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The tone system of Foodo nouns

Gray C. Plunkett

THE TONE SYSTEM OF FOODO NOUNS

by

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This thesis meets the standards for appearance, conforms to the style and format requirements of the Graduate School of the University of North Dakota, and is hereby approved.

Dean of the Graduate School

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Title   The Tone System of Foodo Nouns

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Degree   Master of Arts

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Signature _____Gray Plunkett_____

Date _____9. Aug. 1991_____

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Finally, I would like to thank Almighty God for creating language in all its intricacies and enabling me to gain some understanding of the intricate tone system of Foodo.

Soli Deo Gloria.

ABSTRACT

This thesis presents an autosegmental analysis of the tone system of the nouns of Foodo, a Guang language of Benin. The goal is to give an analysis of the tone system of nouns that will account for all the surface tonal phenomena by positing two underlying tones. Foodo nouns consist of a stem together with its class prefix and/or suffix; while tonal alternations in prefixes are easily explained by two tone rules, the suffixes exhibit rather complex alternations. Many of the theoretical assumptions of lexical phonology, (especially the view that most lexical rules are cyclic and Kiparsky's Elsewhere Condition) allow for a simple and straightforward account of these tonal alternations. This thesis assumes Pulleyblank's (1986:78-82) version of the Association Convention which excludes automatic multiple-linking and automatic spreading.

A secondary goal of this thesis is to address certain theoretical issues in light of the analysis contained herein. Chapter 6 shows that cyclic application of rules is necessary in the lexical component of a Foodo grammar, thus lending support to the claim of lexical phonology that rule application in the lexical component may be cyclic. This chapter also discusses the issue of what constitutes a tone-bearing unit (TBU) in the language, and shows that current phonological theory does not provide an adequate element to serve as the TBU in Foodo.

CHAPTER 1

1. INTRODUCTION

1.1 Foodo Language Classification

Foodo is a Guang language spoken in Benin, West Africa, by about 15,000-20,000 people. Foodo is spoken in a small area extending about 10 km to the east and south from the town of Sèmèrè, the cultural center of the Foodo-speaking area. It is located about 3km from the Togolese border in the Atacora Departement in Northern Benin (see Fig. 1). The town of Sèmèrè is divided into two administrative areas (Sèmèrè I and II) and is made up of eight villages (or quarters) clustered near each other. The eight quarters are given in (1.1) with their official French spellings and Foodo pronunciations.

(1.1) The Eight Quarters of Sèmèrè

	Official Name	Pronunciation in Foodo

Sèmèrè I

a.	Agbandaré	àgbàndálꞓ:
b.	Baparapéi (Krékpéi)	bákàlàkpèí ~ bàkèlèkpèí
c.	Daka	dàkà
d.	Ouramaré	wúl'á:málꞒ:
e.	Tchinguéyaré	čéŋéy'á:lꞒ:

Sèmèrè II

a.	Gao	gàʊ́
b.	Kpakpalaré	kpákpàlà:lꞒ:
c.	Troucaré	túlùkà:lꞒ:

1
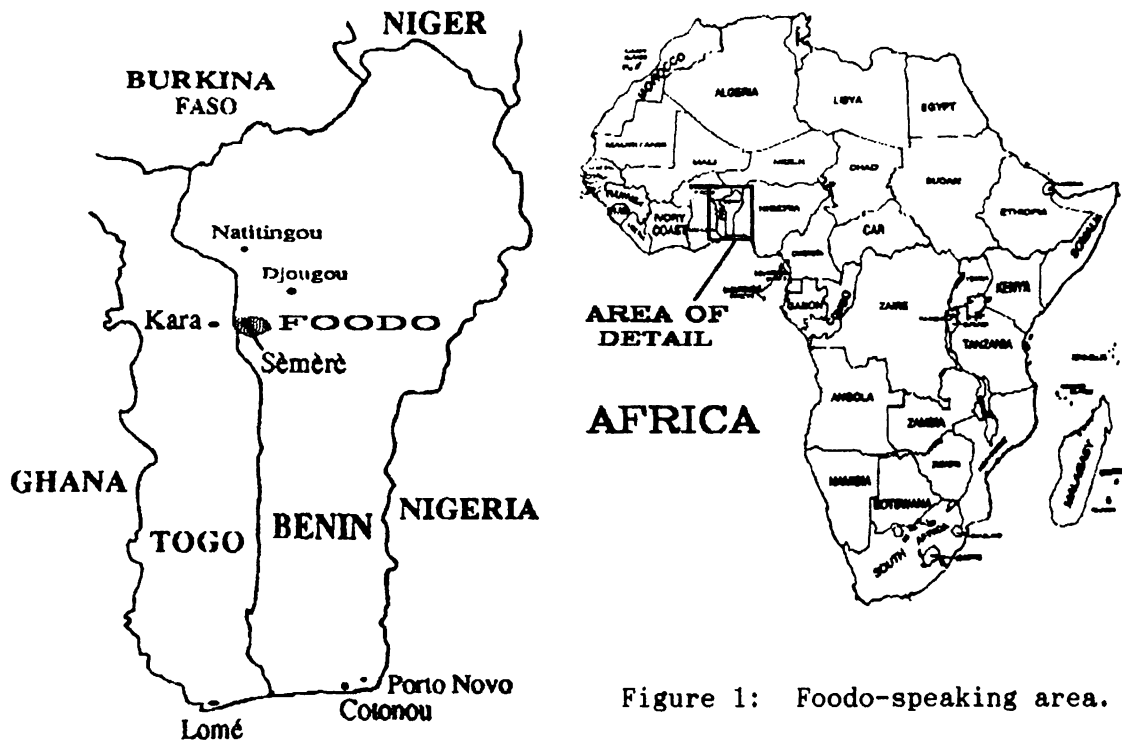
Figure 1: Foodo-speaking area.

Other principal Foodo-speaking villages, all within 10 km of Sèmèrè, include Gbao [gbáù], Niangbakabiya [ɲaɲgbakabʊᶌa],[1] and Awétébi [àwòtóbí].[2] Many Foodo speakers have moved away from their home area to many other towns and villages in Benin, as well as Togo, Niger, Nigeria, and Ghana. I have been told that there are one or two villages in Ghana with substantial Foodo populations. In all these circumstances, the speakers still consider Sèmèrè as their home area.

---

[1]I am unsure of the tones for this pronunciation.

[2]According to the Atlas Linguistique de la République du Bénin (1980:13) Foodo is also spoken in Kim-Kim, Jakada, Kanefele, and Mami, villages in close proximity to Sèmèrè. As far as I know, Kim-Kim is mainly a Lakpa speaking village. I do not have any further information about the other villages mentioned. Tchagbalé (1987:63) also mentions Sunka, but I do not have any information on this village either.

The term [fó:dò] can refer to the town of Sèmèrè, the language of that town, and the speakers of that language, who comprise their own ethnic group. Sometimes a qualifying word will be added to the term to clarify what one is referring to (i.e. fó:dò kùnùn 'Foodo language').

The Foodo language area is surrounded by groups speaking Kabiye, Lakpa, Kotokoli (Tem), and Fulfulde (Peul). Because the Foodo comprise a minority in this area, there is a high degree of multilingualism in these languages. All of the surrounding languages are only very distantly related to Foodo. The Foodo have a special relationship with the Kotokoli based on a military pact made many generations ago. This is reinforced by the fact that the Kotokoli, like the Foodo, are predominantly Muslim. A very high percentage of Foodo know Kotokoli and use it with Kotokoli speakers and in markets. There is also a high degree of contact with Dendi, another Muslim group who dominate the town of Djougou, a major center about 45 km to the north-east. Dendi is a major trade language of northern Benin and so is known by many Foodo speakers. Hausa is another major trade language in the area, but is less known among most Foodo speakers. A large group of Foodo speakers who had migrated to Ghana were forced to return to the area in the 1960's and 70's. Many from this group are familiar with Ashanti (which is classified as Central Tano by Stewart (1989:225)) and they have brought in loan words from other Ghanaian languages.

According to tradition, the Foodo migrated to their present home area from what is now Ghana. According to Dr. Abiola Félix Iroko, an

historian of the National University of Benin doing research on the origins of the Foodo (personal communication), this migration occurred at least 300 years ago. Since Foodo is a Guang language, the Foodo were given the name Bazantché, which is the Hausa term for Gonja, a major Guang language spoken in Ghana (which is generally considered to be linguistically distinct from Foodo). For this reason, many linguistic publications refer to Foodo as Bazantché (or similar spellings), especially those originating from Ghana.[3]

Due to the relatively small area where Foodo is spoken, there are no major dialectal differences. Where there are alternative pronunciations of some words, I am not able at present to locate the differences by quarters or regions. Part of this is complicated by the fact that often where someone is living is not the same as his "home" area. One possible dialectal difference is the use of Rounding Harmony in noun-class prefixes (see section 2.3.2). There are some vocabulary differences among those who have lived in Ghana, and education in French does also affect vocabulary choices.

According to Stewart (1989:221-228), the Guang language family is a sub-group of Tano, which is part of his (New) Kwa grouping. The Kwa group is part of the Volta-Congo group which in turn is part of the

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[3]Another term for the language is Sàmɛ́l'ɛ́: used primarily by the Kotokoli. This is the term from which 'Sèmèrè' is derived and is the Foodo word for porcupine.

larger Niger-Congo grouping (Williamson 1989:20-21). Example (1.2)

shows the relationship of Guang within the Niger-Congo family.

(1.2)   The position of GUANG within Niger-Congo
         (Snider 1990a:2)

```
                         NIGER-CONGO
            ┌─────────────────┼─────────────────┐
          Mande        ATLANTIC-CONGO        Kordofanian
                  ┌───────────┼───────────┐
              Atlantic(?)  VOLTA-CONGO   Ijoid(?)
        ┌──────────┼──────────────┼───────────┐
      Kru    Benue-Congo         KWA     Dogon(?)   North-Volta-
               (New)            (NEW)                 Congo
                                                 ┌──────┴──────┐
                      ┌──────────────┤          Gur        Adamawa-
                 Left Bank          NYO                     Ubangi
            ┌──────────┬────────────┼──────────┬──────────┐
        Avikam-     Agneby     POTOU-TANO     Attie    Ga-Dangme
        Alladian
    ┌──────┬──────────┼──────────────┬──────────┬──────────┐
   Ega   Potou      TANO          Lelemi,    Logba    Basila-
                                    etc.                Adele
              ┌──────────┼──────────────┬──────────┐
        Western Tano   GUANG      Central Tano   Krobou
        (Aboure, Eotile)          (incl. Anyi,
                                   Baule, Akan)
```
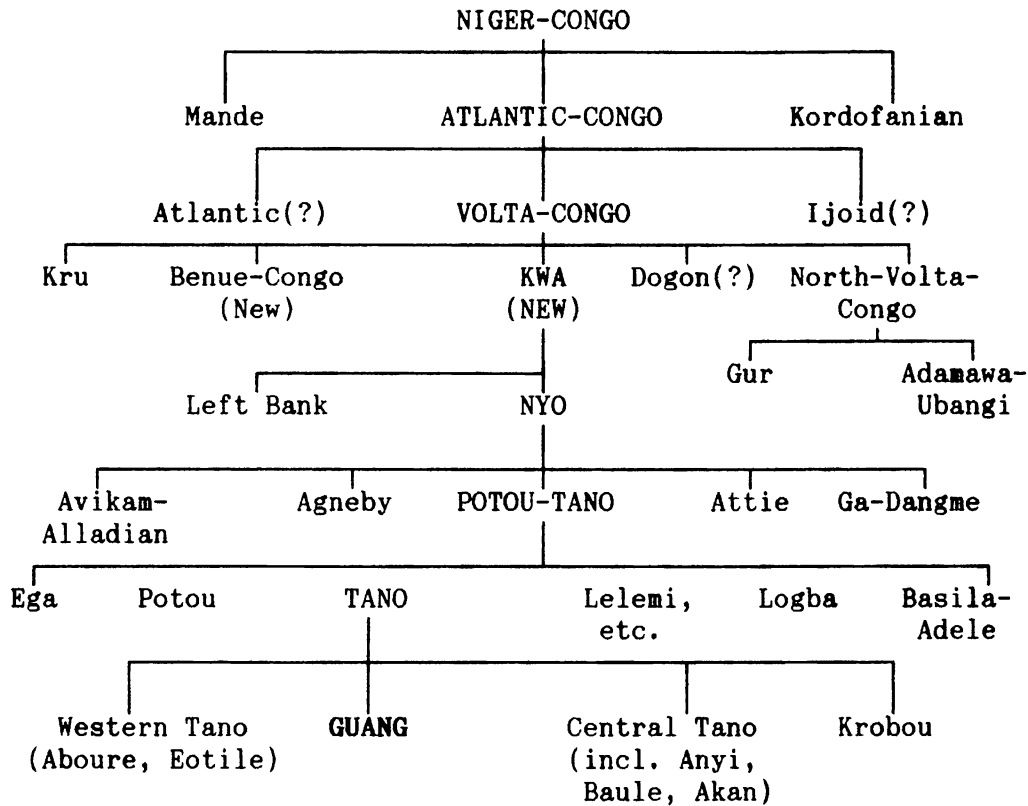
Within the Guang family, Snider (1990a:3) classifies Foodo as

being a North Guang language and part of his Oti-Guang subgroup, as seen

in (1.3).

(1.3) Subclassification of the Guang languages (Snider 1990a:3)

```
                    ┌ Gonja                    ┌ MOUNTAIN ┬ Gichode-Ginyanga
                    │                          │          └ Nawuri
          ┌ N.GUANG ┤ OTI ─────────┬ Foodo ───┤
          │         │              │          ┌ Chumburung
          │         └ Nkonya       └ RIVER ───┤
GUANG ────┤                                   └ Krachi-Juang
          │                        ┌ N. HILL ─┬ Gwa
          │         ┌ HILL ────────┤          └ Cherepong
          └ S.GUANG ┤              └ Larteh
                    │              ┌ Awutu
                    └ COASTAL ─────┤
                                   └ Efutu
```
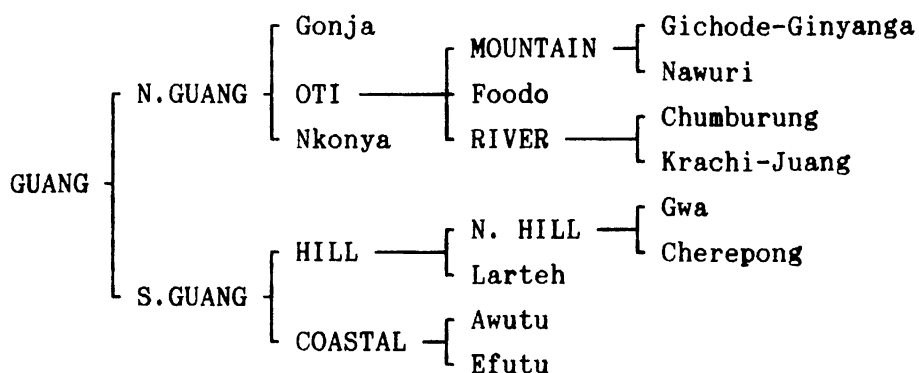
1.2 Data

The data for this thesis were collected between April 1989 and March 1991 in Sèmèrè under the auspices of the Summer Institute of Linguistics (SIL)[4] and the National Center for Applied Linguistics[5] of the Republic of Benin's Ministry of Education. My principal sources for data are listed in (1.4).[6]

(1.4)

	Name	Age	From Quarter
a.	Ikililou Abdou	24	Kpakpalaré
b.	Saadu Alassane	ca. 38	Troucaré
c.	Ossoumanou Kessia	ca. 64	Tchinguéyaré

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[4]In Benin the official name is: Société Internationale de Linguistique (SIL).

[5]The official name is: Centre National de Linguistique Appliquée (CENALA)

[6]Confirmation of some of the data was made in the U.S. by Mr. Abdoulaye Bio-Tchanni, a Foodo speaker temporarily residing in the U.S. who grew up in Djougou, Benin.

A complete list of the data used in this thesis is in Appendix B. The data consist of approximately 900 nouns (counting singular and plural forms separately) and 275 gerund nouns. While some words were gathered from texts, most of the nouns were elicited in isolation. Most of these were also elicited in frames to assure accuracy of tonal transcriptions.

1.3 Phonetic Transcription

The phonetic transcriptions in this thesis are generally broad and leave out certain allophonic processes which are not related to the subject of this thesis.

One of these is vowel centralization. Snider (1988:139) mentions that this is pervasive in Guang languages. He mentions that front vowels occurring between two consonants in a phonological word are centralized. In Foodo this centralization process also occurs with back vowels.

Words ending in short vowels often end with a glottal stop. I have found no evidence that this is contrastive, however, and so do not indicate them in the body of this thesis. I have, however, retained them in my transcriptions in the data given in Appendix B. I also do not indicate nasalized vowels (which always occur after a nasal consonant) nor the [+ATR] variant of /a/, which I discuss in section 2.2.3. Also, any combination of velar and bilabial stop (oral

or nasal) is to be interpreted as a double articulation (i.e. **kp** is a voiceless labio-velar stop).

1.4 Related Literature

The first written mention of a Guang language being spoken in the area of Sèmèrè appears in a German article by V. Zech (1898) which is cited in Cornevin (1964:229-230). Zech notes that Sèmèrè at that time was surrounded by an earthen wall with a thick spiny hedge. The fortification is no longer in existence but it does possibly explain the origin of the name Sèmèrè from the Foodo word [sàmĺl'é:] meaning porcupine.

The first language data of Foodo appeared in Bertho (1951), *Trois ilôts linguistiques du Moyen-dahomey: le Tschumbuli, le Bazantché, et le Basila.* Bertho identifies Foodo (Bazantché) as a dialect of the "Gondja" linguistic group and gives a basic word list. The second published data appeared in Painter (1967), *The distribution of Guang in Ghana and a statistical pre-testing on twenty-five idiolects.* He gives a Swadesh word list of the languages under study including Foodo. Painter classifies Foodo (Bazantche)[7] as a Dahomey Guang group, but revises this to be one of 13 dialects of North Guang in Painter (1970:31). The chapter on the Languages of Ghana in *The Volta-Comoé languages,* ed. by M. E. Kropp Dakuba (1988:76-85) mentions Foodo

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[7]The spellings of the term Bazantché vary depending on the article. In this section, I refer in parenthesis to the spelling given by the particular author in the article being referred to.

(Bazantcé) as a Guang language spoken in Togo (sic)[8] and says it is similar to Ginyanga (a Guang language of Togo, closely related to Gichode). Foodo is mentioned in the *Mini-Atlas de la Province de l'Atacora* (1980). A more recent comparative study involving Foodo is Gabriel Manessy's (1987) *La classification nominale en Proto-Guang*. In this article Manessy addresses the issue of the origin of Foodo noun-class suffixes and concludes that the presence of such suffixes is evidence that proto-Guang had noun-class suffixes which have been lost (except for some residual effects) in the other Guang languages (Manessy 1987:23).

The only article devoted solely to a synchronic study of the language, to my knowledge, is Zakari Tchagbalé's (1987) *Classes et genres nominaux du foodo langue guang du Bénin*, which deals with the noun-class system. Tchagbalé establishes underlying forms for the noun-class prefixes and suffixes as well as the stems, based on a corpus including approximately 200 items. His discussion of tone is limited to an appendix where he mentions the occurrence of downstep and gives some phrases showing agreement marking. He also includes tone in the phonetic transcriptions throughout the article.

Yao Toussaint Tchitchi of Benin's National Center for Applied Linguistics (CENALA) is in the process of writing a phonological description of Foodo. I have not been able to see any of the

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[8]The article incorrectly states that Foodo (Bazantcé) is spoken in Togo.

manuscript, but through personal communication I know that he and I agree on the basic phonemic inventory of the language.

In looking at the related Guang languages, there is a greater wealth of material. Considerable work in Guang phonology has been done recently by Keith Snider. Most of his work has been compiled in his Ph.D. dissertation (1990a), *Studies in Guang phonology*.

To my knowledge, this thesis is the first analysis of any aspect of the tonal system of Foodo.

1.5 Overview

This thesis examines tonal processes which occur in the nouns of Foodo. Chapter 2 contains a summary of the theoretical assumptions of autosegmental and lexical phonology, a brief overview of Foodo segmental phonology, and an explanation of the noun-class system.

Chapter 3 contains a number of phonological rules which account for the surface tones of most Foodo nouns. An analysis proposed by Snider (1990b) for the surface tone of noun-class prefixes of other Guang languages is shown to be valid for Foodo as well. This analysis shows that all but one Foodo noun-class prefix have the same underlying tone pattern, a HL with the L prelinked to the tone-bearing unit (TBU) of the prefix. All noun-class suffixes are underlyingly H, but some suffixes exceptionally require prelinking.

Chapter 4 looks at the main derivational processes used to form Foodo noun stems. The surface tones of such nouns are easily accounted for by the rules posited in Chapter 3. No new tonal rules are necessary, but one derivational suffix, the locative suffix -**tende** (with L tone) is an exception to one tonal rule, H-Spread. All derivational affixes in Foodo are suffixal. Exceptional groups of words in Classes 1, 7, and 8 are discussed. Accounting for these word groups generally involves positing underlying stem tone patterns which are not commonly found.

Chapter 5 looks at postlexical processes. The lexical rule of L-Delinking is shown to apply postlexically across word boundaries in Foodo. Snider's (1990c) application of Register Tier theory to Oti Guang languages is shown to account for the occurrence of downstep in Foodo as well.

Chapter 6 looks at two theoretical issues. First, a cyclic application of rules is shown to be necessary to account for surface tones in Foodo nouns. Second, the problem of defining the TBU of Foodo is discussed. The problem centers around the tone-bearing unit status of nasal affixes, and the apparent change in tone-bearing unit status after vowel coalescence between a stem-final vowel and a vowel initial suffix.

CHAPTER 2

2. PRELIMINARIES

This chapter covers basic materials to help the reader understand the analysis of Foodo tone. There is a discussion of theoretical assumptions, an overview of Foodo segmental phonology, and a discussion of the Foodo noun-class system.

2.1 Theoretical Assumptions

This section provides an overview of the basic concepts, notational devices, and formal conventions of autosegmental and lexical phonology used in this thesis to analyze the tone system of Foodo nouns.

2.1.1 Autosegmental Framework

The basic assumption of autosegmental phonology is that "the phonological representation is broken up into a finite number of parallel tiers." (Pulleyblank 1986:9)[1]

One of the prime motivations for autosegmental phonology (first discussed in Goldsmith 1976) was the need to account for the largely independent nature of tone. For example, often a vowel is deleted by

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[1]Much of this section comes from the first chapter of Goldsmith (1990:8-47).

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some rule, but the tone associated with that vowel remains and vice-versa.   To account for such phenomena, Goldsmith posited that tones are represented on a separate tier, called the tonal tier, while all other features are represented on a segmental (or melodic) tier.   In order to match up the elements on the tonal tier with those on the segmental tier, an autosegmental representation uses association lines to link up the elements on each tier.   The association lines provide the means to interpret a phonological representation.   A simple autosegmental representation is illustrated in (2.1) for the Foodo word [tɪlà] 'Koran'. H represents high tone and L low tone.

(2.1)

```
        tonal tier          H    L
                            |    |
                            |    |
        segmental tier  t   ɪ  l  a
```

The association does not have to be one to one.   In (2.2a) we see a representation with two tones and three vowels while in (2.2b) we see a representation with two tones and one vowel.   By associating one vowel with two tones we indicate that the vowel is produced with a contour tone, in this case a falling tone.   The graphic representation of the tonal tier above the segmental tier is purely arbitrary, and has no theoretical significance.   In transcriptions, tones will be marked as follows: ´ high tone, ` low tone, ^ falling tone, ˇ rising tone, and ' downstep.

(2.2)

a.   H   L   b. L H   L
       | / \ | \ /
    v i: y a y a   o y o:

    [ví:yàyà]   [òyô:]
      swing   *thief*
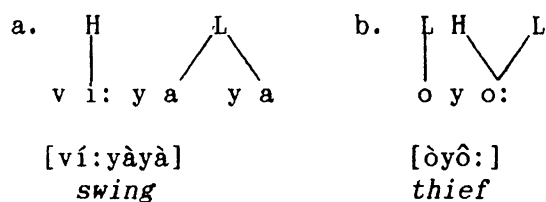
In his original work, Goldsmith (1976) showed how other features beside tone can be represented on separate tiers as well, such as nasality and the feature [ATR] (Advanced Tongue Root) for vowel harmony systems. Since that time, phonologists have discovered that autosegmental representation is useful in describing many phenomena, so that today it is possible to view every distinctive feature as occurring on its own tier.

As pointed out by Pulleyblank (1986:11), one of the central issues in autosegmental phonology concerns the principles for linking up each tier in non-rule-governed situations.

Goldsmith (1976:27) first proposed that the relationship between autosegments on different tiers would be governed by the universal principle known as the Well-formedness Condition (WFC) restated in (2.3).

(2.3) Well-formedness Condition (initial statement)

    (1) All vowels are associated with at least one tone.
         All tones are associated with at least one vowel.

    (2) Association lines do not cross.

If a derivation violated the WFC at any time, the Condition is to be interpreted as to change the configuration minimally so as to satisfy the WFC. Since that time, there has been a great deal of debate as to which parts of this principle (if any) are universal in nature. Pulleyblank (1986:11) points out that the WFC would automatically associate more than one tone with a single TBU if there were more tones than TBUs. Similarly, one tone would be linked to more than one TBU if there are more TBUs than tones. Pulleyblank argues that this is too strong a position and proposes a weaker version of universal tone association in the following conventions (2.4) and (2.5).

