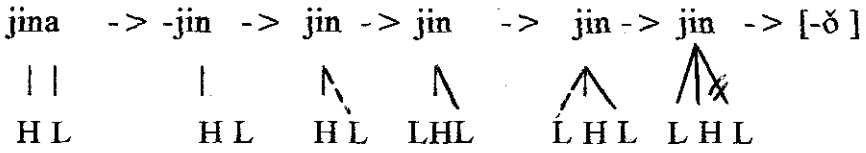
		L		L		
judu	→	judu	→	judu	→	[-ŏl]
| |				¦		
H L		H		H		
		L		L		
				¦		
jati	→	jati	→	jati	→	[-ăt]
||				¦		
HL		H		H		

The third hypothesis is to claim that the floating tone resulting from the deletion of the last tone bearing unit landed on the preceding vowel. Later, the deletion of the prefix vowel caused its low tone to link to the root. Thus, given Hyman's constraint on tonal contours in syllable structures, the last low tone of the contour had to drop. The principle is stated as follows: "Within contour tone syllables, no tone may be multiply linked." (Hyman 1988).

The historical process will then stand as follows.

(153)

judu	->	-jud	->	jud	->	jud	->	jud	->	jud -> [-ŏl]
| |		\		/		∧		⋀		⋀̸
H L		HL		HL		LHL		LHL		LH L



This third hypothesis encompasses both diachronic and synchronic facts. For the relinking of the floating low that results from the deletion of the noun class prefix is a well-known phonological process in the current stage of the development of Bakoko.

5.1.6.2. Contour tones arising from partial reduplication

Partial reduplication is a noun creation process in Bakoko. The canonical shape of partial reduplicates (which will be discussed in due course) stands as follows:

NPfx + CV + H + Root + (V). The data below display a sample of nouns created through partial reduplication.

(154)	lì-lɛ̀mɛ̀	'to dream'	è+lɛ̀-H-lɛ̀m → [èlɛ̌lɛ̀m]	'dream'
	lì-kɔ̀n	'to be sick'	ŋ̀-kɔ̀-H-kɔ̀n → [ŋ̀kɔ̌kɔ̀n]	'a sick person'
	lì-dìt	'to be heavy'	è-dì-H-dìt-è → [èdǐdìdtè]	'weight'
	?		ɔ̀-sɔ̀-H-sɔ̀n → [ɔ̀sɔ̌sɔ̀n]	'ant'

As it can be observed from the data, the floating H that enters the derivation of partial reduplicates hooks leftwards and yields a contour tone. Along the same line, it shall be argued at the phrasal level that contour tones originate either from the presence of grammatical floating tones or processes of tone spreading. All these facts confirm Greenberg's (1948:117) assertion: *"Two-tone systems which faithfully reflect the Proto-Bantu tonal system are reported for Lingala, Lokele, Lonkunde, Lokunda, Lotswa and*

Lingombe. Duala, Yaounde, Basa and Bakoko show two additional tonemes, a rising tone for Proto-Bantu sequence low-high and a falling tone for Proto Bantu high-low. Yaounde, Basa and Bakoko sometimes, under determined conditions, show a falling tone on final vowels in open syllables, particularly in monosyllabic forms."

To sum up, contour tones in Bakoko must be construed as sequences of level tones. Besides, Greenberg's statement about Bakoko and its neighbouring languages adds further justification for the postulation of lexical floating tones (cf. 5.1.5).

After these preliminaries about tone, we now set out to describe the tonological processes that operate in the various components of the language.

5.2. Tonological processes.

5.2.1. Nominal Tone.

5.2.1.0. Introduction.

For a better understanding of the tonal phenomena that take place here, we recall the morphological structure of the noun. It was claimed in chapter two that the nominal form (NF) rewrites Noun Class Prefix plus Stem. Then, the stem in turn rewrites Root plus an optional nominal suffix. This section investigates the various tonal processes that apply during nominalization process:

5.2.1.1. Tone Assignment on Noun Stems.

Here, I analyze the tone assignment on underived stems on the one hand and derived noun stems on the other.

5.2.1.1.1. Underived Stems.

Underived stems refer to those stems that equal the root. Given the tone melodies displayed by nouns in (135) and repeated below (155) for convenience, I assume the Universal Association Conventions (UAC) as proposed by Pulleyblank (1983:11), the Obligatory Contour Principle (OCP) as a constraint on roots, a rule of tone spreading that assigns tone to untoned or toneless vowels and a Low Mapping rule (LMR) that creates a falling contour tone.

Association Conventions (Pulleyblank 1983)
"Map a sequence of tones onto a sequence of tone bearing units,

(a) from left to right
(b) in a one-to-one relation

Well-Formedness Condition
Association lines do not cross"
Obligatory Contour Principle (McCarthy 1986:208)
"At the melodic level, adjacent identical segments are prohibited."

Besides UAC and OCP, a general rule of tone spreading governs the derivation of the roots displayed below. The rule states that a linked tone spreads onto toneless vowels in the underived stem (i.e. root) domain.

Tone Spreading (TS):

Finally a rule that maps an unlinked low tone to a vowel with a high tone applies to create a falling contour. Within tiered phonology, the procedure

of association of tone and tone bearing units has generated a lot of discussion and undergone quite a number of modifications. The association conventions a la Goldsmith (1976) differ from that of Williams (1971) in that while Goldsmith allows automatic creation of contour tones, Williams thinks that a language specific stipulation must be made to that effect. Williams proposal was later modified by Halle and Vergnaud (1982) through the provision that:

"If the procedure above (Williams 1971) runs out of syllables, more than one tone may be assigned to the last vowel only if the grammar of the language includes a stipulation to the effect."

This provision which was later adopted by Pulleyblank (1983) in the formulation of another version of Association Conventions thus holds for Bakoko. Put differently, the grammar of Bakoko stipulates that an unlinked low tone maps to a vowel that is already linked to a high tone.

Low Mapping Rule (LMR): An unlinked low tone links to a preceding vowel that is already associated with a high tone

Below is a sample of underived stems followed by their derivation.

(155) a) H - Melody

Monosyllables		Disyllables		Trisyllables.
-mú	'head'	séhá	'baldness'	
-tít	'meat, animal'	kélé	'smallpox'	
-sóŋ	'moon, month'	mbémbí	'measles'	
-lɔ́	'day'	wándá	'young boy'	

b) L - Melody

-bùm	'belly'	-wònà	'groundnut'				
-sòn	'flesh'	-kɔ̀ndɔ̀	'banana'(sp)	-tàtàŋgà	' butterfly'		
-vè	'vone'	-vùhà	'error'	-ndèmbìjè	'example'		
-nù	'mounth'	-kwètɛ̀	'potato'	-dàlɓòè	'spider'		

c) H L - Melody

-dî	'spirit'	-tómbɛ̀	'goat'	-tómbèlì	'tumbler'		
-sɛ̂	'fish'(sp)	-ɓásì	'ring'	-síŋgìhì	'cat'		
-k âŋ	'guinea fowl'	-kúmbà	'pride'	-áŋgòlo	'mango'		
-pâm	'male'	-kúkɛ̀	'cook'	-áŋgìhì	'handkerchief'		

d) LH Melody

-ŏl	'nose'	-tàmbá	'cap'
-ɨ̌h	'eye'	-ɓèlá	'chair'
-ăt	'buffalo'	-pùmá	'orange'
-ŭ	'gray hair'	-sèsé	'whistle'

Given the above LMR and the third hypothesis stated in (5.1.6.1), it is claimed that the rising contours on monosyllables are not derived at the root level. Rather, they are derived at a later stratum where the noun class prefix has been added to the root. Putting aside the monosyllables in (d), the following sample of URs can be postulated for the above data. Then, the various rules stipulated so far operate to yield the surface forms.

Underived Lexical Items.

(156)

tit	sɛha	tataŋga	sɛ	tombɛ	tombeli	tamba
H	H	L	HL	HL	HL	LH

UAC

tit	sɛha	tataŋga	sɛ	tombɛ	tombeli	tamba	
H	H	L	HL	H L	H L	L H	
N/A	sɛha	tataŋga	N/A	N/A	tombeli	N/A	T.S.
	H	L			H L		
N/A	N/A	N/A	sɛ	N/A	N/A	N/A	LMR
			HL				
[tít]	[séhá]	[tàtàŋgà]	[sê]	[tómbè]	[tómbèlì]	[tàmbá]	OUTPUT

5.2.1.2. Derived Stems

As stated earlier, derived stems refer to stems that do not equal the root. These include roots to which a nominal suffix has been added on the one hand and partial reduplicates on the other. The former will be addressed under verbal tone.

Partial reduplication is a well attested process of noun creation in Bakoko. The data below illustrate the phenomenon.

(157)	-sàh	'to be light'	è-sǎsàhè	'lightness'
	-dìt	'to be heavy'	è-dǐdìtè	'weight'
	-lèm	'to dream'	è-lělèm	'dream'
	-kɔ̀n	'to be sick'	è-kɔ̌kɔ̀n	'a sick person'
	-sɔ́h	'to be sweet'	è-sɔ́sɔ́hè	'sweetness'

-púú	'to be white'	è-púpúè	'whiteness'
-vóó	'to be sharp'	è-vóvóè	'sharpness'

Following Marantz (1982), we construe partial reduplication as a form of affixation. *"It is assumed that an affix lacking phonemic content activates a UG convention that copies the adjacent base's segmental tier, which then maps to as many positions in the CV template as possible, consistent with matching [+consonantal] segments with C- slots and [-consonantal] ones with V-slots."* (Kenstowicz 1994: 623). More concretely, partial reduplication in Bakoko involves the prefixation of a CV template with a H tone to the root. It is assumed that the whole base melody is always copied including the tonal melody which in fact is part of the base.

If we forget about the suffixes in partial reduplicates (for the time being), the following rules will be stated in order to derive the forms in (157) above.

a) Association Conventions (UAC) (Pulleyblank 1983).
b) H tone linking
c) H tone deletion.

The processes in (b) and (c) read as follows.

High Tone Linking (HTL)

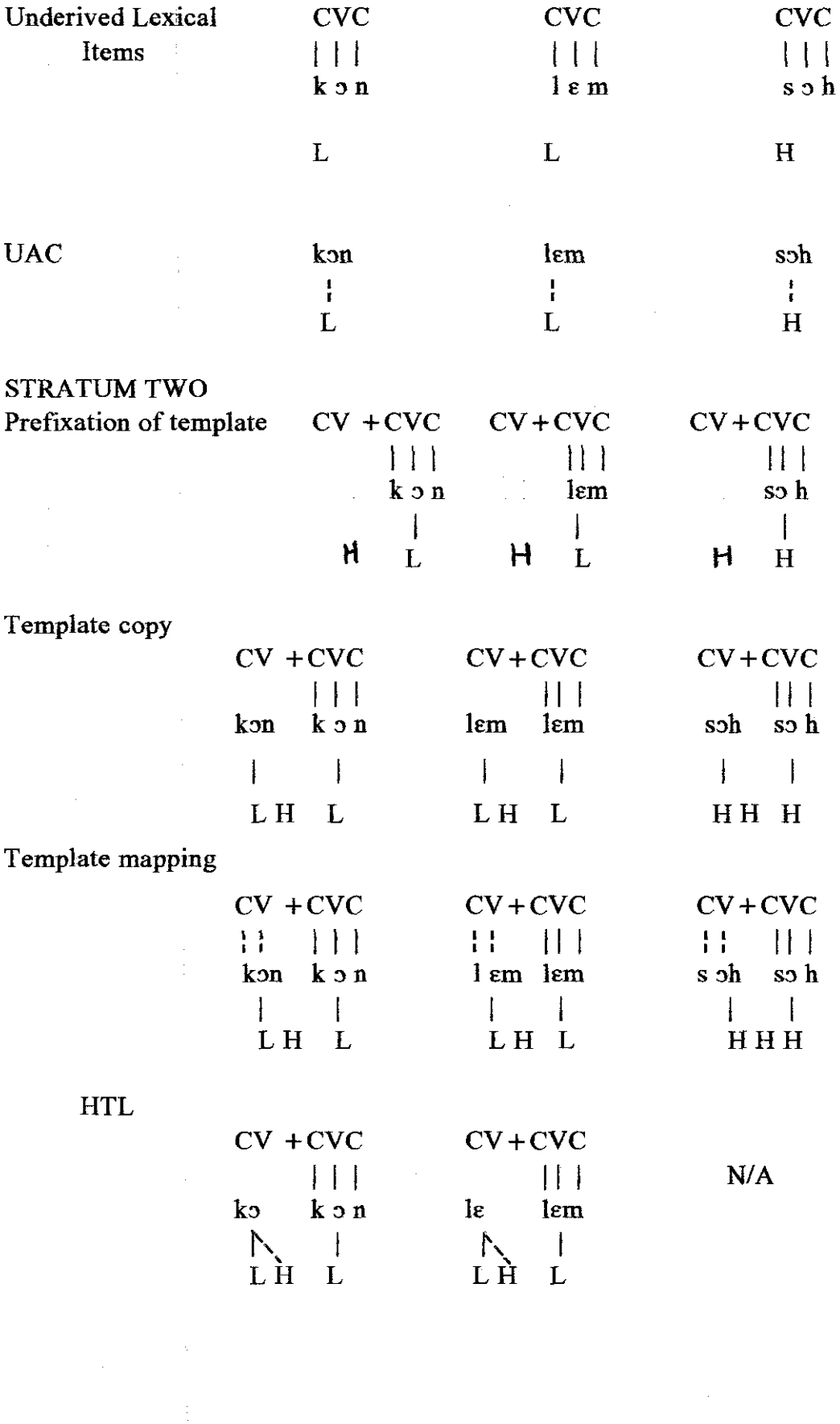
A H tone links onto a preceding vowel that is already associated to a low tone. The output of this process is a rising contour tone.

High tone Deletion (HTD)

An unassociated H tone deletes when preceded by a linked H tone. This rule can be considered as an OCP effect.

It shall be argued in due course that partial reduplication operates at the second stratum of lexical phonology.

(158) Sample derivation.



HTD	N/A	N/A	CVC VC | | | | | s ɔ s ɔ h | | H H H ↘ ø
OUTPUT	[kɔ̌kɔ̀n]	[lɛ̌lɛ̀m]	[sɔ́sɔ́h]

To sum up, partial reduplication operates through the prefixation of CV template to the root. The segmental content of the abstract CV sequence is taken from the root. It also appears that the tone of the template associates to the tone bearing unit when the root melody has already been copied, along with its tone.

5.2.1.3. Compounding.

Compounding is a morphological process whereby two or more independent roots combine to form another word. In Bakoko, the meaning of the compound is not necessarily discovered by knowing the meaning of the different words that form it.

It has been claimed that roots are assigned tone prior to any morphological affixation through the UAC a la Pulleyblank (1983), OCP and tone spreading. But compounds tend to falsify these assumptions. The following data illustrate the point.

(159) ɲàmàbùlú 'rheumatism'
pàkàtóló 'rabbit'
kòɓákòɓá 'turkey'(3)
mŭmháà 'thirty'
mŭmnáà 'forty'
mŭmtân 'fifty'
tàtàná 'now'

The application of rules and principles assumed so far would yield the following unattested words. Below is a sample derivation of compounds and reduplicates when construed as indivisible elements.

(160)	Underived Lexical Items	pakatolo	tatana	koɓakoɓa
		L H	L H	L H
UAC		pakatolo	tatana	koɓakoɓa
		L H	LH	L H
TS		pakatolo	tatana	koɓakoɓa
		L H	LH	L H
OUTPUT		* [pàkátóló]	*[tàtáná]	*[kòɓákóɓá]

An alternative approach would require the multiple linking of both tones of the LH melody. Under such an assumption, the above words will be represented as follows:

(161) pakatolo tatana koɓakoɓa

L H L H L H

All these forms violate the UAC and the third one also violates the Well Formedness Condition. Besides, this matching of tones and segments does not follow any coherent principle.

However, it is claimed in this thesis that these violations are simply apparent. In fact, compounding and reduplication take place after the root cycle where the UAC, OCP and TS normally apply. Thus, the derivation of compounds and reduplicates stands as follows:

(162) underived Lexical # ama ## bulu ## paka ## tolo ## koɓa ## koɓa #
Items' L LH L H LH LH

UAC # ama # # bulu # # paka # # tolo # # koɓa # # koɓa #
| ¦ ¦ ¦ ¦ ¦ ¦ ¦ ¦ ¦ ¦ ¦
L LH L H L H LH

TS ama # # bulu # # paka # # tolo # # koɓa # # koɓa #
/ | | / / | | | |
L LH L H LH LH

Stratum one
Compounding or amabulu pakatolo koɓakoɓa
Reduplication | / | | | / |/ | | | |
L LH L H L H L H

Stratum two
prefixation ɲamabulu — —
| / | |
L L H

OUTPUT [ɲàmàbùlú] [pàkàtóló] [kòɓákòɓá]

These derivations show that compounding and reduplication take place when all roots are already assigned tones.

5.2.1.4. Noun class Prefixation.

It has been argued in this work that all noun class prefixes but 9 and 10 bear a low tone at the UR in Bakoko. It has also been noticed that the prefixation of the noun class marker to the root gives rise to a series of segmental phenomena i.e. vowel deletion, nasal desyllabification etc... Such segmental processes entail in turn suprasegmental changes that must be accounted for.

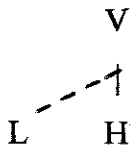
5.2.1.4.1. Floating Low tone Relinking.

This tonal process is provoked by the deletion of the prefix vowel before a vowel initial root on the one hand and nasal desyllabification or coalescence on the other. The data below illustrate the facts.

(163)	/dì-íh/	[dĭh]	'eye'
	/ɓà-ɔ́n/	[ɓɔ̌n]	'children'
	/ɓà-én /	[ɓěn]	'rich people'
	/dì-ó /	[ʤǒ]	'name'
	/dì-ól/	[ʤǒl]	'nose'
	/m̀-ɔ́n /	[mɔ̌n]	'child'
	/ m̀-én/	[měn]	'rich person'

From the observation of the above data, it appears that vowel deletion, coalescence and nasal desyllabification yield a floating low tone. This tone docks onto the root initial vowel. Since the roots in the above data bear an underlying high tone, the tone docking process results in a rising contour formation. This tonal process is called floating low tone relinking.

Floating Low Tone Relinking (FLR): A floating low tone docks onto the right wards tone bearing unit when the latter bears a high tone.



A sample derivation of the above data is provided below, through the application of the floating low tone relinking rule

(164) Sample Derivation.

Underived lexical items	ih H	ɔn H	ol H	ɔn H
UAC	ih ¦ H	ɔn ¦ H	ol ¦ H	ɔn ¦ H
Stratum one	—	—	—	—
Stratum two	di ih | L H	ɓa ɔn | L H	di ol | L H	m ɔn | L H
UAC	di ih ¦ | LH	ɓa ɔn ¦ | L H	di ol ¦ | L H	m ɔn ¦ | LH
Segmental and syllabic rules	d ih | L H	ɓ ɔn | L H	dʒol | L H	m ɔn | L H
FLR	d ih ⟋⌉ L H	ɓ ɔn ⟋⌉ L H	dʒol ⟋⌉ L H	m ɔn ⟋⌉ L H
Output	[dĩh]	[ɓɔ̃n]	[dʒɔ̃l]	[mɔ̃n]

The claim made here is that the floating low tone relinking rule is a stratum two process. But one could wonder whether the UAC do not apply to the fully-formed word, i.e. on the output of the so-called stratum two. Under such a hypothesis, we will still derive the correct output as evidenced by the following:

(165) Input	di ih	ɓa ɔn	di ol	m ɔn
	L H	L H	L H	L H
UAC	di ih	ɓa ɔn	di ol	m ɔn
	LH	L H	L H	LH
Segmental and syllabic rules	d ih	ɓ ɔn	dʒol	m ɔn
	L H	L H	L H	L H
FLR	d ih	ɓ ɔn	dʒol	m ɔn
	L H	L H	L H	L H
Output	[dĭh]	[ɓŏn]	[dʒŏl]	[mŏn]

Though this hypothesis yields the expected outputs for all the above data in (163) and though it seems simpler because the UAC does not apply twice, the hypothesis will not be held in this thesis. In fact, the application of the UAC on the fully formed lexical item cannot always generate the attested surface forms. Consider for example the data below:

(166)	bí-sámà	'six'
	mì-yàó	'kindness'
	lì-ɓèmbá	'flock'
	ɔ̀-ɓèlá	'chair'
	m̀-ɓòŋgó	'boat'

è-lìŋɓán	'mirror'
è-ɓèŋgá	'pot'
ǹ-sɔ̀ŋgí	'arithmetic'
bí-tân	'five'

The application of the UAC on the above nominal forms derives wrong outputs. The sample derivation below illustrates the point.