(2.4)   Association Conventions:

> Map a sequence of tones onto a sequence of tone-bearing
> units, (a) from left to right
>   (b) in a one-to-one relation.

(2.5)   Well-formedness Condition:

> Association lines do not cross.

Pulleyblank's position assumes that multiple linkings of tones to a single tone-bearing unit or multiple linkings of a single tone to more than one tone-bearing unit come about only by language-specific rules. In Pulleyblank's version of the Association Conventions and Well-Formedness Condition association by universal principle is strictly one-to-one from free autosegments.

Goldsmith (1990) has since proposed another, more restricted version of the Association Conventions which is more in line with

Pulleyblank's view prohibiting automatic multiple linkings. Goldsmith (1990:14) summarizes the universal aspects of tone mapping in one Association Convention stated in (2.6).

(2.6)   Association Convention

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

The Association Convention in (2.6) will not go into effect unless there is at least one association line in a derivation. Goldsmith (1990:19) assumes that every language will have an **Initial Association Rule.** After this language-specific rule, the Association Convention will take affect. Since the association radiates outward from the association line, association will be from left-to-right on those elements to the right of the association line and right-to-left on those elements to the left of the association line.

While this position seems very plausible, it presents problems if one assumes that rules may be cyclic in the lexical part of the phonology. If the Initial Association Rule is a rule, then it should apply at every cycle. But Goldsmith clearly views this type of rule as only applying once (i.e. initially) to assure that a given form has at least one association line. Goldsmith does not work within the framework of lexical phonology and does not assume cyclicity.[2] However,

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[2]Actually, Goldsmith (1990:14-15) assumes this "weak" position of automatic spreading only for ease of exposition in his book. In the last chapter (1990:319-332) he introduces a radical revision not only

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since I am basing my analysis on lexical phonology and do assume cyclicity, I will assume throughout this thesis Pulleyblank's version of automatic spreading as stated in (2.4) and (2.5) above. Unlike Pulleyblank, I will refer to the combination of Association Conventions and Well-formedness Conventions simply as the Association Convention (in the singular).

Since the Association Convention will not multiply-link tones to TBUs or vice versa, it is possible to have both unassociated (floating) tones and unassociated TBUs. As Pulleyblank (1986:73) proposes for Margi, I will posit for Foodo a supplement to the Association Convention which assures that every TBU will receive a tone.[3] Note that this is a language-specific supplement, not a universal.

(2.7)   Tone Spreading: Supplement to Association Convention

$$\begin{array}{c} T \\ | \ \diagdown \\ V \ \ (v) \end{array} \quad \% \quad \text{(Mirror Image)}$$

---
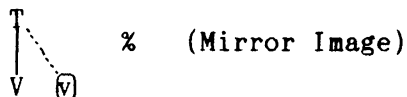
toward the universal aspects of automatic spreading but toward phonological theory as a whole. Since this position is not fully worked out and would entail a complete revision of the way phonological rules are written and applied, I will not adopt any of these ideas in this thesis.

[3]Since I propose a mirror-image rule, one could object that the same result could be maintained by adopting Clement and Ford's (1979:180-186) version of the Association Conventions which assumed automatic spreading of a single tone onto more than one TBU but took the position that contour tones were only created by rule. While I do not have any strong convictions one way or the other, I will follow Pulleyblank in assuming that universally the weaker version of the Association Conventions should be maintained and that Foodo has a language specific rule which assures all TBUs will be associated with a tone.

The above rule says that an associated tone will spread to a free TBU to the right and left (the mirror image part of the rule indicated by the symbol %) of the already associated TBU. The rule will apply iteratively, assuring that all free TBUs will be associated to a tone. (See section 2.1.4 for the choice of [+syllabic] segment (V) as the TBU in Foodo.)

A brief note on notational conventions is in order. The circle around the V indicates that the vowel is floating (not associated with any segment on the facing tier). This notation is very often used in rules to indicate that a tone is floating. When it is in the structural description of a rule it means that the segment must be floating for the rule to apply. The absence of a circle or an association line with, for example, a tone implies that the linked or unlinked nature of the tone is inconsequential for the rule. The dotted line indicates a structural change whereby a segment from one tier becomes associated with a segment on another tier. In the above rule this notation indicates that the tone will spread to an unassociated vowel. Another common notational device not seen in the above rule is a strike or 'x' through an association line (indicated in this thesis as ⨍). This indicates that the rule deletes the association line.

Since the above rule of Tone Spreading (2.7) is a supplement to the Association Convention, I consider it outside the class of other phonological rules in the language since it will apply whenever the Association Convention applies.

Another question regarding the Association Convention is when it applies. The established view has been that it applies whenever possible throughout a derivation (Goldsmith 1976; 1990; Pulleyblank 1986). Pulleyblank (1986:11-12) discusses an alternative view, that assumes the convention applies at the beginning of a derivation but not automatically elsewhere, but he gives evidence in his book to reject this view. Since I have no empirical evidence in Foodo to reject the established view, I assume in this thesis that the Association Convention (along with the supplement given in (2.7)) will apply whenever possible throughout a derivation.

Within autosegmental phonology a universal constraint on phonological representations has been posited known as the Obligatory Contour Principle (OCP). McCarthy (1986:208) states the OCP as:

(2.8) Obligatory Contour Principle (OCP)

> "At the melodic level, adjacent identical elements are prohibited."

I realize that there are differences of opinion as to the universal aspects of the OCP (for example, Odden (1986, 1988a) inter alia), but for the purposes of this thesis I recognize the validity of the OCP and will posit two rules which "repair" structures that violate the OCP.

2.1.2 Lexical Phonology

This thesis will analyze the tone system of Foodo within the framework of lexical phonology. The basic premise of lexical phonology is "that there are two distinct types of phonological rule applications" (Pulleyblank 1986:1). One type of application is in the lexical component of the grammar. This is known as **LEXICAL PHONOLOGY**. The other type of application occurs after the syntactic component of the grammar. This is know as the **POSTLEXICAL PHONOLOGY** (also called Sentence-Level or Phrasal Phonology). The theory of lexical phonology claims that phonological rules systematically differ in interesting ways depending on whether they apply in the lexical or postlexical component of the grammar. The theory does not claim that there is a different set of phonological rules, rather one set of phonological rules each of which is "defined as applying lexically, postlexically or both lexically and postlexically" (Pulleyblank 1986:1). If a rule applies both lexically and postlexically, lexical phonology claims the rule will manifest different properties in each component. An important claim is that rules applying in the lexical domain will have access to morphological information (and not syntactic information) while rules applying in the postlexical domain will have access to syntactic information (and not morphological information) (Mohanan 1986:13). A summary of the different properties of lexical and postlexical rule application is given in Pulleyblank (1986:7), which I repeat in (2.9).

(2.9)   LEXICAL   POST-LEXICAL

    a. may refer to word-internal   a. cannot refer to word-
       structure   internal structure

    b. may not apply across words   b. may apply across words

    c. may be cyclic   c. cannot be cyclic

    d. if cyclic, then subject to   d. non-cyclic, hence across-
       strict cycle   the-board

    e. structure-preserving   e. need not be structure-
                                          preserving

    f. may have lexical   f. cannot have lexical
       exceptions   exceptions

    g. must precede all post-   g. must follow all lexical
       lexical rule applications   rule applications

The postlexical module has been further divided into two sub-modules, a syntactic module and a phonetic implementational module (Mohanan 1986:11-12). The phonetic implementational module is reserved mainly for allophonic rules, that is, rules that are strictly phonetic in nature. One main distinguishing feature of phonetic rules is that they are not limited to the binary use of features, but may be gradient in nature. I generally will not deal with such rules in this thesis. However, in section 5.2 I will discuss downstep and its formulation as a postlexical phonological rule by use of Register Tier theory.

The basic model of lexical phonology is presented in (2.10), adapted from Mohanan (1986:11-12).

(2.10)

```
┌─────────────────────────────────┐
│            LEXICON              │
│                                 │
│     morphemes  . . . .│ . . . . Underlying
│              │                        representations
│              ↓                  │
│     morphological and           │
│     phonological rule           │
│       applications              │
│              │                  │
└──────────────│──────────────────┘
               │
               ↓
     words/lexical entries . . . . . . Lexical
               │                        representations
┌──────────────│──────────────────┐
│  ┌───────────│───────────────┐  │
│  │           ↓               │  │
│  │        SYNTAX             │  │
│  │                           │  │
│  │     syntactic and         │  │
│  │   phonological rule       │  │
│  │     applications          │  │
│  │           │               │  │
│  └───────────│───────────────┘  │
│              ↓                  │
│   phonological phrases . │ . . . Syntactico-
│              │                   Phonological
│  ┌───────────│───────────────┐  representations
│  │           ↓               │  │
│  │        PHONETIC           │  │
│  │     IMPLEMENTATION        │  │
│  │           │               │  │
│  └───────────│───────────────┘  │
└──────────────│──────────────────┘
               │
               ↓
     output . . . . . . . . . . . Phonetic
                                   representations
```
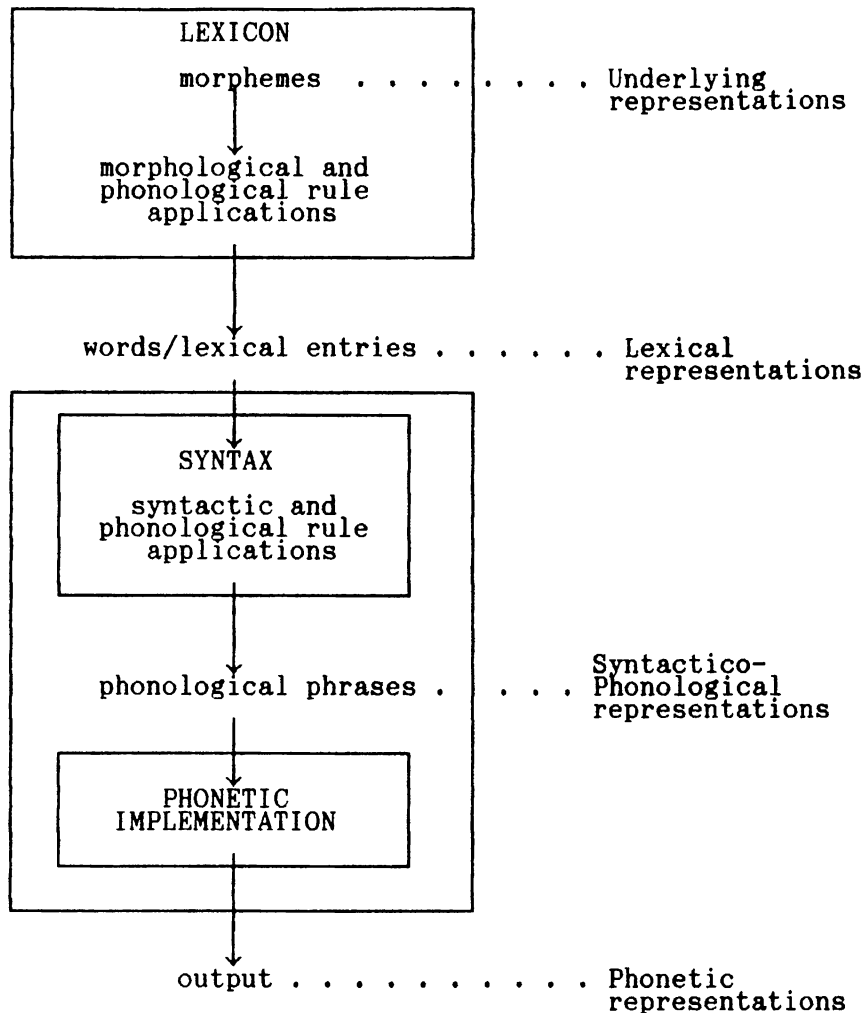
According to Mohanan (1986:15), lexical phonology is based on a
theory of word formation which claims that morphological operations may
take place at different modules in the lexicon. For example,
inflectional morphology and compounding in a given language may occur in
different modules of the lexicon. These modules have been referred to
as 'levels' or 'strata'. I will use the term 'levels' in this thesis.
Lexical rules may apply to only certain levels in the lexicon or to all

levels in the lexicon. In this way, lexical phonology can capture the fact that some affixes are sensitive to a particular rule while others affixes are not. In Chomsky and Halle (1968) (SPE), this was captured by positing different morphological boundaries. Lexical phonology does not differentiate between different morphological boundaries (only the constituent boundaries [and] figure in the formulation of phonological rules), but rather speaks of different levels of morphological operations. One constraint of lexical phonology is that a rule applies to multiple levels only if they are adjacent, i.e., a rule may apply at levels 2,3,4, but not at levels 2,4,5 without applying also at level 3.

In analyzing the tone system of Foodo nouns, while I do need to distinguish between lexical and postlexical processes, I have found no reason to posit different morphological levels since all lexical rules apply in all morphological processes.[4] For this reason, I will only state whether a rule applies lexically or postlexically.

In keeping with most views of lexical phonology, I will assume in this paper that the lexical part of the phonology is cyclic.[5] Cyclic application means that phonological rules are free to apply to the

---

[4]However, in my preliminary analysis of the verbal system of Foodo (not discussed in this thesis), I have reason to think that there are some rules operating in verbal morphology not operating in noun morphology, possibly requiring the stipulation of at least two levels in the lexicon. Since I will not be dealing with verbal morphology in this thesis, I will not posit more than one level.

[5]Lexical phonology does allow some levels in the lexicon to be non-cyclic, but I do not find any evidence of non-cyclic levels in Foodo.

output of every morphological process. It should be pointed out that
this position assumes that there is a cycle for the stem. Thus tones in
a stem will be associated before any affixes are added.

In addition to the assumption of cyclicity, lexical phonology
claims that cyclic rules must obey the Strict Cycle Condition. The
strict cycle, posited by Kiparsky (1982:41), restricts rule application
to derived environments. Since lexical phonology claims that only
lexical rules may be cyclic, it follows that postlexical rules are not
cyclic and not subject to the strict cycle.

Another concept utilized in lexical phonology is the Elsewhere
Condition (Kiparsky 1982:10), which I repeat here:

(2.11)   Rules A, B in the same component apply disjunctively to a form
         Φ if and only if
         (i)   The structural description of A (the special rule)
               properly includes the structural description of B (the
               general rule).
         (ii) The result of applying A to Φ is distinct from the
               result of applying B to Φ.
         In that case, A is applied first, and if it takes effect, then
         B is not applied.

The Elsewhere Condition stipulates that when two rules may apply
to a given form and their application would produce different outputs,
then the more specific rule applies and the more general rule does not
apply. The Elsewhere Condition eliminates the need for extrinsic rule
ordering in many cases. I will accept this condition and show that in
at least one case it eliminates the need to extrinsically order two
rules.

Pulleyblank (1986:5), following Kiparsky (1982), assumes that bracket erasure will apply at the end of every stratum (level). This differs from the original SPE formulation (Chomsky and Halle 1968:20) that bracket erasure will erase internal brackets at the end of each cycle. Mohanan (1986:23,59) follows the original SPE formulation and erases internal brackets at the end of each cycle. Since the strict cycle would prevent rules from applying to internal bracketing from an earlier cycle anyway, I see no reason to reject Mohanan's proposal. I will therefore assume that bracket erasure applies at the end of each cycle.

Since in the phonology of Foodo there is never a need to make a distinction between left and right brackets in the application of rules, I will not distinguish between left and right brackets in writing rules. Instead, I will use a single vertical line with bold face (**|**) to mean a constituent boundary. While I have not seen this notational device used by other authors of lexical phonology, this device is useful because there is one rule which operates across a constituent boundary in which the boundary is sometimes constituent initial and at other times constituent final. However, the application of the rule is the same in both cases. This shows the need to have a way of indicating the presence of a constituent boundary in a rule without further designating whether it indicates a position that is constituent initial or final. (In the example derivations, however, I continue to distinguish left and right brackets.)

2.1.3 Downdrift vs. Downstep

In many African languages, there is a phenomena where the pitch of sequences of H and L tones in a phrase are lower after every occurrence of a L tone (or an uninterrupted sequence of L tones). Each sequence of tones that begins with H following a L is on a lower register than this preceding L.[6] Thus, in a phrase there is an effect of the pitch level drifting down as the phrase progresses. For this reason, this automatic process has been called **downdrift**. For example, a sequence H L H L would be realized as [¯-¯_] not as [¯-¯-]. It is claimed that the pitch level of Ls usually descend slower than Hs. However, Snider (1990c:454) points out that Clements (1983:172) questions these claims based on instrumental evidence showing that L tones as well as H tones fall significantly in spans affected by downdrift. From some initial instrumental analysis of Foodo phrases, it appears that Ls as well as Hs downdrift, but Ls do seem to downdrift at a slower rate than Hs. Example (2.12) shows a frequency graph of a phrase taken from a Foodo text.

---

[6]A L immediately following a L (i.e. without an intervening H) is not at a new register but is on the same register as the preceding L.

(2.12)
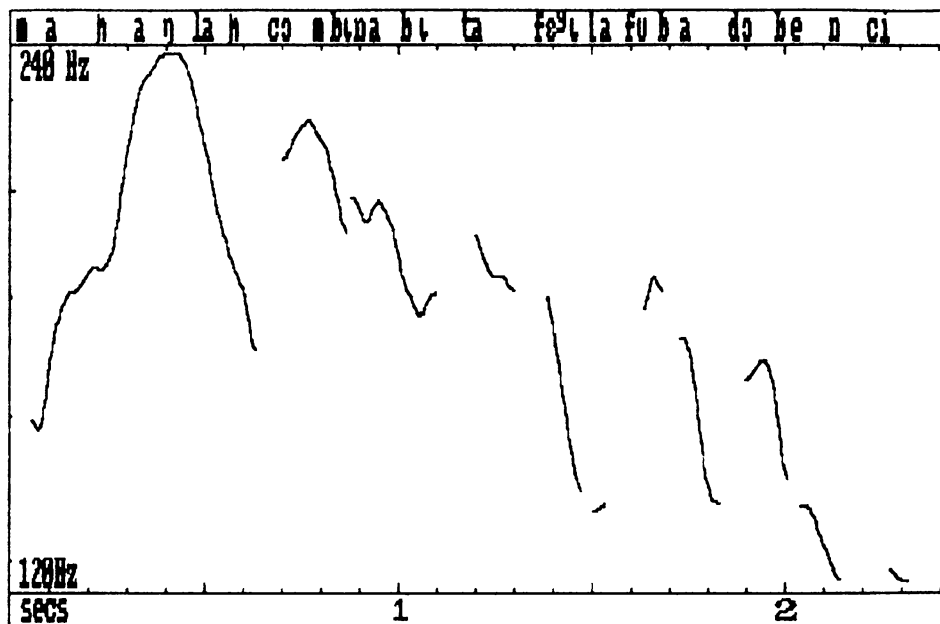
The transcription of the above phrase with surface tones is:
[mà:ɲâŋ là ɲčɔ́m b'ĉná: b'ĉtá: fèʸĉ là fúbàdɔ̀: bèɲčì] 'Don't wait until
the rains are almost finished to plant manioc'. Notice that while the L
tones of là ɲčɔ́m are not significantly lower than the initial L of
mà:ɲâŋ, the L tones of fèʸĉ là and bèɲčì are definitely lower than the
preceeding Ls. The Hs are progressively lower with the exception of the
first H tone of fúb'ádɔ̀: which is at about the same level as the
preceding H of b'ĉtá:.

From the above discussion, it should be clear that downdrift
refers to an automatic process when it exists in a given language. The
term **Downstep** refers to a situation where the L which triggers downdrift

does not appear on the surface. The classic example comes from Twi (2.13), taken from Hyman (1975:227).

(2.13)

	/mɪ́ ɔ̀bú/	'my stone'
pitch-assignment:	3 1 3	
downdrift:	2	
vowel deletion:	Ø	
	[mɪ́ 'bú]	
	3 2	

In (2.13) the segmental aspect of the noun prefix ɔ- is deleted after possessive nouns. The low tone of the prefix, however, is still triggering downdrift, with the result that the following H is realized at a new lower pitch register. Since the L triggering downstep is no longer on the surface the following H is called a downstepped H and is indicated as 'H. The symbol ' is used in phonetic transcriptions to indicate a downstep.[7] A similar example of downstep is found in Foodo where the noun-class prefix O- (see section 2.4.2) is also deleted in possessive constructions. Thus /mí òbó:/ 'my room' is realized [mí b'ó:].

It should be clear from these examples that downstep differs from downdrift only by the fact that the L triggering the downdrift is not present in the surface form. I claim, however, that it is present at some stage in the phonological representation. In section 5.2 I will

---

[7]I prefer to place this symbol directly before the segment with the downstepped H rather than before the syllable as Hyman does (i.e. mɪ́ b'ú rather than mɪ́ 'bú).

apply Snider's (1990c) Register Tier theory to Foodo to account for changes in tonal register due to this phenomenon. Meanwhile, I will simply assume that any floating L in a phonological form will create a new register for a following H (marked as 'H).

One final note: as I have stated, downdrift (of both H's and L's) is an automatic process in Foodo. In order to avoid a very complex system of notating tone (and to follow general linguistic convention) these automatic lowerings will not be indicated at all in the phonetic transcriptions. Only those occurrences of non-automatic lowering (downstep) will be indicated by a 'v̂. Thus the H in a word like ɔ̀bó: 'room' should be interpreted as occurring at a lower pitch than the two Hs in a word like ɔ́sɛ́nɔ̀ 'hip'. Also, since Ls after L H sequences are also lowered, the second L in dùbúlì 'rock' is lower than the first L in that word and the Ls in the words for 'room' and 'hip'.

2.1.4 Tone Bearing Units

For the purposes of this thesis I will assume that the tone-bearing unit (TBU) in Foodo is a [+syllabic] segment (V), which is indicated on the skeletal tier. In section 6.2 I will discuss the problems with this assumption and why other alternatives also present problems. Since the presence or absence of intervening non-TBUs on the skeletal tier (i.e. Cs) never play a role in the structural description of any of my tone rules, I will not indicate them in any rules.

2.2 Segmental Phonology

Since this paper is concerned with tone, I will only give a brief overview of the segmental phonological system of Foodo. Segmental phonological processes which affect tone in some way will be discussed as they become pertinent.

2.2.1 Syllable Structure

Since none of the phonological rules proposed in this thesis refer to syllables, I will not formalize a principle of assigning syllable structure in Foodo. Instead, I will outline a hierarchical representation of syllable structure and then briefly discuss the possible syllable types in the language.

Example (2.14) shows a hierarchical representation of the syllable structure of the two-syllable Foodo word [čè:čé] 'bicycle'.[8] The skeletal tier represents the core to which other autosegmental units (like the tonal tier and the melodic tier, which can actually be made up of several different autosegmental features) are linked. Each C or V represents a timing slot, so long segments are those which are linked to two slots on the skeletal tier.

---

[8]A fuller treatment of syllable structure representation can be found in Itô 1986.

(2.14)


```
                        σ              σ
                      /  \           /  \
                     O    R         O    R
                     |   / \        |    |
                     |  N  Coda     |    N
Skeletal Tier        C  V           C    V
                     |   \  /        |    |
Melodic Tier         č    ε         č    ε
```

O	= Onset
R	= Rime
N	= Nucleus
C	= [- syllabic]
V	= [+ syllabic]
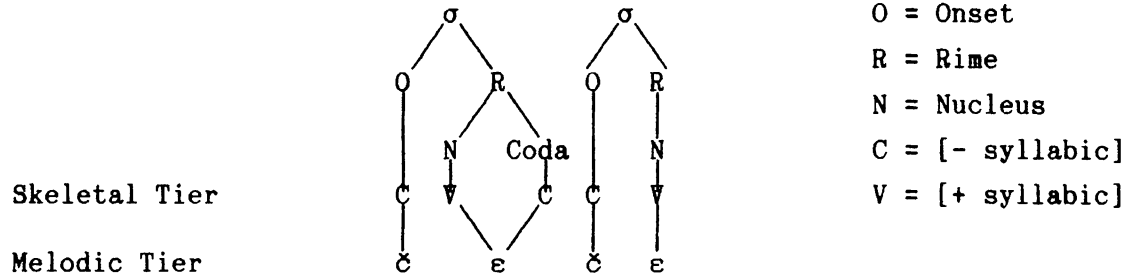
In underlying forms, there are five possible syllable types: CV, CV:, CVV, CVC, V and VC.[9] Both V and VC are limited to affixes. Examples of these syllable types are given in (2.15).

(2.15)   Underlying Syllable Types

	Syllable Type	Underlying Form Segment	Tone	Gloss
a.	CV	bu	HL	*rock*
b.	CV:	na:	H	*cow*
c.	CVV	čii	*HL[10]	*pull out*
d.	CVC	keN	H	*day*
e.	V	-a	H	*Noun-class Suffix*
f.	VC	-ʋN	L	*3rd Person Object Pronoun Class 1*

In Foodo length is contrastive in vowels. Since in most cases, long vowels behave like one TBU and not two, I will represent long vowels as in (2.16a) (see Casali 1988:Sections 5.2.1.1-5.2.1.3 for a similar treatment of long vowels in Nawuri).

---

[9]There is one occurrence of a CCV stem **Nsi** used for forming the words for 'eye' and 'lip'.

[10]See section 4.1 for a discussion of the *HL notation to indicate prelinking.

(2.16)

```
        a.  V      C              b.  V      V
             \    /                    \    /
              \  /                      \  /
             [a  F]                    [a  F]
```
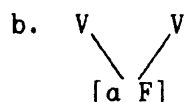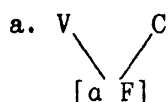
In the verbs there are some exceptional forms where the long
vowels behave like two TBUs. I will anaylze these as (2.16b) above to
account for their exceptional nature. Such an analysis is not without
precedent as it has been proposed by Halle and Clements (1983:14) that
some long vowels in Turkish are VV and others are VC to explain
morphological differences. To show this distinction when giving an
abbreviated form of the underlying representation or in derivations
where the skeletal tier is not represented, I will indicate these long
vowels by doubling the letters, for example /ii/. This will distinguish
long vowels that are two Vs from long vowels that are VC, which will be
notated as /i:/.

The analysis of most long vowels as VC will not only account for
the tonal behavior of long vowels but also explain why in stems there is
never a CV:N--such a form would be CVCC, which is not allowed in
underlying forms. In surface forms however, CV:m is possible due to the
affixation of the noun-class suffix -m. I posit that this -m is
underlyingly a syllabic -m, i.e. V and thus a TBU. However, a
postlexical rule (unstated in this thesis) will change such syllabic
nasals to [-syllabic].[11] This segment will then resyllabify with the

---

[11]This solution creates a case of absolute neutralization which violates
Kiparsky's Alternation Condition (to be discussed in section 3.2.2). I
discuss the reasons for choosing this solution in section 6.2.

preceding syllable (producing a CVCC syllable in surface forms) unless the following word begins with a vowel in which case it will resyllabify with it. Example (2.17) illustrates the two possibilities.

(2.17)

a.

cows   *heads*
cows' heads

b.

cows   *EMPHATIC MKR*
They're really cows!
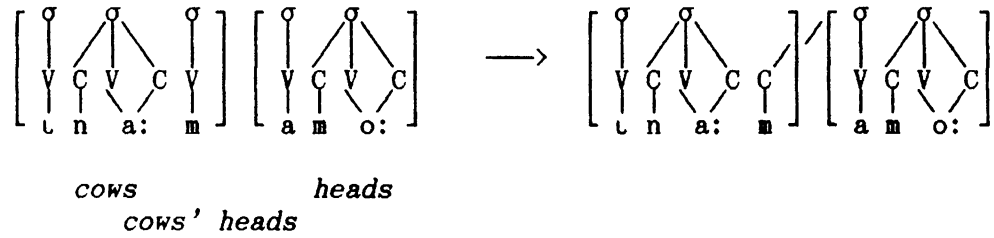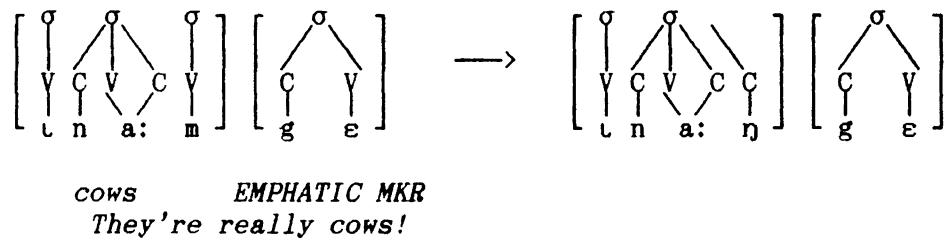
2.2.2 Consonants

Example (2.18) shows the consonant phonemes in Foodo.

(2.18)

p		t		k	kp	
b	bʷ	d		g	gb	
f	fʷ	s				(h)
(v)		(z)				
			č			
			ɟ			
m	mʷ	n	ɲ	ŋ	ŋm	
		l	y	w		
		(r)				

The segments in parentheses are found only in loan words. The phonemes /v/ and /z/ are realized as [f] and [s] respectively by speakers with little knowledge of French or Arabic. Speakers who know either French or Arabic also have the phoneme /r/ in loan words which have this sound. It is usually a trilled r.

Nasals are always homorganic with a following consonant.[12] Because of this, I will posit nasals in coda position and syllabic nasal prefixes as unspecified for place of articulation features in underlying form, represented as /N/. When this unspecified nasal is followed by a consonant it will assimilate in its point of articulation by a postlexical rule. If it is followed by a vowel or pause, a default rule will give it a velar point of articulation.

I have included three labialized stops in the phonemic inventory. These are rare, occurring in my data only in the following words:

(2.19)

a.	kàbʷɩ́yʹá	m̀bʷɩ́ʹm̀	(Plural)	*bird*
b.	mʷî:	bìmʷíê:	(Gerund)	*suck*
c.	fʷɩ̂	bɩ̀fʷê:	(Gerund)	*throw away*

While there are some occurrences of labialized consonants in clearly derived environments (cf. dùbúlì/àbʷê: 'rock/s'), the above examples are

---

[12]Before l the resulting nasal is a lateral nasal, [ḷ]. Before w the resulting nasal is a velar nasal with rounded lips, [ŋʷ]. I will transcribe the [ḷ] as n and the [ŋʷ] as ŋ. The following l or w will make it clear that the nasal is realized as either a lateral nasal or a rounded velar nasal.

not clear. Both Snider (1990a:9-10) and Casali (1988) mention underlying labialized consonants in their analyses of Chumburung and Nawuri respectively. Snider (1990a:9) explains their presence in Chumburung as due to a sporadic historical change where a rounded vowel became unrounded and the round quality of it was transferred to the preceding consonant, resulting in a labialized consonant followed by a non-round vowel. Since this change was sporadic, Chumburung has a three-way phonological contrast: CU, C^{w}I, and CI (where U represents a rounded vowel, I a non-rounded vowel, and C^w a rounded consonant). This could be the case in Foodo. I rule out the possibility of considering the labialized consonant as a consonant cluster because there are no clear syllable types of the form CCV. Since the occurrence of labialized consonants is so limited in Foodo, for this thesis I will assume that they will be represented in underlying forms and leave the matter open to further research.

2.2.3 Vowels

Foodo has 9 contrastive vowels. As stated in section 2.2.1 above, length is also contrastive. The nine vowels can be divided into two groups based on the feature Advanced Tongue Root [ATR] as shown in (2.20)

(2.20)   [+ATR]   [-ATR]

      i   u   ɪ   ʊ

      e   o   ɛ   ɔ

                    a

There is no [+ATR] counterpart of /a/ in underlying forms.[13]

Foodo can be viewed as having a canonical five-vowel system with the addition of the feature [ATR] as an autosegment. The distinction between long and short vowels will be handled on the CV-tier (skeletal tier). Goldsmith (1987:123; 1990:302) proposes an autosegmental representation of a canonical five-vowel system using the features [round] and [low]. Example (2.21) shows Goldsmith's (1990:302) system. The specification for [back] is filled in by a default specification rule (2.22). Notice that in Goldsmith's system a is not specified for the feature [round] and the high vowels (u, i) are not specified for the feature [low]. The feature [low] is not a binary feature but is a unary (or privative) feature. In this way, Goldsmith can group the vowels e, o, and a into a natural class (they all have the autosegment [low] while the high vowels do not). The feature [round] needs to be binary in order to distinguish u, o from i, e and at the same time establish the uniqueness of a, which steps out of the system by not having a value for [round].

(2.21)

```
    [+round]   [-round]   [+round]   [-round]
       |          |          |          |
 ------X----------X----------X----------X----------X----------
                             |          |          |
                           [low]      [low]      [low]

       u          i          o          e          a
```

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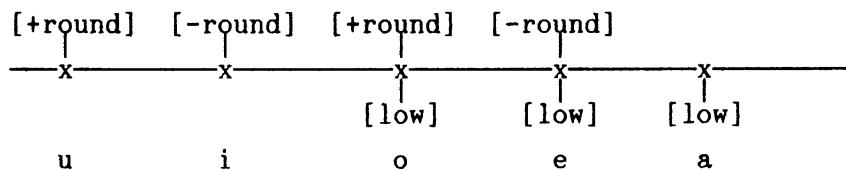
[13]Snider (1988:139) describes a [+ATR] allophonic variant of a in Guang languages. While this may exist in Foodo, the distinction is very hard to hear and is only allophonic. I thus have no firm opinion on the matter, and do not note it in any of the data.

(2.22) Default [back]-specification

```
[a round]              [a round]
    |                      |
    x        --->          x
                           |
                      [a back]
```
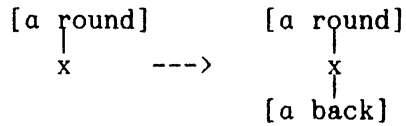
Adapting this system for Foodo would yield (2.23). The feature
[ATR] is on a separate tier.[14]

(2.23)

```
    [+round]      [-round]      [+round]      [-round]
──────x────────────x────────────x────────────x────────────x──────
     /            /            /|            /|            /|
[-ATR]      [-ATR]       [-ATR] |      [-ATR] |     [-ATR] |
                               [low]         [low]        [low]

     ʊ            ɩ            ɔ            ɛ            a

    [+round]      [-round]      [+round]      [-round]
──────x────────────x────────────x────────────x──────
     /            /            /|            /|
[+ATR]      [+ATR]       [+ATR] |      [+ATR] |
                               [low]         [low]

     u            i            o            e
```
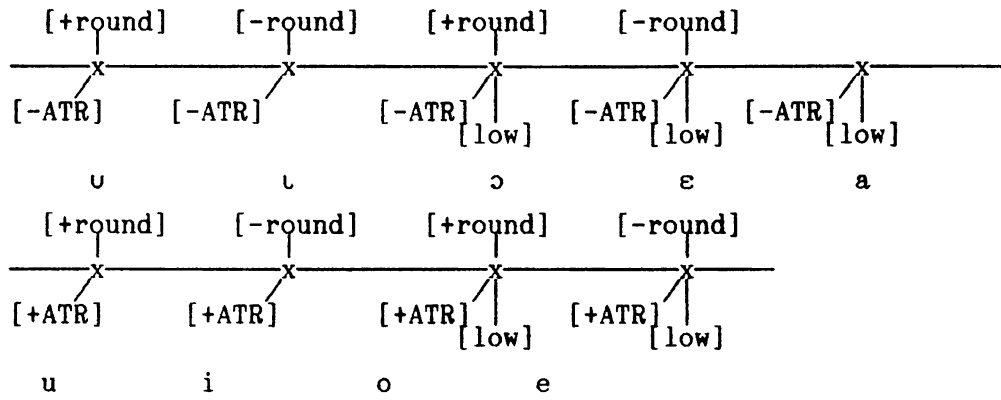
As will be seen in section 3.2.2, this system gives an account for a

common vowel assimilation process found in Foodo. This same process is

discussed in Goldsmith (1990:302-303) and given as one of his arguments

in favor of this treatment of the canonical five-vowel system.

---

[14]It may be that the vowel a should be represented as not being
specified for [ATR]. Snider (1990a:145) proposes essentially the same
analysis for Chumburung, but he makes [ATR] a unary feature associated
only with [+ATR] segments. Such an analysis may be more plausible for
Foodo, but to decide this issue would require a more thorough
investigation into ATR vowel harmony, which is beyond the scope of this
paper.   I will tentatively adopt the position that [ATR] is a binary
feature associated with all segments and leave the matter open to
further research.

Nasalized vowels do occur in surface forms. However, nasality is not contrastive, but allophonic due to a preceding nasal consonant. Because they are completely predictable, nasalized vowels will not be indicated in any of the phonetic transcriptions in the data.

2.3 Harmony Systems

2.3.1 ATR Harmony

Foodo, like other Guang languages, has a well-developed vowel harmony system involving the feature [ATR]. Prefixes receive their [ATR] feature from the [ATR] of the stem. In addition, all vowels in the stem agree in regard to the value of [ATR].

Most suffixes also receive their [ATR] feature from the [ATR] of the stem. These facts can be accounted for autosegmentally by saying that the feature [ATR] spreads both to the left and right from the stem within a word. Example (2.24) shows how this would work for the word dísídì 'abscess'.

(2.24)

$$\left[\left[\;_{\text{dI}}\;\left[\;_{\text{si}}^{[+\text{ATR}]}\;\right]\;\right]\;_{\text{dI}}\;\right]$$
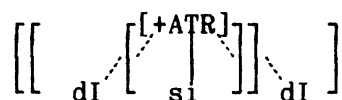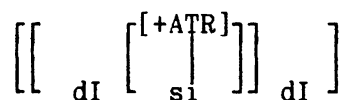
$$\left[\left[\;_{\text{dI}}\;\left[\;_{\text{si}}^{[+\text{ATR}]}\;\right]\;\right]\;_{\text{dI}}\;\right] \qquad \text{Spread of ATR}$$

There are, however, some suffixes which are always [-ATR] and do not undergo ATR harmony. These are all derivational suffixes and the

only noun-class suffix which follows it is the -a suffix. For this reason there is no evidence whether or not these [-ATR] suffixes would block ATR harmony from spreading to a noun-class suffix. While there may be a better solution, for the purposes of this thesis I will assume that these suffixes have the feature [ATR] specified in the lexicon, while other affixes are unspecified for the feature [ATR]. I will indicate that a segment is unspecified for the feature [ATR] by using capital letters (i.e. I, O, etc.).[15]

For the purposes of this thesis, I will assume that the rule of ATR Harmony is a lexical rule, though I will not specifically show it as such in derivations. My main reason for assuming that ATR Harmony is a lexical rule is because, to the best of my knowledge, it is blocked by word boundaries. However, ATR Harmony does spread over into clitics, as with the possessive pronoun clitics and verb clitics.

The vowel /a/ has no [+ATR] counterpart in underlying forms. According to Snider (1988:139), there is an allophonic [+ATR] variant of /a/ in Guang languages which occurs to the left of [+ATR] vowels (i.e. in prefixes). He notes that the phonetic difference between these two sounds has been unrecognized by many linguists. I have not been able to hear this distinction with any certainty, but I do not rule out the

---

[15]Care must be taken not to confuse O (a mid rounded vowel unspecified for the feature [ATR]) with Ø (the null symbol) as both of these are indicated in lists of noun-class prefixes in this thesis.

possibility that it exists in Foodo. This distinction is not indicated in the phonetic data in this thesis nor in the data in Appendix B.

2.3.2 Round Harmony

There is also a harmony of the feature [round] in Foodo nouns. This harmony is more limited than ATR harmony and often varies among speakers. The feature [round] can spread leftward from a stem onto a prefix. The constraints on when this can occur seem to vary with different prefixes, and I do not attempt in this thesis to go into this complex system. I will briefly summarize here the generalizations for each prefix, so that the reader will understand when a certain prefix appears differently in a derivation.

The class prefix kU-[16] (Class 3, see section 2.4.2) shows alternations of kʊ/ku/kʌ/ki.[17] Generally, stems whose vowels are [-round], take a [-round] prefix as in (2.25).[18]

---

[16]Based on Snider (1988:138,150) and other Guang languages it would seem more plausible to posit an underlying form of kI- instead of kU-. Either solution runs into problems, but it appears that positing kU- results in fewer exceptions than kI-. Tchagbalé (1987:83-85) posits two separate prefixes, kʊ- and kʌ-, but when he comes to summarizing his classes he settles on kʊ- (1987:113).

[17]There is one form with kɔ- kɔlɔtɔ́ʊ 'goiter'.

[18]Goldsmith's (1987:123; 1990:302) system, while being useful for formulating a rule for Vowel Coalescence (see section 3.2.2, has some problems in dealing with this alternation since stems with the vowel a take a [-round] prefix. In the system I'm adopting for Foodo, a is not specified for the feature [round]. One solution would be to posit that [-round] is the default value for the prefix.

(2.25)[19]

a.	kíčéù	*rainy season*
b.	kìɲí:s'ú:	*sand*
c.	kìtě:t'ɛ́ú	*feather*
d.	kítí:ù	*goat*
e.	kìná:ú	*cow*
f.	kítâŋ	*placenta*

However, some speakers do not make this change and pronounce all the above words with [+round] prefixes. There are some [-round] stems which seem to take only a [+round] prefix as in (2.26).

(2.26)

a.	kúpí:'ú	*forest*
b.	kùfélú:	*moon*
c.	kùyéù	*cheek*
d.	kùkéù	*type of tree*

An added complication is that there are a few words which all speakers pronounce with a [-round] prefix. These are shown in (2.27).

(2.27)

a.	kítá:ù	*cloth*
b.	kítâŋ[20]	*forgetfulness*

I have no explanation for these facts.

---

[19]For completeness, I am indicating tone, but tone has no bearing on any of the harmony systems described in this chapter.

[20]This word is homophonous with the word meaning 'placenta' for those speakers that pronounce the word 'placenta' with the [-round] version of the prefix. The difference is that no speaker would pronounce the word meaning 'forgetfulness' with the [+round] prefix (i.e. *kútâŋ).

The class prefix **dI-** (Class 5) also shows a [round] alternation. Unlike the prefix **kU-** there is no difference among speakers and the alternation is more widespread and consistent. When the first vowel of the stem is a high, rounded vowel the feature [round] spreads to the prefix as in (2.28).

(2.28)

a.	dúkúndì	*fist*
b.	dúwúlì	*bone*
c.	dúyúlì	*millet seed*
d.	dùwúlɩ̀	*animal skin*
e.	dùpúdí	*stomach*
f.	dùɟúd'úlɩ̀	*baboon*

For rounded mid vowels, the prefix is often rounded, but this is not true for all cases, as (2.29) shows.

(2.29)

a.	dɩ̀ɲɔ́w'ɔ́lɩ̀	*breast*
b.	dɩ̀bɔ́:lɩ̀	*shallow hole*
c.	dɩ̀kɔ́ɲɟálɩ̀	*slave*
d.	dìtɔ̀mpɔ̀ndí	*vagina*
e.	dùfɔ́lɩ̀	*boy*
f.	dúpɔ́:lɩ̀	*weariness*
g.	dùgbɔ́:lɩ̀	*fog*
h.	dùkɔ́:dɩ̀lɩ̀	*back*
i.	dùkɔ̀:dɩ̀lɩ̀	*drum*
j.	dùbɔ́l'ɩ̀:	*egg*

Stems with the vowel /a/ always have the [-round] form of the prefix.

(2.30)

a.	díyálì	*leg*
b.	dígbálì	*market*
c.	díkándì	*chest*
d.	dísádì	*field*
e.	dìkpákpálì	*shoulder*
f.	dìpálì	*pounded yam*
g.	dìčàdí	*town*
h.	dìsà:sálì	*molar*

Finally, the prefix bI-, which marks gerunds, also shows rounding
harmony. In most cases, this is optional among speakers, but there are
some words for which it appears to be obligatory (2.31g-h). The feature
[+round] spreads leftward from the stem to the prefix. The feature
[+round] may come either from the first vowel of the stem or from the
initial consonant of the stem (i.e. a w or a labialized consonant).[21]
Examples of this are in (2.31):[22]

---

[21]Some verbs beginning with w I have transcribed in the data as taking
the unrounded bI- prefix. However, I am not sure whether the rounded
version is also possible in these cases or not. I have checked some of
these with Abdoulaye Bio-Tchanni via telephone, and he does pronounce
the [+round] version of the prefix before verbs beginning with a w even
if the vowel in the verb is [-round]. Also, there are two verbs with
mid, rounded vowels (kó 'fight' and gbò 'rot') which do not allow
rounding of the prefix.

[22]The alternation in vowels is due to Vowel Coalescence, discussed in
section 3.2.2.

(2.31)

	Verb	Gerund	Gloss
a.	bú	bùbó: ~ bìbó:	harvest
b.	nú	bùnó: ~ bìnó:	hear
c.	sɔ̀tâ	bùsɔ́tâ: ~ bɪ̀sɔ́tâ:	put into something
c.	kɔ́lɪ̀	bùkɔ̀nɔ́ ~ bɪ̀kɔ̀nɔ́	grind
d.	fʷɪ̀	bùfʷê: ~ bɪ̀fʷê:	throw away
e.	mʷî:	bùmʷíê: ~ bìmʷíê:	suck
f.	wɪ̀	bùwê: ~ bɪ̀wê:	chew
g.	kúlɪ̀	bùkúlê: (*bɪ̀)	pray
h.	wù	búwô: (*bi)	see

2.4 Noun-Class System

As in many African languages, Foodo has a well-developed noun-class system. Most nouns in Foodo consist of a stem with a noun-class prefix and a noun-class suffix. The most common tone pattern on noun stems are L, H, HL, and LH. Some noun stems occur without a prefix and/or without a suffix. I will use a Ø to indicate such instances.

In categorizing nouns into different noun classes, Africanists often base their classes on agreement phenomena (on adjectives, verbs, etc.) rather than the form of the affixes themselves. One reason is that often two nouns will take the same affixation but trigger different agreement. In this system the singular and corresponding plural of a noun are considered to be in different noun classes. The main reason for this is that the singular of nouns in one agreement class may form their plurals in two or more different agreement classes. For example, the corresponding plural of one word (which in the singular is in Class 1) may be in Class 2 (a plural class) while the corresponding plural of another word (whose singular is also in Class 1) may be in

Class 4 (another plural class). Examples of this are shown in the following section.

In this thesis, when I speak of a noun as being in a certain noun class I will be referring to noun classes based on agreement. Within each noun class I will discuss what inflectional affixation is possible.

2.4.1 Agreement Classes

Based on agreement, there are nine noun classes in Foodo. Four of these classes are singular classes, four are plural classes and one class is neutral, consisting of liquid or mass nouns and gerunds. In making these noun classifications, I have adopted Tchagbalé's (1987:113-114) system. Example (2.32) shows the agreement phenomena of each class.

(2.32)	Demonstrative Adjective	Adjective Prefix[23]	3rd Person Subject Clitic[24]
Class 1	ꙗuɴʟ	O-	O-[25]
Class 2	baɴʟ	a-	ba-
Class 3	kuɴʟ	kU-	kU-
Class 4	aꙗuɴʟ	a-	a-
Class 5	duɴʟ	dI-	dU-
Class 6	yuɴʟ	I-	yU-
Class 7	kaɴʟ	ka-	ka-
Class 8	suɴʟ	N-	sU-
Class 9	buɴʟ	N-	bU-

The following table (2.33) shows how singular and plural noun classes are paired.[26]

(2.33)   Singular   Plural

Class 1 —— Class 2

Class 3 —— Class 6

Class 5 —— Class 4

Class 7 —— Class 8

Class 9

---

[23]Adjectives also take a suffix depending on the class. Since the suffixes are more complicated, though generally they are like the noun suffixes, I have ignored them to simplify the chart.

[24]Except for those that refer to Class 1, object clitics are formed by placing the subject clitics after the verb followed by an -a suffix. Due to vowel coalescence, the surface form of the object clitics are realized kɔ:, dɔ:, etc. The 3rd person object prefix referring to Class 1 is ʊ̀ŋ.

[25]Note that these are mid round vowels unspecified for the feature [ATR], not null affixes.

[26]There are some examples of exceptions to this pairing. Also, nouns of Class 7 which form their plural in Class 4 are very limited in number.

The lines show which classes pair up to form singular and plurals. For example, some nouns that form the singular in Class 3 form the plural in Class 4, others form the plural in Class 6. Class 6 nouns are the plurals corresponding to either Class 1 or Class 3.

2.4.2 Noun-Class Affixes

The following chart (2.34) summarizes the noun-class prefixes and suffixes of each class:

(2.34)

	Prefix	Suffix		Prefix	Suffix
Class 1	Ø O	Ø a m	Class 2	a	Ø a m
				Ø	ana
Class 3	kU	Ø U	Class 4	a	Ø a m nO lO
Class 5	dI	lI dI I	Class 6	I I L[27]	Ø a m ye nO
Class 7	ka	a *a[29]	Class 8	N[28]	a m *m[29] lO nO
Class 9	N bI	Ø a *m[30] nO			

---

[27]Unlike all other class prefixes which contain a HL with the L prelinked, this prefix contains an underlying L tone. This L tone prefix is used only on those nouns which form their singular in Class 1 without a prefix and all nouns in Class 1 that form their plural in Class 6 take this L tone prefix in the plural. This will be discussed in section 3.1.2.

[28]N (for both Class 8 and 9) represents a syllabic nasal unspecified for place of articulation.

[29]An asterisk indicates that the tone of the affix is prelinked. This prelinking will be discussed in section 4.7.1.

[30]Prelinking is only necessary for the gerund form in this Class, not the regular nouns.

As can be seen from the chart, a few classes have two possible prefixes and every class has several suffixes. In Class 2, stems that do not take a prefix take the -ana suffix. The bI- prefix in Class 9 is used only on gerunds.

For the most part, the choice of prefix and suffix is arbitrary, though there are often phonological tendencies in the choice of the suffix. For example, CVN stems often take a different suffix than other stems. In Class 3 a CVN stem does not take a suffix while in Class 4 a CVN stem usually takes the -■ suffix.[31] In Class 5 a CVN stem usually takes the -dI suffix. Also, in Classes with both an -a and -■ suffix, short vowels usually take the -a suffix and long vowels the -■ suffix. There are numerous exceptions, however. Further study may reveal a pattern based on comparative evidence, but for this thesis the prefix and suffix of a stem will be indicated in the lexicon. An exception to this are the gerunds whose suffix can be predicted based on the phonology. These will be discussed in section 4.2.

---

[31]Because the point of articulation for nasals in coda position in stems is always predictable, I do not specify it. The point of articulation comes from the following consonant. Word-finally (as when a CVN stem does not take a suffix) an unspecified nasal receives the point of articulation for a velar nasal by a default rule. When CVN is followed by an ■ suffix, the first nasal is deleted. For example, the stem kuN (with L tone) is realized dúkúndì 'fist' in Class 5 but ákúḿ 'fists' in Class 4. The reason for positing a suffix is because word-final stem nasals are always realized as ŋ. The only occurrence of a word-final ■ is from the suffix ■.