(167) Sample Derivation

INPUT	bisama	bitan	ɔɓɛla	liɓemba
	H L	H L	L H	L H
UAC	bisama	bitan	ɔɓɛla	liɓemba
	¦ ¦	¦ ¦	¦ ¦	¦ ¦
	H L	H L	L H	L H
T.S.	bisama	N/A	ɔɓɛla	liɓemba
	¦ ¦		¦ ¦	¦ ¦
	H L		H L	L H
OUTPUT	*[bísàmà]	*[bítàn]	*[ɔ̀ɓɛ́lá]	*[lìɓémbá]

The wrong outputs obtained in the above derivation provide further evidence that the UAC and TS apply on the underived lexical items (roots). Then, at a later stage, when the noun class prefix is added, along with its tone, the UAC apply once again to match the tone and the segments.

5.2.1.4.2. Floating Low tone deletion

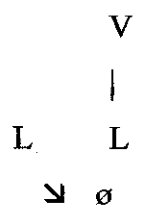
The floating low tone that arises from the loss of the noun prefix tone bearing unit may be followed by a vowel initial root. In such a case, no change is observed. Consider for instance the data below.

(168) /dì-ùwè/	→	[dùwè]	'walk, trip'
/dì-ɔ̀t/	→	[dʒɔ̀t]	'boil'
/mì-àm/	→	[màm]	'things, affairs'
/è-ɔ̀ŋgó/	→	[jɔ̀ŋgó]	'chameleon'
/mì-ɔ̀t/	→	[mɔ̀t]	'boils'
/dì-ìh/	→	[dìh]	'fireplace'

As one compares the underlying and surface forms, one notices that two low tones reduce to one after the loss of the noun class prefix vowel. Two hypotheses can be made as to what happens to the floating low tone: either it remains floating or it gets deleted. Though both possibilities hold, I claim that the floating low elides under OCP. In fact, it has been observed that the floating low docks on the root initial vowel to create a contour tone in 5.2.1.4.1. Given the assumption that OCP controls the root, it is thought that that principle preempts the floating low from relinking after the prefix vowel deletion.

Floating Low Tone Deletion (FLD)

A floating low tone gets deleted when followed by a low that is associated to a vowel.



(169) Sample Derivation.

Input	di-uwɛ	di ɔt	e oŋgo	di ih
	| |/	| |	| | |	| |
	L L	L L	L L H	L L
Segmental	d uwɛ	dʒɔt	joŋgo	dih
rules	\ /	|	| |	|
	L L	L L	L L H	L L
FLD	duwɛ	dʒɔt	joŋgo	dih
	|/	|	| |	|
	L L	L L	L L H	L L
	↘ ø	↘ ø	↘ ø	↘ ø
OUTPUT	[dùwɛ̀]	[dʒɔ̀t]	[jòŋgó]	[dìh]

As we mentioned earlier, the FLD is an OCP effect. Though it can be claimed that the floating low remains unassociated, there is no substantive evidence for such a claim. In fact, the floating low never shows up (i.e. triggers a phenomenon) in this environment. Thus, there is no reason for arguing that it remains unassociated or floating.

5.2.1.4.3. HL Melody Stems.

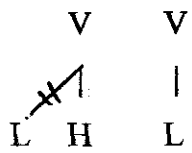
It has been argued that the floating low tone that arises from the deletion of the vowel of the noun class prefix docks onto the following tone bearing unit (root initial vowel). Meanwhile, it has been observed that the language does not display instances of LHL melody at the stem level. In this

regard, how do we account for floating low tones that precede HL melody stems? Let us consider the following data.

(170)	/è-íɓè/	->	[jíɓè]	'shadow'
	/bì-íɓè/	->	[bíɓè]	'shadows'
	/dì-íɓè/	->	[díɓè]	'darkness'
	/dì-ámbò/	->	[ʤámbò]	'swamp'
	/ dì-áŋgòlò/	->	[ʤáŋgòlò]	'mango'
	/dì-ómò/	->	[ʤómò]	'quarrel'
	/bì-álkà /	->	[bjálkà]	'nails'

The data above reveal that the floating low does not dock onto the HL melody stem. Or else, it can be claimed that the floating low lands on the root initial vowel and creates a rising contour tone. But this is followed by a contour simplification process which is aimed at meeting the requirements of the stem melodies. Under this hypothesis, it can be stated that the FLR (Floating Low Relinking) applies to associate the floating low to the root initial vowel. Then a contour simplification rule operates to yield the surface forms.

Contour Simplification (C.S).: A rising contour reduces to a high tone when followed by a low tone.



The derivation of the above data can be seen in the following sample derivation:

(171) Sample Derivation

INPUT	di iɓe	di omo	di ambo
	| | |	| | |	| | |
	L H L	L H L	L H L
Segmental rules	d iɓe	ʤ omo	ʤ ambo
	| |	| |	| |
	L H L	L H L	L H L
F.L.R.	d iɓe	ʤ omo	ʤ ambo
	⌐ | |	⌐ | |	⌐ | |
	L H L	L H L	L H L
C.S.	di ɓe	ʤ omo	ʤ ambo
	≠ |	≠ |	≠ |
	L H L	L H L	L H L
OUTPUT	[díɓè]	[ʤómò]	[ʤámbò]

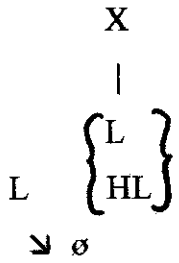
Though the application of the contour simplification rule derives the expected outputs, this rule seems undesirable because it predicts that Bakoko does not tolerate LHL melodies on nominal forms. But such a claim is falsified by the presence of words like those listed below in the lexicon.

(172)	èvɔ́lɔ̀	'broom'	èsáhà	'lung'
	èbúŋgà	'mat'	ŋ̀kúɣù	'defunct'
	ǹtómbè	'goat'	èkɔ́xhè	'cough'
	m̀ɓɛ́là	'owner, proprietor'		

I therefore conclude that contour simplification is not aimed at meeting a requirement on fully formed lexical items. Instead, it satisfies a condition on stem melodies where we seldom encounter LHL. This situation implies that the brackets on the stem are not erased at the end of the stem formation. Rather, all the constraints on the stem remain active. Mutaka (1990:125-126) declares that "... Bracket erasure has never been shown to be an inviolable principle of UG. The work it has successfully accomplished in lexical phonology has been its usefulness within a given stratum. Nothing in the theory should in principle forbid some kind of rebracketing of constituents at different strata, if these strata are conceived of as independent blocks. In fact, the literature dealing with phrasal phonology implicitly assumes this rebracketing by regrouping constituents of the prosodic hierarchy into syllable, foot, prosodic word, phonological phrase, intonational phrase, utterance (Selkirk 1986, Hayes 1989, Nespor and Vogel 1982)." In this work, I assume that, at stratum two where the noun class prefix is added, the various formatives are rebracketed into stem (stratum one) and INFL (stratum two). Reasons for assuming this rebracketing will be discussed in more detail at the end of this chapter when we postulate boundary tones between stratum one and stratum two.

The rebracketing of the various formatives thus motivates the reduction of the LHL into HL on the stem. Given this rebracketing, the above data can be looked at in a different perspective. Instead of postulating a relinking rule followed by a delinking one (Contour Simplification), we could simply assume that the floating low tone deletes when followed by a HL melody stem. This rule would simply require a modification of the Floating Low tone Deletion (FLD) that was proposed earlier.

Floating Low Tone Deletion (FLD) modified.
A floating low tone deletes when followed by a low tone or a HL melody stem.



This alternative is simpler because it does not require an additional rule in the grammar. Therefore it is preferable to a rule that proposes relinking and delinking. Under this assumption, the above data can be derived as follows:

(173) INPUT	di iɓe	di omo	di ambo
	L H L	L H L	L H L
Segmental rules	d iɓe	dʒ omo	dʒ ambo
	L H L	L H L	L H L
F.L.D.	d iɓe	dʒ omo	dʒ ambo
	L H L	L H L	L H L
	ø	ø	ø
OUTPUT	[díɓè]	[dʒómò]	[dʒámbò]

To conclude, it has been argued in this section that as far as tone is concerned, roots otherwise called underived lexical items are derived prior to any affixation process through the application of OCP, UAC and tone spreading after which noun class prefixes and partial reduplication then operate at the second stratum through High Tone Linking, High Tone Deletion, floating Low Relinking, Floating Low Deletion and the UAC. Stems, i.e. roots plus nominal suffix or root plus verbal extensions will be construed in the subsequent section as derived at stratum one.

5.2.2. Verbal Tone.

Verbs and deverbal nouns have underlying tonal information, just as lexical nouns do. Such a situation contrasts with the one found in many Bantu languages of the Great Lakes region where verbs have no underlying tone. Among these languages are Kikuria, Kihehe, Kinga, Safwa, Makua, Makonde, and Yao as reported in Odden (1989, 1994). This section provides an analysis of tone and tonal phenomena in the derivational morphology of the verb (i.e. root plus extensions, etc.) on the one hand and the inflectional morphology on the other.

5.2.2.1. Tone Assignment on verb stems.

It has been claimed that there are two kinds of stems in Bakoko. These are underived and derived stems. Underived stems are those that equal the root and are otherwise called by Meeussen (1969) verbal base. Derived stems otherwise called 'deverbative bases' by Meeussen (1967:92) are made up of a root plus an extension (Ext) or a final vowel (FV). It is assumed that both kinds of stems are derived at different levels of lexical phonology.

5.2.2.1.1. Underived stems.

Underived stems or roots are monosyllabic in Bakoko. It is assumed that they are derived prior to any affixation process through the application of the UAC that assign tone to segments. It is also argued that roots may have a high or low tone underlyingly. Consider for example the following data.

(174) a.	lì- ɓàt	'to ask'	b.	lì- ɓát	'to add'
	lì-mìn	'to swallow'		lì-mán	'to finish'
	lì-ɔ̀l	'to laugh'		lì-sál	'to work'
	lì-ɓèn	'to refuse'		lì-hɛ́n	'to see'
	lì-dìŋ	'to love'		lì-dí	'to eat'

Underived stems are assigned tone through the application of the UAC. A sample derivation of the above data is proposed below:

(175) Underived Lexical items	min	ɓat	hɛn	di
	L	L	H	H
UAC	min	ɓat	hɛn	di
	¦	¦	¦	¦
	L	L	H	H
OUTPUT	[mìn]	[ɓàt]	[hɛ́n]	[dí]

5.2.2.1.2. Derived Stems.

This section addresses two types of derived stems: derived nouns or deverbatives and derived verbs.

i) Derived verbs [(3)].

As stated earlier, a derived verb is a cover term to refer to stems that are made up of a root plus a final vowel or a verbal extension. Though a verbal extension can be a vowel, the latter differs from the final vowel by the fact that it modifies the meaning of the verb base. Below is a sample of derived verbs.

(176) a. -tʃìì 'to write'		tʃìì-ɓàn	'to get registered'
		tʃìì-lè	'to write for'
		tʃìì-làn	'to write to each other'
	-dìŋ 'to love'	dìŋ-ɓàn	'to love oneself'
		dìŋ-àn	'to love each other'
		dìŋ-lè	'to love for'
	-ɓàt 'to ask'	ɓàt-ɓàn	'to ask oneself, to wonder'
		ɓàt-àn	'to ask each other'
		ɓàt-lè	'to ask for'
b.	-lɔ́x 'to beat'	-lɔ́x-ɓàn	'to beat oneself'
	-lám 'to cook'	-lám-lè	'to cook for'
	-káx 'to tie'	-káx-jɛ̀	'to oblige'
	-óx 'to hear'	-óx-làn	'to listen to each other'
	-sóŋg 'to count'	-sóŋg-lɛ̀	'to be counted'
	-ɓáh 'to put'	-ɓáh-lɛ̀	'to be split'

Sets (a) and (b) display low and high tone roots respectively. These roots are followed by various verbal extensions. In each case, the verbal extension bears a low tone at the surface. A similar statement can be made about derived stems made up of root plus final vowel.

(177) a.	-tàk- ~	-tàk-à	'to suffer'
	-ɓɛ̀x- ~	-bɛ̀ɣ-ɛ̀	'to carry'
	-kòx ~	kòɣ-ò	'to bite'
	-kɔ̀ŋ- ~	-kɔ̀ŋ-ɔ̀	'to peel'
	-lɔ̀nd- ~	-lɔ̀nd-ɔ̀	'to sew'
	-pùm- ~	-pùm-ù	'to harvest'

b.	-lóx-	~	-lóɣ-ò	'to graze
	-níŋg-	~	níŋg-ì	'to enter'
	-tɛ́l-	~	tɛ́l-ɛ̀	'to stand'
	-ɲát-	~	ɲát-à	'to raise'
	-kúl-	~	kúl-ù	'to destroy'
	-óm-	~	óm-ò	'to quarrel'
	-vúŋg-	~	vúŋg-ù	'to blow'

The main question to address about derived verbs is that of tone assignment. More precisely, how is tone assigned on derived verbs? Are the derived and underived verb stems obtained at the same level of lexical phonology? I claim that they are not derived at the same level. Underived stems are obtained before any affixation process through the application of the UAC that assign tone to vowels. Instead, derived stems are produced at level one of lexical phonology where a toneless suffix is added to the root. But the toneless suffix (verbal extension or final vowel) is assigned a tone by default at the postlexical component.

Default Tone Mapping (DTM)

A low tone is assigned to a toneless tone bearing unit.

V
¦
L

Thus, the assignment of tones to derived verb stems operates as follows:

(178)

Underived lexical items	ɓat	ɓex	lam	kul
	L	L	H	H
UAC	ɓat	ɓex	lam	kul
	¦	¦	¦	¦
	L	L	H	H

Stratum One

Affixation	ɓat-ɓan	ɓɛx-V	lam-le	kul-V
	|	|	|	|
	L	L	H	H
Segmental rules	—	ɓɛɣɛ	—	kulu
		|		|
		L		H

Postlexically:

DTM	ɓat-ɓan	ɓɛɣɛ	lamle	kulu
	| ¦	| ¦	| ¦	| ¦
	L L	L L	H L	H L
OUTPUT	[ɓàt-ɓàn]	[ɓèɣè]	[lámlè]	[kúlù]

Two alternative analyses can be raised against the one assumed here. A first approach is to argue that the verbal suffixes (extensions and final vowels) are toneless. Meanwhile derived and underived stems are produced at the same level. Within this alternative, the rules of UAC and T.S. apply to assign tone to tone bearing units. Below is a sample derivation of the data in (a) and (b).

(179) INPUT	ɓat-ɓan	ɓex-V	lam-le	kul-V
	L	L	H	H
Segmental rules	—	ɓɛɣɛ	—	kulu
		L		H

UAC	ɓat ɓan	ɓɛɣɛ	lamle	kulu
	¦	¦	¦	¦
	L	L	H	H
T.S.	ɓat ɓan	ɓɛɣɛ	lamle	kulu
	˩ˊ	˩ˊ	˩ˊ	˩ˊ
	L	L	H	H
OUTPUT	[ɓàt ɓàn]	[ɓèɣè]	*[lámlé]	* [kúlú]

Under this alternative, one can yield the expected outputs for low tone stems. However, the application of Tone Spreading in the (b) forms creates unattested surface forms.

A means of avoiding this undesirable situation is to claim that there are two kinds of derived verb stems: L and HL melody verb stems. Such an alternative solution will generate the right outputs.

(180) INPUT	ɓat-ɓan	ɓex-V	lam-le	kul-V
	L	L	H L	H L
Segmental rules	—	ɓɛɣɛ	—	kulu
		L		H L
UAC	ɓat ɓan	ɓɛɣɛ	lamle	kulu
	¦	¦	¦ ¦	¦ ¦
	L	L	H L	H L
T.S.	ɓat ɓan	ɓɛɣɛ	—	—
	˩ˊ	˩ˊ		
	L	L		
OUTPUT	[ɓàt ɓàn]	[ɓèɣè]	[lámlè]	[kúlù]

The claim made by the second alternative solution is that the L tone that occurs on the extensions and final vowels are underlying. But such a claim does not hold when verbs are put in the imperative form. As I will argue later on, the imperative singular marker is a floating H tone that docks leftwards on the vowel of the stem. When it links to a root vowel that bears a low tone, a rising contour is created. However, though the extensions and final vowels always surface with a L tone, the landing of the imperative floating H marker does not yield a contour. This statement is evidenced by the data below.

(181) Verbs (Infinitive)		Imperative Singular	
a. -mìn	'to swallow'	mǐn	'swallow'
-ɓàt	'to ask'	ɓǎt	'ask'
-ɔ̀l	'to laugh'	ɔ̌l	'laugh'
-dìŋ	'to love'	dǐŋ	'love'
b. -ɓèɣè	'to carry'	ɓèɣé	'carry'
-ómò	'to quarrel'	ómó	'quarrel'
-ɓàtɓàn	'to ask oneself'	ɓàtɓán	'ask yourself'
-dìŋàn	'to love each other'	dìŋán	'love each other'

The above alternative solutions cannot account properly for the rising contour formation in (a) and the surface H in (b). If the roots and verbal suffixes (extensions and final vowels) were assigned tone at the lexical component, then we would expect (a) and (b) forms to behave alike. But such is not the case. However, our solution which claims that extensions and final vowels are not assigned tone at the lexical component can accurately account for all the data in (a) and (b). The derivation of the imperative forms under the assumption held in this work operates as follows:

(182) Sample derivation

Underived lexical items	min	ɓat	om	diŋ	ɓat
items					
	L	L	H	L	L
UAC	min	ɓat	om	diŋ	ɓat
	¦	¦	¦	¦	¦
	L	L	H	L	L
Stratum One					
Affixation	—	—	om-V	diŋ-an	ɓat ɓan
			¦	¦	¦
			H	L	L
Segmental rules	—	—	omo	—	—
			|		
			H		
Imperative H linking	min	ɓat	omo	diŋan	ɓatɓan
	⟍	⟍	| ¦	| ¦	| ¦
	L H	L H	H H	L H	L H
OUTPUT:	[mĭn]	[ɓăt]	[ómó]	[dìŋán]	[ɓàtɓán]

From the above sample derivation, it becomes apparent that the imperative marker comes in when the roots have already been assigned tone. A contour tone is thus formed when the root bears a low tone. Meanwhile extensions and final vowels are still toneless. Therefore, the linking of the imperative H tone does not provoke any contour formation.

ii) Derived nouns

Unlike their underived counterparts, derived nouns share the same root with a verbal form. However, they display all the characteristics of a

nominal form. For example, they are preceded by a noun class prefix that has a singular and a plural form. Of interest for us here is the fact that derived nouns are generally followed by a nominal suffix. This section addresses tone assignment on these nominal suffixes. A sample of derived noun stems is displayed in the data below. The first set (a) shows noun stems with a high tone suffix whereas (b) displays low tone nominal suffixes.

(183) a.	lì-pùn-	'to resemble'	ɲ-pùn-án	'resemblance'
	lì-vèx-	'to create, to measure'	è-vèx-lé	'creature'
	lì-ɓàt-	'to ask'	m̀-ɓàt-áx	'question'
	lì-ɓɔ́l-	'to lose'	ɲ-ɓɔ́l-án	'loss'
	lì-jéɓ-	'to answer'	ɲ-jéɓ-ján	'answer'
	lì-kím-	'to blame'	bì-kím-á	'blame'
b.	lì-jéx-	'to teach'	m̀-jéx-lè	'teacher'
	lì-ló	'to vomit'	ɲ-ló- à	'vomiting'
	lì-áx-	'to yawn'	è-áx-làn	'yawn'
	lì-vèx-	'to measure'	ɔ̀-vèx-à	'meter'
	lì-tʃìì-	'to write'	m̀-tʃìì-lè	'writer'

It is assumed in this work that nominal suffixes, unlike verbal extensions and final vowels come along with an underlying tone. Besides, it has been argued that roots are derived prior to any affixation process. Thus, it is thought that nominal suffixes are assigned tone through the application of the UAC at stratum one. A sample derivation of the above data is provided below:

(184) Underived lexical items	pun	vex	lo	ax	vex
	L	L	H	H	L
UAC	pun	vex	lo	ax	vex
	L	L	H	H	L
Stratum one					
Affixation	punan	vexle	loa	axlan	vexa
	L H	L H	H L	H L	L L
UAC	punan	vexle	loa	axlan	vexa
	L H	L H	H L	H L	L L
Segmental rules	—	—	—	—	veɣa
					L L
OUTPUT	[pùnán]	[vèxlé]	[lóà]	[áxlàn]	[vèɣà]

In this perspective, the derivation of deverbatives does not require any additional rule.

An alternative analysis could posit tonal melodies for the derived nouns. Thus, it would be claimed that the root and the nominal suffix are derived at the same level of lexical phonology. Under such an approach, the application of the UAC and T.S. rules would yield the expected outputs as evidenced by the sample derivation below.

(185) Sample Derivation

Input	ɓɔlan	vexa	vexle	axlan
	H	L	L H	H L
UAC	ɓɔlan	vexa	vexle	axlan
	|	|	| |	| |
	H	L	L H	H L
T.S.	ɓɔlan	vexa	—	—
	H	L		
Segmental	—	veɣa	—	—
		L		
OUTPUT	[ɓɔ́lán]	[vèɣà]	[vèxlé]	[áxlàn]

Though this second hypothesis yields the expected outputs, it is not maintained in this thesis for the following reasons: First of all, the sole fact that two words, namely vèɣà and vèxlé are derived from the same root proves that each suffix has its underlying tone. Therefore, the postulation of a tone spreading process to account for vèɣà implies that at least some nominal suffixes are toneless. Under this view, one could claim that low tone suffixes are not specified for tone at the UR. But such a claim would lead to unattested surface forms for the actual HL melody derived nouns. This statement can be illustrated by the following sample derivation in which low nominal suffixes are considered as toneless.

(186) Input	punan	ɓɔlan	jexle	loa	vexa
	L H	H	H	H	L
UAC	punan	ɓɔlan	jexle	loa	vexa
	L H	H	H	H	L
TS	—	ɓɔlan	jexle	loa	vexa
		H	H	H	L
Other rules	—	—	—	—	veɣa
OUTPUT	[pùnán]	[ɓɔ́lán]	*[jéxlé]	*[lóá]	[vèɣà]

The hypothesis that surface low nominal suffixes are underlyingly toneless leads to wrong outputs in some cases.

Moreover, if tonal melodies are postulated on derived nouns, this will imply that the latter do not differ from underived nouns, at least at the underlying level. As it will become evident in due course, such a claim is not acceptable because the OCP mainly controls the underived lexical items in Bakoko.

To sum up, deverbal nouns are derived at stratum one of lexical phonology where the nominal suffix is added to the root, along with its tone. Then, the UAC apply to match the tone with the tone bearing units.

5.2.2.2. Verbal Inflection.

The verb is a grammatical category that is likely to undergo a series of modifications depending on tense, aspect, mood, etc. This section

addresses and accounts for the main phonological changes that occur on a verbal form. Of great interest for us here are the notions of tense and aspect.

Comrie (1985:9-12) defines tense as "a grammaticalized expression of location in time ... In most languages that have tense, tense is indicated on the verb, either by the verb morphology (as with English past loved versus non-past loves) or by grammatical words adjacent to the verb." Comrie also distinguishes between absolute and relative tenses. Absolute tenses refer to the present tense, the past tense and the future tense. Relative tenses are the divisions that operate within absolute tenses. The time-line in Bakoko is made up of six relative tenses which are the present tense, the future tense, the remote future tense, the past tense, the remote past tense and the indefinite past tense. Some of these tenses affect the morphology of the verb (e.g. Remote Past tense (P2))) and other tenses have their markers adjacent to the verb. Of interest for us in this chapter is the fact that some of these adjacent markers provoke tonal changes on the verb.

On the other hand, Comrie (1976:3) defines aspect as follows: "Aspects are different ways of viewing the internal temporal constituency of a situation." In the English sentence 'John was reading when I entered' he writes that "the second verb presents the totality of the action referred to (here, my entry) without reference to its internal constituency: the whole of the situation is presented as a single unanalyzable whole, with beginning, middle and end rolled into one; no attempt is made to divide this situation up into the various individual phases that make up the action of entry." In the analysis that follows, the subtle distinctions between the notions of tense and aspect shall not be highlighted. Instead, our focus will be on the tonal changes that occur with respect to tense and aspect. Meanwhile, tense and aspect specifications that do not entail tonal processes will deserve no special attention in this section.

5.2.2.2.1. The Present Tense.

It has been argued in the second chapter that the present tense marker is a residual *velar fricative* [x] followed by a floating low tone. The consonant slot attaches to the preceding subject prefix and the low tone remains floating as evidenced below. In the following data, we display a low tone verb (a) and a high tone verb (b) in the present tense.

(187)a. mà-x mìn mìndím [màx mìn mìndím] 'I swallow water'
I TM swallow water
ɔ̀-x mìn mìndím [ɔ̀x mìn mìndím] 'you swallow water'
you TM swallow water
à-x mìn mìndím [àx mìn mìndím] 'he swallows water'
he TM swallow water
bǐ-x mìn mìndím [bǐx mìn mìndím] 'we swallow water'
we TM swallow water
mìní-x mìn mìndím [mìníx mìn mìndím] 'you swallow water'
you TM swallow water
bí-x mìn mìndím [bíx mìn mìndím] 'they swallow water'
they TM swallow water

b. mà-x hén mùt [màx hén mùt] 'I see a person'
I TM see person
ɔ̀- x hén mùt [ɔ̀x hén mùt] 'you see a person'
you TM see person
à-x hén mùt [àx hén mùt] 'he sees a person'
he TM see person
bǐ-x hén mùt [bǐx !hén mùt] 'we see a person'
we TM see person

mìní-x hén mùt [mìníx !hén mùt] 'you see a person'
you TM see person
bí-x hén mùt [bíx !hén mùt] 'they see a person'
they TM see person

From these data, it appears that the verb root does not undergo any change in (a). In (b) we notice that the high tone of the verb root is realized lower in the plural forms. This phenomenon is commonly called downstep of a high tone. This downstep leads us to question the exact representation of the underlying forms. Two hypotheses can be postulated here.

The first hypothesis claims that the above downstep is automatic. Put differently, the language does not tolerate a sequence of high tones. When such a situation occurs, the second high is realized lower than the first. Thus, at the surface phonetic level, one should not find two consecutive high tones. If such a hypothesis were adopted, one would have to handle numerous counterexamples, both at the lexical and postlexical level. Below is a sample of data where sequences of high tones occur. (a) displays high tone sequences at the lexical level while (b) shows phrasal data.

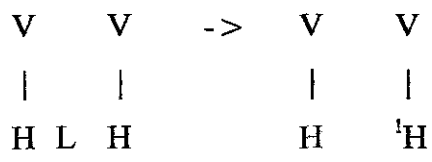
(188) a. ŋ̀-káálá 'white man' è-sáŋ́é 'father'
mì-kélé 'vaccination' mbómbó 'grandfather'
mbémbí 'measles' bì-kímá 'blame'

b. bǐ sóm- óó tít -> [bǐ sómóó tít] 'we brought meat'
we buy P2 meat
mìní ɓát-áá tít -> [mìní ɓátáá tít] 'you added meat'
you add P2 meat
bí hén-éé ɓòt [bí hénéé ɓòt] 'they saw people'
they see P2 people

These exceptions to automatic downstep cause us to reject the first hypothesis.

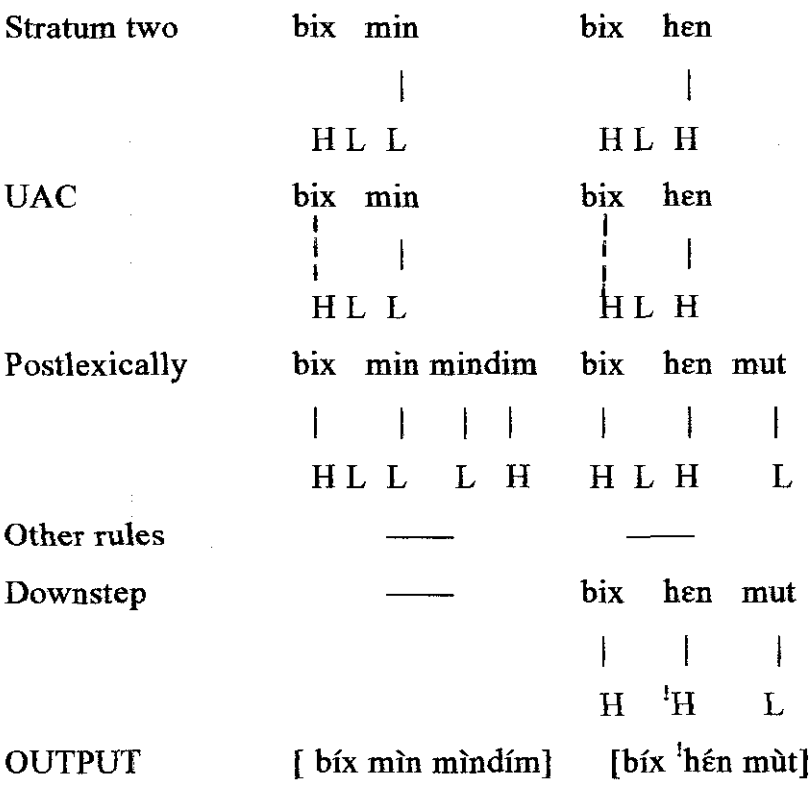
The second hypothesis claims that there is a floating low tone between the subject marker and the verb root. This floating low, along with the residual consonant [x] form the present tense marker. Thus, it is thought that the floating low tone that occurs between the subject marker and the verb does not surface. In other words, it does not link onto a preceding or subsequent tone bearing unit. Instead, its presence between two high tones causes the downstep of the second high.

Downstep: the second of two high tones is realized lower than the first when both are separated by a floating low tone.



In Pulleyblank's (1983) model, downstep is construed as a phonetic phenomenon [4]. This work confirms Pulleyblank's analysis of downstep and gives evidence that downstep operates after all postlexical processes. Given this assumption, a sample derivation of the above data is provided by [bíx mìn mìndím] 'they swallow water' and [bíx !hén mùt] 'they see a person'

(189) Underived lexical items	min	hɛn
	L	H
UAC	min	hɛn
	L	H
Stratum One	—	—



5.2.2.2.2. The Past Tense 1 (P1).

As we mentioned earlier, the P1 marker is H [a]. The segmental part of the formative (vowel) coalesces with the preceding V-slot while the floating H docks to the right onto the verb root. The data below illustrates the surface realizations of the P1 marker. Sets (a) and (b) display the P1 forms of two low tone roots, while set (c) shows P1 forms with a high tone root.

(190) a. lì-ɓàt 'to ask'

/mì a ´ ɓàt /	→	[mà ɓât]	'I asked'
/ɔ a ´ ɓàt /	→	[wà ɓât]	'you asked'
/à a ´ ɓàt /	→	[à ɓât]	'he asked'
/bǐ a ´ ɓàt /	→	[bă ɓàt]	'we asked'
/mìní a ´ ɓàt /	→	[màná ɓàt]	'you asked'
/bí a ´ ɓàt /	→	[ɓá ɓàt]	'they asked'

b. lì-ɓèx-V 'to carry'

/mì a ´ ɓèx-V/	→	[mà ɓéɣè]	'I carried'
/ɔ̀ a ´ ɓèx-V/	→	[wà ɓéɣè]	'you carried'
/à a ´ ɓèx-V/	→	[à ɓéɣè]	'he carried'
/bǐ a ´ ɓèx-V/	→	[ɓǎ ɓèɣè]	'we carried'
/mìní a ´ ɓèx-V/	→	[mànáɓèɣè]	'you carried'
/bí a ´ ɓèx-V/	→	[ɓá ɓèɣè]	'they carried'

c. lì-hén 'to see'

/ mì a ´ hén /	→	[mà hén]	'I saw'
/ ɔ̀ a ´ hén /	→	[wà hén]	'you saw'
/ à a ´ hén /	→	[à hén]	'he saw'
/ bǐ a ´ hén /	→	[ɓǎ hén]	'we saw'
/ mìní a ´ hén /	→	[mànáhén]	'you saw'
/ bí a ´ hén /	→	[ɓá hén]	'they saw'

Before looking at the phonological processes that operate when a verb is put into the P1 form, we start by questioning the nature of the P1 formative. As one considers the various surface realizations, several proposals can be made as to the shape of the P1 formative. The following formatives can be postulated:

H LH H

a	a	a

H

|

a

Solution 1: The P1 formative is

H

|

If we posit a as P1 marker, it can be argued that the derivation of the surface forms proceeds as follows:

-Segmental processes apply to delink the tone of the subject marker which remains floating.

-The floating low relinking (FLR) process applies to link the stranded tone to the P1 marker, following the Stranded Tone Principle. This yields a rising contour.

-The floating H deletes when followed by another H tone.

-The high mora of a rising contour spreads onto a low tone root, in the singular form. This contour simplification on the INFL (through the spreading) creates another contour on the verb root.

-A falling contour simplifies on a verb root that is followed by a toneless vowel. It can be argued that the low part of the falling contour delinks and docks on the toneless vowel.

Following the first hypothesis, a sample derivation of the forms in (a), (b) and (c) is provided below.

(191) Sample derivation

Input	ɔ a ɓat	ɔ a bɛɣɛ	bi a ɓat	a a hɛn
(Stratum 2)	| | |	| | |	| | |	| | |
	L H L	L H L	H H L	L H H
Segmental rules	w a ɓat	w a bɛɣɛ	b a ɓat	a hɛn
	| |	| |	| |	| |
	L H L	L H L	H H L	L H H
FLR	w a ɓat	w a bɛɣɛ	b a ɓat	a hɛn
	⟋| |	⟋| |	⟋| |	⟋| |
	L H L	L H L	H H L	L H H
H Del.	——	——	ba ɓat	——
			| |	
			H H L	
			↘ø	

H-Spread	wa ɓat	wa bɛɣɛ	——	——
	LH L	LH L		
FCS	——	wa bɛɣɛ	——	——
		L HL		
Postlexcially	——	——	ɓa ɓat	——
Segmental			H L	
rules				
OUTPUT	[wà ɓât]	[wà bɛ́ɣɛ̀]	[bá ɓàt]	[à hén]

Though the first hypothesis derives the expected outputs, it is however unacceptable for many reasons. First of all, it requires new rules that do not capture linguistically significant generalisations [5]. Secondly, the rising contour simplification that operates through the H tone spreading is highly unreliable. It is a morphologized rule that solely applies to singular forms. Meanwhile, plural forms such as ɓá ɓàt 'they asked' do exist in the language and do not undergo the spreading rule. In a more general perspective, the P_1 negative forms stand as a counter example to the rising contour simplification rule.

Consider the following:

(192) mă ɓàt mɔ̀ní ɓé 'I did not ask for money'
I Neg P_1 ask money
wă ɓàt mɔ̀ní ɓé 'You did not ask for money'
You Neg P_1 ask money
ă ɓàt mɔ̀ní ɓé 'He did not ask for money'
He Neg P_1 ask money

the above forms meet all the conditions for the rising contour simplification to apply.
But it does not. Such situation lead us to reject [H / a] as P_1 formative.

Solution two: The P_1 formative is L H / a

If we assume the above P_1 formative, it would favour a straight forward account of the singular forms where it can be claimed that the floating H tone docks on the root. When the root vowel bears a low tone, it yields a falling contour. Otherwise the floating H deletes under OCP when followed by a high tone root. Along the same line, it will be argued that the floating low which results from segmental processes of vowel deletion or glide formation either deletes or remains floating. On the other hand, the derivation of plural forms requires highly complicated and ad hoc rules. Since all the plural subject markers end in a high tone, one can argue that the segmental rules create floating high tones. The latter then reassociate to the vowel of the P_1 formative to yield falling contours. A contour simplification rule then operates to delink the floating tone which finally deletes. Finally, the floating H of the P_1 formative deletes when preceded or followed by a high tone. The problem with this solution is that it is too complicated and less plausible. It also lacks psychological reality because it is hard to believe that a child acquires so many rules within a limited and short time span [(5)].

Solution three: The P_1 formative is H / a.

The third hypothesis assumes a P_1 marker made up of a toneless vowel [a] and an unlinked high tone. Given the URs that have been

postulated for the P_1 forms, the following statements can be made about the surface forms:

-The floating H of the P_1 formative docks onto the verb root. As a result of the docking process, low tone roots receive a falling contour tone specification as in the singular forms of (a).

- When the falling contour is followed by a toneless vowel, the contour simplifies. Namely, the low part of the contour delinks and relinks onto the toneless vowel.

-When the subject marker ends in a high tone, the floating H of the P_1 formative gets deleted.

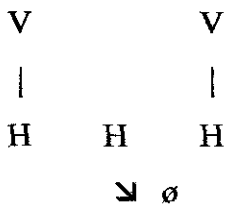
-When the floating H is followed by a H tone root, it gets deleted under OCP.

From the above assumptions, the following tone rules can be stated in order to account for the P_1 data.

High Docking: A floating H docks onto a low tone root to its right.

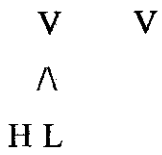
(6)

Floating High Tone Deletion (H.T.D.):A floating high tone gets deleted when preceded or followed by a linked H.



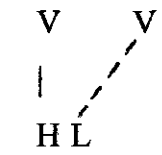
This floating high deletion rule is a revised version of the previous one. The new information added here is that the floating H also delete if followed by a linked H.

Contour Simplification (C.S.) The low part of a contour delinks when followed by a toneless vowel.



It is thought that contour simplification feeds a relinking of the floating low with the toneless vowel.

Floating Low Relinking (FLR_2): A delinked low tone (i.e. floating low tone) reassociates with a following toneless vowel.



Prior to all these processes, it is worth noting that when the P_1 formative is added to the subject marker, segmental phenomena operate (i.e. glide formation, vowel deletion, etc.). These segmental processes create floating tones which along with the P_1 marker's floating H form a sequence of unassociated tones. Thus, the UAC apply to assign tones to tone bearing units. As mentioned earlier, this work assumes the UAC a la Pulleyblank (1983).

When applied to the underlying forms, the rules stated above yield the expected surface forms. The derivation of [wà ɓât] you asked', [wà ɓé ɣɛ̀] 'you carried, [ɓáɓàt] , they asked' and [à hén] 'he saw' from /ɔa ´ɓàt /, /ɔ a ´ɓè ɣɛ /,/ bí a ´ɓàt / and / à a ´hén / respectively is provided below.

(193)

Input	ɔ a ɓat	ɔ a ɓɛɣɛ	bi a ɓat	a a hɛn
Stratum two	| |	| |	| |	| |
	LH L	LH L	H H L	L H H
Segmental Rules	wa ɓat	wa ɓɛɣɛ	b a ɓat	a hɛn
	|	|	|	|
	LH L	LH L	H H L	L H H
UAC	wa ɓat	wa ɓɛɣɛ	b a ɓat	a hɛn
	/ |	/ |	/ |	/ |
	LH L	LH L	H H L	L H H
HTD	wa ɓat	wa ɓɛɣɛ	ba ɓat	a hɛn
	| |	| |	| |	| |
	LH L	L H L	H H L	L H H
			↘ø	↘ ø
H Docking	wa ɓat	wa ɓɛɣɛ	N/A	N/A
	| /|	| /|		
	L H L	LHL		
C.S.	N/A	wa ɓɛɣɛ	N/A	N/A
		| /|		
		L H L		
FLR_2	N/A	wa ɓɛɣɛ	N/A	N/A
		| | ¦		
		L H L		
Other rules				
OUTPUT	[wà ɓât]	[wà bɛ́ɣɛ̀]	[ɓá ɓàt] (7)	[à hɛ́n]

5.2.2.2.3. The Indefinite Past Tense (P3)

The P3 marker that has been identified in chapter two is a V-slot [u] and an unassociated or floating high tone. Like the P1 marker, the segmental part of the formative coalesces with the preceding vowel while the floating high tone docks onto the root vowel (under appropriate conditions). The data below display an underived low stem (a) , a derived low stem (b) and a high tone stem (c) in the P3 form.