Example (2.35) shows how singular and plural prefixes pair up.[32]

(2.35)

```
        Singular           Plural

        Cl 1  O-  ————————  I-  Cl 6
                    \    /
                     \  /
                      \/
                      /\
                     /  \
        Cl 3  kU- ————————  a-  Cl 2
                    /               Cl 4
                   /
        Cl 5  dI-


                      /———  I- (L tone) Cl 6
                     /
                    /
        Cl 1  Ø  ———————  Ø (-ana) Cl 2
                    \
                     \
        Cl 7  ka- ————————  N-  Cl 8
```

---
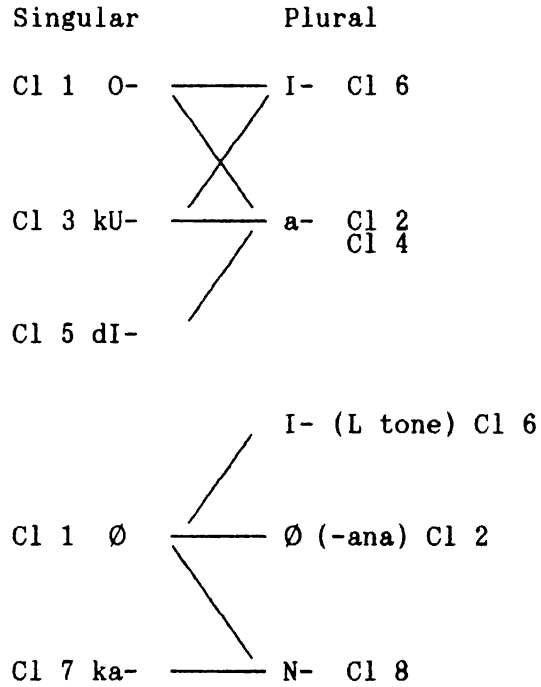
[32]This omits some exceptional pairings. For example, three words in Class 7 take a ka- prefix with the plurals being formed with a- prefix in Class 4.

CHAPTER 3

3. TONAL PROCESSES

Foodo has two contrastive tones: high (H) and low (L). The clearest contrast between these two tones occurs in verbs.

(3.1)

wú	*die*	fí:àwú	*You(pl) died.*
wù	*see*	fí:àwù	*You(pl) saw.*

In addition to the two level tones of H and L, in surface forms there are also downstepped H tones ('H). Foodo also has two falling contour tones, one falling to a low and another falling to a 'H. Rising tones are much rarer, but do occur in certain contexts. In addition, Ls in utterance final position immediately preceded by another L are falling. This is a regular phonetic process, which I have systematically ignored in my phonetic transcriptions.

3.1 Noun Prefixes

Tones on Foodo noun-class prefixes alternate between low and high. Example (3.2) shows some words from Class 5 with the corresponding plural from Class 4:

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(3.2)

Singular Class 5	Plural Class 4	Gloss
dɩ́ɲɔ́w'ɔ́lɩ́	áɲɔ́w'ɔ́:	*breast*
díbílì	ábê:	*unit/seed*
dùmúlí	àmó:	*head*
dɩ̀kɔ́ɲɟálɩ̀	àkɔ́ɲɟâ:	*slave*
dɩ̀yélɩ̀	àyém	*mouse*
dɩ̀čàdɩ́	àčánɔ́	*town*
dùfùdálɩ̀	àfùdâ	*lung*
dùfɔ́lɩ́	àfɔ́lɔ́	*boy*

The above data show that there are no words which start with a H L tone sequence and there are no words which have all H.[1] The next two sections present two analyses to account for these facts.

3.1.1 First Analysis

The solution Snider (1990b:90) offers for Guang languages accounts for the facts described above. He states that in Guang languages the surface tone of the prefix can be predicted from the underlying tonal melody of the root. Since Snider based his conclusion on data from several Guang languages of Ghana, with only limited data for Foodo, it is noteworthy that his generalization also holds for Foodo.

Snider proposes that "the underlying tonal melody of the prefix is L preceded by a floating H tone." Whenever the underlying root melody is L the floating H tone spreads rightward on to the prefix and root.

---

[1]There are also no words which are all L, but this is accounted for by the fact that all the nouns given (and most nouns in general) have a class suffix with a H tone. The analysis presented below will, however, account for the scarcity of words which are LLH or LLLH.

(1990b:92)   I will adopt his underlying form of the prefix for Foodo
(3.3), and will formulate two rules (3.4) and (3.5) to account for the
realization of H tone on the prefix.

(3.3)   Noun-class Prefix

```
H  L
   |
   V
```

(3.4)   Prefix Delinking: Lexical

```
| H  L  |   | L |
|  \ |  |   | | |
|   `V  |   |   |
```

(3.5)   H-Spread: Lexical

```
H  | L
 \ | |
  `V| V
V    V
```
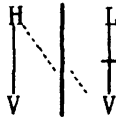
I have posited two separate rules of Prefix Delinking and H-Spread
instead of collapsing them into one rule because H-Spread occurs
independently in derivational and compounding processes, as will be seen
later.[2]   The rule of Prefix Delinking only occurs when the underlying
root melody is L.[3]   Any H in the root melody prevents the rule from
applying, even if the H follows a L.   Thus a LH root melody receives a L
tone on the prefix, not a H.   Even though not specified in the rule,

---

[2]Snider (1990b:93) states that Guang languages differ in how far the H
spreads. In Foodo the H spreads one TBU.

[3]There are five exceptions to this rule. These are listed and discussed
on page 121.

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this rule will only apply to prefixes, since there is never a floating H and a L in the same constituent after the Association Convention applies except in the case of the noun-class prefix.

Example (3.6) shows a partial derivation of two stems, a L stem noun and a LH stem noun. On the first cycle, the Association Convention applies to associate the leftmost tone to the leftmost TBU. On the second cycle the prefix is added. The structural condition of Prefix Delinking (3.4) is met in (3.6a) but not in (3.6b). After application of Prefix Delinking in form (a) H-Spread (3.5) can apply. On the third cycle, the suffix is added and after further associations and rules (to be discussed later) the correct surface forms result.

(3.6) a.   b.

kúčéù   dìčàdì   Surface forms
rainy season   *town*

Further evidence for this comes from the compounds òbìčísê: 'daughter' and òbìɲísê: 'son'. When the stem bi with L tone occurs alone as in óbê: 'child' or díbílì 'seed', the prefix is H. But when this stem is compounded to the stems či or ɲi (both with H tone) the prefix is L, since after compounding the stem melody is LH and not L (see section 4.6 for a discussion of this compound).

This analysis accounts for the lack of any words (with prefixes) which start with H L, since H tone will only surface on a prefix when the stem is L, which then creates the environment for H-Spread to apply. The result is that whenever the prefix is H the next TBU will also be H on the surface. The analysis also accounts for the lack of words which are all H, since a prefix will only surface with a H tone if the stem is L (section 3.2.1 will account for the presence of downstepped Hs in a word with no surface Ls as in dìɲɔ̀w'ɔ̀lì 'breast').

3.1.2 Alternative Analysis

An alternative analysis to the above would be to propose that noun-class prefixes were underlyingly L. A rule of dissimilation would then change the L to a H before L roots. H-Spread would then apply as it does in the first analysis.

The alternative analysis is less congenial to the general spirit of autosegmental phonology in which phonological changes are accounted for by means of spreading or delinking of association lines rather than

changing features. My analysis (from Snider 1990b) does not require any changing of features.

A second and stronger argument against a dissimilation analysis involves a particular noun-class prefix, I-, that behaves tonally unlike any other prefix. This prefix, which is the plural of nouns without a prefix, does not manifest the alternation between H and L, but is invariably L. Examples of this group of nouns are shown in (3.7).

(3.7)

Singular	Plural	Gloss
kùnùŋ	ìkùnùŋ	*language*
čòkòtò	ìčòkòtò	*pants*
sàndě:	ìsàndě:	*sheep*
čὲ:čέʔ	ìčὲ:čέʔ	*bicycle*
sìlìbàʔ	ìsìlìbàʔ	*pot*
gúndí	ìgúndí	*lion*
líndʼáɱ	ìlíndʼáɱ	*root*

This would be accounted for under the first analysis by positing that Class 1 nouns without prefixes form their plurals with a different prefix than those nouns which take the singular prefix O- of Class 1 or kU- of Class 3. This different prefix has only a floating L instead of the HL as the other prefixes:

(3.8)

      L

      I-

Under the alternative analysis, the group of nouns without a prefix in Class 1 would have to be specially marked in the lexicon as

not undergoing the rule of dissimilation when they take a prefix in the plural. The first analysis proposed (following Snider 1990b) avoids this complication. The special I- prefix simply has a different underlying tonal melody which explains why it behaves differently than the other prefixes. This analysis claims that there is a phonological rather than morphological difference between this prefix and the other prefixes. Since the languages studied by Snider (1990b) did not have any prefixes which were different tonally, Foodo provides additional support for Snider's analysis.

It is interesting to note that this special prefix appears to be an innovation in Foodo, as other Guang languages apparently do not have a prefix with a different underlying tone than the other prefixes. Indeed, the group of nouns in Class 1 without a prefix is the one that Snider (1990b:90) uses as evidence for the H spreading onto the stem in nouns, since these nouns do not have a prefix in the singular and a I- prefix in the plural. This particular evidence cannot be used in Foodo, as these nouns invariably take a L tone prefix I-.

3.2 Noun-Class Suffixes

As stated above, Foodo has noun-class suffixes in addition to noun-class prefixes. The presence of noun-class suffixes adds an interesting complication to the tonal system of Foodo, one that has not been found in other Guang languages. If one looks at the surface tones at the end of words, one finds five possibilities: L, H, 'H, H-L, and

L-H. I propose that these surface manifestations can all be accounted for by positing that noun-class suffixes are underlyingly H as in (3.9).

(3.9) Noun-class Suffix

    H

    V

The H tone of the suffix will only associate if the TBU of the suffix has not received a tone (by the Association Convention) from the root. In the morphology, noun-class suffixes are added after noun-class prefixes. Here is an example of a derivation for the word dìsí:lí 'horn':

(3.10)

$$\begin{bmatrix} H \\ si: \end{bmatrix} \qquad \text{Cycle 1:}$$

$$\begin{bmatrix} H \\ | \\ si: \end{bmatrix} \qquad \text{Association Convention}$$

$$\begin{bmatrix} H & L & \begin{bmatrix} H \\ | \\ si: \end{bmatrix} \\ dI & & \end{bmatrix} \qquad \begin{matrix} \text{Cycle 2:} \\ \text{Add Prefix} \end{matrix}$$

$$\begin{bmatrix} \begin{bmatrix} H & L & H \\ | & & | \\ dI & & si: \end{bmatrix} & H \\ & & lI \end{bmatrix} \qquad \begin{matrix} \text{Cycle 3:} \\ \text{Add Suffix} \end{matrix}$$

$$\begin{bmatrix} \begin{bmatrix} H & L & H \\ | & & | \\ dI & & si: \end{bmatrix} & H \\ & & | \\ & & lI \end{bmatrix} \qquad \text{Association Convention}$$

dìsí:lí
horn

In (3.10) above, the contiguous Hs violate the OCP. In order to repair violations of the OCP, I propose two rules in (3.11) and (3.12) which are both lexical and postlexical.

(3.11) OCP Repair I: Lexical and Postlexical

$$
\begin{array}{ccc}
T_1 & T_2 \\
| & | & \longrightarrow \\
V & V
\end{array}
\qquad \text{Condition:} \quad T_1 = T_2
$$

(3.12) OCP Repair II: Lexical and Postlexical

$$
\begin{array}{c}
\emptyset \\
\uparrow \\
T_1 \quad \textcircled{T}_2
\end{array}
\qquad \% \quad \text{(Mirror Image)}
$$

Condition: $T_1 = T_2$
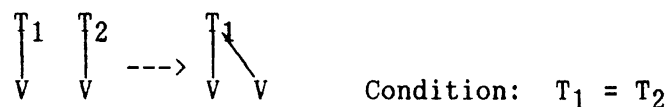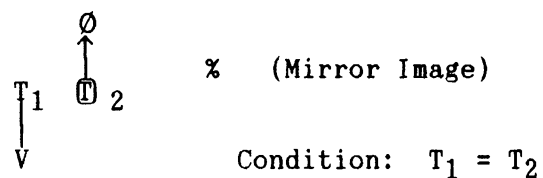
Assuming the OCP (and positing rules to repair violations of it) is helpful in Foodo, as it rules out sequential identical tones in a structure, thus simplifying the structural descriptions of many of the tonal rules of the language.

The derivation in (3.10) will continue with OCP Repair I (3.11) resulting in (3.13):

(3.13) After application of OCP Repair I

$$
\left[\left[\begin{array}{cc} H & L \\ & \\ d\hat{\imath} & s\hat{\imath}: \end{array}\begin{array}{c} H \\ \\ \end{array}\right]_{1I}\right]
$$

A low tone stem in Class 5 will be derived as follows:

(3.14)

$$
\begin{bmatrix} & L \\ & si: \end{bmatrix}
\qquad \text{Cycle 1:}
$$

$$
\begin{bmatrix} & L \\ & si: \end{bmatrix}
\qquad \text{Association Convention}
$$

$$
\begin{bmatrix} H & L & \begin{bmatrix} L \\ si: \end{bmatrix} \\ di \end{bmatrix}
\qquad \begin{matrix} \text{Cycle 2:} \\ \text{Add Prefix} \end{matrix}
$$

$$
\begin{bmatrix} H & L & \begin{bmatrix} L \\ si: \end{bmatrix} \\ di \end{bmatrix}
\qquad \text{Prefix Delinking}
$$

$$
\begin{bmatrix} H & \begin{bmatrix} L \\ si: \end{bmatrix} \\ di \end{bmatrix}
\qquad \text{OCP Repair II}
$$

$$
\begin{bmatrix} H & \begin{bmatrix} L \\ si: \end{bmatrix} \\ di \end{bmatrix}
\qquad \text{H-Spread}
$$

$$
\begin{bmatrix} \begin{bmatrix} H & L \\ di & si: \end{bmatrix} & H \\ & & li \end{bmatrix}
\qquad \begin{matrix} \text{Cycle 3:} \\ \text{Add Suffix} \end{matrix}
$$

$$
\begin{bmatrix} \begin{bmatrix} H & L \\ di & si: \end{bmatrix} & H \\ & & li \end{bmatrix}
\qquad \text{Association Convention}
$$

dísi:lì
termite

The floating H will be deleted by a rule of H-Deletion (3.15)

(3.15) H-Deletion: Lexical

H ---> Ø

At first, it would appear that this rule is too general and will
delete floating highs that should not be deleted. For example, in the
derivation of the word for 'sheep' sàndě:, when the suffix is added the
H tone of the suffix fulfills the structural description of H-Deletion,
as in (3.16):

(3.16)

$$\left[\left[\begin{array}{c} \setminus \\ saNd\epsilon \end{array}\right] \begin{array}{c} H \\ a \end{array}\right]$$ Cycle 2:
Add Suffix

$$\left[\left[\begin{array}{c} \setminus \\ saNd\epsilon \end{array}\right] \begin{array}{c} H \\ \vdots \\ a \end{array}\right]$$ Association Convention

However, the Association Convention, as a universal condition, always applies before any phonological rules. Since in the word sàndě: on the second cycle there is a free TBU with which the H may associate, the Association Convention associates the H to the final TBU of the word as seen in (3.16). The H is no longer floating and so will not delete. In the derivation of the word 'termite' dísí:lì in (3.14), the H of the suffix is not associated by the Association Convention and is thus free to be deleted by H-Deletion.

The rule of H-Deletion also deletes the floating H of the prefix when it is not associated by the rule of Prefix Delinking (3.4). In the case where a form is subject to Prefix Delinking, it would appear that Prefix Delinking must be ordered before H-Deletion. However, the Elsewhere Condition (2.11) assures that Prefix Delinking will apply before H-Deletion, since Prefix Delinking is the more specific rule.

One might question why I have chosen to treat the noun-class prefix-suffix pair as two separate morphemes (by adding them on two different cycles) when together they serve the function of marking a noun class. I have chosen to do so for two reasons. First, the selection of prefixes and suffixes are independent in nature. The

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noun-class prefixes are mostly limited to one set per agreement class, while there are usually several noun-class suffixes for each agreement class. Also, many of the same suffixes appear in several different agreement classes. This is also true of prefixes but to a more limited extent.

Secondly, and more importantly, adding the prefixes and suffixes on the same cycle as one discontinuous morpheme would result in an incorrect form *dísí:l'í for 'termite' as can be seen in (3.17).

(3.17)

[L / sì:]	Cycle 1: Association Convention
[H L / dì [L / sì:] H lì]	Cycle 2: Add Prefix and Suffix
[H L / dì [L / sì:] H lì]	Association Convention
[H L / dì [L / sì:] H lì]	Prefix Delinking
[H / dì [L / sì:] H lì]	OCP Repair II
[H / dì [L / sì:] H lì]	H-Spread
[H L H / dì sì: lì]	Output of Lexical Component After Bracket Erasure

*dísí:l'í

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By assuming the prefix is added before the suffix on different cycles,
the correct surface form dísí:lì will result as shown in (3.14) above.
There does not seem to be any way to change the rules to achieve the
right result if the prefix and suffix are added on the same cycle. The
problem arises more from the nature of the Association Convention.

3.2.1 L-Delinking

Two syllable noun stems with underlying L tone are realized with a
'H on the second syllable of the stem as in dɪ̀ɲɔ̃w'ɔ̀lɪ̀ 'breast'. This is
accounted for by a rule of L-Delinking (3.18).

(3.18) L-Delinking: Lexical and Postlexical
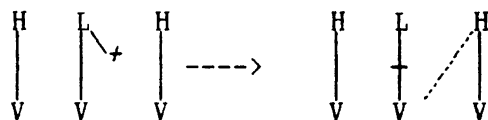
$$
\begin{array}{ccc}
\overset{H}{\underset{V}{|}} & \overset{L}{\underset{V}{\big\backslash_{\!+}}} & \overset{H}{\underset{V}{|}}
\end{array}
\;----\!>\;
\begin{array}{ccc}
\overset{H}{\underset{V}{|}} & \overset{L}{\underset{V}{+}} & \overset{H}{\underset{V}{\diagup|}}
\end{array}
$$

Condition: The V associated with the L is not part of
a long vowel.
A boundary must intervene on one side of
the V associated with the L.

This rule says that a linked L that is not multiply-linked (the
meaning of the small x on the second association line coming from the L)
when between two H's will delink and the H to the right will spread
leftward and link with the now free TBU. The TBU that is delinked may
not be part of a long vowel (VC). The two conditions in the rule
(concerning word boundary and long vowels) are for the postlexical
application of the rule. The conditions are never met in the lexical

part of the phonology and their presence does not interfere with the correct lexical application of the rule.

The derivation of [dɛɲɔ̃w'ɔ̃lɛ] proceeds as follows:

(3.19)

[...] ɲɔwɔ	Cycle 1: Association Convention (and Tone Spreading)
[H L [L]] dI ɲɔwɔ	Cycle 2: Prefix Delinking
[H [L]] dI ɲɔwɔ	OCP Repair II and H-Spread
[[H L] H] dI ɲɔwɔ lI	Cycle 3: Association Convention
[[H L] H] dI ɲɔwɔ lI	L-Delinking
[H L H] dI ɲɔwɔ lI	Bracket Erasure Output of Lexical Phonology

dɛɲɔ̃w'ɔ̃lɛ
breast
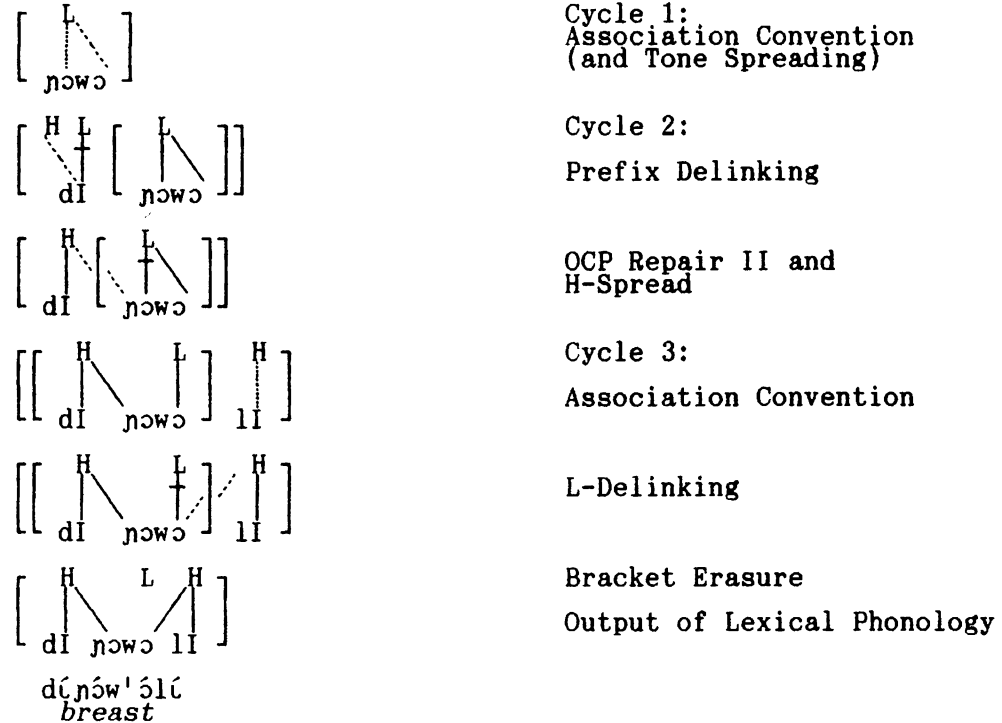
3.2.2 Vowel Coalescence

The suffix -a undergoes coalescence with the vowel of the stem. This coalescence results in a long mid vowel (unless the stem vowel is another a). The roundness and ATR of the vowel depends on the vowel of the stem. Example (3.20) shows all possibilities for -a coalescence.

(3.20)   i+a/e+a   ----> e:
           ɩ+a/ɛ+a   ----> ɛ:
           u+a/o+a   ----> o:
           ʊ+a/ɔ+a   ----> ɔ:
           a+a   ----> a:

While this is a very common coalescence cross-linguistically, such coalescence usually results in short rather than long vowels. By assuming Goldsmith's (1990:302) proposal for representing a canonical five-vowel system, this coalescence can be easily accounted for by the following rule:[4]

(3.21) Vowel Coalescence: Lexical
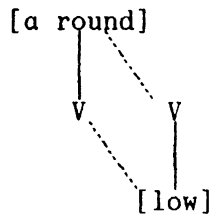
Once the vowels have been coalesced, they will act like one TBU. This can be accounted for by positing the following rule:

(3.22) TBU Conflation: Lexical
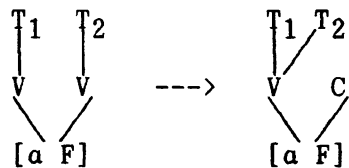
Since the V is the tone-bearing unit, this process will merge two TBUs into one. Whatever tones were associated with the two TBUs will now be

---

[4]I am assuming that at some point ATR vowel harmony will take place, assuring that the two vowels agree in the feature [ATR].

associated with the one TBU.[5] The TBU Conflation rule (3.22) could be

included as part of the Vowel Coalescence rule. However, TBU Conflation

is independently motivated, since whenever two identical vowels come

together in the morphology they act like one TBU. For example, in ɔ́já:

'fire' from ɔ-ja-a the long a: acts as one TBU after application of the

Association Convention.[6]

Due to the limitations of a two-dimensional piece of paper, I have

written the above rule in an abbreviated form using the notation [α F].

This should be interpreted to mean that the two vowels have the same

features associated with them on all tiers (round, low and ATR).

Ignoring the feature [ATR], (3.23) shows possible vowel combinations.

Letters (a-c) would fulfill the structural description of (3.22) and

undergo TBU conflation. Letters (d-f) do not fulfill the structural

description of the rule and therefore do not undergo TBU Conflation.

---

[5]When the two tones are different this would create a contour tone.
However rising tones will only result when the L is not delinked
previously by L-Delinking (3.18). Because of this, rising tones are
rare, usually only seen in some agentive nominalizations or other
derivational nouns. As for falling contours, these are restricted to
pre-pausal position due to a further rule discussed later.

[6]I assume that due to the OCP, whenever two a's are adjacent their
identical features are collapsed (by some OCP Repair rule similar to
what I have proposed for tone) creating identical features associated
with two Vs, thus fulfilling the structural description of TBU
Conflation.