(194) a. lì-mìn 'to swallow'

/mì u´ mìn /	→	[mù mîn]	'I swallowed'
/ɔ̀ u´ mìn /	→	[wù mîn]	'you swallowed'
/à u´ mìn /	→	[ɔ̀ mîn]	'he/she swallowed'
/bǐ u´ mìn /	→	[bǔ mìn]	'we swallowed'
/mìní u´ mìn /	→	[mùnú mìn]	'you swallowed'
/bí u´ mìn /	→	[bú mìn]	'they swallowed'

b. lì-ɓèx-V 'to carry'

/mì u´ ɓèx-V /	→	[mù ɓéɣè]	'I carried'
/ɔ̀ u´ ɓèx-V /	→	[wù ɓéɣè]	'you carried'
/à u´ ɓèx-V /	→	[ɔ̀ ɓéɣè]	'he carried'
/bǐ u´ ɓèx-V /	→	[bǔ ɓèɣè]	'we carried'
/mìní u´ ɓèx-V /	→	[mùnú ɓèɣè]	'you carried'
/bí u´ ɓèx-V /	→	[bú ɓèɣè]	'they carried'

c. lì-ɓát 'to add'

/mì u´ ɓát /	→	[mù ɓát]	'I added'
/ɔ̀ u´ ɓát /	→	[wù ɓát]	'you added'

/à u ´ ɓát /	→	[ɔ̀ ɓát]	'he added'
/bǐ u ´ ɓát /	→	[bǔ ɓát]	'we added'
/mìní u ´ ɓát /	→	[mùnú ɓát]	'you added'
/bí u ´ ɓát /	→	[bú ɓát]	'they added'

Other hypotheses could as well be postulated about the shape of the P3 formative. It can be thought that the P3 formative is "[u] associated to a floating H" or "[u] associated with a L and a floating H" as well. But again, the evidence raised against "[a] associated to a H" and "[a] associated to a L and a floating H" as possible P1 formatives will rule them out. Thus, the rules that have been postulated for the derivation of the P1 surface forms will also yield the expected outputs for the P3 data. Thus providing independent motivation for the rules. The derivation of [mù ɓát], [mùnú ɓèɣè], [ɔ̀ mîn] and [ɔ̀ ɓɛ́ɣè] from /mì u ´ ɓát/, /mìní u ´ ɓèx-V/ , /à u ´ mìn/ and /à u ´ ɓèx-V/ respectively is provided below.

(195)

Input	mi u ɓat	mini u ɓɛɣɛ	a u min	a u ɓɛɣɛ
Stratum	| |	| | |	| |	| |
two	L H H	L H H L	L H L	L H L
Segmental	mu ɓat	munu ɓɛɣɛ	ɔ min	ɔ ɓɛɣɛ
Rules	|	| |	| |	| |
	L H H	L H H L	L H L	L H L
	mu ɓat	munu ɓɛɣɛ	ɔ min	ɔ ɓɛɣɛ
UAC	¦ |	| ¦ |	| |	| |
	L H H	L H H L	L H L	L H L
	mu ɓat	munu ɓɛɣɛ		
H.T.D.	| |	| | |	——	——
	L H H	L H H L		
	↘ ø	↘ ø		

H Docking	——	——	ɔ min	ɔ ɓɛɣɛ
			L H L	L H L
C.S.	——	——	——	ɔ ɓɛɣɛ
				L H L
FLR_2	——	——	——	ɔ ɓɛɣɛ
				L H L

Post Lexical Rules

OUTPUT [mù ɓát] [mùnú ɓɛ̀ɣɛ̀] [ɔ̀ mîn] [ɔ̀ ɓéɣɛ̀].

To sum up, it can be noticed that the derivation of the P_3 forms does not require any additional rule.

5.2.2.2.4. The Habitual

The definition of the habitual that is assumed in this work is taken from Comrie (1976: 27-28). "The feature that is common to all habitual, whether or not they are also iterative is that they describe a situation which is characteristic of an extended period or time, so extended in fact, that the situation referred to is viewed not as an incidental property of the moment but, precisely, as a characteristic feature of a whole period." In English for example the habitual can be viewed as a feature of the past or present tenses.

Nana used to go to church. (Past tense)

Nana goes to church.(Present)

Besides, the habitual aspect freely combines with other aspects, namely the progressive aspect. Bakoko however does not operate such distinctions. The habitual aspect describes a situation which characterizes the entire time-line, whether present or past.

The habitual marker (Hab) that has been postulated in chapter two for Bakoko is ŋgà ´. The data below illustrate that the habitual aspect. (a) displays a low tone stem while (b) shows a high tone stem.

(196) (a) - ɓèɣɛ 'to carry'

mì	ŋgà	ɓéɣè	'I used to carry'
I	Hab	carry	
ɔ̀	ŋgɔ̀	ɓéɣè	'you used to carry'
you	Hab	carry	
à	ŋgà	ɓéɣè	'He used to carry'
He	Hab	carry	
bĭ	ŋgà	ɓéɣè	'we used to carry'
we	Hab	carry	
mìní	ŋgà	ɓéɣè	'you used to carry'
you	Hab	carry	
bí	ŋgà	ɓéɣè	'They used to carry'
They	Hab	carry	

(b) -ɓát 'to add'

mì	ŋgà	ɓát	'I used to add'
I	Hab	add	
ɔ̀	ŋgɔ̀	ɓát	'you used to add'
you	Hab	add	
à	ŋgà	ɓát	'He used to add'
He	Hab	add	

bĭ	ŋgà	ɓát	'we used to add'
we	Hab	add	
mìní	ŋgà	ɓát	'you used to add'
you	Hab	add	
bí	ŋgà	ɓát	'they used to add'
they	Hab	add	

As one compares the forms in (a) and (b), one notices that the verb stem in (a) undergoes the following alternation ɓèɣè ~ ɓéɣè. On the other hand, the (b) forms do not show any alternation. Thus, various hypotheses can be made as to the shape of the Habitual formative i.e. ŋgà, ŋga ´, ŋgà ´. The first hypothesis derives from the observation of the (b) forms, the second which is made up of a toneless CV sequence and a floating high tone is parallel to the P_1 formative argued for in this thesis. The third hypothesis is drawn from the (a) surface forms.

Solution 1: The Habitual formative is [ŋgà]

If [ŋgà] is postulated as the habitual formative, the derivation of the (b) forms will not require any additional rule. However, one would need a rule that assigns a H tone to a low tone root vowel. It can be claimed under this hypothesis that the language does not tolerate a low tone stem after a formative that bears a low tone. Thus, the alternation ɓèɣè ~ ɓéɣè can be construed as resulting from a process of tone dissimilation where L L becomes L H. It must be recalled that the first L is borne by the Habitual formative and the second by the root vowel. Though such an approach may yield the expected outputs, it is highly ad hoc. The following arguments can be raised against the first solution.

a) For the postulation of a polarisation effect to hold, the formative and the verb have to belong to the same phonological domain. But such is

not the case. It is instead argued that the verb stem belongs to stratum one while the pre stem material are derived at stratum two.

b) Given the assumptions of Underspecification Theory, a rule of tone polarisation is not reliable. Instances of polarisation in the literature are known as Meeussen's and Stevick's rules. These are in fact the instantiations of OCP constraining a phonological domain. The well-known cases of Meeussen's rule reduces a H H sequence to H L or H ø. But to the best of our knowledge, instances of L L reducing to L H have not been mentioned.

c) A polarisation rule does not express a linguistically significant generalization. It can easily be falsified by other data where a pre stem material with a low tone is followed by a stem that also bears a low tone. The data below lend more credence to the point.

(197)	mà	x	tàkà	'I suffer'
	I	Po	suffer	
	ɔ̀	x	tàkà	'You suffer'
	You	Po	suffer	
	à	x	tàkà	'He suffers'
	He	Po	suffer	

H

Solution 2: The habitual Formative is ŋga

Under this hypothesis, it can be argued that the floating H docks to the right on the root. Then the toneless element [ŋga] is assigned a low tone by default at the postlexical component. This results in a H specification on the low tone roots. Along the same line, it can be argued that the floating H gets deleted when followed by a H-tone root vowel, following the High Tone Deletion rule (HTD) that was earlier stated. Under this assumption,

the derivation of the data in (a) and (b) proceeds as illustrated by the following sample derivation:

(198) Input	a ŋga ɓɛɣɛ	a ŋga ɓat
(Stratum two)	| |	| |
	L H L	L H H
H docking	a ŋga ɓɛɣɛ	
	| /|	N/A
	L H L	
H.T.D.		a ŋga ɓat
		| |
		L H H
		↘ ø
C.S.	a ŋga ɓɛɣɛ	
	| /|	N/A
	L H L	
FLR2	a ŋga ɓɛɣɛ	
	| | ¦	N/A
	L H L	
Postlexically:		
Default Low	a ŋga ɓɛɣɛ	a ŋga ɓat
	| ¦ | |	| ¦ |
	L L H L	L L H
OUTPUT	[à ŋgà ɓéɣɛ̀]	[à ŋgà ɓát]

Though the second solution derives the expected outputs, it remains questionable. It had been argued in 5.2.2.2.2.(cf. solution three) that the UAC apply at stratum two to assign tones to tone bearing units, prior to the application of High Tone Deletion. But the above derivation skips the UAC

at stratum two. If the UAC applied at stratum two, one would have got wrong outputs. Moreover, it had been argued that the HTD rule applies when the floating H is either preceded or followed by an associated H tone. Thus, if HTD first checks the toneless formative [ŋga], the floating H ought- in normal circumstances-to land on the toneless sequence. To sum up, the second solution is not acceptable.

Third Solution: The Habitual Formative is [ŋgà ´]

The third hypothesis posits low tone sequence [ŋgà] and a floating H tone. Under this assumption, it is claimed that the (a) forms are derived through the application of High Docking, Contour Simplification and Floating Low Relinking 2 that were earlier stated. Along the same line, it is thought that the (b) forms derive from the application of the Floating High Tone Deletion (HTD) rule. Thus, it can be observed that no additional rule is required to yield the surface forms within the third solution. The derivation of [mì ŋgà ɓéɣè] 'I used to carry`, [à ŋgà ɓát] 'he used to add' and [ɓí ŋgà ɓéɣè] 'they used to carry from / mì ŋgà ´ ɓèɣɛ̀ /, /à ŋgà ´ ɓát / and / ɓí ŋgà ´ ɓèɣɛ / respectively is provided below.

(199) Sample Derivation

Input	mì ŋga ɓɛɣɛ	a ŋga ɓat	ɓı ŋga ɓɛɣɛ
(Stratum 2)	| | |	| | |	| | |
	L LH L	L L H H	H L H L
H Docking	mì ŋga ɓɛɣɛ	N/A	bı ŋga ɓɛɣɛ
	| | / |		| | / |
	L LH L		H L H L
H.T.D.	N/A	a ŋga ɓat	N/A
		| | |	
		L L H H	
		↘ ø	

C.S.	mɪ ŋga ɓɛɣɛ	N/A	bɪ ŋga ɓɛɣɛ
	L LH L		H L H L
FLR_2	mɪ ŋga ɓɛɣɛ	N/A	bɪ ŋga ɓɛɣɛ
	L L H L		H L H L
OUTPUT:	[mì ŋgà ɓéɣè]	[à ŋgà ɓát]	[bí ŋgà ɓéɣè]

5.2.2.2.5. The Imperative.

The imperative refers to the form of the verb which is usually used to give orders. Unlike other verb forms, it can only be conjugated in the second person (singular and plural) and the first person plural. But we will focus our attention on the second person singular and plural because the first person plural is identical to the Present tense form. The data below show verbs in their imperative forms: (a) and (b) display verb stems made up of roots only; (c) and (d) display verb stems plus a final vowel; (e) and (f) show stems that are made up of a root plus a verbal extension.

(200) a.	lì-ɓàt	'to ask'	b. lì-ɓát	'to add'
	ɓăt	'ask'(sg)	ɓát	'add'(sg)
	bĭ ɓàt	'let us ask'	bĭ ɓát	'let us add'
	ɓàtán	'ask'(pl)	ɓátán	'add'(pl)
c.	lì-ɓèx + V	'to carry'	d. lì-ɔŋ + V	'to remember'
	ɓèɣé	'carry'(sg)	ɔŋɔ́	'remember'
	bĭ ɓèɣè	'let us carry'	bĭ ɔŋɔ̀	'let us remember'
	ɓèxlán	'carry'(pl)	ɔŋlán	'remember'(pl)

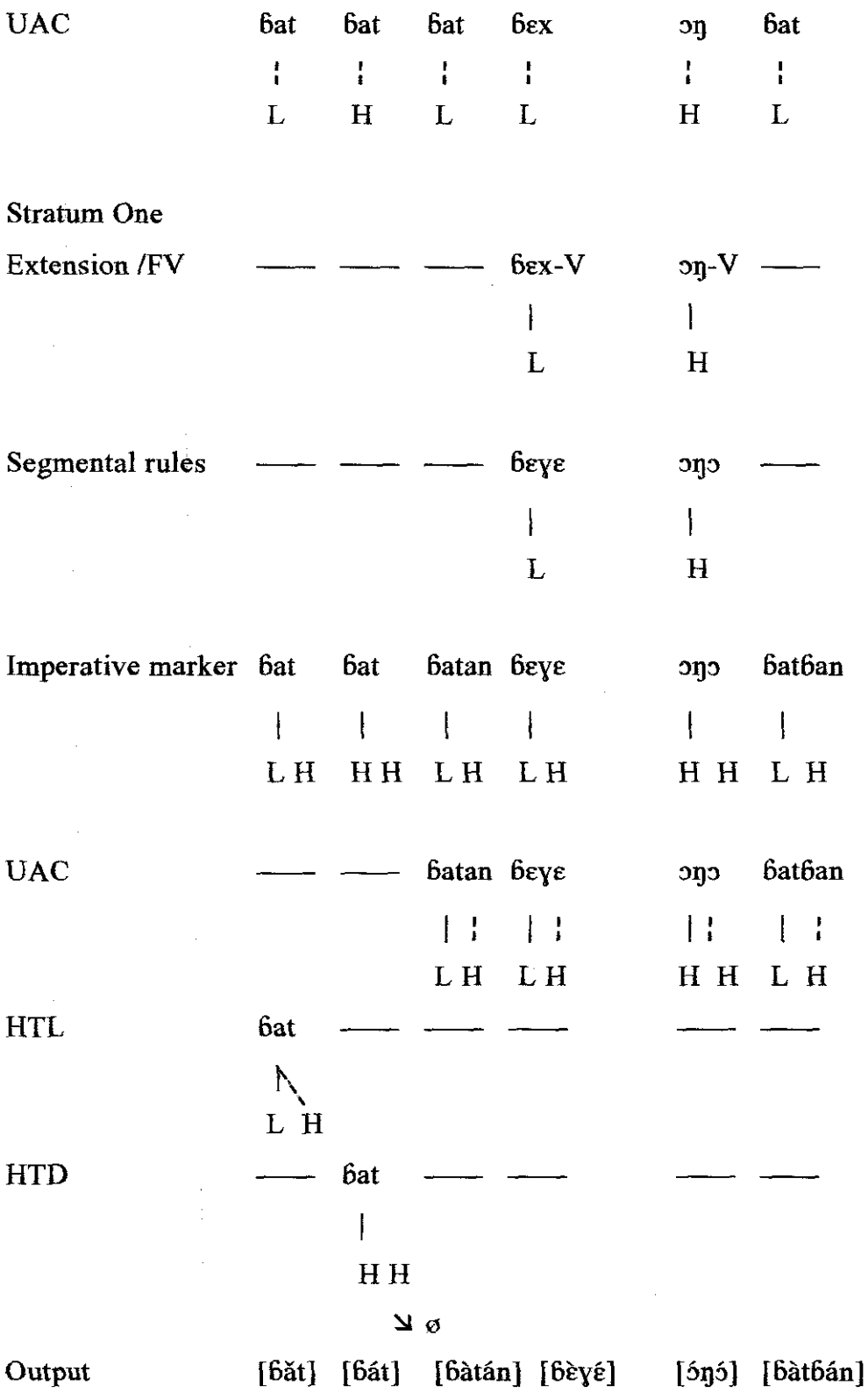
e.	lì-tʃìì+le	'to write for/to'	f.	lì-ɓàt+ɓan	'to ask oneself'
	tʃììlé	'write to'(pl)		ɓàt ɓán	'ask yourself'
	bǐ tʃìì lè	'let us write to'		bǐ ɓàtɓàn	'let us ask ourselves'
	tʃìì láán	'write to'(pl)		ɓàtɓáán	'ask yourselves'

In the following analysis, the first person plural forms will not deserve special attention because they are similar to the present tense forms. The data in (e) and (f) will be dealt with in a more insightful way in a later part of this chapter where I shall argue that the stem plus all suffixed elements form a phonological word.

It is obvious from the data above that the imperative marker is a floating H which lands on the verb stem. The second person plural form is -án or -lán depending on the shape of the stem. The linking of the floating H onto the stem will be accounted for using the High Tone Linking rule which is argued to apply at both stratum one and stratum two. The plural marker which comes along with its tone is derived through the UAC (i.e. creation of an association line). Following this hypothesis, it appears that the derivation of the imperative forms does not require any additional rule to the grammar. The derivation of ɓǎt 'ask', ɓát 'add', ɓèɣé 'carry', ɔŋɔ́ 'remember' ɓàtán 'ask'(pl), ɓàtɓán 'ask yourself' from / ɓàt ´/, /ɓát ´/, / ɓèx-V´/, /ɔŋ-V ´ /, /ɓàtán/ , /ɓàtɓan´/ respectively is provided below.

(201) Sample derivation

Underived lexical items	ɓat	ɓat	ɓat	ɓɛx		ɔŋ	ɓat
	L	H	L	L		H	L


UAC
ɓat ɓat ɓat ɓɛx ɔŋ ɓat
L H L L H L
Stratum One
Extension /FV
ɓɛx-V ɔŋ-V
L H
Segmental rules
ɓɛɣɛ ɔŋɔ
L H
Imperative marker
ɓat ɓat ɓatan ɓɛɣɛ ɔŋɔ ɓatɓan
L H H H L H L H H H L H
UAC
ɓatan ɓɛɣɛ ɔŋɔ ɓatɓan
L H L H H H L H
HTL
ɓat
L H
HTD
ɓat
H H
ø
Output
[ɓăt] [ɓát] [ɓàtán] [ɓɛɣé] [ɔŋɔ́] [ɓàtɓán]

Comments on the above derivation are in order here:

-OCP is a constraint on underived stems. Therefore, the HTD rule is an OCP effect on [ɓát]. However, it is worth noticing that the derived stem [ɔ́ŋɔ́] receives its second H from the tone linking rule. If OCP were a constraint on derived stems, then extensions and final vowels would have been assigned tone through the tone spreading process as it is the case in underived roots. But at the level where the imperative marker is added, the extensions and final vowels remain toneless.

-The High Tone Linking (HTL) rule as stated before seemed to be a typical level two process. But the above derivation argues that HTL can also apply at the first stratum. But an across-the-board application of the HTL rule at level one would also link the floating lexical high tone to the root and yield wrong outputs. Thus, a morphological condition must be set on the HTL at level one. This condition has the effect of preempting the lexical floating high from linking and allowing a grammatical tone (imperative marker) to associate.

High Tone Linking (Revised)

V
|
L H

The rule reads that a floating high tone docks left onto a preceding vowel. If the floating high occurs at level one, then, it must link if it is the imperative marker.