(3.23)

```
a.  [+round]        b.  [-round]      c.
        |\                  |\
        | \                 | \
        V  V                V  V              V   V
        |  /                |  /              |  /
        | /                 | /               | /
       [low]               [low]             [low]

        o  o                e  e              a   a

d.  [+round]        e.  [-round]      f.  [-round][+round]
        |\                  |\
        | \                 | \
        V  V                V  V              V       V
        |                      |              |
       [low]               [low]            [low]

        o  u                i  e              e       u
```
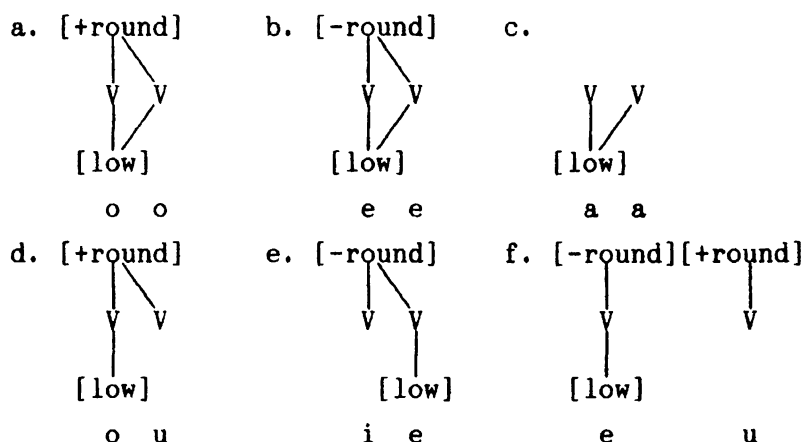
The rule of TBU Conflation applies not only to those vowel sequences which result from the suffix -a, but also those which result from the suffix -U, a Class 3 suffix marker, when the features on the melodic tier are identical. There is a segmental rule (not formalized in this thesis) where the stem vowel takes on the roundness of the following suffix vowel when both vowels are high. For example, in kúyû: 'tree' from kU-yi-U the rule changes the i to u. Since this now fulfills the structural description of TBU Conflation, it applies, resulting in the long u: being one TBU instead of two.[7]

Example (3.24) shows some examples of Vowel Coalescence in the second column which consists of plural nouns from Class 4. The first column shows the corresponding singulars which are from Class 3 and Class 5.

---

[7]Actually, this varies among speakers. Some speakers treat the resulting long vowel as one TBU while others treat it as two TBUs as in other words with the suffix -U like kùyéù 'cheek'. This can be observed in the emphatic form with ge (see example (6.7) in section 6.2).

(3.24)

	Class 3 Singular	Class 4 Plural	Gloss
a.	kúbɔ̀ù	ábɔ̂:	*neck*
b.	kùsú:	às̀ɔ́:	*ear*
c.	kùtáú	àtá:	*bow*

	Class 5 Singular	Class 4 Plural	Gloss
d.	díbílì	ábê:	*seed*
e.	dùbélù	ábê:	*palm nut*
f.	díɲílì	áɲê:	*tooth*
g.	dúyúlì	áyɔ̂:	*millet*
h.	dùmúlí	àmɔ́:	*head*
i.	dìkpílì	àkpê:	*type of bird*[8]
j.	dùtàlálù	àtàlâ:	*palm branch*

Consider now the derivation of the form **ábê:** 'seeds'. On the stem cycle the L of **bi** associates:

(3.25)
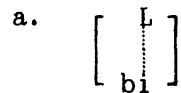
a.

$$\left[\begin{array}{c} L \\ | \\ bi \end{array}\right]$$

On the second cycle, the prefix is added and Prefix Delinking applies:

b.

$$\left[\begin{array}{cc} H \,L & \\ \backslash | & \\ a & \left[\begin{array}{c} L \\ | \\ bi \end{array}\right] \end{array}\right]$$
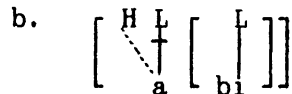
Since the OCP is violated, OCP Repair II is triggered and then H-Spread:

c.

$$\left[\begin{array}{cc} H & \\ | \backslash & \\ a & \left[\begin{array}{c} L \\ | \\ bi \end{array}\right] \end{array}\right]$$

---
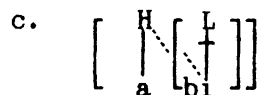
[8]In local French known as 'vouanzou'.

On the third cycle, the class suffix -a is added and the L of the stem associates with the suffix, while the H of the suffix is deleted by H-Deletion:

d.

The structural description of Vowel Coalescence is met resulting in the following after application of the rule:

e.

For the sake of clarity, I assume a fuller representation here that includes the skeletal tier, but still uses phonetic symbols as short-hand for segmental features:

f.
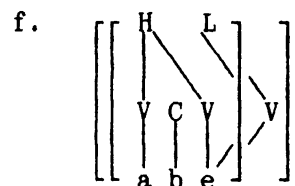
Since the two vowels have identical features, TBU Conflation is triggered:

g.
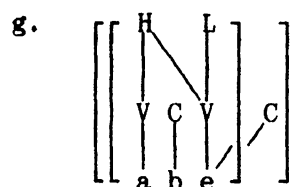
After bracket erasure at the end of the cycle:

h.
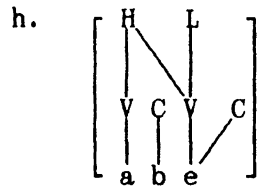
The rule of Vowel Coalescence is a neutralization rule. The distinction between high and mid vowels is lost. In those cases where the -a suffix is only in the singular form, and a different suffix is in the plural form, the underlying form of the vowel is synchronically recoverable. There are many nouns, however, where the stem vowel is not recoverable, either because the plural also takes an -a suffix or there is no plural form. There are also some derivational suffixes which always take an -a noun-class suffix. Kiparsky (1973) proposes that cases of absolute neutralization should be disallowed in phonological theory. One major consequence of this constraint, which he calls the Alternation Condition, is that "if a form appears in a constant shape, its underlying representation is that shape" (Kiparsky 1973:18).

I will follow Kiparsky's Alternation Condition in this thesis, and therefore, propose a mid vowel in the underlying forms of stems before the suffix -a when there is no alternation. It should be pointed out that there are probably cases where this choice is due to lack of knowledge. For example, based on just the singular and plural forms for

'dog' kpɩ́dê:/ɩ̀kpɩ́dê:, I would have posited kpɩde.[9] But there is a form of this stem where the rule of Vowel Coalescence does not neutralize the distinction between high and mid vowels. This is the word for 'puppy' kèkpídí'á/ŋ̀kpídí'á. Because I have discovered this word, I now posit the underlying form of the stem in the word for 'dog' as kpɩdɩ. In places where I follow the Alternation Condition and posit mid vowels in underlying forms, further reasearch may reveal that the underlying vowels are actually high.

I also realize that in many of these cases of absolute neutralization, other Guang languages (which do not have noun-class suffixes) often show a high vowel. While it would be tempting to posit such cases in Foodo as also having high vowels, I will not do so unless Foodo synchronically shows an alternation of the form with a high vowel.

3.2.3 Contour Simplification

There are reasons for assuming that (3.25h) is not the correct lexical representation (the output of the lexical component). When we look at words ending in falling contours, such as ábê: 'children',[10] or óbê: 'child' in various contexts, we see that the L of such contours is only realized in pre-pausal positions.[11]

---

[9]The underlying tones of this stem are discussed in section 4.7.3.

[10]This form is both the plural of díbílì 'seed' or 'unit' and the plural of óbê: 'child'.

[11]Throughout this thesis, surface forms of individual words are cited in their pre-pausal forms.

(3.26)

a.	ábê:	+	gé	ábé: g'é	*They're children!*
b.	ábê:	+	dɔ̀	ábé: dɔ̀	*in the children*
c.	ábê:	+	kùnùŋ	ábé: kùnùŋ	*children's language*
d.	ábê:	+	áyá:m̀	ábé: 'áyá:m̀	*children's legs*
e.	óbê:	+	díɲílì	óbé: d'íɲílì	*child's tooth*

The above shows that the L of the contour is not realized either before a following H or L. That the L of the contour is still present is clear from the fact that any following H tone is always downstepped.

One solution to this problem would be to posit a postlexical rule that delinks the L of HL contours before those environments when the L appears to be floating. However, this rule would need to be written in such a way as to apply in all cases except before a pause.

A simpler solution would be to write a lexical rule which simplifies falling contours that result from TBU Conflation, as in (3.27):

(3.27)   Contour Simplification: Lexical

H L
V C
[α F]
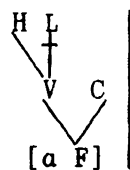
This rule says that a L of a falling contour will delink when the V (TBU) it is associated with shares the segmental features [α F] with a C (i.e. a long vowel) at a boundary. According to this analysis, the lexical representation (i.e. the output of the lexical component) of a form like ábê: would have a floating L as in (3.28).

(3.28)   Lexical Representation of word for 'children'

$$\left[\begin{array}{c} \begin{array}{ccc} H & & L \\ \big\backslash & & \\ V & C & V \quad C \\ | & | & |\big/ \\ a & b & e \end{array} \end{array}\right]$$
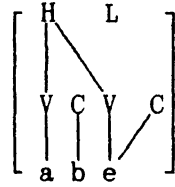
A postlexical rule of L-Docking (3.29) will then create a falling contour in pre-pausal position:

(3.29)   L-Docking: Postlexical

$$\begin{array}{c} \textcircled{L} \\ \vdots \quad | \quad // \\ V \quad | \end{array}$$
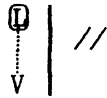
The L will only associate, in the postlexical part of the phonology, if the form appears in pre-pausal position.

Another illustration that the lexical representation of such forms has a floating L and not a linked L comes from examples of this word as the first element in an associative construction. Consider the following data:

(3.30)

a.	òčí:m̀	+	dùmúlí	=	òčí:m̀ d'úmúlí	*woman's head*
b.	dísí:lì	+	dùmúlí	=	dísí:lì dùmúlí	*termite's head*
					*dísí:lí d'úmúlí	
c.	óbê:	+	dùmúlí	=	óbé: d'úmúlí	*child's head*

Example (3.30a) shows examples of the postlexical application of L-Delinking (to be fully discussed in section 5.1). In (3.30b) the rule does not apply as would be expected when two linked Ls are between the two Hs. The structure of (3.30b) is shown in (3.31) below.

(3.31)

a.
$$\left[\begin{array}{c} \text{H} \quad \text{L} \\ \diagdown \\ \text{dì sì:lì} \end{array} \right] \left[\begin{array}{c} \text{L} \quad \text{H} \\ \diagup \quad \diagdown \\ \text{du mu lì} \end{array} \right]$$
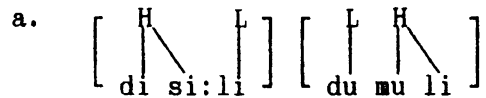
After OCP Repair I there would be one multiply-linked L:

b.
$$\left[\begin{array}{c} \text{H} \quad \text{L} \\ \diagdown \\ \text{dì sì:lì} \end{array} \right] \left[\begin{array}{c} \text{H} \\ \diagdown \\ \text{du mu lì} \end{array} \right]$$
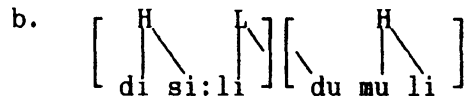
The rule of L-Delinking cannot apply to such a form since the rule states the L cannot be multiply-linked.

Interestingly, in (3.30c) L-Delinking does apply. If the L of óbê: was associated to the final syllable, the rule of L-Delinking should not apply, since it would have the same structural description as 'termite's head' seen in (3.31) above. The rule of Contour Simplification (3.27), however, does account for the fact that L-Delinking applies postlexically to a form like óbé: d'úmúlí 'child's head'. According to the analysis proposed here, when the form 'child's head' is formed postlexically it will have the following structure:

(3.32)

a.
$$\left[\begin{array}{c} \text{H} \quad \text{L} \\ \diagdown \\ \text{o be:} \end{array} \right] \left[\begin{array}{c} \text{L} \quad \text{H} \\ \diagup \quad \diagdown \\ \text{du mu lì} \end{array} \right]$$
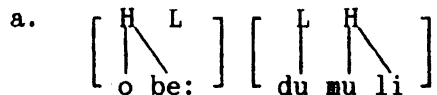
OCP Repair II will delete the floating L resulting in:

b.
$$\left[\begin{array}{c} \text{H} \\ \diagdown \\ \text{o be:} \end{array} \right] \left[\begin{array}{c} \text{L} \quad \text{H} \\ \diagup \quad \diagdown \\ \text{du mu lì} \end{array} \right]$$
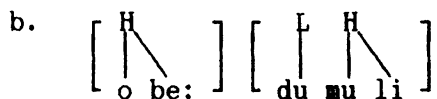
This now fulfills the structural description of L-Delinking so that it now applies, resulting in (3.32c) which is the correct surface form (see (3.30c)).

(3.32)

c.
$$\left[\begin{array}{c}H\\ \diagdown\\ \text{o be:}\end{array}\right]\left[\begin{array}{c}L\ \ H\\ \diagup|\diagdown\\ \text{du mu li}\end{array}\right]$$

óbé: d'úmúlí
child's head
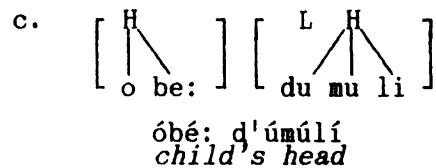
The rule of Contour Simplification along with OCP Repair II accounts for a form like óbé: d'úmúlí 'child's head' (3.30c) where the postlexical application of L-Delinking (3.18) is able to apply since there is only one L associated with one TBU between the two Hs.

The analysis presented here is for all words ending in a long vowel which in pre-pausal position have a falling contour over the long vowel. This analysis claims (by the lexical rule of Contour Simplification) that in the lexical representation of such words the L of the surface contour is floating and not linked. The falling contour in pre-pausal position is accounted for by a postlexical rule of L-Docking. This analysis not only accounts for the lack of a contour in such words before words beginning with L and H tone, but also accounts for the fact that when such words are followed by words with surface tones of L H ..., as in dùmúlí 'head', L-Delinking applies.

3.3 Summary of Tonal Processes

The rules discussed thus far account for all lexical tonal processes in Foodo nouns, and are summarized here. Two more rules, both postlexical, will be discussed--one in section 4.2.1 and the other in section 5.2.

(3.33) Tone Spreading: Supplement to Association Convention   (2.7)
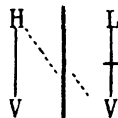
$$\begin{array}{c} T \\ | \, \backslash \\ V \quad \textcircled{v} \end{array} \quad \% \quad \text{(Mirror Image)}$$

(3.34) Prefix Delinking: Lexical   (3.4)

$$\left| \begin{array}{cc} \textcircled{H} & L \\ \, \backslash & | \\ & V \end{array} \right| \quad \left| \begin{array}{c} L \\ | \end{array} \right|$$

(3.35) H-Spread: Lexical   (3.5)

$$\begin{array}{ccc} H & & L \\ | \, \backslash & | & | \\ V & | & V \end{array}$$

(3.36) OCP Repair I: Lexical and Postlexical   (3.11)

$$\begin{array}{cc} T_1 & T_2 \\ | & | \\ V & V \end{array} \quad \text{--->} \quad \begin{array}{cc} T_1 \\ | \, \backslash \\ V & V \end{array} \quad \text{Condition:} \quad T_1 = T_2$$

(3.37) OCP Repair II: Lexical and Postlexical   (3.12)

$$\begin{array}{c} \varnothing \\ \uparrow \\ \\ T_1 \quad \textcircled{T}_2 \\ | \\ V \end{array} \quad \% \quad \text{(Mirror Image)}$$
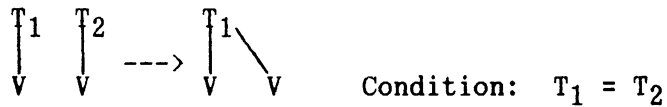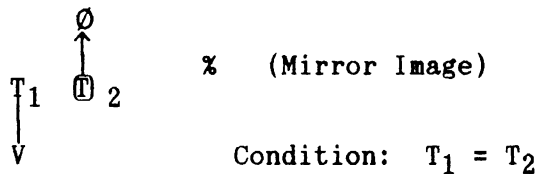
$$\text{Condition:} \quad T_1 = T_2$$

(3.38)   H-Deletion: Lexical   (3.15)

$$H \longrightarrow \emptyset$$
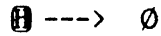
(3.39)   L-Delinking: Lexical and Postlexical   (3.18)
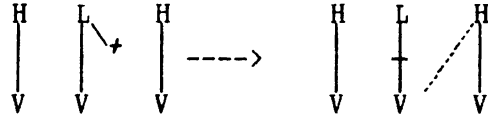
```
H   L   H              H   L      H
|   |\ +|     ---->     |   |    /|
|   | \ |               |   +   / |
V   V   V               V   V  /  V
```

          Condition: The V associated with the L is not part of
                          a long vowel.
                          A boundary must intervene on one side of
                          the V associated with the L.

(3.40)   Vowel Coalescence: Lexical   (3.21)

```
[a round]
    |  \
    |   \
    V    V
     \   |
      \  |
     [low]
```
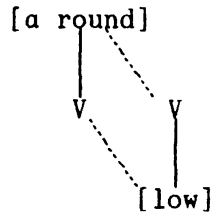
(3.41)   TBU Conflation: Lexical   (3.22)

```
T1  T2                 T1 /T2
|   |                  | /
V   V      --->        V    C
 \ /                    \  /
[a F]                   [a F]
```
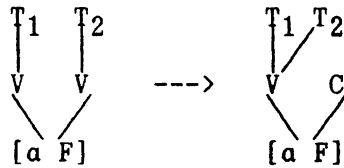
(3.42)   Contour Simplification: Lexical   (3.27)

```
H L
 \|
  +
  V   C   |
   \ /    |
  [a F]   |
```
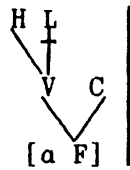
(3.43)   L-Docking: Postlexical   (3.29)

```
L
|   |  //
:   |
V   |
```
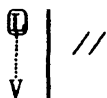
I will show in the next chapter how these relatively simple rules account for all Foodo noun surface tones, both in derivational processes and in compounding.

CHAPTER 4

4. DERIVATIONAL PROCESSES

4.1 Introduction

There are three active derivational processes in Foodo which apply to verb stems to form nouns. One process forms a gerund construction, another forms agentive nominalizations, and the third forms locative nominalizations. There are two derivational processes for forming nouns which involve noun stems. One of these involves a diminutive suffix. The other involves compounds.

Since I do not find any phonological rules peculiar to derivational processes, I have no reason to put derivational affixation on a different level from inflectional affixation. Therefore, both of these processes will occur on the same level in the lexical part of the phonology. In order to understand the derivational processes involving verb roots, I need first to present an overview of the underlying tonal structure of Foodo verbs.

Foodo verbs can be divided into four groups based on their underlying tones. There are verbs with underlying tone melodies of L, H, and HL. There is also a group which has an underlying tone melody of HL with the H prelinked to the second (or only) syllable of the verb

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indicated as *HL.[1] Examples of these four groups in the conditional

form are in (4.1). In the data ó~ɔ́ is the 3rd person subject marker and

ñ is the conditional aspect marker.

(4.1)

ɔ́-ñ-tɔ̀	L	*If he pays*
ɔ́-ñ-dàlì	L	*If he greets*
ɔ́-ñ-dá	H	*If he hits*
ɔ́-ñ-sélì	H	*If he peels*
ɔ́-ñ-dɔ̂	HL	*If he sleeps*
ɔ́-ñ-tɔ́lì	HL	*If he falls*
ó-ñ-tî:	*HL	*If he pierces*
ɔ́-ñ-tìlɔ̂	*HL	*If he calls*

Most verbs consist of one or two syllables. One syllable verbs

include CV, CV:, CVV, and CVN syllable types, though I will show in

section 4.2.1 that surface CVN verbs are underlyingly all **CVŋE**.

The large number of verbs with a prelinked HL probably results

historically from some kind of compounding or suffixation.

Synchronically, however, these are not active compounds or suffixes. I

cannot attach meaning to the separate syllables, and have no other

reason to believe that Foodo speakers today view these verbs as

compounds. Therefore, I will prelink such verbs in the lexicon.

If verbs with a prelinked HL were derived from compounding or

suffixation, the present prelinking of the H would have arisen from a

---

[1]In this thesis (and the data in Appendix B) the prelinking is to be
understood as being to the second TBU of the stem, unless the stem is
also marked with an asterisk, in which case the prelinked tone is
prelinked to the TBU immediately following the asterisk. For example,
if the underlying form is given as **busul*uwɔ** *LHL, the first L tone is
prelinked to the third TBU (the third u in this example).

reanalysis of instances of the rule of H-Spread. The verb tílí 'call'
in this group would have been derived as in example (4.2). The compound
consists of a morpheme with underlying H tone attached to a morpheme
with underlying L tone. On the first cycle, the Association Convention
applies:

(4.2)

a.
$$\left[\left[\begin{array}{c} H \\ \vdots \\ tí \end{array}\right]\left[\begin{array}{c} L \\ \vdots \\ lí \end{array}\right]\right]$$
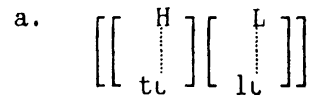
The structural condition of H-Spread is met, so it applies:

b.
$$\left[\left[\begin{array}{c} H \\ \diagdown \\ tí \end{array}\right]\left[\begin{array}{c} L \\ \diagdown \\ lí \end{array}\right]\right]$$
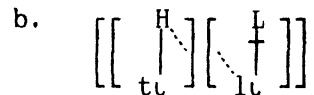
After bracket erasure, this results in the following form:

c.
$$\left[\begin{array}{cc} H & L \\ \diagdown & \diagdown \\ tí & lí \end{array}\right]$$
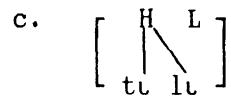
This is precisely the structure which results from prelinking followed
by application of the Association Convention as seen in (4.3).

(4.3)

$$\left[\begin{array}{cc} H & L \\ \diagdown & \diagdown \\ tí & lí \end{array}\right] \quad \begin{array}{c} \text{---}> \\ \text{Association} \\ \text{Convention} \end{array} \quad \left[\begin{array}{cc} H & L \\ \diagdown & \diagdown \\ tí & lí \end{array}\right]$$
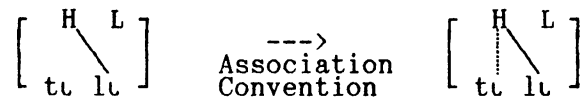
Though there is little support that these verbs are active
compounds, there is some distributional evidence for this

reconstruction. Not counting CVN verbs, which are clearly two syllables underlyingly (see section 4.2.1), there are only a small number of one syllable verbs in this group (see (4.4)) and they are all CVV or CV:. The fact that the one syllable verbs in this group all have long vowels, suggests that historically these may have been two syllables (lending support to the hypothesis that they were two morphemes) and the intervening consonant has dropped out. The gerunds of two of these verbs (4.4e,j) synchronically have two syllables. The fact that most of these verbs take the suffix -a instead of -m is also unusual, since long vowels usually take -m.[2]

(4.4)

	Surface form of Verb	Surface form of Gerund	Gloss
a.	bî:	bìbíê:	*become black*
b.	čâ:	bùčâ:	*tie together*
c.	čî:	bìčíê:	*pull out*
d.	kù:	bùkùê:	*look for*
e.	lê:	bùlé:lê:	*take away*
f.	lô:	bùló:'m̀	*enter/go in*
g.	mʷî:	bùmʷíê:	*suck*
h.	pê:	bùpéyê:	*become red*
i.	tî:	bìtíê:	*pierce*
j.	wâ:	bùwálâ:	*do/make*

4.2 Gerunds

The gerund is formed by prefixing bI- and adding a suffix, resulting in a form that is in Class 9. The suffix is -a for stems

---

[2]Another group of verbs of the form CVCV: also take -a instead of -m, but they are similarly unusual in that they also have an underlying *HL form.

which end in short vowels and -ᴍ for stems which end in long vowels. There is a small group of two-syllable verbs whose second syllable is -lI, which is replaced with -nO in the gerund.

The tone of the prefix is the same as other noun-class prefixes--a floating H and a prelinked L. The suffixes, likewise, have H tone as do most of the other noun-class suffixes. However, the H tone of the suffixes -ᴍ and -nO must be prelinked, since they always surface with a H tone even with L tone verbs. Prelinking would correctly account for a form like bɪbá:'ᴍ 'sew' as shown in (4.5).[3]

(4.5)   a. No Prelinking   b. Prelinking

            *bɪbá:m̀   bɪbá:'m̄
                                          sew

In (4.5a), the H of the suffix is not prelinked, so the L of the stem would associate with the suffix, resulting in the incorrect form *bɪbá:m̀. In (4.5b) the H is prelinked, leaving no free TBU for the L to associate with. Instead the L remains floating, which accounts for the downstepped high in the correct form bɪbá:'m̄.

It is interesting that there does not appear to be any specific derivational affix which would change the grammatical category of a verb to a noun. Instead the verb seems to be receiving noun-class affixation

---

[3]In glossing gerund forms I will give the simple form of the English verb. A closer translation for many of these would be the -ing form.

(though the prefix is special to verbs) like noun stems.   I therefore
propose that the noun is derived from a verb without derivational
affixes.   The noun-class affixes are added to this derived noun.[4]
Example (4.6) shows a sample derivation of the gerund form of the verb
bú 'harvest'.

(4.6)

$\begin{bmatrix} \quad H \\ _V\ bu \end{bmatrix}$	Lexical Entry
$\begin{bmatrix} \quad H \\ _V\ bu \end{bmatrix}$	Cycle 1: Association Convention
$\begin{bmatrix} _N\begin{bmatrix} \quad H \\ _V\ bu \end{bmatrix} \end{bmatrix}$	Cycle 2: Nominalization
$\begin{bmatrix} \quad H \\ _N\ bu \end{bmatrix}$	Cycle 2: Bracket Erasure
$\begin{bmatrix} HL \\ bI \end{bmatrix}\begin{bmatrix} \quad H \\ _N\ bu \end{bmatrix}$	Cycle 3: Add Prefix
$\begin{bmatrix} L \\ bI \end{bmatrix}\begin{bmatrix} \quad H \\ _N\ bu \end{bmatrix}$	H-Deletion
$\begin{bmatrix} \begin{bmatrix} L \quad H \\ bI\ bu \end{bmatrix} \begin{matrix} H \\ a \end{matrix} \end{bmatrix}$	Cycle 4: Add Suffix Association Convention
$\begin{bmatrix} \begin{bmatrix} L \quad H \\ bI\ bu \end{bmatrix} \begin{matrix} \\ a \end{matrix} \end{bmatrix}$	OCP Repair I

---

[4]Alternatively, the bI- could be analyzed as a derivational prefix.   If
so, then the gerunds would take no noun-class prefix, but then it would
be coincidental that this prefix has the same underlying tones as the
noun-class prefixes.   With both analyses the assignment of tones
proceeds in a similar fashion.

$$\begin{bmatrix} \begin{bmatrix} & \overset{L}{\big|} & \overset{H}{\big|} \\ & b\grave{\imath} & bo{:} \end{bmatrix} \end{bmatrix}$$

Vowel Coalescence
TBU Conflation
Vowel Harmony

$$\begin{bmatrix} & \overset{L}{\big|} & \overset{H}{\big|} \\ & b\grave{\imath} & bo{:} \end{bmatrix}$$

Bracket Erasure

Output of Lexical
Phonology

bìbó:
harvest

The next four sections develop this analysis for verbs with different underlying tone patterns.

4.2.1 Underlying L Verbs

Verbs with underlying L tone can have the following surface syllable types: CV, CV:, CVN, CVCV, CV:CV, CVCVCV.   Example (4.7) shows the forms of the gerund for each type.

(4.7) Gerunds of underlying L verbs

Surface Syllable of Verb	UR of Verb	Gerund Surface Form[5]	Gloss
CV	ba	bɩbâ:	*come*
CV:	ba:	bɩbá:'m̃	*sew*
CVN	buŋE	búbúŋ'é:	*cover*
CVCV	bala	bɩbál'á:	*bring/carry*
	kɩlɩ	bɩkɩn'ɔ́[6]	*look at*
CV:CV	be:si	bíbé:s'é:~bíbê:sɛ̌:	*make a mistake*
CVCVCV	kpɩtɩla	bɩkpɩtɩlǎ:	*approach*

I have shown in (4.5) above how the form with CV: is arrived at
due to the prelinked H of the -m suffix. The one syllable CV verb would
proceed as other one syllable L stem nouns. After application of Prefix
Delinking and H-Spread, the L of the stem is free to associate with the
suffix, thereby preventing the H of the suffix from associating. This L
is then delinked after the coalescence of the stem vowel and the suffix

---

[5]As in the rest of this thesis, surface forms of individual words are
cited in their pre-pausal forms, after application of L-Docking
postlexically.

[6]The forms CVCV where the second CV is lI are often irregular. In the
gerund form, the lI drops out and the -nO suffix with a prelinked H tone
is added as the suffix. (The prelinking is to account for the fact that
this gerund form has a downstepped H.) This phenomenon of lI surfacing
as nO in the gerund form is not a phonological rule since not all lI
forms do this. However, all the CVCV verbs with H tone end in lI and
they all take the -nO form (cf. the gerund of fulɩ 'wash' with H tone is
bùfúnɔ́). Also all CVCV L tone and HL verbs with lI take this (cf. talɩ
'plug' with L tone is bɩtán'ɔ́ and gbeli 'bathe' with HL tone is
bìgbénó), but CV:CV verbs with lI do not take the -nO form (cf. da:lɩ
'lie down' with L tone is bɩdá:l'é:~bɩdâlɛ̌: and le:li 'delay' with HL
tone is bìlé:l'é:). Verbs with the prelinked HL tone pattern never take
this exceptional form.

-a by Contour Simplification. Example (4.8) shows a derivation starting at the third cycle with the addition of the suffix.

(4.8)

$$\begin{bmatrix} \begin{bmatrix} & \overset{H}{\underset{bI}{\diagdown}} & \overset{L}{\underset{ba}{\diagdown}} \end{bmatrix} & \overset{H}{\underset{a}{}} \end{bmatrix}$$

Cycle 3:
Add Suffix

$$\begin{bmatrix} \begin{bmatrix} & \overset{H}{\underset{bI}{\diagdown}} & \overset{L}{\underset{ba}{\diagdown}} \end{bmatrix} & \underset{a}{} \end{bmatrix}$$

Association Convention

H-Deletion

$$\begin{bmatrix} & \overset{H}{\underset{bʊ}{}} & \overset{L}{\underset{ba:}{\diagdown}} \end{bmatrix}$$

TBU Conflation
Contour Simplification

Bracket Erasure
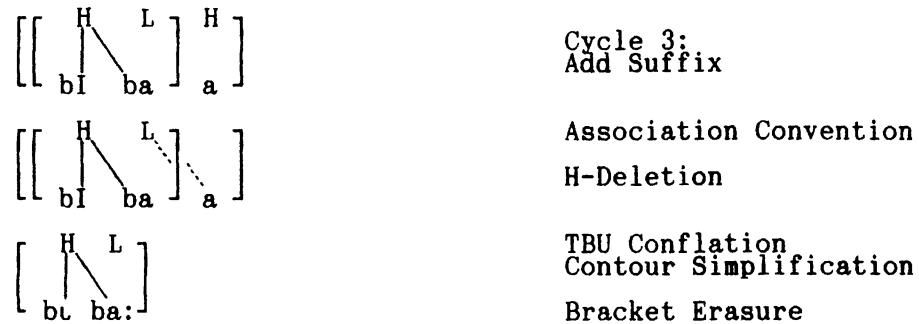
After postlexical application of L-Docking the surface form in pre-pausal position is bʊbâ: 'come'.

Verbs which normally have a surface syllable type of CVN show evidence of a vowel after the nasal in the gerund form. Specifically, they show ɛ:/e: in the gerund form. I therefore analyze all surface CVN verbs as being underlyingly CVŋE.[7] To account for the deletion, I posit the following postlexical rule:[8]

---

[7]When I list verb stems by syllable types, I will do this based on surface syllable types. Therefore, these verbs will be listed as CVN. In the actual underlying form of the verb, they will have the form CVŋE. The final vowel E is not specified for [ATR] since in all these forms the value of [ATR] is the same as the first vowel. This vowel is also not specified for the feature [low], since when this vowel surfaces it receives the feature [low] from the suffixal -a.

[8]I fully specify the nasal (ŋ) in both the underlying form and the rule because there are postlexically forms CVNEC such as kéɲéŋ'á 'morning'. All verbs with surface forms of CVN end in an ŋ.

(4.9)   Vowel Deletion: Postlexical

$$
\begin{array}{c}
\text{T1} \;\; \text{T2} \\
\mid \;\;\, \nearrow \; \mid \\
\text{C V ŋ Ɛ} \quad \{\; \varsigma \;\} \\
\mid \\
\downarrow \\
\emptyset
\end{array}
$$
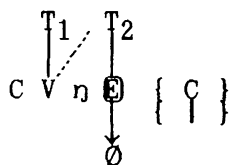
The rule in (4.9) deletes a mid front vowel which follows a CVŋ when it is preceded by a word boundary or a consonant. The rule also associates whatever tone was associated with the deleted V to the preceding V.

The final C is necessary in the rule because the E deletes not only at the end of a word, but also before a following consonant. This situation develops when, in the lexical part of the phonology, a derivational affix beginning with a consonant is affixed to the verb (like ɔ́kántèndě: 'place for speaking' composed of the verb stem kaŋE and the locative suffix -tende). Since internal brackets are erased in the lexical phonology, the rule would not otherwise apply postlexically in such a case.

Vowel Deletion must precede the rule which assimilates the point of articulation to that of the following consonant (which is not formalized in this thesis) because of forms such as ɔ́tâŋwɔ́: 'fighter' (stem taŋE and -wɔ) and ɔ́kántèndě: 'place for speaking'.

Since surface CVN verbs have two TBUs underlyingly, after H-Spread, the L is still linked to the E of the stem, which means the H of the suffix is free to associate with the suffix -a. This sets up the

environment for L-Delinking, which accounts for the downstep in the gerund form:

(4.10)

$$
\left[\begin{array}{c} \overset{H}{\underset{bI\ bu\ \eta E}{\big\backslash}}\ \overset{L}{\underset{}{|}} \end{array}\right]\ \left.\overset{H}{\underset{a}{|}}\right]
$$
Cycle 3:
Add Suffix
Association Convention

$$
\left[\begin{array}{c} \overset{H}{\underset{bI\ bu\ \eta E}{\big\backslash}}\ \overset{L}{\underset{}{\nmid}} \end{array}\right]\overset{H}{\underset{a}{\big/|}}\ \right]
$$
L-Delinking

$$
\left[\begin{array}{c} \overset{H}{\underset{bI\ bu\ \eta e:}{\big\backslash}}\ \overset{L}{\underset{}{\big/}} \end{array}\right]\overset{H}{\big/}\ \right]
$$
Vowel Coalescence
and
TBU Conflation

búbúŋ'é:
cover
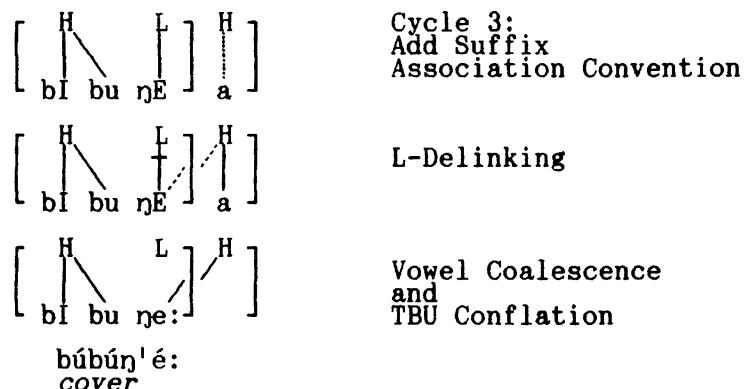
The derivation of the CVCV form bíbál'á: proceeds in a similar fashion. The CVCVCV form has a tonal shape that one would expect from a stem with three TBUs. On the cycle for the stem, the Association Convention (with the supplement of Tone Spreading) assures that all three TBUs are associated to the L tone of the stem. After the Prefix is added and Prefix Delinking and H-Spread apply, the L is still linked to two TBUs, so the rule of L-Delinking does not apply. The H of the suffix is able to associate with the suffix which creates a rising tone after vowel coalescence:

(4.11)

Cycle 3:
Add Suffix
Association Convention

[with tone diagram: H, L over bì kpʋ tʋ la, and H over a]

TBU Conflation

[with tone diagram: H, L, H over bì kpʋ tʋ la:]
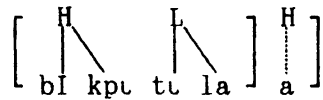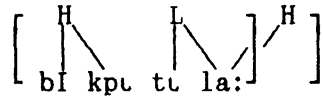
bìkpʋ̀tʋ̀là:
approach

The form CV:CV shows two different tonal patterns depending on the
speaker. This is easily accounted for, if long vowels can be analyzed
as either one or two TBUs. Those speakers who pronounce the form as
HH'H analyze the long vowel as VC (one TBU), which means the verb stem
has a total of two TBUs. This then receives the same surface tones as
CVCV verbs (which have two TBUs). Speakers who pronounce the form with
a falling contour and rising contour analyze the long vowel as two TBUs
(VV). This is the same as a CVCVCV verb, but since the first two TBUs
are over a long vowel, a falling contour results on the (surface) first
syllable. The two derivations for these are shown below:

(4.12)

Cycle 3:   Add Suffix and Association Convention

a. [tone diagram: H, L over bì be: si, and H over a]   b. [tone diagram: H, L over bì bee si, and H over a]
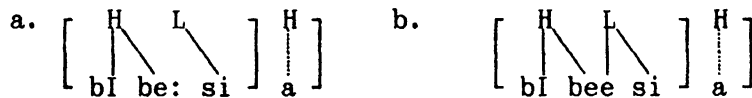
TBU Conflation for both forms
L-Delinking applies in form a.

[tone diagram: H, L, H over bì be: se:]   [tone diagram: H, L, H over bì bee se:]
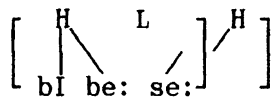
bíbé:s'é: bíbê:sě:
make a mistake   *make a mistake*

The two different tonal patterns can be accounted for in a simple way by positing that some speakers have the long vowel exceptionally marked in the lexicon as two Vs instead of the normal VC.

4.2.2 Underlying HL Verbs

The verbs with underlying HL tone take the following gerund forms.

(4.13)   Gerunds of underlying HL verbs

CV	wʟ	bɩ̀wê:	*chew*
CVN	nuŋE	bùnúŋ'é:	*drink*
CVCV	busi	bùbús'é:	*repeat*
	gbeli	bìgbén'ó	*bathe*
CV:CV	ki:la	bìkí:l'á:	*give back*
CVNCV	taNla	bɩ̀tánl'á:	*swear*
CVCVCV	tekila	bìtékìlǎ:	*touch*

These all proceed in a similar manner to the L verbs without undergoing Prefix Delinking and H-Spread. Verbs with one TBU show a falling contour, since the L is free to associate with the suffix and the suffixal H deletes by H-Deletion. In verbs with two TBUs (CVN, CVCV, CV:CV, CVNCV) the L tone associates with the second TBU on the first cycle, which means the H of the suffix can then associate with the suffix on the third cycle. This sets up the structural condition for L-Delinking to apply, resulting in a downstepped H in all these forms. Verbs with three TBUs (CVCVCV) are similar to the same form with L tone. The L tone is linked to two TBUs so L-Delinking does not apply. Since

the H of the suffix is able to associate, a rising tone results on the final syllable after TBU Conflation.

It is interesting that speakers who analyze verbs with underlying L tone of the syllable type CV:CV as three TBUs (see example (4.12)) do not do so in the same syllable pattern (CV:CV) with underlying HL. It is only in the verbs with underlying L that I have observed an alternation of tone patterns in the gerund form.

4.2.3 Underlying H Verbs

The verbs with underlying H tone take the following gerund forms.

(4.14)   Gerunds of underlying H verbs

CV	ba	bừbá:	*split*
CV:	da:	bừdá:m̀	*taste*
CVN	laŋE	bừláŋé:	*play (drum)*
CVCV	mɛlừ	bừménɔ́	*swallow*

The surface tonal forms are straightforward, all being accounted for by the Association Convention. It should be remembered that due to OCP Repair II the lexical forms will only have one H as in (4.17):

(4.15)

$$\left[\begin{array}{cc} \overset{L}{\underset{b\grave{\imath}}{|}} & \overset{H}{\underset{da:\ m}{\diagdown}} \end{array} \right]$$

bừdá:m̀
taste

All CVCV forms in this class of verbs have lI as the second syllable and take the exceptional form -nO as stated in footnote 6 of this chapter. The only multisyllabic verbs with H tone are CVCV and CVN. This is an interesting distributional gap, which may indicate that longer verbs are made up of compounds or suffixes which are always L.

4.2.4 Underlying *HL Verbs

The group of verbs with the underlyingly prelinked HL shows the greatest variety of syllable types. The gerund forms are in (4.16):

(4.16) Gerunds of underlying *HL verbs

CV:	lo:[9]	bùló:'m̀	*enter/go in*
CVV	bii	bìbíê:	*become black*
	mᵛii	bìmᵛíê:	*suck*
CVN	čaŋE	bìčáŋê:	*continue*
CVCV	bala	bìbálâ:	*hide*
	feyʋ	bìféyê:	*sweep*
CVCVV	bili*i[10]	bìbílíê:	*turn round*
CV:CV	čɔ:lʋ	bùčɔ́:lê:	*put into smth.*
	lɛ:lʋ[11]	bìlé:lê:	*take away*
CVNCV	ɲaNda	bìɲándâ:	*spoil/break*
CVCVN	tɛlɛŋE	bìtéléŋ'é:	*delay*
CVCVCV	čʋmasʋ	bìčʋ́más'é:	*sneeze*
CVNCVCV	ɲuNpɔlʋ	bùɲúmpɔ́l'é:	*tickle*
CVCV:CV	mili:la	bìmílí:l'á:	*surround*
CVCVNCV	ɲʋlʋNdʋ	bìɲʋ́lʋ́nd'é:	*shine (of metal)*

---

[9]This is the only occurance of a CV: verb with underlying *HL. Since the form only has one TBU it is odd that the H must be prelinked to it. I include it in this group of verbs because in verb forms, in particular the imperative, the surface tonal pattern is the same as other verbs in this group, which differs from the surface tonal pattern of the group of verbs which is underlying HL without any evidence of prelinking. As for nouns derived from this verb, the surface tones could be accounted for with the H prelinked to the only TBU or not prelinked, since in either case the L of the stem is not able to associate to either the stem or the suffix vowel because this form takes the noun-class suffix -m which has a prelinked H. The result is, therefore, a downstepped H on the suffix. In this form, I analyze the long vowel as underlying VC (as opposed to VV) because the gerund takes an -m suffix (as long vowels do with verbs that have different underlying tones) and not -a (as the other verbs in this group ending in long vowels).

[10]See footnote 1, page 80 for an explanation of the use of asterisk in underlying stems.

[11]The verb form may surface as either lé:lC or lê:.

The tonal patterns in this group are accounted for by the prelinking of the H to the second TBU in all forms except the CVCVV verbs where the H is prelinked to the third TBU (and the one example lo:, which only has one TBU). Those stems with two TBUs will have a falling contour at the end since the L is free to associate with the suffix, as the derivation in (4.17) shows.

(4.17)

```
[  H  L  ]                          Cycle 1:
[   \    ]                          Association Convention
[ ba  la ]

[ L [  H  L ]]                      Cycle 2:
[ |  [   \   ]]                     Add Prefix
[ bI [ ba  la ]]                    H-Deletion

[[ L   H  L ] H]                    Cycle 3:
[[ |   \    \  ]                    Add Suffix
[[ bI ba la ] a]                    Association Convention

[[ L   H  L  ]  ]                   H-Deletion
[[ |   \     ]  ]                   TBU Conflation
[[ bI ba la: ]  ]                   Contour Simplification

        bȗbálâ:                     Surface Form
        hide
```

The forms with three TBUs will have a downstepped H since the L will associate with the third TBU by the Association Convention, enabling the H to link with the suffix, setting the stage for L-Delinking to create a downstep. This is illustrated in (4.18) for the form bȗčȋmás'é:.

(4.18)

$$
\left[\left[\left[\begin{array}{c} L \\ | \\ b\acute{\iota} \end{array} \begin{array}{c} H \\ | \\ \check{c}\iota \end{array} \begin{array}{c} \\ \diagdown \\ ma \end{array} \begin{array}{c} L \\ | \\ s\iota \end{array}\right]\right] \begin{array}{c} H \\ \vdots \\ a \end{array}\right]
$$

Cycle 3:
Add Suffix
Association Convention

$$
\left[\left[\begin{array}{c} L \\ | \\ b\acute{\iota} \end{array} \begin{array}{c} H \\ | \\ \check{c}\iota \end{array} \begin{array}{c} \\ \diagdown \\ ma \end{array} \begin{array}{c} L \\ | \\ s\iota \end{array}\right] \begin{array}{c} H \\ / \\ a \end{array}\right]
$$

L-Delinking

$$
\left[\left[\begin{array}{c} L \\ | \\ b\acute{\iota} \end{array} \begin{array}{c} H \\ | \\ \check{c}\iota \end{array} \begin{array}{c} \\ \diagdown \\ ma \end{array} \begin{array}{c} L \\ | \\ s\epsilon\mathrm{:} \end{array}\right] \begin{array}{c} H \\ / \end{array}\right]
$$

TBU Conflation

b̀č̀más'é:
sneeze

The forms CVCVV also have three TBUs, but the H is prelinked to the third TBU (the second V of the long vowel). This accounts for the falling contour in the gerunds of these forms instead of a downstepped H as in b̀č̀más'é: 'sneeze'. Example (4.19) shows how this works for the stem bili*i 'turn round'.

(4.19)
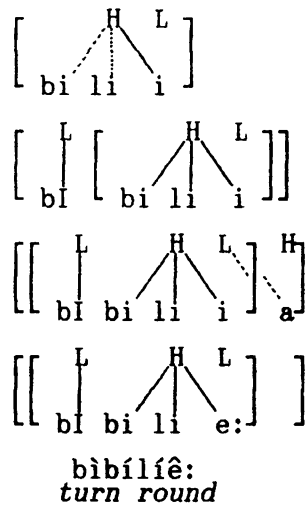
$$
\left[\begin{array}{c} H \\ / \\ bi \end{array} \begin{array}{c} \\ / \\ li \end{array} \begin{array}{c} L \\ \diagdown \\ i \end{array}\right]
$$

Cycle 1:
Association Convention

$$
\left[\begin{array}{c} L \\ | \\ b\acute{\iota} \end{array} \left[\begin{array}{c} H \\ / \\ bi \end{array} \begin{array}{c} \\ li \end{array} \begin{array}{c} L \\ \diagdown \\ i \end{array}\right]\right]
$$

Cycle 2:
Add Prefix
H-Deletion

$$
\left[\left[\begin{array}{c} L \\ | \\ b\acute{\iota} \end{array} \begin{array}{c} H \\ / \\ bi \end{array} \begin{array}{c} \\ li \end{array} \begin{array}{c} L \\ \diagdown \\ i \end{array}\right] \begin{array}{c} H \\ \\ a \end{array}\right]
$$

Cycle 3:
Add Suffix
Association Convention

$$
\left[\left[\begin{array}{c} L \\ | \\ b\acute{\iota} \end{array} \begin{array}{c} H \\ / \\ bi \end{array} \begin{array}{c} \\ li \end{array} \begin{array}{c} L \\ \diagdown \\ e\mathrm{:} \end{array}\right]\right]
$$

H-Deletion
TBU Conflation
Contour Simplification

bìbílîê:
turn round

Surface Form

Example (4.20) shows why the H must be prelinked to the second V of the long vowel and not the second TBU (the first V of the long vowel) as in the other verbs of this group.

(4.20)

```
      H L                    Cycle 1:
   [ /| | ]                  Association Convention
     bi li i

    L    H L                 Cycle 2:
   [ | [ /| | ] ]            Add Prefix
     bI   bi li i            H-Deletion

     L    H L     Hh         Cycle 3:
  [[ |  /| | ] ]             Add Suffix
     bI bi li i    a         Association Convention

     L    H L     Hh
  [[ |  /| | ] ]             L-Delinking
     bI bi li i    a

     L    H   L    Hh
  [[ |  /|   ] ]             TBU Conflation
     bI bi li  e:

     *bìbílí'é:              Surface Form
```

As seen in (4.19), when the long vowels of both CVV and CVCVV forms undergo Vowel Coalescence, only the second V coalesces. If the long vowel is a high vowel, the result is a short high vowel followed by a long mid vowel. Example (4.21) shows how the rule of Vowel Coalescence (3.21) applies in this case with a high front vowel. The rule states that the feature [low] will spread leftward to only one V. This leaves the first V unspecified for [low], so it remains a high front vowel. This, of course, assumes that the rule is not iterative.

(4.21)
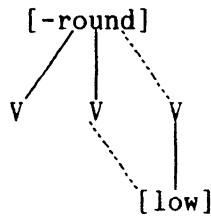
I have now shown that the rules posited for regular nouns also account for surface tones of all gerund forms. The rest of this chapter shows how these same rules are sufficient for other derived nouns as well.

4.3 Agentive nominalizations

A common derivational process is agentive nominalization, expressing the person who does the action. All of these forms end in wɔ: with three possible surface tone patterns: HL, LH, and 'H. The singular is formed by the prefix O- from Class 1 and the plural by the prefix a- from Class 2.[12]

Tchagbalé (1987:78-79) analyzes the segmental aspect of this form as an agentive suffix -wɔ or -wu followed by the noun-class suffix -a. Tchagbalé could not make a decision either way between the two possible forms of the agentive suffix. Since this never occurs without the

---

[12]There is one agentive nominalization whose plural takes the I- prefix and is in Class 6, the form ìfúŋwɔ́: 'whistler'. Usually human designations in Class 1 form their plural in Class 2 with a-. There are a few apparent exceptions to this, such as the plural for 'thief' òyô: whose plural is ìyô:. Tchagbalé (1987:116) suggests that such forms represent retrograde states of man. Such an explanation could possibly apply to the word for 'whistler', since whistling is considered extremely impolite in Foodo culture.

noun-class suffix -a, there are no alternations in this form. As already stated in section 3.2.2, I will follow Kiparsky's Alternation Condition and posit the form as -wɔ.[13] Since ATR vowel harmony does not apply to this form, it is invariably -wɔ, and never -wo. I posit that this suffix is specified [-ATR] in underlying form, thus preventing the feature [ATR] from spreading to it from the stem.

Tonally, we see that this agentive suffix surfaces as H, L, and 'H. Each of these can be accounted for if we assume that the agentive suffix is underlying L, as in (4.22).

(4.22) Agentive Suffix

           L

       wɔ

The agentive suffix surfaces with a rising contour after the noun-class suffix is added, if the preceding TBU of the stem has a L tone associated with it. This is true for all verbs with underlying L or HL melodies with two or more TBUs. Examples of these are shown in (4.23).

---

[13]If one looks at other Oti Guang languages, we see that three out of the other four languages have a surface high vowel in their agent suffixes (Snider 1989:#401,404-409, 410). The language that has a mid vowel in the word list is Gichode, but Snider (1990:101) says that in that language high rounded vowels are realized as mid utterance finally.