-The UAC, as a principle, are not static. Instead, they apply at various stages to associate tones to tone bearing units.

5.2.2.2.6. The subjunctive and conditional.

The subjunctive describes the forms of the verb that refer to actions which are possibilities rather than facts. On the other hand, the conditional refers to a form of a verb expressing the idea that one thing is dependent on another. Though the subjunctive and the conditional are inherently different, they behave alike at the phonological level. Displayed below all three sets of data that illustrate the phonological changes undergone by two low tone verb stems and two high tone verb stems. (a) describes the indicative forms; (b) describes the subjunctive forms and (c) describes the conditional forms. The verbs used in the sentence are:

	Low tone verbs:		High tone verbs.	
(202)	nùŋ-V	'to sell'	ɲú	'to drink'
	ɓèx-V	'to carry'	dí	'to eat'

a. Present Tense

Ngàŋgò àx nùŋù mìndím 'Ngango sells water'
Ngango he TM sell water

Ngàŋgò àx ɓèɣè mìndím 'Ngango carries water'
Ngango he TM carry water

Ngàŋgò àx ɲú mìndím 'Ngango drinks water'
Ngango he TM drink water

Ngàŋgò àx dí lìkàɓò 'Ngango eats yams'
Ngango he TM eat yams

b. Subjunctive

í ɓàt né à núŋú lí'kúɓé 'he must buy bananas'
it ask that he sell banana

í ɓàt né à béɣé lìkàɓò	'he must carry yams'
it ask that he carry yam	
í ɓàt né à ɲú mí ⁱndím	'he must drink water'
it ask that he drink water	
í ɓàt né à dí lìkàɓò	'he must eat yams'
it ask that he eat yam	

c. conditional

kí à núŋú lìkàɓò, àx kɛ̀ lìkɔ̀n	'if he sells bananas, he will be sick'
if SM sell yam he TM go be sick	
kí à ɓéɣé lìkàɓò, àx kɛ̀ lìkɔ̀n	'if he carries yams, he will be sick'
if SM carry yam he TM go be sick	
kí à ɲú mí ⁱndím, àx kɛ̀ lìkɔ̀n	'if he drinks water, he will be sick'
if SM drink water he TM go be sick	
kí à núŋú lìkàɓò, àx kɛ̀ lìkɔ̀n	'if he eats yams, he will be sick'
if SM eat yam he TM go be sick	

As one compares the verb forms in the subjunctive and conditional to those in (a), one notices that all the verb stems in the former take a high tone. The following hypotheses can be made as to the shape of the subjunctive and conditional markers. It can be assumed that they are marked by a floating H that immediately precedes the verb stem. Two proposals can be made as to how the floating high lands on the verb stem.

The first proposal claims that the floating H docks onto the verb stem and then the underlying tone is delinked when it is low. If the verb stem bears a high tone, then the floating H deletes under OCP. Following the first proposal, the derivation of the forms in (b) and (c) will proceed as follows:

(203) Sample derivation

Input	a ɓɛɣɛ	a nuŋu	a di
	| |	| |	| |
	LH L	LH L	LH H
L Delinking	a ɓɛɣɛ	a nuŋu	——
	| ∓	| ∓	
	LH L	LH L	
H Docking	a ɓɛɣɛ	a nuŋu	——
	|	|	
	LH L	LH L	
HTD	——	——	a di
			| |
			L H H
			↘ ø
OUTPUT	[à ɓéɣé]	[à núŋú]	[à dí]

This proposal is highly questionable. First, one can question the motivation of the low delinking process. Secondly, the High Docking rule in its earlier formulation did not spread onto more than one tone bearing unit. Why does it spread on the entire stem here? Thirdly, it has been argued that the presence of a floating low between two high tones always provokes the downstep of the second high. This is a very general postlexical process as it will become evident in due course. Therefore, if the above derivation were right, the outputs for the first and second examples would have been different. Though one can claim that the Low Delinking and the High Docking are morphologized rules, such an explanation cannot hold for the failure of the above forms to undergo downstep. Thus, the first proposal is simply not acceptable.

A second proposal claims that the tone of the verb stem gets deleted. Then, a floating high tone docks onto the verb stem.

(204) Sample derivation

Input	a ɓɛɣɛ	a lamle
	| |	| |
	LH L	L H L
S.T.D.	a ɓɛɣɛ	a lamle
	| ∔	| ∔
	LH L	LH L
	↘ ø	↘ ø
T.R.	a ɓɛɣɛ	a lamle
	|	|
	LH	LH
OUTPUT	[à ɓéɣé]	[à lámlé]

Under this hypothesis, the Stem Tone Deletion (S.T.D.) rule plays a very crucial role. If one claims that the underlying tone of the verb stem simply delinks, then one would yield unexpected outputs for the low tone stems. In fact, the presence of the floating low in such cases would cause a downstep of the second high tone of the verb stem. One could also claim that the low tone alone undergoes the deletion rule. In this case, one would have to assign a tone to the extension or final vowel. If the subjunctive/conditional marker associates to the final vowel or extension, the well formedness condition that prohibits the crossing of association lines would be violated. This is illustrated by the following derivation:

a lamle

\|

LH H

Another approach can claim that the H of the root moves onto the extension/final vowel. Then the subjunctive/conditional hooks onto the root vowel. Though such a solution would yield the expected outputs, it is very costly because it requires more rules. Moreover, one can wonder why the OCP effect does not apply here. These rules are conditioned by the subjunctive and conditional verb forms.

Stem Tone Deletion (STD): The verb stem tone gets deleted in the subjunctive and conditional forms.

V V
| [Condition: subjunctive / conditional]
T ↘ ø

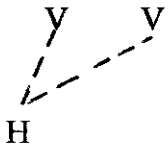
One could argue that the low tone gets deleted whereas the high tone remains associated. In this case, it can be argued that the subjunctive and conditional floating H gets deleted through OCP effect when followed by a high tone stem. But such an approach is not acceptable as one observes the behavior of stems made up of a high tone root plus a verbal extension in the subjunctive form.

(205) lì-lám 'to cook' lì-lám-le 'to cook for'
lì-pɔ́t 'to talk' lì-pɔ́t-ɛ 'to make s.o. talk'
màx sòmò né à lámlé ń ꜜdɔ́m ꜜwɛ́ɛ́ 'I want to cook for her husband'
I TM want that she cook for husband her
màx sòmò né à pɔ́tɛ́ bɔ̀t 'I want him to make people talk'
I TM want that he talk Caus people

As one observes the verb stems in these sentences, it appears that toneless verbal extensions also receive a high tone specification. If we claim that the underlying high of the verb stem does not delete, then we would need a

special rule that spreads the high tone of the root onto the toneless verbal extension. This solution is undesirable because it adds more rules to the grammar.

Tone Replacement (TR): A floating H spreads onto all the toneless elements of the verb stem.



[Condition: subjunctive/conditional]

The derivation of [à ɓéɣé] and [à lámlé] from / à ´ ɓèxɛ / and / à ´ lámle / respectively is provided below, through the application of the Stem Tone Deletion and Tone Replacement rules.

(266) Input	a ɓɛxɛ	a lamle
	| |	| |
	L H L	L H H
S.T.D.	a ɓɛxɛ	a lamle
	| |	| |
	L H L	L HH
	↘ø	↘ø
T.R.	a ɓɛxɛ	a lamle
	| /	| /
	L H	L H
Other Rules	a ɓɛɣɛ	
	| |/	——
	L H	
Output	[à ɓéɣé]	[à lámlé]

To conclude this section on lexical tonology, two points are in order. First, the prestem material has appeared as a specific phonological domain.

Further evidence will be raised to support this idea. Second, more light needs to be shed on the status of the floating tones that seem to belong to the prestem material but land on the verb root. It shall be argued below that they neither belong to stratum one nor to stratum two. As a matter of fact, they are boundary tones.

5.2.3. The Prestem Material as a Phonological Domain.

It has been claimed that the stem plus suffixes form the stratum one of lexical phonology while the prestem material makes up the second stratum. But it has been observed that the floating high of the Past Tense 1, Indefinite Past Tense and Habitual that seem to belong to stratum two dock onto the stem. Thus, one can question the domain to which the floating high belongs. Does it belong to stratum one or stratum two? Meanwhile other floating high tones that precede the stem do not dock onto the stem but they dock to the left. This section sets out to argue that the lexicon is organized into two strata. Some tenses (Past tense 1, indefinite Past tense, and Habitual) allow boundary tones that are attracted by the stem or root (which is a prominent position). It also provides segmental and suprasegmental evidence that the prestem material forms a domain on its own.

5.2.3.1. Evidence for a stratum two domain.

Two pieces of evidence can be raised to argue for a second stratum domain: suprasegmental and segmental.

At the suprasegmental level, it is observed that floating high tones dock to the left at the second stratum. A High Tone Linking (HTL) rule has been stated to account for such facts in the derivation of partial reduplicates. The same rule also accounts for the negation in Bakoko. Consider for instance the following data.

(206) a. màx mìn mìndím 'I swallow water'
I Pres. swallow water
ɔ̀x mìn mìndím 'you swallow water'
àx mìn mìndím 'he swallows water'
b. mà ɓât mìndím 'I asked for water'
I P1 ask water
wà ɓât mìndím 'you asked for water'
à ɓât mìndím 'he asked for water'
c. mì ŋgà mîn mìndím 'I am used to swallowing water'
I HAB swallow water
ɔ̀ ŋgɔ̀ mîn mìndím 'you are used to swallowing water'
à ŋgà mîn mìndím 'he is used to swallowing water'

The falling contours that are found in the (b) and (c) forms have been construed as resulting from the High Tone Docking. Let us now consider the negative forms of the above data.

(207) a. măx mìn mìndím ɓémà 'I do not swallow water'
I NEG.Pres. swallow water NEG
ɔ̌x mìn mìndím ɓé 'you do not swallow water'
ăx mìn mìndím ɓé 'he does not swallow water'
b. mă ɓàt mìndím ɓémà 'I did not ask for water'
wă ɓàt mìndím ɓé 'you did not ask for water'
ă ɓàt mìndím ɓé 'he did not ask for water'
c. mĭ ŋgà ɓât mìndím ɓémà 'I am not used to swallowing water'
ɔ̌ ŋgɔ̀ ɓât mìndím ɓé 'you are not used to swallowing water'
ă ŋgà ɓât mìndím ɓé 'he is not used to swallowing water'

As one compares the positive and the negative forms of the above data, one observes that the subject markers in the latter bear a rising contour. I propose that the negation marker is a discontinuous morpheme that stands as follows:

H ....ɓé(mà); that the floating high of the negation marker docks to the left, following the High Tone Linking (HTL) process.

Along the same line, when one considers the first person plural forms of the Subject Marker, it appears that it always bears a rising contour. The following data illustrate the facts:

(208) bǐx mìn mìndím 'we swallow water'
bǐx ɓàt mìkalà 'we ask for doughnuts'
bǐx ɓèɣɛ̀ lìkúɓé 'we carry a banana'

Again, I propose that the above subject marker has LH sequence at the underlying level. The UAC assign the L to the unique vowel slot. Then the HTL applies to link the floating H to the subject marker. To conclude, it appears that the HTL is a typical stratum two process.

At the segmental level, one notices some marginal phenomena which are peculiar to the prestem material. As evidenced in the previous sections, the habitual, past tense 1 and indefinite past tense markers are respectively

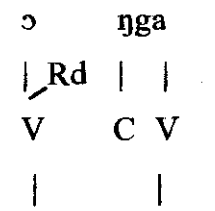
LH H H
|
ŋga a and u.

The data below illustrate instances where those formatives are preceded by the second person singular and plural subject markers.

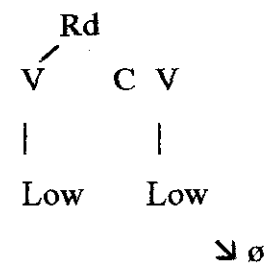
(209) a. / ɔ̀ ŋgà ´ mìn / → [ɔ̀ ŋgɔ̀ mîn] 'you (sg) are used to swallowing'
b. / mìní a ´ mìn / → [màná mìn] 'you (pl) swallowed'
/mìní u ´ mìn / → [mùnú mìn] 'you (pl) swallowed'

In 209 (a), one observes that the vowel of the habitual marker harmonizes with that of the subject marker. In the vowel feature system assumed in this thesis, [ɔ], [ɛ] and [a] share the feature [low]. Thus, it can be claimed that there is a Low vowel OCP effect at the second stratum. The derivation of the form in (a) takes place as follows.

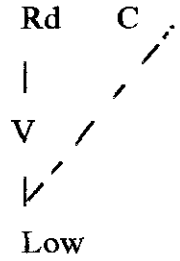
(210) Input



Low OCP



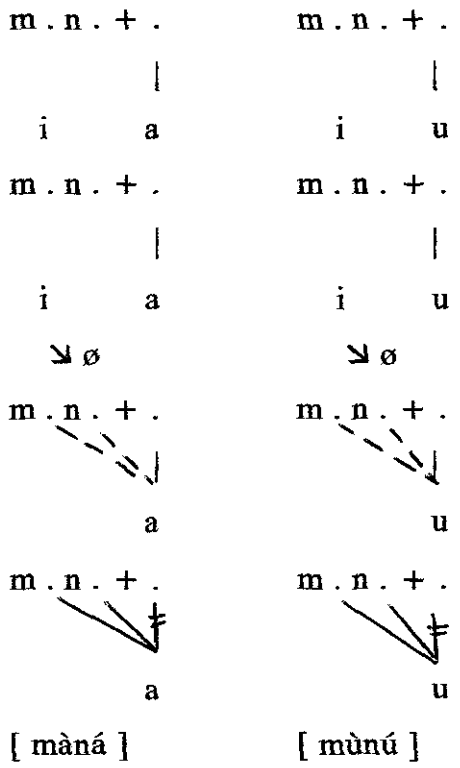
V-Spread



Output [ɔ̀ ŋgɔ̀]

In 209 (b), it appears that when the subject marker is added to a tense marker, all the vowels of the S.M. copy the vowel features of the tense marker. In normal circumstances, one would have expected the outputs to be *mìná and *mínú. This situation motivates a representation of consonants and vowels on different tiers. But as it will become evident later on, such a representation is valid at stratum two only.

(211) Input



Beyond the frontiers of the second stratum, such a representation and the V-spread process that it entails are no longer motivated. Consider the following data for instance:

(212) lì + kàlà 'doughnut' → [lìkàlà]

à + hén 'he saw' → [à hén]

à + ɔ̀l 'he laughed' → [à ɔ̀l]

The above data put together a stratum morpheme (lì-, à-) and a root or stem. Within this environment, the Low vowel OCP and the V-spread processes are not mentioned.

To sum up, the SM-NEG-TM that precede the verb form a specific phonological domain called stratum or level two of lexical phonology. In this environment, the HTL, Vowel Deletion, Vowel Spreading Low Vowel and the OCP have been motivated to account for the phonological changes observed. It is thus argued that the above stated processes operate within the

stratum two brackets, prior to their prefixation to the stem in the verb formation.

5.2.3.2. Evidence for Boundary Tones.

It has been claimed that within stratum two, floating high tones dock to the left. Evidence has been provided by partial reduplicates, the first person plural subject marker and the negation. It has also been observed that the Past tense 1 and Indefinite Past Tense formatives have a high tone that docks onto the root vowel. Therefore, we can wonder whether these tones belong to stratum one or stratum two.

It cannot be argued that they belong to stratum one. It was earlier demonstrated that the various elements that make up the stem are rebracketed at the end of the derivation. Thus, such tones that are prefixed later cannot be claimed to be stratum one formatives. On the other hand, if they are construed as stratum two formatives, they ought to dock to the left, just as the other floating high tones do. In this thesis, it is held that they belong neither to stratum one, nor to stratum two. Instead, they are boundary tones, located between stratum one and stratum two domains[8].

As far as rule ordering is concerned, it is assumed that at the end of the stratum two derivation, brackets are erased. Then boundary tones dock to the right, attracted by the root or they are deleted when preceded or followed by another high tone. It is thought, for various reasons that the root is a prominent position. Evidence for this statement is provided by the following facts. First, the root is the only environment where the seven vowels of the inventory all occur. As a matter of fact, the roots below display the seven vowels of the Bakoko system.

-mìn	'to swallow'	-sùŋ	'to save'
-vèx	'to create'	-bòm	'to hit'

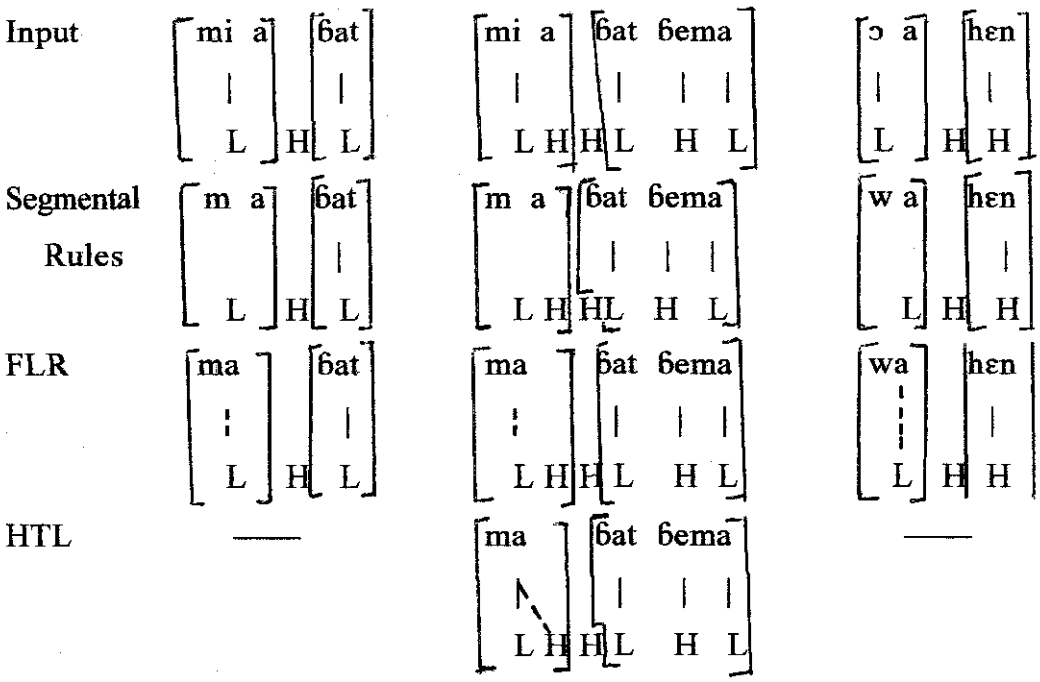
-hέn	'to see'	-kɔ̀x	'to grind'
-ɓàt	'to ask'		

The prefixes and suffixes do not enjoy this status. They exhibit a restricted number of vowels.

Second, the root is an environment where each tone bearing unit is always specified for tone at the underlying level. It has been argued in 5.1.3.2 that verbal suffixes (Final Vowels and Extensions) are toneless at the underlying level.

Third, it has been observed that trisyllabic verbal stems reduce to disyllables (4.3.6.1). The medial syllable nucleus being the one that always deletes. Drawing from such facts, it is thought that the first syllable of the stem (root) projects a foot in the metrical grid. Therefore, the root stands as a strong position. As a sample derivation, the transformation of / mì a ´ ɓàt / 'I asked', / mì ´ a ´ ɓàt ɓémà / [mà ɓât], [mă ɓàt ɓémà] and [wà hέn] respectively is provided below.

(213) Sample Derivation



Bracket erasure

	ma ɓat	ma ɓat ɓema	wa hɛn
	| |	⟍ | | |	| |
	L H L	L H H L H L	L H H
H.T.D.	N/A	ma ɓat ɓema	wa hɛn
		⟍ | | |	| |
		L H H L H L	L H H
		ø↙	ø↙
H Docking	ma ɓat		
	| ⟋⟍		
	L H L		
Postlexical:			
Output	[mà ɓât]	[mă ɓàt ɓémà]	[wà hén]

Conclusion.