(4.23)

UR of Verb	UL Tone of Verb	Agentive Surface Form	Gloss
nuŋE	HL	ònûŋwɔ̌:	*drinker*
gbeli	HL	ògbéliwɔ̌:	*bather*
tɔlʊ	HL	ɔ̀tɔ́lʊwɔ̌:	*epileptic (i.e. faller)*
duŋE	L	ódûŋwɔ̌:	*biter*
dalʊ	L	ɔ́dáliwɔ̌:	*greeter*
fe:sʊ	L	ɔ́fé:siwɔ̌:	*rester*

There are no examples in my data of L with CVCVCV.

The derivation of the form ɔ̌gbéliwɔ̌: proceeds as in (4.24). On the first cycle, the Association Convention (and Tone Spreading) apply to the stem:

(4.24)

a.
$$\left[\begin{array}{cc} H & L \\ | & | \\ gbe & li \end{array} \right]$$

Cycle 1:
Association Convention
(Tone Spreading)

On the second cycle, the agentive suffix is added and the Association Convention applies:

b.
$$\left[\left[\begin{array}{cc} H & L \\ | & | \\ gbe & li \end{array} \right] \begin{array}{c} L \\ | \\ wɔ \end{array} \right]$$

Cycle 2:
Association Convention

Since the OCP is violated, OCP Repair I applies, resulting in the following form:

c.

$$\left[\left[\begin{array}{c} H \quad L \\ | \quad | \diagdown \\ \text{gbe li} \end{array}\right]_{\text{wɔ}}\right]$$

OCP Repair I

On the third cycle, the noun-class prefix is added:

d.

$$\left[\begin{array}{c} HL \\ | | \\ O \end{array}\left[\begin{array}{c} H \quad L \\ | \quad | \diagdown \\ \text{gbe li wɔ} \end{array}\right]\right]$$

Cycle 3:
Add Noun-class Prefix
H-Deletion

On the fourth cycle, the noun-class suffix is added and the Association Convention applies to link the H of the suffix to the suffix:

e.

$$\left[\left[\begin{array}{c} L \quad H \quad L \\ | \quad | \quad | \diagdown \\ O \quad \text{gbe li wɔ} \end{array}\begin{array}{c} H \\ | \\ a \end{array}\right]\right]$$

Cycle 4:
Add Noun-class Suffix
Association Convention

After Vowel Coalescence and TBU Conflation, the lexical representation is as follows:

f.

$$\left[\begin{array}{c} L \quad H \quad L \; H \\ | \quad | \quad |\diagdown| \\ O \quad \text{gbe li wɔ:} \end{array}\right]$$

Lexical Representation:
After H-Deletion
Vowel Coalescence
and TBU Conflation

òg̈béliwɔ̌:
bather

Since the second L is multiply-linked, it is not subject to L-Delinking.

The surface tone of -wɔ: is a falling contour whenever the stem is H. Examples of these forms are in (4.25).

(4.25)

čа	H	ɔ̀čáwɔ̂:	*healer*
da:	H	ɔ̀dá:wɔ̂:	*taster*
fuŋ	H	ɔ̀fúŋwɔ̂:	*whistler*
fulʋ	H	ɔ̀fúlúwɔ̂: [14]	*cleaner*
gbʋlʋ	H	ɔ̀gbʋ́lʋ́wɔ̂:	*blacksmith*

This tonal pattern is easily accounted for by rules posited thus far. Consider an example such as ɔ̀čáwɔ̂: 'healer'. On the first cycle the H associates by the Association Convention:

(4.26)

a.

$$\left[\begin{matrix} H \\ | \\ \text{čа} \end{matrix} \right]$$

Cycle 1:
Association Convention

On the second cycle the derivative agentive suffix is added and the Association Convention applies:

b.

$$\left[\left[\begin{matrix} H \\ | \\ \text{čа} \end{matrix} \right] \begin{matrix} L \\ | \\ \text{wɔ} \end{matrix} \right]$$

Cycle 2:
Association Convention

This form meets the structural description of H-Spread:

c.

$$\left[\left[\begin{matrix} H \\ | \end{matrix} \right] \begin{matrix} L \\ | \end{matrix} \right]$$
čа wɔ

H-Spread[15]

---

[14]Rounding harmony often takes place when a high unrounded vowel is between two rounded vowels.

[15]Earlier in section 3.1.1 we saw the rule of H-Spread applying from a prefix to a stem. Here we see the rule applying from a stem to a

On the third cycle, the prefix is added:

d.
$$\left[\begin{array}{cc} H & L \\ | & \\ O & \end{array} \left[\begin{array}{cc} H & L \\ & \diagdown \\ \text{ča} & \text{wɔ} \end{array}\right]\right]$$
        Cycle 3:
Add Prefix

H-Deletion applies, and then the noun-class suffix is added on the fourth cycle. Since the L is now floating, it associates with the suffix, preventing the H from associating:

e.
$$\left[\left[\begin{array}{ccc} L & H & L \\ | & | & \\ O & \text{ča} & \text{wɔ} \end{array}\right] \begin{array}{c} H \\ \\ a \end{array}\right]$$
        Cycle 4:
Add Suffix
Association Convention
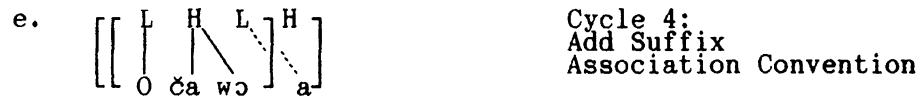
To this form, H-Deletion, Vowel Coalescence, and TBU Conflation apply:

f.
$$\left[\left[\begin{array}{ccc} L & H & L \\ | & | & \\ O & \text{ča} & \text{wɔ:} \end{array}\right]\right]$$
        H-Deletion
Vowel Coalescence
TBU Conflation

Contour Simplification applies to this form, delinking the final L. After bracket erasure, the output of the lexical phonology is:

g.
$$\left[\begin{array}{ccc} L & H & L \\ | & | & \\ \text{ɔ} & \text{ča} & \text{wɔ:} \end{array}\right]$$

ɔčáwɔ̂:
healer
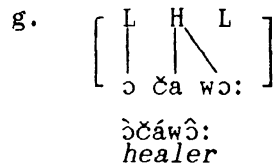
In pre-pause position, the final syllable is realized with a falling tone, otherwise with a H tone. All the forms built on stems with H tone proceed in a similar way.

---

suffix. This is the reason that I have posited a single symbol to represent a constituent boundary in rules.

This leaves only those forms with downstepped H to account for. One would expect a downstep whenever the L of the agentive suffix is linked only to this suffix and there are no Ls linked to any immediately preceeding TBU of the stem. This is precisely the case in verbs with one TBU with underlying L and HL, and in all verbs with underlying prelinked HL (where the H is prelinked to the last TBU of the stem). Downstepped H occurs in each of these forms, as seen in (4.27).[16]

(4.27)

ji	L	ɔ́ʃíw'ɔ̄:	eater
dɔ:	L	ɔ̄dɔ́:w'ɔ̄:	farmer
dʊ	HL	ɔ̀dʊ̀w'ɔ̄:	sleeper
kʊʊ	*HL	ɔ̀kʊ̀:w'ɔ̄:	searcher
mʷii	*HL	ɔ̀mʷíw'ɔ̄:[17]	sucker
kaŋE	*HL	ɔ̀káŋw'ɔ̄:	speaker
dʊna	*HL	ɔ̀dʊ̀náw'ɔ̄:	cook (i.e. boiler)
kʊlʊ	*HL	ɔ̀kʊ́lʊ́w'ɔ̄:	one who prays
yu:li	*HL	ɔ̀yú:líw'ɔ̄:	thief (i.e. stealer)
kpanda	*HL	ɔ̀kpándáw'ɔ̄:	mixer
fuli*i	*HL	ɔ̀fúlí:w'ɔ̄:	jumper

The derivations for all the agentive nominalizations with surface tones ending in downstepped H would proceed in a similar fashion.

---

[16]Unfortunately I do not have data for some of the longer verb forms in the prelinked HL class, which I would predict would not have a downstepped H but a rising tone as in (4.24) above.

[17]I have no explanation for the fact that the vowel is long in the verb form (and gerund form) but short in the agentive nominalization.

Consider, for example, the derivation of ɔ̀dʊ̀náwˈɔ́: 'cook'. On the first

cycle the supplement to the Association Convention, Tone Spreading, will

apply to free TBUs:

(4.28)

a.
$$\left[\begin{array}{cc} H & L \\ | & \diagdown \\ dʊ & na \end{array} \right]$$

Cycle 1:
Tone Spreading

On the second cycle the agentive suffix is added and the

Association Convention applies:

b.
$$\left[\left[\begin{array}{cc} H & L \\ | & \diagdown \\ dʊ & na \end{array} \right] \begin{array}{c} L \\ \diagdown \\ wɔ \end{array} \right]$$

Cycle 2:
Add Agentive Suffix
Association Convention

This form is in violation of the OCP, so OCP Repair II applies

c.
$$\left[\left[\begin{array}{cc} H & L \\ | & \diagdown \\ dʊ & na \end{array} \right] \begin{array}{c} \\ \diagdown \\ wɔ \end{array} \right]$$

OCP Repair II

H-Spread does not apply because there is no boundary between the H and

the L, which is part of the structural description of the rule of

H-Spread. On the third cycle, the prefix is added:

d.
$$\left[\begin{array}{c} HL \\ | \\ O \end{array} \left[\begin{array}{ccc} H & L \\ | & \diagdown & \diagdown \\ dʊ & na & wɔ \end{array} \right] \right]$$
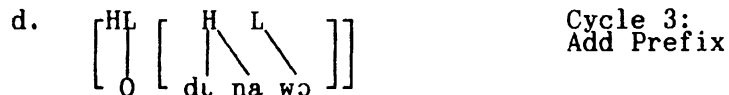
Cycle 3:
Add Prefix

After H-Deletion the cycle is over. On the fourth cycle, the suffix is

added, and the H associates to the suffix:

e.

$$\left[\left[\left[\begin{array}{c}L \quad H \\ \mid \quad \mid\backslash \\ O \quad d\upsilon \quad na \quad w\mathfrak{o}\end{array}\quad\begin{array}{c}L\\ \mid\end{array}\right]\begin{array}{c}H\\ \vdots\\ a\end{array}\right]\right]$$
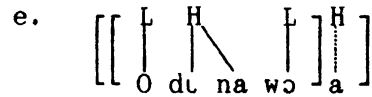
Cycle 4:
Add Suffix
Association Convention

L-Delinking now applies to this form, resulting in a downstepped H. Vowel Coalescence and TBU Conflation also apply, which results in the following form after bracket erasure:

f.

$$\left[\begin{array}{ccc}L & H & L \quad H\\ \mid & \mid\backslash & \diagup\\ \mathfrak{o} & d\upsilon \quad na & w\mathfrak{o}:\end{array}\right]$$

ɔdʊnáwꞌɔ̌:
cook (i.e. boiler)
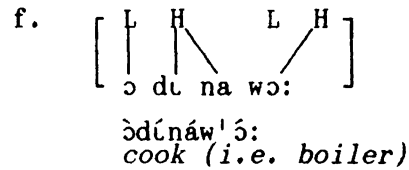
It is crucial in all of these forms that the rule of OCP Repair II applies. Otherwise, the L of the agentive suffix would associate with the noun-class suffix, which would prevent the H of the noun-class suffix from associating, resulting in an incorrect form. This is illustrated in (4.29) where I show the derivation starting from the fourth cycle, without application of OCP Repair II on the second cycle:

(4.29)

$$\left[\left[\left[\begin{array}{c}L \quad H \quad L \quad L\\ \mid \quad \mid\backslash\backslash\backslash\\ O \quad d\upsilon \quad na \quad w\mathfrak{o}\end{array}\right]\begin{array}{c}H\\ \vdots\\ a\end{array}\right]\right]$$

Cycle 4:
Add suffix
Association Convention

$$\left[\left[\left[\begin{array}{c}L \quad H \quad L \quad L\\ \mid \quad \mid\backslash\backslash\backslash\\ O \quad d\upsilon \quad na \quad w\mathfrak{o}\end{array}\right]\begin{array}{c}\\ \backslash\\ a\end{array}\right]\right]$$

H-Deletion

$$\left[\left[\left[\begin{array}{c}L \quad H \quad L\\ \mid \quad \mid\backslash\backslash\mid\\ O \quad d\upsilon \quad na \quad w\mathfrak{o}:\end{array}\right]\right]\right]$$
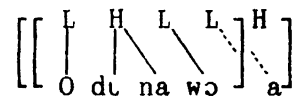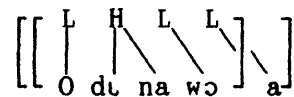
Vowel Coalescence
TBU Conflation

*ɔdʊnáwɔ̌:

This is evidence that the OCP holds in Foodo and the language has a repair strategy for any violations on __each__ cycle.

4.4 Locative nominalizations

Example (4.30) below shows another common nominalization:

(4.30)

UR of Verb	UL Tone of Verb	Locative Surface Form	Gloss
da	H	ɔ́dátèndě:	*place for playing*
laŋE	H	ɔ́lántèndě:	*place for playing (drums)*
fulʋ	H	ɔ́fúlɩ̀tèndě:	*place for cleaning*
ba:	L	ɔ́bá:tèndě:	*place for sewing*
sɔŋE	L	ɔ́sɔ́ntèndě:	*place for fighting*
fɛ:sʋ	L	ɔ́fɛ́:sɩ̀tèndě:	*place for resting*
dʋ	HL	ɔ́dɩ́tèndě:	*place for sleeping*
tɔlʋ	HL	ɔ́tɔ́lɩ̀tèndě:	*place for falling*
kaŋE	*HL	ɔ́kántèndě:	*place for speaking*
čina	*HL	òčínátèndě:	*place for sitting*

All of the above forms end in -tèndě:, with the surface tone invariable. This form is a locative nominalization meaning "place for ___-ing". The singular of the locative nominalization takes the noun-class prefix O- from Class 1. The plural takes the noun-class prefix I- from Class 6.

I posit the locative suffix as -teNde with an underlying L tone. The noun-class suffix -a is then added to this form, resulting in the long vowel with a rising tone. Since the vowels in this suffix are always [+ATR], I posit that underlyingly this suffix is specified as such. This prevents ATR vowel harmony from spreading the feature [ATR] from the stem on to the suffix.

Tonally, this suffix always surfaces as a L followed by a rising tone. For underlying H tone verbs, the rule of H-Spread should spread the H on to this suffix which would result in a form like *ɔ́dáténdě: or, after L-Delinking, *ɔ́dáténd'é: 'place for playing'. Since neither form occurs, I posit that this suffix is exceptional and does not undergo the rule of H-Spread. This seems like a reasonable assumption, since the suffix is completely invariable. The form will appear in the lexicon as:

(4.31)   Locative suffix

```
        L

     tɛNde              [-H-Spread]
       |
     [+ATR]
```

The derivation of ɔ́fólítèndě: 'place for cleaning' would proceed as in (4.32):

(4.32)
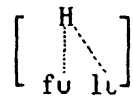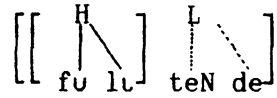
```
        H
    [   |\   ]                          Cycle 1:
        | \                             Association Convention
    [ fʊ lʊ ]                           Tone Spreading


    [[  H  ]  L      ]                  Cycle 2:
     [ |\ ]  |  \                       Add Locative Suffix
     [ | \]  |   \                      Association Convention
    [[ fʊ lʊ] teN de ]                  Tone Spreading


    [ L [  H    L   ]]                  Cycle 3:
    [ | [ |\   |  \ ]]                  Add Noun-class Prefix
    [ | [ | \  |   \]]                  H-Deletion
    [ O [ fʊ lʊ teN de ]]


    [[ L  H    L    ] H ]               Cycle 4:
    [[ |  |\   |  \ ] | ]               Association Convention
    [[ |  | \  |   \] | ]
    [[ O fʊ lʊ teN de] a ]


    [ L  H    L    H ]                  Lexical Representation
    [ |  |\   |  /|  ]                  After Vowel Coalescence
    [ |  | \  |/  |  ]                  and TBU Conflation
    [ ɔ fʊ lʊ teN de: ]

        ɔfʊlʊtèndě:
    place for cleaning
```
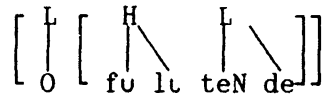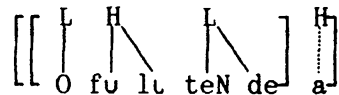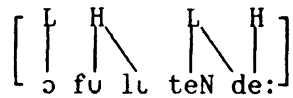
In cycle 2, if H-Spread had applied, the H would have spread to the first TBU of teNde and delinked the L from that TBU.

This concludes discussion of derivational processes based on verb stems. The next two sections, discuss derivational processes based on noun stems.

4.5 Diminutive Suffix -bi

There are a group of nouns with a diminutive suffix -bi. The singular of these nouns are in Class 5 and the plural in Class 4. This diminutive suffix is affixed to the noun stem before affixation of the class suffix. Consider the data in (4.33):

(4.33)

UL Tone of Stem	Singular Class 5	Plural Class 4	Gloss
L	dínsíb'ílí	ánsíb'é:	lip[18]
L	dúpúlùbìlí	ápúlùbě:	intestine [19]
L	dìdàmbìlí	àdàmbě:	road [20]
H	dìtó:bílí	àtó:bé:	clitoris
H	dɩ̀bá:bílí	àbá:bé:	finger[21]
H	dɩ̀námbílí	ànámbé:	toe
H	dɩ̀ŋmámbílí	àŋmámbé:	hair[22]
H	dìfélébílí	àfélébé:	star[23]
HL	dùčú:b'ílí	àčú:b'é:	anus
LH	dìkìmbílí	àkìmbé:	fish
LH	dìlùmbílí	àlùmbé:	medicine
LH	dùsùmbílí	àsùmbé:	word
LH	dɩ̀ŋmà:lɩ̀bílí	àŋmà:lɩ̀bé:	letter (of alphabet)[24]
LH	dɩ̀nɔ̀ɲčɔ́lɔ́bílí	ànɔ̀ɲčɔ́lɔ́	saliva
*LH[25]	dùwèlèbílí	àwèlèbé:	prince

---

[18]cf. dínsílì/ánsê: 'eye'

[19]The root of this word is difficult to determine. Based on tone it would seem to be pulu with L. This would agree with the tone of the form ípúnò 'belly', but there are also the words dùpùlí:/àpùlúà 'navel' and dùpúdí/àpúnó 'stomach' which are underlyingly LH and H.

[20]This is an exception to Prefix Delinking. See page 121 for a list of exceptions.

[21]cf. kùbá:ú/àbá:ɩ 'arm'

[22]cf. ɩ̀ŋmáɩ 'hair'

[23]cf. kùfélú:/àfélɔ́ 'moon'

[24]cf. ŋmà:lɩ́ Imperative of 'write'

[25]For this form I must posit that the second TBU of the stem is prelinked to the L.

First, it should be noted that this suffix is always [+ATR] which spreads to the class suffix -1I and in most cases spreads also on to the stem (cf. kùfélú: 'moon' with **dìfélébílí** 'star'). The surface tone of this suffix appears as **H, L** and **'H.** The clearest solution to account for these surface tones is to posit that **-bi** is underlyingly toneless and receives its tone from the root in the lexical component of the grammar.

(4.34)   Underlying Form of Diminutive Suffix

        bi
         |
    [+ATR]

The derivation of a L tone root would proceed as follows:

(4.35)
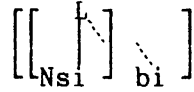
$\begin{bmatrix} \overset{L}{\vert} \\ \text{Nsi} \end{bmatrix}$	Cycle 1: Association Convention
$\begin{bmatrix} \begin{bmatrix} \overset{L}{\diagdown} \\ \text{Nsi} \end{bmatrix} \text{bi} \end{bmatrix}$	Cycle 2: Add Diminutive Suffix Association Convention (Tone Spreading)
$\begin{bmatrix} \overset{L}{\diagdown} \\ \text{Nsi bi} \end{bmatrix}$	Bracket Erasure
$\begin{bmatrix} \overset{HL}{\underset{\text{di}}{\mid}} \begin{bmatrix} \overset{L}{\diagdown} \\ \text{Nsi bi} \end{bmatrix} \end{bmatrix}$	Cycle 3: Add Prefix
$\begin{bmatrix} \overset{H}{\underset{\text{dIN}}{\diagdown}} \begin{bmatrix} \overset{L}{\diagup\diagdown} \\ \text{si bi} \end{bmatrix} \end{bmatrix}$	Prefix Delinking OCP Repair II H-Spread Resyllabification
$\begin{bmatrix} \begin{bmatrix} \overset{H}{\underset{\text{dIN}}{\diagdown}} \overset{L}{\underset{\text{si bi}}{\diagdown\diagdown}} \end{bmatrix} \overset{H}{\underset{\text{li}}{\mid}} \end{bmatrix}$	Cycle 4: Add Suffix Association Convention
$\begin{bmatrix} \begin{bmatrix} \overset{H}{\underset{\text{dIN}}{\diagdown}} \overset{L}{\underset{\text{si bi}}{\diagdown}} \end{bmatrix} \overset{H}{\underset{\text{li}}{\diagup}} \end{bmatrix}$	L-Delinking
$\begin{bmatrix} \overset{H}{\underset{\text{dINsibi}}{\diagdown}} \overset{L}{} \overset{H}{\underset{\text{li}}{\diagup}} \end{bmatrix}$	Bracket Erasure Output of Lexical Phonology
dínsíb'ílí *lip*	
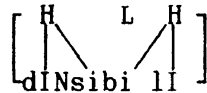
The derivation of the plural form is the same, except the rules of Vowel Coalescence and TBU Conflation also apply.

In a two syllable L tone root such as **pulu**, after Prefix Delinking and H-Spread, the L would still be linked to two TBUs (the second TBU of the root plus the TBU of the diminutive suffix -**bi**). This would prevent application of L-Delinking, and result in the correct form for 'intestine' **dúpúlùbìlí**. The other forms in (4.33) above would be derived from the Association Convention and rules already posited.

One form not given in (4.33), appears to be an exception to this analysis, the word for 'work' dìsímbílì/àsímbê:. The problem is that -bi surfaces with a H tone while the class suffix -lI surfaces with a L tone. This cannot be accounted for if -bi is underlyingly toneless. A simple solution would be to assume that this form does not contain the diminutive suffix -bi, but rather a single morpheme siNbi which has an underlying tone of HL with the H prelinked to the second TBU as in (4.36). A problem with this analysis is that related languages show a stem of simply /suŋ/ with H tone for this word, which suggests that the form in Foodo probably is the result of compounding. Perhaps this is a compound of the root bi with L tone used to form the word for 'child', óbê: and 'unit' or 'seed' díbílì. In compounding, H-Spread would spread the H of suŋ to the low of bi resulting in essentially the same structure as (4.36). While this might be possible, it stretches the meaning of bi, and it is doubtful that Foodo speakers today recognize this as a compound, so I will assume that the stem is monomorphemic with an underlying form as in (4.36).

(4.36)

$$\begin{array}{cc} H & L \\ & \diagdown \\ & \diagdown \end{array}$$
siNbi

4.6 Compounding

My data contain a few instances of clear compounding. Consider the following data:

(4.37)

	Surface Form	Stem	Gloss	Compound	Gloss
a.	óbê:	bi	*child*		
b.	òčí:m̃	či	*woman*	òbìčísê:	*daughter*
c.	ɔ̀ɲɩ̀m̃	ɲɩ	*man*	òbìɲísê:	*son*
d.	ɔ́bɩ̀l'ɛ́:	bɩlɛ	*old man*	òčíbɩ̀l'ɛ́:	*old woman*

In (4.37b,c) the stems for 'man' and 'woman' are made into adjective forms by the L tone adjective suffix sɛ, then these adjective stems are compounded with the stem for 'child', bi, to form the nouns 'son' and 'daughter'.[26] In (4.37d) the stem či 'woman' is compounded to the stem bɩlɛ 'old man' to form the word for 'old woman'.

Part of the derivation of the word for 'daughter' is summarized in (4.38). For compounding, each stem goes through a cycle on its own, where the Association Convention applies.

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[26]The adjectival suffix -sɛ with L tone is not discussed in this thesis. Its derivation is like that of the agentive suffix -wɔ with L tone.