The above sections have described tone and tonal processes in the lexical component. It has been argued that the lexicon is organized into two strata. Between the first and the second stratum, boundary tones have been postulated for some tenses. Below is a chart that displays the various formatives that make up the verb morphology.

	Stratum two				Stratum one			
	S.M	NEG_1	T.M.	B.T.	Root	EXT/FV	T.M.	NEG_2
Present			-x	L				
Past tense 1			a	H				
Past tense 2							H CVV	bé (mà)
Indefinite Past Tense			u	H				
Habitual			ŋgà	H				
Imperative sg.							H	
Imperative pl.							Cán	
Conditional				H				
Subjunctive				H				
	mì 'I' ɔ̀ 'you' à 'he' bǐ 'we' mìní 'you' bí 'they'	H						

Chart n° 6: Verb Morphology

5.2.3. Postlexical Tone Processes

The tonal processes examined so far have dealt with the noun and the verb. The tonal rules that apply during the formation of the nominal form (prefixation, suffixation) have been described on the one hand. On the other hand, the rules that apply in the derivational and inflectional morphology of the verb have been stated. All these rules have been termed lexical rules because they enter the formation of the lexicon. The current section aims at describing the tonal phenomena that operate at the phrase and sentence levels when words concatenate. It is assumed here, following Kaisse (1985) that the postlexical component is subdivided into two strata. The first stratum referred to as Postlexical One (P1) describes a postlexical phenomenon that has recourse to morphological information. The second stratum referred to as Postlexical two (P2) describes more general phonological rules that apply in an across-the-board fashion. Here, emphasis will be laid on tone processes and not on morphological structures. Some of the rules examined here include tone spreading, tone linking, downstep, contour simplification, etc.

5.2.3.1. The Postlexical 1.

As has been pointed out in chapter two, the possessive prefixes do not seem to have any underlying tonal specification. Instead, their tone varies depending on the last tone of the preceding noun. The following data illustrate the phenomenon:

(214) a. mùt w-ámà 'my person' b. mɔ̌n w-àmà 'my child'
child AGR my
mùt w-ɔ́ɔ̀ 'your person' mɔ̌n w-ɔ̀ɔ̀ 'your child'

mùt w-éé 'his person'	mǒn w-ꜜéé 'his person'
mùt w-áhá 'our person'	mǒn w-ꜜáhá 'our child'
mùt w-áná 'your person'	mǒn w-ꜜáná 'your child'
mùt w-áɓá 'their person'	mǒn w-ꜜáɓá 'their person'

lìsòŋ dʒ-ámà 'my tooth'	lìmáŋ dʒ-àmà 'my cheek'
tooth AGR my	cheek AGR my
lìsòŋ dʒ-ɔ́ɔ̀ 'your tooth'	lìmáŋ dʒ-ɔ̀ɔ̀ 'your cheek'
lìsòŋ dʒ-éé 'his tooth'	lìmáŋ dʒ-ꜜéé 'his cheek'
lìsòŋ dʒ-áhá 'our tooth'	lìmáŋ dʒ-ꜜáhá 'our cheek'
lìsòŋ dʒ-áná 'your tooth'	lìmáŋ dʒ-ꜜáná 'your cheek'
lìsòŋ dʒ-áɓá 'their tooth'	lìmáŋ dʒ-ꜜáɓá 'their cheek'

It has been argued in the second chapter that the possessive marker or prefix varies with respect to the class of the preceding noun. Of interest for us here is the difference between the forms in (21a) and those in (21b). The first set of data (a) displays nouns that end in a low tone plus possessive while the second set (b) exhibits high tone roots plus possessives. It can be observed in (a) that the possessive takes a high tone when preceded by a low tone. In (b) the possessive takes a low tone or a downstepped high when preceded by a high tone root. Thus, the assignment of tone on the possessive shows a polarization effect. How can this situation be accounted for? First of all, the following alternations can be stated within the possessive form.

(215)	-ámà	~	àmà	-áhá ~	ꜜáhá
	-ɔ́ɔ̀	~	ɔ̀ɔ̀	-ámá ~	ꜜámá
	-éé	~	ꜜéé	-áɓá ~	ꜜáɓá

The downstepped high tone forms cannot be posited as underlying because downstep is commonly known as a postlexical or phonetic phenomenon. Secondly, if we posit the HL versus the L form of the possessive root as underlying, this will require a rule that changes a H into a L within an underived lexical item at the postlexical level. Such a rule would be really undesirable. Instead, if the L form of the root is underlying, the HL form can be construed as resulting from the linking of a preceding floating H. To sum up, the following can be claimed as underlying forms of the possessive roots.

(216)	-ámà	'my'	-áhá	'our'
	-ɔ́ɔ̀	'your'	-ámá	'your'
	-ɛ́ɛ́	'his'	-áɓá	'their'

The other important question to answer here is that of the tone of the possessive prefix. Given the polarity phenomenon observed in all the noun classes but class nine, several proposals can be made about the tone of the possessive prefix. It can be claimed that the possessive prefixes, but for that of class nine (9) are not specified for tone at the underlying level. Other proposals will posit an underlying Low or High tone to the possessive markers.

Solution one: The possessive marker is toneless

If we claim that the possessive marker is toneless, then it can be said that it takes the opposite value of the preceding noun tone. The earlier versions of generative phonology dealt with such situations by stating rules of the following nature:

$$V \rightarrow V \,/\, \underset{-\alpha H}{V} \text{ —} \quad \underset{\alpha H}{}$$

Given such a polarization rule, one is not forced into making an arbitrary choice of one or the other value as basic. It is simply assumed that the polarizing morpheme is not specified for tone at the underlying level. But as Pulleyblank (1983:204) writes, *"a rule of polarisation is impossible given the theory of underspecification [which proposes that] a rule must not refer to [aF] in its structural description before a default rule assigns [aF] "*. He further argues (p. 205) that "without underspecification, there was no indeterminacy since alpha-polarity rules could be posited, with underspecification, one must choose between two possible dissimilation rules and one possible deletion rule." Without working out the details of the first solution, it appears that it is an unbearable hypothesis because the Theory of Underspecification has been assumed in this work.

Solution two: The possessive marker bears a L tone.

The second hypothesis posits an underlying low tone on the possessive marker. Under this assumption, the derivation of the forms in (b) is straightforward. It can be argued that the underlying L of the possessive marker delinks after the glide formation process. Then, it either remains floating or gets deleted. Along the same lines, it can be thought that the third person singular and the plural forms of the possessives undergo the same process. Then, the presence of a floating L between high tones yields a downstep phenomenon. But the derivation of the first and second person singular remains a stumbling block for this hypothesis. It would require a H tone that lands on the first tone bearing unit of the possessive root. The postulation of such a rule would be highly ad hoc. Thus, the solution that postulates an underlying L on the possessive marker will not be retained in this work.

Solution three: The possessive marker is a H tone.

The third hypothesis posits an underlying H on the possessive marker. Given this assumption, it can be argued that the H of the possessive marker becomes low when preceded by a H tone. This process generally called Meeussen's Rule (MR) (after the Belgian linguist who first detected its existence) is a well-known dissimilation phenomenon in Bantu languages. Following the same reasoning, it can be thought that the devocalisation process yields a floating tone (which is H before L tone nouns and L before H tone nouns.). The floating L unlike the one analyzed at the lexical level does not relink. It thus remains floating and causes the downstep when found between two H tones. On the other hand, the floating H relinks onto the following tone bearing unit, following the Stranded Tone Principle when the latter bears a low tone. Otherwise, it gets deleted under OCP as observed at the lexical component. The following tone rules can thus be stated to account for the above data.

Meeussen's Rule (MR):

The H of the possessive marker becomes L when preceded by a H tone.

H H → H L Condition: the second H is a Possessive marker.

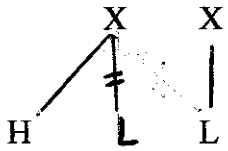
Meeussen's Rule as it is found in Bakoko applies in its earlier formulation. It is not HH → HØ but HH→ HL. If the former were right, then one would be unable to explain the source of the downstep phenomenon between two H tones.

Floating High Relinking (FHR).

A floating high tone docks to the right onto a vowel that bears a L tone, thus creating a falling contour tone.

Falling Contour Simplification (F.C.S.).

A falling contour simplifies to a high tone when followed by another low tone.



The derivation of [mɔ̌n wàmà] 'my child', [mùt wámà] 'my person', [lìmáŋ dʒáhá] 'our cheek' from / mɔ̌n ú àmà/, /mùt ú àmà/ , /lìmáŋ líáha/ respectively is provided below.

(217) Sample derivation.

Input	mɔn u ama	mut u ama	lɪmaŋ li aha
	LH H L L	L H L L	L H H H
MR	mɔn u ama	N/A	lɪmaŋ li aha
	LH L L L		L H L H
Segmental rules	mɔn w ama	mut wama	limaŋ dʒ aha
	LH L L L	L H L L	L H L H
FHR	N/A	mut wama	N/A
		L H L	
F.C.S.	N/A	mut wama	N/A
		L H L L	
Downstep	N/A	N/A	lɪmaŋ dʒ aha
			L H ! H
Output:	[mɔ̌n wàmà]	[mùt wámà]	[lìmáŋ ˈdʒáhá]

The claim made by Meeussen's rule stated above, is that the possessive marker which is normally construed as a possessive prefix is phonologically interpreted as a nominal suffix. In fact, it is obvious that the possessive prefix is different from the nominal prefix. While the latter stands on its own and forms a unit with the noun root, the former is determined by the class of the preceding nominal form. Thus, the status of the possessive marker is somehow ambiguous. Its shape is determined by the preceding noun but it forms a unit with the following possessive root. This ambiguity of the possessive prefix is manifested in the phonology as follows: Meeussen's Rule applies to the possessive marker prior to its affixation to the root, thus revealing the link between the noun and that morpheme. Then the segmental rules and other tone rules show the relationship between the possessive marker and the following root. It must be made clear at this level that the noun prefix and the possessive prefix are not derived at the same component of the grammar. Otherwise, one would have expected the floating low to relink when followed by a high tone as it is the case at level two. But such is not the case. Moreover, the Falling Contour Simplification (FCS) that is fed by the Floating High Relinking (FHR) is a postlexical process that has not been attested at the lexical component of the grammar.

To sum up, it appears that the possessive marker which is derived at the postlexical level is however peculiar. In fact, there are other morphemes in the grammar of which the shape can be predicted from the class of their preceding nouns. But they undergo the general and across-the-board postlexical rules. That is why the noun plus possessive form a special or particular phonological domain called here Postlexical One (P1).

5.2.3.2. The Postlexical two (P2).

The postlexical 2 level is the phonological domain where we find phrasal rules that apply in an across-the-board manner, without any

reference to the morphology. These comprise the lexical floating high tone linking, the high tone spreading rule, the default tone assignment rule, the downstep, etc.

5.2.3.2.1. The Lexical Floating High Tone Linking (LHL).

It was observed earlier that the lexical floating tones that result from the loss of vowels in the previous stages of the language development do not show the same behavior. Thus, the lexical floating low tone is linked to the root at the lexical level while the floating high tone remains floating. It is argued here that the lexical floating high tone docks onto the root (to the left) at the phrasal or postlexical level. The data below illustrate the phenomenon.

(218) a. ǹ-tʃɛ̀n 'host'

ɲɛ̀mb 'death'

b. ǹtʃɛ̌n à mùt 'the person's host'
host AM person
ǹtʃɛ̌n w àmà 'my host'
host AGR my

ɲɛ̌mb è mùt 'the person's death'
death AM person
ɲɛ̌mb j àmà 'my death'
death AGR my

As one compares the data in (a) and (b), one observes the following alternations ǹtʃɛ̀n ~ ǹtʃɛ̌n, ɲɛ̀mb ~ ɲɛ̌mb. Several proposals can be made in order to explain the source of these alternations. First, one can claim that the associative marker bears a falling tone and the possessive concord morpheme a high tone. Then it can be argued that the H of the associative

marker and possessive marker docks to the left to yield a contour tone. But this hypothesis can easily be contradicted by the following facts.

a) mùt 'person'	b.	mùt à mŏn 'the person of the child'
		person AM child
		mùt wámà 'my person'
		person AGR my
mbèŋ 'rain'		mbèŋ jàmà 'my rain'
		rain AGR my

Following the first hypothesis, one should expect the alternations below: mùt ~ mŭt and mbèŋ ~mbĕŋ. But the expectations are not met. Thus, the first hypothesis cannot be adopted in this work.

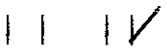
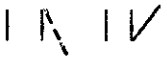
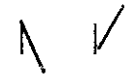
A second hypothesis posits a lexical floating high tone between the first noun and the concord marker. The lexical floating tone, unlike a grammatical one does not convey a meaning. Under the second assumption, it can be claimed that the lexical high docks to the left in a non final position.

Lexical Floating High tone Linking (LHL).

A lexical floating high tone docks to the left onto a preceding low tone bearing unit.

The derivation of [ɲĕmb è pápá] 'a violent death', [ndzĕn jàmà] 'my path' and [ǹtʃĕn wàmà] from / ɲèmb ´ è pápá /, ndzèn´ è àmà/ and /ǹtʃèn´ú àmà / is provided below.

(219) Sample derivation

Input	ɲɛmb e papa	ndzen e ama	ntʃɛn u ama
			
	L H L H	L HL L	L L H HL
LHL	ɲɛmb e papa	ndzen e ama	ntʃɛn u ama
			
	L H L H	L HL L	L L H HL
M.R.	N/A N/A		ntʃɛn u ama
			L L H LL
Segmental	N/A	ndzen j ama	ntʃɛn w ama
rules			
		L HL L	L L H LL
Output	[ɲěmb è pápá]	[ndzěn jàmà]	[ǹtʃěn wàmà]

5.2.3.2.2. The phrasal high tone spreading (PHS)

At the phrasal level, it has been observed that a high tone spreads onto a low that is followed by another high tone. As a consequence, a falling contour is formed. Then the contour simplifies to a high tone and leaves the low tone floating. The data below illustrate the phenomenon.

(220) /èlɔ̀lɔ̀ é ŋ̀ káálá / -> [èlɔ̀lɔ̃ ŋ́ˈkáálá] 'the European's duck'
duck AM European

/èdìdjà é ǹdɛ̌ɛ́ / -> [èdìdjă ń ˈdɛ̌ɛ́] 'the wall of the house'
wall AM house

/lìmáŋ lì tóɣà/	->	[lìmáŋ lí!tóɣà]	'the small cheek'
cheek AGR small			
/wɔ̀ á mɔ̃n /	->	[wǎ !mɔ́n]	'the child's arm'
arm AM child			
/àx hén lìkúɓé/	->	[àx hén lí!kúɓé]	'he sees the banana'
he TM see banana			
/àx dí lìkúɓé/	->	[àx dí lí!kúɓé]	'he eats the banana'
he TM eat banana			

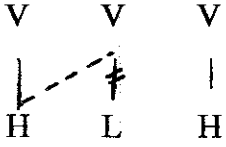
When we compare the underlying and surface forms, we notice that two neighboring vowels coalesce into one. Then, following the Stranded Tone Principle, the floating tone docks onto the vowel that caused the deletion. It is observed that when the associative marker deletes, the stranded H docks to the left. Therefore, it appears that all floating high tones, be they lexical or grammatical dock to the left at the postlexical level. Thus, the lexical floating high tone linking (LHL) can be reformulated as follows:

Phrasal High Linking (PHL)

A floating high tone docks onto a vowel that bears a low tone to the left at the postlexical level.

It is also argued that a high tone spreads onto a following low that is followed by another high tone.

Phrasal High Tone Spreading (PHS).



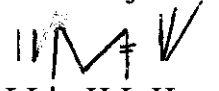
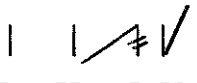
The PHS feeds a falling contour simplification process. From the facts of the above data, it appears that the falling contour simplification (FCS) which is a postlexical rule applies as well when the contour is followed by a high tone. Thus, the falling contour simplification (FCS) will be revised as follows:

Falling Contour Simplification (FCS)

In this statement, T stands for any tone which may be high or low.

The derivation of [èlɔ̀lɔ̀ ŋ́ káálá] 'the duck of the European' from / èlɔ̀lɔ̀ é ŋkáálá / and [àx hén lí kúɓé] 'he sees the banana'(as a sample) is provided through the application of the above rules as follows:

(221) Input	elɔlɔ e ŋkaala	ax hɛn likuɓe
	LLL H L H	L H L H
Segmental rules	elɔlɔ ŋkaala	——
	LLL H L H	
PHL	elɔlɔ ŋkaala	——
	LLL H L H	
PHS	elɔlɔ ŋkaala	ax hɛn likuɓe
	LLL H L H	L H L H

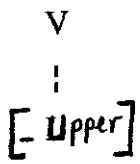
FCS	elɔlɔ ŋkaala	ax hɛn likuɓe
		
	LLL H L H	L H L H
Other rules		
Output:	[èlɔ̀lɔ̌ ŋ̀káálá]	[àx hén lí̀kúɓé]

5.2.3.2.3. The Default Tone Mapping (DTM).

It has been argued in the previous sections that the final vowels and verbal extensions are not specified for tone at the underlying level. A default tone mapping has been stated earlier in 5.2.2.1.2. to account for tone assignment on derived stems. The DTM repeated here for convenience reads as follows:

Default Tone Mapping (DTM)

A toneless vowel is assigned a low tone at the postlexical level.



The application of the DTM can be observed in the derivation of verbal stems in the section referred to above.

5.2.3.2.4. Downstep.

The productive effect of downstep has been observed throughout this work. In this section we characterize the phenomenon more specifically as a postlexical process.

Downstep is a well-known phonological pattern of many languages. It refers to a situation where a high tone is realized lower than a preceding one. In Bakoko, downstep is a widespread phenomenon. Each time that a low tone is found between two high tones, the second high undergoes

downstep. Below is a sample derivation of data that illustrate the facts of downstep in Bakoko.

(222)	a.	bíx ˡhén	'they see'
		mìníx ˡhén	'you (pl) see'
	b.	mɔ̌n ˡwéɛ́	'his child'
		mɔ̌n ˡwáhá	'our child'
		mɔ̌n ˡwáná	'your child'
		lìmáŋ ʤˡáhá	'our cheek'
		lìmáŋ ʤˡáná	'your cheek'
		m̀mú ˡwáhá	'our head'
		m̀mú ˡwáná	'your head'
		m̀mú ˡwáɓá	'their head'
	c.	àx ɲú mínˡdím	'he drinks water'
		àx dí líˡkúɓé	'he eats a banana'
		èpíl éˡtɔ́ɣà	'a small debt'
		èɓálé éˡtʃɛ́n	'a big loan'
		mìmáŋ míˡtám	'the other cheeks'

In Bakoko, downstep is always provoked by the presence of a floating low tone between a sequence of high tones. In 222 (a) for instance, it is claimed that the present tense marker is a floating low tone located between the subject marker and the verb.

In 222 (b), it is claimed that the possessive markers for classes 1, 3, and 5

are respectively ù, ù and lì. When they undergo devocalization and coalescence, their low tones are set afloat. Thus, the conditions for downstep to operate are met. In 222 (c), it is thought that a H spreads onto a L that is followed by another H. Then the H spread is followed by the delinking of the L which becomes floating and causes downstep. The statement of downstep is repeated below as follows:

Downstep.

A high tone is realized on a lower pitch than a preceding high when both are separated by a floating low tone.

The application of downstep yields [bíx ꜜhén] 'they see' [mɔ̀n ꜜwáhá] 'our child', [lìmáŋ dʒꜜáná] 'your cheek', [èpíl éꜜtɔ́ɣà] 'a small debt' from [bíx ˋ hén] [mɔ̀n ú áhá] , [lìmáŋ lí áná], [èpíl é tɔ́ɣà] respectively.

(223) Sample Derivation

Input	bix hɛn	mɔn u aha	límaŋ di ana	epil e tɔɣa
P1	HL H	LH H H	L H H H	L H L H L
MR	——	mɔn u aha	límaŋ di ana	——
		LH L H	L H L H	
P2				
Segmental rules	——	mɔn w aha	límaŋ dʒana	——
		LH L H	L H L H	

PHS —— —— —— epıl e tɔɣa

L H L H L

FCS —— —— —— epıl e tɔɣa

L H L H L

Downstep bıx hɛn mɔn w aha limaŋ dʒ ana epıl e tɔɣa

H ¡H LH ¡H L H ¡H L H ¡H L

OUTPUT [bíx ¡hɛ́n] [mɔ̌n ¡wáhá] [lìmáŋ dʒ¡áná] [èpíl é¡tɔ́yà]

5.3. Conclusion.

This chapter has analyzed tone and tonological processes in Bakoko. It was obvious to us that an autosegmental approach is best suited for the analysis of tone. Bakoko is a two tone language: High and Low. Association conventions à la Pulleyblank (1983) have been assumed for the matching of tones and tone bearing units. From the analysis, there is evidence that tonological processes are assigned to specific strata of the lexicon. Thus, both a lexical and a postlexical component have been motivated with relevant arguments. The lexical component is made up of two non-cyclic strata. The postlexical component, following Kaisse (1985), is subdivided into two sections: Postlexical one and Postlexical two. While most of the rules are assigned to specific strata, some rules have been found to be necessarily multi-stratal (e.g. UAC, High Tone Deletion, etc.)

Endnotes for chapter 5

(1) On can wonder whether the H- toned -le in (137) is not the same morpheme as the L- toned -le forms in (138). Our proposal is that they are separate morphemes. The L- toned forms stand as the agentive suffix. But all agent creations do not follow the same principle. Consider the following as an example:

lì-vèx	'to create'	m-bvèx	'creater'
	'to measure'	è-vèx-lé	'creature'
		ɔ̀-vèɣ-à	'meter, measure'

If one claims that they are not separate morphemes, one can posit an underlying suffix /-lé / for both. Then it can be thought that Meeussen's Rule applies to delink the suffix tone before a H-toned root. Such an approach would adequately account for forms like è-vèx-lé 'creature' ǹ-jéx-lè 'teacher'. However, it would fail to account for ǹ-tʃìì-lè 'writer' and other data where a H- toned root takes H toned suffixes and yet no tonal change is observed.

(2) The derivation in (149) simply argues that the Low tone that is unassociated after the application of the UAC links to the root via a language specific rule while the H counterpart associates at the postlexical level as evidenced in (147).

(3) 'Derived stems' is an ad hoc denomination to refer to stems whose roots can enter the formation of more than one verb. In other words, we are not referring to verbs that have changed class. Keith Snider (personal communication) would term them 'compound stems'. But the word

'compound' evokes the idea of two independent units put together. But such is not the case for 'compound verbs' because the extensions and Final Vowels cannot stand on their own.

(4) Linguists working on African Languages have argued long and hard against that analysis of downstep. Snider (1999) for one argues that downstep in African languages is in fact phonological, albeit postlexical. Without going into this debate, we claim that downstep in Bakoko applies in the last resort at the postlexical level. Put differently, it is fed by the various phonological processes such as vowel deletion, coalescence, tone spreading that yield floating tones.

(5) Keith Snider (personal communication) remarked that we do not really have a good understanding of what is psychologically real. For there are many cases where children apparently do learn many complicated rules in a short time (e.g. tone system of Yemba).

(6) It will be argued in 5.2.3.2 that all H tones located between the prestem material and the root are attracted by the root which is a prominent position.

(7) It has been observed in 2.1.2.5 and throughout this thesis that both ɓa and bja are acceptable surface forms of the same UR /ɓiə/. Thus, the devocalisation process stands as an intermediary stage between the UR and the form [ɓa].

(8) In the literature, some linguists working on Bantu languages (Hyman 1990, Black 1995...) realized that some tonal morphemes can be best construed as occurring between two separate phonological domains. Such tones have been termed boundary tones.

Chapter VI
GENERAL CONCLUSION

Using the lexical phonology approach, I have discussed in this thesis the segmental phonology, the syllable and syllabic phonology and the tonological processes of Bakoko.

Though the Bantu languages of the Great Lakes zone have been largely discussed in the literature (Kanerva 1989, Mutaka 1990, Hyman 1990, among others), those of Guthrie's Zone A have been barely explored. Moreover, the main works dealing with the latter group of languages have been carried out within a structuralist paradigm (Bot Ba Njock 1970, Alexandre 1966, Bitjaa 1990, etc.). Talking about the current approaches to African linguistics, Bamgbose (1995:11) declares that "the major difference between African linguistics in the 1960's and today is the impact of linguistic theory. The effect of this impact can be observed in the way articles are written to draw attention to theoretical issues and implications." Moving within this current tendency of African linguistics, this thesis intended to achieve a double purpose: fact finding on the one hand and theoretical implication on the other hand. Nowadays, it is seldom a secret that facts of African languages (e.g. tone) have significantly contributed to the establishment of autosegmental phonology. The following are the main findings of this analysis.

Firstly, it has been argued with relevant data and theoretical insights that the phonology of Bakoko is stratally organized. Linguists working on Bantu languages (Goldsmith 1987, Myers 1987, Mutaka 1990 among others) claim that the Bantu lexicon is made up of two strata or phonological domains. The facts of Bakoko confirm this hypothesis; however, with additional insights into the organisational structure of Bakoko Phonology. The lexical phonology of Bakoko is made up of two

strata, both non cyclic. The roots and stems (root plus suffixes) are derived at stratum one while the prestem material is derived at stratum two. Thus, tense markers are divided into two groups. The suffixed tense markers belong to stratum one and the prefixed tense markers to stratum two. Boundary tones have been motivated and shown to intervene between stratum one and stratum two. The postlexical component of the grammar is subdivided into two sections: postlexical one and postlexical two. Postlexical one rules display lexical properties, i.e. they are sensitive to the morphology. Postlexical two rules, on the other hand, apply in an across-the-board fashion.

Secondly, one of the findings of this study is that rules are assigned to specific strata. It has been argued for example that Tone Spreading solely applies at the root cycle. When applied at the stem cycle, wrong outputs are derived. Syllabification too appears as a dynamic process operating at all the levels of the grammar. In the literature, it has been observed that languages vary as to how segmental units are parsed into syllables and instances of static and continuous syllabification have been recorded. This thesis has provided evidence that syllabification operates at the various strata of lexical and postlexical phonology. In this respect, resyllabification has been construed as a mechanism that achieves syllable adjustment, i.e. it reorganizes segments into syllable units. It has been argued that most resyllabification rules in this language are intended to meet the Onset First Requirement.

Thirdly, discussion of aspects of the phonology of Bakoko provides some implications for the theories of tiered phonology, underspecification and lexical phonolgogy.

For instance, tonal melodies have been argued for underived lexical items. The controversial Obligatory Contour Principle has been found to be productive in the phonology of Bakoko. It is active as a constraint on underlying representations (roots) on the one hand and in the course of

derivation on the other hand. Moreover, given the Feature Geometry representation of the vowel features adopted in this study, the role and status of OCP has been reinforced as an active principle in vowel deletion and vowel coalescence.

With regard to Underspecification Theory, Bakoko is a two-tone language: High and Low. Following the claim made by Pulleyblank (1983), Low must be the default tone. But it has been observed that only some morphemes are unspecified for tone at the UR, that is both H and L must be underlyingly specified in most lexical representations.

With regard to Lexical Phonology, there has been a controversy as to what the proper representation of the model is. Some formulations of the theory claimed that the underived lexical item has to get into the morphology where it receives the stratum one affixes before it is scanned by the rules of the phonology. But Halle and Mohanan (1985) claim that the underived lexical item is scanned by the phonology before it gets to the morphology. This controversy is better reflected in the model of Lexical Phonology as schematized by Durand (1990:175) where it is not obvious whether the underlying representation gets to the morphological or phonological component first.

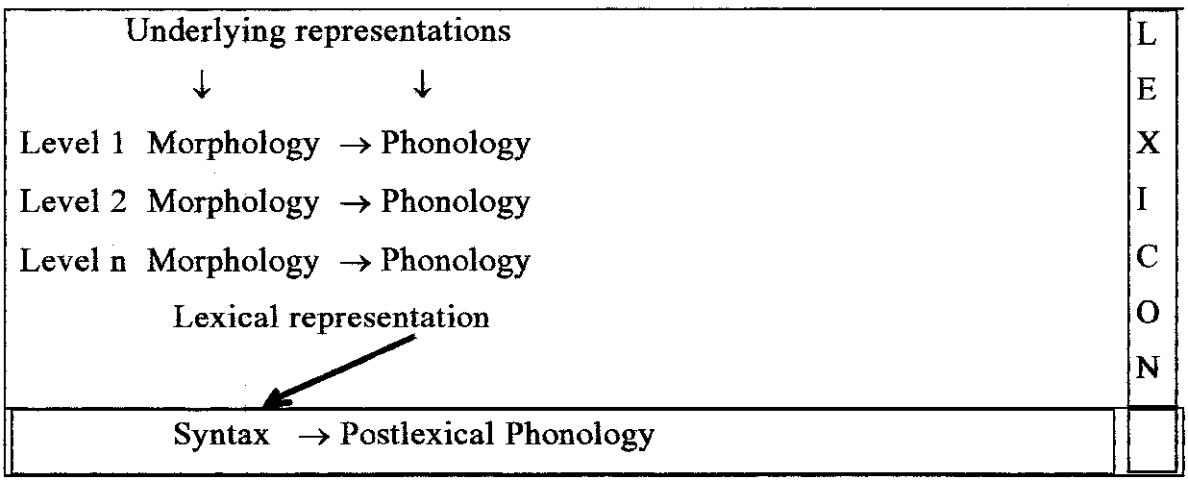
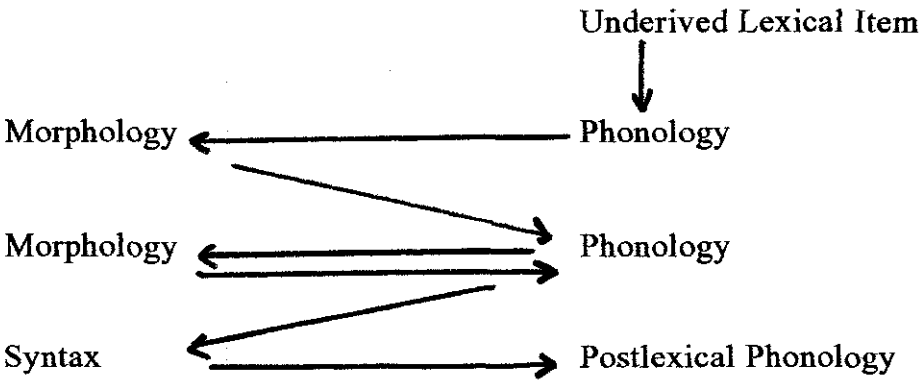


Chart n° 7: The Model of Lexical Phonology

Facts of Bakoko support the proposal made by Halle and Mohanan (1985). Put differently, prior to the affixation of stratum one formatives, the underived lexical item or root is scanned by the rules of phonology. It has been argued that the UAC, OCP, Tone Spreading and Low Mapping Rule apply at the root level. Moreover, it has been demonstrated that the application of the above rules at the stem level yields wrong outputs. The discussion on the model of Lexical Phonology can be summed up by the following representation that best accounts for the facts of Bakoko



Fourthly, the analysis carried out in this thesis, has produced an array of phonological rules for Bakoko which are summarized below in terms of the strata at which they apply.

MORPHOLOGY			PHONOLOGY
STRATUM ONE	Underived Lexical Item	→	UAC (5.2.1.1): Tone Spreading (5.2.1.1.1), Low Mapping rule (5.2.11.1) Syllable Building Rules (4.3.1.1) Vowel Place Spreading (3.5.2) Unspecified Consonant Deletion (3.5.1) Contour Simplification (5.2.1.4.3) Floating Low Relinking (5.2.2.2.2) High Tone Deletion (5.2.1.2) Stem Tone Deletion (5.2.2.2.6) Tone Replacement (5.2.2.2.2.6)
	SUFFIXATION		
STRATUM TWO	PREFIXATION	→ ←	Place Assimilation (3.1.1) Delateralisation (3.1.2) Lateralisation (3.2.1) Devocalisation (4.4.1) Coalescence (4.4.2) Vowel Deletion (OCP) (4.4.3.2) High Tone Linking (5.2.2.2.5) High Tone Deletion (5.2.1.2) Floating Low Tone Relinking (5.2.1.4) Floating Low Tone Deletion (5.2.1.4) High Docking (5.2.2.2.2) Syllable building rules (4.3.1.1) U.A.C. (5.2.1.1)
POSTLEXICALLY	SYNTAX	→ ←	Post Nasal Hardening (3.1.3) Post Nasal Voicing (3.1.4) Post Nasal Deglottalization (3.1.5) Affrication (3.2.2.) Voicing (3.3) Deglottalizaton (3.4) Vowel Deletion (4.4.3.2) Compensatory Lengthening (4.4.3.2) Associative Marker Deletion (4.4.1) Schwa Epenthesis (4.4.5) Meeussen's Rule (5.2.3.1) Downstep (5.2.3.2) Floating High Relinking (5.2.3.1) Falling Contour Simplification (5.2.3.1) Phrasal High Tone Linking (5.2.3.2) Phrasal High Tone Spreading (5.2.3.2) Default Tone Mapping (5.2.3.2) Vowel Reduction (4.4.3.1)

Chart n° 8: Phonological Rules

From the observation of the above sets of rules, the question of rule ordering naturally arises. Put differently, why are some rules assigned to stratum one while others apply later at the postlexical component? Pulleyblank (1983:215) lists some properties that distinguish between lexical and postlexical rule applications. Following these properties, it appears that the lexical rules above refer to word-internal structure, they are structure preserving and do not apply across words on the one hand. On the other hand, postlexical rules follow all lexical rule applications, they apply across words. In short, they do not display lexical properties. This statement holds for the postlexical two rules because the postlexical one rules refer to morphological information as evidenced in chapter five.

Some early formulations of the theory of Lexical Phonology claim that the first stratum of the lexical component must be cyclic. But Halle and Mohanan claim that "the cyclicity of levels must be argued piecemeal. Any level can be non cyclic" (Durand 1990:187). Given our previous statement that both lexical strata are non cyclic, what is it that causes one stratum to precede the other? It has been argued that the stem, i.e. root plus suffixed formatives and the prestem material form separate phonological domains. Following the tendency for Bantu languages to derive the stem at stratum one (Myers 1987, Mutaka 1990, etc.) and given the fact that some stratum two rules (e.g. vowel Deletion) also apply at the postlexical level, both strata ought to form a continuum. In effect, Mohanan in his study of Malayalam states that "if a phonological rule is assigned to more than one level, then the levels must form a continuum" (Kenstowicz 1994:226).

Finally critical data in support of the various aspects of our analysis are provided in appendices one and two in the event of verification of specifics of the analysis.

APPENDIX I

Noun Paradigms

a. L melody	b. H melody	c. LH Melody
Monosyllables	**Monosyllables**	**Monosyllables**
vɔ̀l (11) 'laughter'	sóŋ (9) 'moon'	dĭh (5) 'eye'
wɔ̀ (3) 'hand'	tít (9) 'animal	ʤɔ̌ (5) 'name'
ŋgànd (9) 'feast'	ká (9) 'animal (sp)'	ʤɔ̌l (5) nose
ŋgɔ̀x (9) 'stone'	ndóŋ (9) 'pepper'	mbă (9) 'yam'(sp)
dìh (5) 'firespot'	kón (9) 'bean'	ɲăt (9) 'buffalo'
ʤɔ̀t (5) 'boil'	pém (9) 'chalk'	mŏn (1) 'child'
ŋgɔ̀n (9) 'young girl'	ndóx (9) 'deaf'	mĕn (1) 'proprietor'
kɔ̀h (9) 'fish'	ŋgáá (9) 'gun'	
ɲɔ̀ (9) 'snake'	ndím (9) 'blind'	**Disyllables**
mbɔ̀m (9) 'young girl'	tól (9) 'deaf'	lìmáŋ (5) 'cheek'
		àɔ́ɔ́ (3) 'ear'
Disyllables	**Disyllables**	lìwú (5) 'death'
ɔ̀nù (11) 'finger'	mbémtán (9) 'armpit'	ètút (7) 'shoulder'
lìbùm (5) 'belly'	mbémbí (9) 'measles'	m̀mím (3) 'heart'
èvè (7) 'bone'	paɣó (9) 'paddle'	èsέx (7) 'liver'
ǹsòn (3) 'flesh'	mbɔ́tí (9) 'cloth'	àvíl (3) 'pus'
dùwè (5) 'trip'	kítí (9) 'morning'	ɔ̀píí (11) 'tale'
ɔ̀kɔ̀n (11) 'disease'	kɔ́sí 99) 'noon'	èpíl (7) 'debt'
ènìŋ (7) 'life'	sáwá (9) 'coast'	m̀pέx (3) 'bag'
àwùn'(3) 'oldness'	wóŋɔ́ 'there'	ɔ̀ɓáx (11) 'hernia'

kùndɛ̀ (9) 'freedom'

sìɣà (9) 'generation'

pèɗàn (9) 'competition'

Trisyllables

lìkàɓò (5) 'yam'

lìkàlà (5) 'doughnut'

èdìdjà (7) 'wall'

èpàhà (7) 'comb'

èsuɣù (7) 'toothbrush'

èsɔ̀hɛ̀ (7) 'pain'

ɔ̀dùtù (11) 'abscess'

Tetrasyllables

ètàtàŋgà (7) 'butterfly'

ǹdàlɓòɛ̀ (1) 'spider'

Polysyllables

ǹtʃìŋgànɛ́ (3) 'mindness'

nyàmàbùlú (9) 'rhumatism'

pàkàtóló (99) 'rabbit'

ǹŋáŋgánɛ́ (1) 'new mother'

Trisyllables

èpùmá (7) 'orange'

ǹsòlá (3) 'plantain'

ŋ̀kóŋgó (3) 'frog'

èlìŋɓán (7) 'mirror'

lìkòòká (5) 'door'

ɔ̀sèsé (11) 'whistle'

èɓàŋgá (7) 'word'

m̀pùŋgú (3) 'confusion'

èvèxlé (7) 'creature'

èkáká (7) 'hip'

mìkɛ́lɛ́ (4) 'vaccination'

bìsíŋgá (8) 'hatred'

èsáŋɛ́ (1) 'father'

ɔ̀wándá (11) 'boy'

lìwándá (5) 'friend'

ǹséɓá (3) 'trumpet'

ètámbí (7) 'shoe'

d) HL Melody	e) LHL Melody
Monosyllables	**Trisylables**
pâm (1) 'male'	èsáhà (7) 'lung'
sê (9) 'fish'(sp)	èkóxhè (7) 'cough'
kâŋ (9) 'guinea fowl'	èvólò (7) 'broom'
dʒôm (5) 'ten'	èbúŋgà (7) 'mat'
Disyllables	m̀bɛ́là (1) 'owner'
kámàt (9) 'goat'	ŋ̀kúɣù (1) 'defunct'
jíɓè (7) 'shadow'	èlɛ̌lɛ̀m (7) 'dream'
dʒámbò (5) 'swamp'	ɔ̀sɔ̌sɔ̀n (11) 'ant'
síxpɛ̀ 'again'	ŋ̀kɔ̌kɔ̀n (1) sick person
búmɛ̀ (1) 'tree'(sp)	**Tetrasyllables**
dʒómò (5) 'quarrel'	èɓéɓéɛ̀ (7) 'wickedness'
jálkà (7) 'nail'	èvɔ́vɔ́lɛ̀ (7) 'cold'
vítà (11) 'smoke'	èsɔ́sɔ́hɛ̀ (7) 'sweet'
bíjà (8) 'tears'	èpúpúɛ̀ (7) 'weight'
péà (9) 'drunkenness'	èdĭdìtɛ̀ (7) 'weight'
ndóà (9) 'vomiting'	èsăsàhɛ̀ (7) 'lightness'
wélàn (3) 'war'	
bítân 'five'	
bínâ 'four'	
bíhâ 'three'	
Trisyllables	
dʒáŋgòlò (5) 'mango'	
wáŋgìhì (3) 'handkerchief'	
tómbèlì (9) 'tumbler'	
síŋgìhì (9) 'cat'	
bísámà 'seven'	

The discrepancies observed in the instantiations of some tonal melodies confirm the analysis of tone assignment on nominal forms as postulated in this thesis. For example, it appears that the LH melody can surface as LH, LLH, LHH, LLLH, etc. The LHL melody does not show up in mono- and disyllables. On polysyllables, it surfaces as LHL, LLHL, LHHL, etc. Such facts led us to claim that tone is not assigned to the fully formed lexical item. Instead, the tonal melody of the lexical item is pieced together in a gradual fashion, each affix coming along with its tone or tonal melody.

VERB PARADIGMS.

The verb in its infinitive form is a nominal made up of a class 5 noun prefix plus a stem. It has been argued that the stem consists of the Root plus an optional Final Vowel or Extension. Roots have been claimed to be monosyllabic with a high or low tone.

1) When the stem equals the root.

(a)	H- Melody	(b)	L- Melody
-hén	'to see'	- kù	'to fall'
-ɓát	'to add'	-wùn	'to grow old'
-ɔ́x	'to swim'	-sò	'wash'
-ɔ́ŋ	'to build'	-ɓàt	'to ask'
-ɓèt	'to climb'	-ɔ̀ŋ	'to follow'
-dí	'to eat'	-dìŋ	'to love'
-lál	'to sleep'	-jàn	'to turn'
-ɲú	'to drink'	-kɔ̀x	'to grind'
-lél	'to jump'	-tɔ̀mb	'to be tired'
-só	'to come'	-vèx	'to create'
-pún	'to refuse'	-wèè	'to walk'
-ló	'to vomit'	-ɔ̀l	'to laugh'

2) When the stem consists of Root plus Final Vowel.

The Final Vowel is always identical to the root vowel. Therefore, it has been construed as an empty V-slot at the UR and surfaces with a low tone.

(a) H- Roots.		(b) L- Roots.	
-níŋg + ì	'to enter'	-lè	'to open'
-tíɣ + ì	'to be small'	-tʃèɣ + è	'to test'
-ém + è	'to be pregnant'	-ɓèɣ + è	'to carry'
-jéɣ + è	'to learn'	-lèm + è	'to dream'
-tél + è	'to stand up'	-tàk + à	'to suffer'
-sél + è	'to peel'	-àɣ + à	'to itch'
-sál + à	'to pay'	-kòŋg + ɔ̀	'to snore'
-ɓáh + à	'to split'	-pɔ̀h + ɔ̀	'to choose'
-vúŋg + ù	'to blow'	-sòm + ò	'to search'
-óm + ò	'to quarrel'	-kòɣ + ò	'to bite'
-lóɣ + ò	'to graze'	-pùm + ù	'to harvest'
-óŋ + ò	'to insult'	-sènd + è	'to glide'
-ɔ́ŋ + ɔ̀	'to remember'	-pàh + à	'to comb'
-jé + è	'to tell a lie'	-lèɣ + è	'to invite'
-tí + ì	'to give'	-kwèh + è	'to close'
-kúl + ù	'to destroy'	-kɔ̀ŋ + ɔ̀	'to shell'
-síŋg + ì	'to rub'	-tèɣ + è	'to bribe'
-vút + ù	'to bend down'		

3) When the stem consists of Root + Extension.

In Bantu linguistics, the extension, unlike the Final Vowel modifies the meaning of the verb. In other words, the extension conveys a meaning. Both stems that equal the root and those made up of a root plus Final Vowel are likely to take a verbal extension. But in the latter case, the Final Vowel and the Extension are mutually exclusive.

3.1. Stems that consist of Root + Verbal Extension.

(a) The Reflexive.

-ɓát	'to add'	→	ɓát + ɓàn	'to add oneself'
-dìŋ	'to write'	→	dìŋ + ɓàn	'to love oneself'
-tʃìì	'to write'	→	tʃìì + ɓàn	'to enrol, register'
-ɓàt	'to ask'	→	ɓàt + ɓàn	'to ask oneself'
-sò	'to wash'	→	sò + ɓàn	'to bathe'

(b) The Applicative [1]

-pɔ́t	'to talk'	pɔ́t + lè	'to talk to'
-lám	'to cook'	lám + lè	'to cook for'
-áá	'to carry (water'	áá + lè	'to carry (water) for'
-dí	'to eat'	dí + lè	'to eat for'
-tʃìì	'to write'	tʃìì + lè	'to write to / for'

(c) The Passive

-ɓát	'to add'	ɓát + ɓɛ̀	'to be added'
-ɓàt	'to ask'	ɓàt + ɓɛ̀	'to be asked'
-dìŋ	'to love'	dìŋ + ɓɛ̀	'to be loved'
-óm	'to send'	óm + ɓɛ̀	'to be sent'

(d) The Reciprocal

-ɓát	'to add'	ɓát+àn	'to add each other'
-dìŋ	'to love'	dìŋ + àn	'to love each other'
-ɓàt	'to ask'	ɓàt+àn	'to ask each other'
-óx	'to hear'	óx + làn	'to listen to each other'

(e) The Causative 1.

The difference between causative 1 and causative 2 has been dealt with in chapter two.

-pót	'to talk'	pót + è ~ pót + jè	'to oblige s.o. to talk'
-káx	'to lie'	káx + jè	'to oblige s.o. to tie'
-tɔ̀ɔ̀	'to sit'	tɔ̀ɔ̀ + jè	'to oblige s.o. to sit'
-pún	'to refuse'	pún + è ~ pún + jè	'to oblige s.o. to refuse'

(f) The causative 2.

-pót	'to talk'	pót +hànè	'to make s.o. talk'
-sál	'to work'	sál +hànè	'to make s.o. work'
-dìŋ	'to love'	dìŋ +hànè	'to make s.o. love'
-tʃìì	'to write'	tʃìì+hànè	'to make s.o. write'

3.2. Other stems.

This section addresses stems that are normally made up of a root plus a Final Vowel. But these roots are likely to have an additional verbal extension. It has been observed that the Final vowel and the Verbal Extension are mutually exclusive, i.e. they never co-occur in the same stem in Bakoko. This situation opposes the one found in Basaa (Bitjaa 1991) or in the the Bantu languages of the Great Lakes region where more than one verbal extension and the Final Vowel are likely to co-occur. Unlike the stems described in 3.1, the suffixation of verbal extensions on these roots is not very productive. Hereafter is a sample of such stems.

(a) Applicative.

-ɓèɣ + è	'to carry'	→	ɓèx + lè	'to carry for'
-tàk + à	'to suffer'		tàk + lè	'to suffer for'
-jéɣ + è	'to learn'		jéx + lè	'to teach i.e. to learn to'
-tʃàt + à	'to hunt'		tʃàt + lè	'to hunt for'

(b) Causative 1.

-tɛ́l + è	'to stand'	tɛ́l + jè	'to make s.o. stand'
-ɓáh + à	'to split'	ɓáh + è ~ ɓáh + jè	'to make s.o. split'

(c) Passive

-ɓáh + à	'to split'	ɓáh + lè	'to be split'
-sɔ́ŋg + ɔ̀	'to count'	sɔ́ŋg + lè	'to be counted'
-ɓèɣ + è	'to carry'	ɓèx + lè	'to be carried'
-kòɣ-ò	'to bite'	kòx + lè	'to be bitten'

(d) Reciprocal.

-ɓèɣ + è	'to carry'	ɓèx + làn	'to carry each other'
-kòɣ-ò	'to bite'	kòx + làn	'to bite each other'

Endnotes for Appendix I.

(1) Another form of the applicative -lènè has been identified in Bakoko. This extension which seems to stem from the influence of neighbouring languages (e.g. Duala) means 'on behalf of'. But its use is not widespread among the speakers of the language.

e.g. -tʃìì	'to write'	→	tʃìì + lènè	'to write on behalf of'
-sál	'to work'		sál + lènè	'to work on behalf of'

APPENDIX II

Phrasal Data.

A- Noun + Adjective Collocations.

	N	AGR ADJ.	
(1)	mɔ̌n	ń¦tɔ́ɣà	'a small child'
	mùt	ǹ tɔ́ɣà	'a small person'
(2)	ɓɔ̌n	ɓá¦ tɔ́ɣà	'small children'
	ɓòt	ɓà tɔ́ɣà	'small people'
(3)	m̀mú	ń¦ tɔ́ɣà	'a small head'
	ànù	ǹ tɔ́ɣà	'a small mouth'
(4)	mìmú	mí¦ tɔ́ɣà	'small heads'
	mìnù	mì tɔ́ɣà	'small mouths'
(5)	lìmáŋ	lí¦ tɔ́ɣà	'a small cheek'
	lìsòŋ	lì tɔ́ɣà	'a small tooth'
(7)	èlɔ̀lɔ̀	è tám	'another duck'
	èpíl	é¦tám	'a small debt'
(8)	bìlɔ̀lɔ̀	bì tám	'other ducks'
	bìpíl	bí ¦tám	'other debts'
(9)	kɔ̀h è	tʃén	'a big fish'
	tít	é¦ tʃén	'a big animal'
(10)	kɔ̀h é	tʃén	'big fishes'
	tít	é tʃén	'big animals'
(11)	ɔ̀nɔ̀n	vì tɔ́ɣà	'a small bird'
	ɔ̀lɔ́	ví ¦ tɔ́ɣà	'a small day'

(3pl) ànɔ̀n à tɔ́ɣà 'small birds'

àlɔ́ á! tɔ́ɣà 'small days'

B. Associative Constructions.

	N1	AM	N2	
(1)	mɔ̌n	à	màndíɣá	'The child of the woman'
	mùt	à	mɔ̌n	'The person of the child'
(2)	ɓɔ̌n	bí	mán!díɣá	'The children of the woman'
	ɓòt	bí	m!ɔ́n	'The people of the child'
(3)	m̀mím	á	mùt	'The heart of a person'
	ànù	á	tít	'The mouth of the animal'
	mìmím	mí	mùt	'The hearts of a person'
	mìnù	mí	tít	'The mouths of the animal'
(5)	lìmáŋ	lí	ŋ́!káálá	'The cheek of the European'
	lìsòŋ	lí	mùt	'The tooth of the person'
(4)	mìmáŋ	mí	ŋ́!káálá	'The cheeks of the European'
	mìsòŋ	mí	mùt	'The teeth of the person'
(7)	èdìdjà	é	ń!dɛ̌ɛ́	'The wall of the house'
	èpíl	é	ŋ́!káálá	'The debt of the European'
(8)	bìlɔ̀lɔ̀	bí	ɓá!káálá	'The ducks of the Europeans'
	bìpíl	bí	ɓòt	'The debts of people'
(9)	kɔ̀h	è	mùt	'The fish of the person'
	póŋ	è	mùt	'The brain of the person'
(10)	kɔ̀h	é	mùt	'The fishes of the person'
	póŋ	é	mùt	'The brains of the person'
(11)	ɔ̀nɔ̀n	ví	mán!díɣá	'The bird of the woman'
	ɔ̀lémb	ví	mùt	'The tongue of the person'
(3pl)	ànɔ̀n	á	mán!díɣá	'The birds of the woman'
	àlémb	á	mùt	'The tongues of the person'

C/ Noun + Possessives.

	N	AGR POSS			N.	AGR.POSS	
(1)	mɔ̌n	wàmà	'my child'	(2)	ɓɔ̌n	ɓàmà	'my children'
	mùt	wámà	'my person'		ɓòt	ɓámà	'my people'
	mɔ̌n	wɔ̀ɔ̀	'your child'		ɓɔ̌n	ɓɔ̀ɔ̀	'your children'
	mùt	wɔ́ɔ̀	'your person'		ɓòt	ɓɔ́ɔ̀	'your people'
	mɔ̌n	ǃwɛ́ɛ́	'his child'		ɓɔ̌n	ǃɓɛ́ɛ́	'his children'
	mùt	wɛ́ɛ́	'his person'		ɓòt	ɓɛ́ɛ́	'his people'
	mɔ̌n	ǃwáhá	'our child'		ɓɔ̌n	ǃɓáhá	'our children'
	mùt	wáhá	'our person'		ɓòt	ɓáhá	'our people'
	mɔ̌n	ǃwáná	'your child'		ɓɔ̌n	ǃɓáná	'your children'
	mùt	wáná	'your person'		ɓòt	ɓáná	'your people'
	mɔ̌n	ǃwáɓá	'their child'		ɓɔ̌n	ǃɓáɓá	'their children'
	mùt	wáɓá	'their person'		ɓòt	ɓáɓá	'their people'

(3)	m̀mím	wàmà	'my heart'	(4)	mìmím	màmà	'my hearts'
	m̀pèx	wámà	'my tail'		mìpèx	mámà	'my tails'
	m̀mím	wɔ̀ɔ̀	'your heart'		mìmím	mɔ̀ɔ̀	'your hearts'
	m̀pèx	wɔ́ɔ̀	'your tail'		mìpèx	mɔ́ɔ̀	'your tails'
	m̀mím	ǃwɛ́ɛ́	'his heart'		mìmím	ǃmɛ́ɛ́	'his hearts'
	m̀pèx	wɛ́ɛ́	'his tail'		mìpèx	mɛ́ɛ́	'his tails'
	m̀mím	ǃwáhá	'our heart'		mìmím	ǃmáhá	'our hearts'
	m̀pèx	wáhá	'our tail'		mìpèx	máhá	'our tails'
	m̀mím	ǃwáná	'your heart'		mìmím	ǃmáná	'your hearts'
	m̀pèx	wáná	'your tail'		mìpèx	máná	'your tails'
	m̀mím	ǃwáɓá	'their heart'		mìmím	ǃmáɓá	'their hearts'
	m̀pèx	wáɓá	'their tail'		mìpèx	máɓá	'their tails'

(5)	lìmáŋ	ʤàmà	'my cheek'	(7)	èpíl	jàmà	'my debt'
	lìsòŋ	ʤámà	'my tooth'		èlɔ̀lɔ̀	jámà	'my duck'
	lìmáŋ	ʤɔ̀ɔ̀	'your cheek'		èpíl	jɔ̀ɔ̀	'your debt'
	lìsòŋ	ʤɔ́ɔ̀	'your tooth'		èlɔ̀lɔ̀	jɔ́ɔ̀	'your duck'
	lìmáŋ	ꜜʤéé	'his cheek'		èpíl	ꜜjéé	'his debt'
	lìsòŋ	ʤéé	'his tooth'		èlɔ̀lɔ̀	jéé	'his duck'
	lìmáŋ	ꜜʤáhá	'our cheek'		èpíl	ꜜjáhá	'our debt'
	lìsòŋ	ʤáhá	'our tooth'		èlɔ̀lɔ̀	jáhá	'our duck'
	lìmáŋ	ꜜʤáná	'your cheek'		èpíl	ꜜjáná	'your debt'
	lìsòŋ	ʤáná	'your tooth'		èlɔ̀lɔ̀	jáná	'your duck'
	lìmáŋ	ꜜʤáɓá	'their cheek'		èpíl	ꜜjáɓá	'their debt'
	lìsòŋ	ʤáɓá	'their tooth'		èlɔ̀lɔ̀	jáɓá	'their duck'

(8)	bìpíl	ɓàmà	'my debts'
	bìlɔ̀lɔ̀	ɓámà	'my ducks'
	bìpíl	ɓɔ̀ɔ̀	'your debts'
	bìlɔ̀lɔ̀	ɓɔ́ɔ̀	'your ducks'
	bìpíl	ꜜɓéé	'his debts'
	bìlɔ̀lɔ̀	ɓéé	'his ducks'
	bìpíl	ꜜɓáhá	'our debts'
	bìlɔ̀lɔ̀	ɓáhá	'our ducks'
	bìpíl	ꜜɓáná	'your debts'
	bìlɔ̀lɔ̀	ɓáná	'your ducks'
	bìpíl	ꜜɓáɓá	'their debts'
	bìlɔ̀lɔ̀	ɓáɓá	'their ducks'

(9)	tít	jàmà	'my animal'	(10)	tít	jámà	'my animals'
	kɔ̀h	jàmà	'my fish'		kɔ̀h	jámà	'my fish'
	tít	jɔ̀ɔ̀	'your animal'		tít	jɔ́ɔ̀	'your animals'
	kɔ̀h	jɔ̀ɔ̀	'your fish'		kɔ̀h	jɔ́ɔ̀	'your fishes'
	tít	ꜜjɛ́ɛ́	'his animal'		tít	jɛ́ɛ́	'his animals'
	kɔ̀h	jɛ̀ɛ́	'his fish'		kɔ̀h	jɛ́ɛ́	'his fishes'
	tít	ꜜjáhá	'our animal'		tít	jáhá	'our animals'
	kɔ̀h	jàhá	'our fish'		kɔ̀h	jáhá	'our fishes'
	tít	ꜜjáná	'your animal'		tít	jáná	'your animals'
	kɔ̀h	jàná	'your fish'		kɔ̀h	jáná	'your fishes'
	tít	ꜜjáɓá	'their animal'		tít	jáɓá	'their animals'
	kɔ̀h	jàɓá	'their fish'		kɔ̀h	jáɓá	'their fishes'

(11)	ɔ̀nɔ̀n	vámà	'my bird'	(3pl)	ànɔ̀n	wámà	'my birds'
	ɔ̀lɔ́	vàmà	'my day'		àlɔ́	wàmà	'my days'
	ɔ̀nɔ̀n	vɔ́ɔ̀	'your bird'		ànɔ̀n	wɔ́ɔ̀	'your birds'
	ɔ̀lɔ́	vɔ̀ɔ̀	'your day'		àlɔ́	wɔ̀ɔ̀	'your days'
	ɔ̀nɔ̀n	vɛ́ɛ́	'his bird'		ànɔ̀n	wɛ́ɛ́	'his birds'
	ɔ̀lɔ́	ꜜvɛ́ɛ́	'his day'		àlɔ́	ꜜwɛ́ɛ́	'his days'
	ɔ̀nɔ̀n	váhá	'our bird'		ànɔ̀n	wáhá	'our birds'
	ɔ̀lɔ́	ꜜváhá	'our day'		àlɔ́	ꜜwáhá	'our days'
	ɔ̀nɔ̀n	váná	'your bird'		ànɔ̀n	wáná	'your birds'
	ɔ̀lɔ́	ꜜváná	'your day'		àlɔ́	ꜜwáná	'your days'
	ɔ̀nɔ̀n	váɓá	'their bird'		ànɔ̀n	wáɓá	'their birds'
	ɔ̀lɔ́	ꜜváɓá	'their day'		àlɔ́	ꜜwáɓá	'their days'

D- Numerals.

	N.	AGR.	NUM		N.	AGR.	NUM
(1)	mɔ̌n	wà	'one child'	(2)	ɓɔ̌n	bíɓă	'two children'
	mùt	wà	'one person'		ɓòt	bíɓă	'two people'

(3)	m̀mím	wá	'one heart'	(4)	mìmím	míɓă	'two hearts'
	ànù	wá	'one mouth'		mìnù	míɓă	'two mouths'
(5)	dĭh	ʤá	'one eye'	(4)	mĭh	míɓă	'two eyes'
	lìsòŋ	ʤá	'one tooth'		mìsòŋ	míɓă	'two teeth'
(7)	èlɔ̀lɔ̀	já	'one duck'	(8)	bìlɔ̀lɔ̀	bísámà	'six walls'
	èdìdjà	já	'one wall'		bìdìdjà	bítân	'five walls'
(9)	tit	já	'one animal'	(10)	tít	éhάà	'three animals'
	kɔ̀h	já	'one fish'		kɔ̀h	énàà	'four fishes'
(11)	ɔ̀dìɓà	vá	'one key'	(3pl)	àdìɓà	áɓă	'two keys'
	ɔ̀sóó	vá	'one river'		à sóó	àɓă	'two rivers'

Notes on Appendix II.

(1) It is worth pointing out that the adjectival prefix for the class 10 words bears a high tone underlyingly. That is why [tít é tʃɛ́n] does not show the Phrasal High Tone Spreading and hence the downstep. This peculiarity is a feature of most Narrow Bantu languages wherein the difference between the class 9 and class 10 words is marked by a low tone on the concord morphemes of the former and a high tone on those of the latter class.

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