(4.38)

	Cycle 1:
$\begin{bmatrix} L \\ bi \end{bmatrix}$ $\begin{bmatrix} H \\ \check{c}i \end{bmatrix}$	For each stem separately Association Convention

	Cycle 2:
$\begin{bmatrix}\begin{bmatrix} H \\ \check{c}i \end{bmatrix} \begin{array}{c} L \\ s\varepsilon \end{array}\end{bmatrix}$	For woman stem Add adjective suffix Association Convention

$\begin{bmatrix}\begin{bmatrix} H \\ \check{c}i \end{bmatrix} \begin{array}{c} L \\ s\varepsilon \end{array}\end{bmatrix}$	H-Spread

	Cycle 3:
$\begin{bmatrix}\begin{bmatrix} L \\ bi \end{bmatrix}\begin{bmatrix} H \quad L \\ \check{c}i \;\; s\varepsilon \end{bmatrix}\end{bmatrix}$	Compounding

$\begin{bmatrix} L \quad H \quad L \\ bi \;\; \check{c}i \;\; s\varepsilon \end{bmatrix}$	Bracket Erasure at end of cycle

	Cycle 4:
$\begin{bmatrix} H \\ O \end{bmatrix}\begin{bmatrix} L \quad H \quad L \\ bi \;\; \check{c}i \;\; s\varepsilon \end{bmatrix}$	Add Prefix

$\begin{bmatrix} L \quad\quad H \quad L \\ O \;\; bi \;\; \check{c}i \;\; s\varepsilon \end{bmatrix}$	H-Deletion OCP Repair I Bracket Erasure

	Cycle 5:
$\begin{bmatrix} L \quad\quad H \quad L \\ O \;\; bi \;\; \check{c}i \;\; s\varepsilon \end{bmatrix}\begin{array}{c} H \\ a \end{array}$	Add Class Suffix Association Convention

$\begin{bmatrix}\begin{bmatrix} L \quad\quad H \quad L \\ O \;\; bi \;\; \check{c}i \;\; s\varepsilon\text{:} \end{bmatrix}\end{bmatrix}$	H-Deletion Vowel Coalescence TBU Conflation Contour Simplification

òbìčísê:	Surface Form
daughter	

The forms for 'son' and 'daughter' show that compounding must occur before the cycle when the noun-class prefix is added. Otherwise, the rule of Prefix Delinking would apply to the first L stem, **bi**. Since derivational processes and compounding occur first, the two stems are joined on a cycle. Due to bracket erasure at the end of each cycle, the tones of the stem are LH on the cycle when the prefix is added, which

prevents Prefix Delinking from applying. Such an example shows the necessity of bracket erasure at the end of each cycle.

Three other compound forms are found in Class 9, the class for mass nouns. The forms are:

(4.39)

a.	ǹná:čô:	*cow's milk*	cf. kùná:ú	*cow*
b.	ńnô:čǒ:	*mother's milk*		
c.	ǹnúsúč'ó:	*tears*	cf. ó ń sù	*if he cries*

These forms all have a common morpheme čo which appears to be underlyingly L. Although this stem is similar to the stem in the word for 'water' ǹčɔ́ḿ, the stem in 'water' is clearly H. While this morpheme seems to be signifying a watery substance, I posit that it is a different morpheme, with an underlying L and different segments.

The L in the morpheme čo would account for the final falling tone in 'cow's milk' (4.39a). The H of the stem for 'cow' would spread to the 'liquid' morpheme, čo, by H-Spread, leaving the L free to associate to the noun-class suffix.

The surface tones in 'mother's milk' (4.39b) follow naturally from a L tone on the stem noo.[27] The surface falling contour can only be accounted for if the vowel is two TBUs, so I propose that it is underlying VV.

---

[27]I have not seen this stem in other words.

The form ṅnúsúč'ó: 'tears' (4.39c), contains the L tone verb stem su 'cry'. Although I cannot recover the meaning of nu, assuming that it is underlyingly H would account for the surface tones of (4.39c). The fully assembled stem, then, is as follows:

(4.40)

$$\left[\begin{array}{ccc} \mathrm{H} & & \mathrm{L} \\ | & \diagdown & | \\ \mathrm{nu} & \mathrm{su} & \check{\mathrm{co}} \end{array} \right]$$
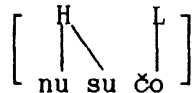
After adding the noun-class affixes, the H of the suffix is free to associate, setting up the environment for L-Delinking to apply, which results in the correct surface form.

4.7 Problem Areas

The analysis presented thus far accounts for the majority of nouns in Foodo. There are a few groups of nouns, however, which present problems, the three main ones being those in Class 7 which take an -a suffix with a prelinked H tone, those in Class 8 which end in se:, and those in Class 1 without prefixes. I will briefly discuss each of these groups.

4.7.1 Class 7 Nouns

Nouns in Class 7 take the prefix ka-[28] and the -a suffix.[29] However, the rule of Vowel Coalescence does not apply to any of the forms in this class.[30] This is a morphological constraint and stems in this class must be marked [-Vowel Coalescence].

There is a small group of nouns in this class in which the suffix surfaces as 'H. The corresponding plural (Class 8) takes an -ɪ suffix that also surfaces as 'H. This suggests that the suffixes in both cases have an underlying H which is prelinked as in (4.41).

(4.41)

```
H        H
|        |
a        ɪ
```

In (4.42) I cite these forms with my proposed underlying tone of the stem to account for the surface forms. The underlying tone *HL indicates that the H is prelinked to the second TBU of the stem.

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[28]Usually before stems with a [-round] autosegment (i.e. I and E) the prefix surfaces as ke- or kɛ-. Before a few stems with a mid rounded vowel (o or ɔ) the prefix surfaces as a ko- or kɔ-.

[29]A small number of nouns fit into this class based on agreement phenomena, but do not take the ka- prefix or -a suffix.

[30]Phonetically, a slight glide (y or w) occurs between a high or mid stem vowel and the -a, which agrees with the roundness of the stem vowel. This glide is a low-level phonetic rule (probably to preserve a CV syllable structure) and is written in the data as a raised ʸ or ʷ. It also occurs in those rare cases (usually loan words) when an a and a high or mid vowel occur together morpheme internally.

119

(4.42)

UL Tone	Singular Class 7	Plural Class 8	Gloss
L	kéké^y'á	ŋké:m̄[31]	basket
L	kàbà^yʈ^yá[32]	m̀bàlʈ:m̄	wall
LH	kèkì^yá	ŋkí:m̄	knife
*HL	kèkpídí^y'á	ŋmkpídí'm̄	puppy
*HL	kàtúlúb'í^yá	ǹtúlúb'í:m̄	hoe
*HL	kèpí:^y'á	m̀pílí:'m̄	jars
HL	kàb^wʈ^y'á	m̀b^wʈ'm̄	bird
LHL	kàčàlʈ^y'á	ɲčàlʈ'm̄	village
LHL	kàčɔbʈ^y'á	ɲčɔbʈ'm̄	gnat
LHL	kèbìdí^y'á	m̀bìdí'm̄	little girl
LHL	kèkĕ:^y'á [33]	ŋkèlé:'m̄	chick

I do not understand why in some of the words the plural form shows a long vowel which is not in the singular.

There is one form in which the plural is formed not with an -m suffix but an -a suffix. This is shown in (4.43). The tone of the plural -a suffix is a H which is not prelinked, which accounts for the falling contour.

(4.43)

| HL | kàsʈ^y'á | ǹsê: | scar |

---

[31]This form takes a regular -m suffix without the prelinked tone.

[32]The stem balʈ is an exception to Prefix Delinking. See page 121.

[33]The long vowel must be two TBUs which accounts for the contour tone. From the plural (and the word 'chicken' from which this form is derived) it is clear that this is due to the loss of a consonant.

Most of the stems in Class 7 which are [-round] (I and E) take
this suffix with the prelinked H. Most other stems in this class take
an -a suffix in which the H tone is not prelinked.[34]

Two other forms need to be mentioned. These are forms used for
the offspring of animals, as shown below:

(4.44)

Singular Class 7	Plural Class 4	Gloss
a. kàná:bí^y'á	àná:bé:	*calf*
b. kàsàndìbì^{y}á	àsàndìbé:	*lamb*

These forms appear to have the diminutive suffix -bi. I have
already showed in section 4.5 that the diminutive suffix is underlyingly
toneless. Such an analysis would not account for the downstepped H in
(4.44a) above. The downstep would be accounted for if the suffix was
underlyingly L. The stem for forming the words for 'child' óbê: and
'seed' or 'unit' díbílì is bi with L tone. I propose that the forms for
the offspring of 'cow' and 'sheep' are compounds of the stems of 'cow'
(na: with H tone) and 'sheep' (sandɩ with L tone) with the L-toned stem
bi of 'child' and 'seed'.[35]

---

[34]One exception to this generalization is the word kélí^{y}à (pl. ńlê:)
'funeral', which must take the non-prelinked suffix in order to account
for the L tone on the suffix.

[35]It is interesting that the bi in these compounds occurs after the stem
of the animal, whereas in the word for 'son' òbìɲísê: and 'daughter'
òbìčísê: the bi is the first element in the compound. The meanings of
the two constructions are somewhat different, one designating the 'seed'
or 'offspring' of an animal and the other specifically designating a

The surface tones for 'calf' follow from H-Spread applying when the two stems are compounded. The plural of this form is exceptional, since my analysis would predict a falling contour. I have no explanation for this.[36]

The form kàsàndìbìᵞá/àsàndìbé: 'lamb' is a complete exception to the rule of Prefix Delinking. The only other exceptions in my data are the words dìdàmbìlí/àdàmbě: 'road', dìtòmpòndí/àtòmpòá 'vagina', kàbàᵞtᵞá/mbàlt:á 'wall' and kòlɔtɔ́ʊ/àlɔtɔ́á 'goiter'. These exceptions can be handled by marking the stems sandt, daN, toNpoN, balt and lɔtɔ as [-Prefix Delinking].

4.7.2 Class 8 Nouns

Most nouns in Class 8 are the plural of singular forms in Class 7. Nouns in Class 8 are formed by a prefix N- and either the suffix -a or -m. As mentioned in the preceeding section, a few stems take an -m suffix which has the H tone prelinked.[37]

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human male or female offspring. The difference is that the words for 'son' and 'daughter' are compounds of a noun and adjective (because of the -se adjectival suffix) and not two nouns as the words for 'calf' and 'lamb'.

[36]I gathered this data late in my research and did not have time to recheck it, so it is possible that this form may actually end in a falling contour.

[37]In the plural of two nouns, ŋwúlɔ́ (singular kàwúlá:) 'skins; clouds' and ŋkɔ́:nɔ́ (singular kɔ̀kɔ́:lá:) 'bumps', the final syllable of the stem is replaced with lO and nO respectively.

Class 8 contains a few nouns that are unusual both segmentally and tonally. These nouns are listed in (4.45) below along with the corresponding singulars (mostly from Class 7).

(4.45) Class 8 exceptional forms

	Singular Class 7	Plural Class 8	UR of Stem	UL Tone of Stem	Gloss
a.	kálá:	ŋkálásê:	kala	H	*fence*
b.	kɔlɔ	ŋkɔl'ɔsê:	kɔlɔ	HL	*river*
c.	wúl'á:(Cl. 1)	ŋwúl'ásê:	wula	HL	*chief*
d.	kàyúlà	ŋyúl'ásê:	yula	HL	*body*
e.	kéč'é:	ŋkéč'é:sê:	keče:	HL*H	*black bean*
f.	ká:s'â:	ŋká:s'ásê:	ka:sa	HL*HL	*cayman*
g.	kàsá:làsǎ:	ǹsá:làsě:	sa:lase	HL	*calabash for water*
h.	káká	ŋkákásě:	kaka	H	*peanut*

The above forms are unusual for several reasons. While the singular forms take Class 7 agreement forms (with the exception of the word for 'chief'), most of the examples show that they do not take the Class 7 noun-class prefix ka- as seen from the plural forms where the kV is still present. It seems that the initial syllable being so similar to other Class 7 nouns has resulted in these forms taking Class 7 agreement forms (demonstrative adjectives, adjectives, etc).

The forms in (4.45) have an unusual plural form ending in -se:. All other nouns in Class 8 take -a or -m. Tonally, in all but two forms the -se: surfaces with a falling contour. Since this occurs clearly after stems with both underlying tones of H and HL this falling contour cannot be accounted by positing an underlying L tone on the suffix as I

did for the agentive suffix -wɔ. I posit that the above forms have the following suffix which is then followed by the noun-class suffix -a.[38]

(4.46)

```
H  L
|
sɛ
```

The prelinking is only to account for the form for 'caymans' (4.45f), which itself has a very exceptional underlying tone of the stem. Assuming the suffix is -sɛ with a HL tone with prelinked H accounts for the surface tones of (4.45a-f). The L of this suffix is free to associate to the noun-class suffix -a by the Association Convention on the cycle when the noun-class suffix is added. A sample derivation of the plural of 'body' is given in (4.47) below.

---

[38]It is possible to analyze this as sɛ:, and the resulting noun would not take a noun-class suffix. I reject this analysis because these nouns would be the only ones in the class which did not take a noun-class suffix.

(4.47)

$$
\begin{bmatrix} \overset{\text{H}}{\underset{\text{yu}}{\mid}} \ \overset{\text{L}}{\underset{\text{la}}{\mid}} \end{bmatrix}
$$
Cycle 1:
Association Convention

$$
\begin{bmatrix} \overset{\text{L}}{\underset{\text{N}}{\mid}} \begin{bmatrix} \overset{\text{H}}{\underset{\text{yu}}{\mid}} \ \overset{\text{L}}{\underset{\text{la}}{\mid}} \end{bmatrix} \end{bmatrix}
$$
Cycle 2:
Add Prefix
H-Deletion
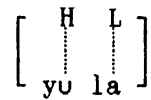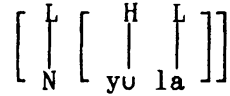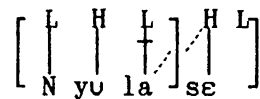
$$
\begin{bmatrix} \overset{\text{L}}{\underset{\text{N}}{\mid}} \ \overset{\text{H}}{\underset{\text{yu}}{\mid}} \ \overset{\text{L}}{\underset{\text{la}}{\mid}} \ \overset{\text{H}}{\underset{\text{se}}{\mid}} \ \overset{\text{L}}{} \end{bmatrix}
$$
Cycle 3:
Add Plural Extenstion
L-Delinking
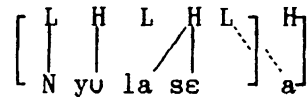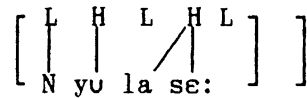
$$
\begin{bmatrix} \overset{\text{L}}{\underset{\text{N}}{\mid}} \ \overset{\text{H}}{\underset{\text{yu}}{\mid}} \ \overset{\text{L}}{\underset{\text{la}}{\diagup}} \ \overset{\text{H}}{\underset{\text{se}}{\mid}} \ \overset{\text{L}}{} \ \overset{\text{H}}{\underset{\text{a}}{}} \end{bmatrix}
$$
Cycle 3:
Add Class Suffix

Association Convention

$$
\begin{bmatrix} \overset{\text{L}}{\underset{\text{N}}{\mid}} \ \overset{\text{H}}{\underset{\text{yu}}{\mid}} \ \overset{\text{L}}{\underset{\text{la}}{\diagup}} \ \overset{\text{H}}{\underset{\text{se:}}{\mid}} \ \overset{\text{L}}{} \end{bmatrix}
$$
H-Deletion
Vowel Coalescence
TBU Conflation
Contour Simplification

ŋyʊl'ásê:
bodies

Surface Form

This still leaves the surface tones of two forms (4.45g,h) unaccounted for. The form ñsálàsě: 'calabashes for water' (4.45g) does not have the special plural suffix -se proposed for the other forms, because this syllable is seen in the singular form of the word as well, kàsá:làsâ:. [39] I thus propose that the stem is sa:lase. Such a stem may have derived historically from a suffix found on adjectives which is -se with an underlying L tone, but synchronically there is no evidence that this is a suffix. The L tone on the final syllable of the stem followed by the H tone of the class suffix -a would account for the rising tone on the form for 'calabashes for water'.

---

[39]In Class 7 mid front vowels before the noun-class suffix -a are replaced by the vowel a. This occurs in a handful of nouns in this class, for example, káwâ: (plural ŋwê:) 'calabash'.

The form for 'peanuts' (4.45h) also ends in a rising tone, and
thus also appears to take the adjective suffix -sɛ (with L tone). This
suffix only appears in the plural of 'peanut' not in the singular. If
the underlying tone of the adjective suffix is L, H-Spread should apply
since the underlying tone of the stem is clearly H (see section 4.3 for
a similar derivation with the agentive suffix -wɔ). If H-Spread is
somehow exceptionally blocked for this form then the environment for
L-Delinking is created (after the addition of the H tone class suffix
-a) which would yield an incorrect form as shown in (4.48).

(4.48)
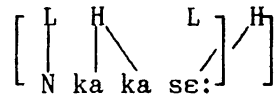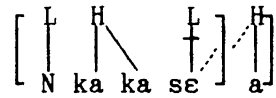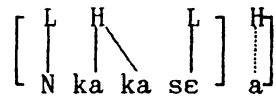
$$
\left[\left[\begin{array}{c} \text{L} \quad \text{H} \qquad \text{L} \\ \text{N ka ka sɛ} \end{array}\right]\begin{array}{c} \text{H} \\ \text{a} \end{array}\right]
$$

Cycle 3:
Add Class Suffix

Association Convention

$$
\left[\left[\begin{array}{c} \text{L} \quad \text{H} \qquad \text{L} \\ \text{N ka ka sɛ} \end{array}\right]\begin{array}{c} \text{H} \\ \text{a} \end{array}\right]
$$

Cycle 3:

L-Delinking

$$
\left[\left[\begin{array}{c} \text{L} \quad \text{H} \qquad \text{L} \\ \text{N ka ka sɛ:} \end{array}\right]\begin{array}{c} \text{H} \end{array}\right]
$$

Cycle 3:
Vowel Coalescence
TBU Conflation

*ŋkákás'é:

Example (4.48) shows that L-Delinking (in addition to H-Spread)
may not apply to this form. A similar situation exists in adjectives,
where it appears that both H-Spread and L-Delinking are prevented from
applying, so it may be that this suffix is marked in some way to prevent
these two rules from applying. In any case, the form for 'peanuts' is
exceptional.

4.7.3 Class 1 Nouns

Class 1 contains a large number of nouns which have no noun-class prefix (represented as Ø). This class presents a problem in that it contains many prelinked tones and some additional tone patterns. One possible reason for this is that more recent loan words are incorporated in this class. In (4.49) I present those cases where the underlying tones are more obvious.[40]

(4.49) Class 1 Nouns with no prefix and no suffix

Underlying tone H

čútú	*rhinoceros*
gádó ~ gódó	*bed*
gúndí	*lion*
kpáŋá	*tibia*
bó:síʸá	*bowl*
fálándʊ́	*quarter*
Jíŋá:lʊ̀	*feast*
kpálʊ̀bá	*bottle*
sɔ̀bɔ̀lɔ̀	*mosquito net*
tógóló	*window*
zílígí	*train*

Underlying tone L

àkpà?	*tire*
hì:jè?	*wedding*
lɔ̀kɔ̀	*well*
pàpà ~ pà:pà	*fan*
wà:lʊ̀	*awale game*
čòkòtò	*pair of pants*
lòtòlò	*throat*

---

[40]It is an interesting distributional fact that there are no monosyllabic stems which do not take a prefix. Since all other stems take a class prefix (and suffix) there are no monosyllabic nouns in Foodo.

Underlying tone HL

áfà	*pig*
táʸ ̀	*sling shot*
tɨ́là	*Koran*
ví:yàyà	*swing*

Underlying tone LH

àdá?	*machete*
àgú	*cat*
čèčá	*traditional cloth*
čè:čé?	*bicycle*
čùká?	*type of dance*
gɔ̀:ɟɨ́?	*neem tree*
gù:gá?	*well bucket*
kàsɨ́[41]	*earth*
kùntú	*sheet*
tènɟú	*straw hat*

Underlying tone LHL

àlɨ́kùkù	*pigeon*
fà:wɨ̂:	*chat*
fɨ̀tɨ́là	*lamp*
gɔ̌:lɔ̀ [42]	*cola*
hàwê:[43]	*paternal aunt*
kòdólòkò	*bridge*

It is interesting that there is only one example of a three syllable word with an underlying HL pattern, and no words of three or more syllables with underlying LH pattern.

---

[41]While this form fits into Class 1 by agreement, its plural form ɨ̀sé: suggests that it does contain a prefix **ka-**. This form does not take a suffix in the singular, however, unlike all other stems taking the prefix **ka-**.

[42]The long vowel is underlying VV (two TBUs) instead of VC to account for the rising tone over the long vowel.

[43]The plural **hàwé:'ánà** also has a long e:, which suggests that this long vowel is not the result of a suffix.

For the majority of nouns in the language, long vowels at the end of words are the result of the -a noun-class suffix. Similarly, a word-final ■ only results from the presence of the -■ noun-class suffix. When the singular and plural of a noun take different noun-class suffixes, the presence or absence of the noun-class suffix is clearly seen. Based on this generalization, it is reasonable to assume that nouns whose singular and plural invariably end in a long vowel or -■, consist of a stem plus a noun-class suffix -a or -■.[44] In many cases, the positing of such a suffix greatly simplifies the underlying tone pattern of the stem, especially in those cases where the long vowel surfaces with a downstepped H. Many nouns in Class 1 without a prefix show cases of final long vowels and final ■, therefore, I analyze these nouns as consisting of a noun-class suffix -a or -■.

Example (4.50) lists the tone patterns of these nouns with suffixes.

---

[44]This is possible only if the long vowel is either mid or low, but not high. There is only one example of a long high vowel at the end of a word that does not clearly contain a suffix, fà:wɛ̂: (pl. ɩ̀fà:wɛ̂:) 'chat'. If this had the -a suffix, after Vowel Coalescence it would end in a mid front vowel. Since there is no other instance of an -I suffix, this form must be analyzed as not having a suffix in both the singular and plural.

(4.50) Class 1 Nouns with suffix and no prefix

Underlying L + H suffix

čàndɛ̌:	čaNdɛ-a	*buffalo*
jàsâm	jasa-m[45]	*fly*
nàndɛ̌:	naNdɛ-a	*squirrel*
ɲàlâm	ɲala-m	*crab*
ŋmàsâm	ŋmasa-m[46]	*bee*
sàndɛ̌:	saNdʋ-a[47]	*sheep*
tàndɛ̌:	taNdɛ-a[48]	*lizard*
yùkʋ́m	yʋkʋ-m	*God*

Underlying H + H suffix

| kpɔ́ŋɔ́: | kpɔŋɔ-a | *entrance (to compound)* |

Underlying LH + H suffix

bìnjé:	biNje-a	*horse*
fʋ̀ntám	fʋNta-a	*rock*
làŋɔ́: ~ lɔ̀ŋɔ́:	laŋɔ-a	*hare*

Underlying HL + H suffix

dál'é:	dalɛ-a[49]	*dream*
línd'ám	liNda-m[50]	*root*
ŋmá:w'ɔ́:	ŋma:wɔ-a[51]	*rice*
sálàŋɔ̌:	salaŋɔ-a	*end of rainy season*
sʋ́s'á:	sʋsa-a	*people*
wʋ́l'á:	wʋla-a	*chief*

---

[45]cf. [čàsʋ̀ŋ] Krachi and Gichode and [čɔ̀sʋ̀ŋ] Chumburung (Snider 1989:#801).

[46]cf. [ŋmèsàŋ] Nawuri and Gichode (Snider 1989:#808).

[47]cf. [sànnʋ̀] Chumburung, [sàntʋ̀] Krachi, and [sàndɛ̀ʸ] Gichode (Snider 1989:#616). I know the underlying stem of this form ends in a high vowel because of the Foodo word for 'lamb' kàsàndìbìʸá.

[48]cf. [tàntê] Gonja (Snider 1989:#766).

[49]cf. [òdírì] Gichode and [èdá:rʋ̂] Gonja (Snider 1989:#1407).

[50]cf [ólíŋ] Nawuri and Gichode and [kàlíɲî] Gonja (Snider 1989:#856).

[51]cf. [ŋmà:wʋ́] Tem (Robert De Craene, personal communication).

Underlying LHL + H suffix with 2 TBUs in stem

bàlâ:	bala-a	*monkey*
kèlém̀	kɛle-m[52]	*chicken*
kpà:lô:	kpa:lo-a	*hawk*
kpàsɔ̂:	kpasɔ-a	*leopard*
lèɲâ: ~ làɲâ:	lɛɲa-a	*frog*
wɔlúm̀	wɔlu-m	*nail*

Underlying LHL + H suffix with 3 TBUs in stem

àdák'á:	adaka-a	*suitcase*
ɲàmɩl'é:	ɲamɩlɛ-a	*heart*
sàmɩl'é:	samɩlɛ-a	*porcupine*
wèJíy'á:	weJiya-a	*harmattan*

There are several nouns in this class which must be analyzed as having a prelinked tone. These are shown in (4.51) below:

---

[52]This form seems to be a borrowing from Tem (Kotokoli) where the word is [kèlìmbíré] (Robert De Craene, personal communication). In Foodo it has been reanalyzed as having a suffix -m which was originally in the stem of the borrowing (and due to the following bilabial stop). I posit that in Foodo it is reanalyzed as a suffix because /m/ never occurs stem finally in the language.

(4.51)

Underlying *HL with H prelinked to second TBU

číjâ	čija	*hot water*
dó:mâ	do:ma	*beginning of rainy season*
dɔ́wɛ̂:	dɔwɛ-a	*partridge*
kpídê:	kpʋdʋ-a[53]	*dog*
nɔ́ndɔ́l'ʋm	nɔNdɔlʋ-m	*tongue*
sílíbà?	sʋlʋba	*pot*

Underlying *LH with L prelinked to second TBU

dànìnsé:	danʋNsɛ-a[54]	*pot*
jàŋàsí	jaŋasʋ	*chameleon*
tèkènté	tekeNte	*veil*

Underlying *LHL with first L prelinked to second TBU

čàjà:lê	čajale	*light*
čìčàkɔ̂: [55]	čʋčakɔ-a	*farmhouse*
tàndùwɔ̂:	taNduwɔ-a	*beard*
lòkòtólò	lokotolo	*hospital*

There are a few examples of reduplication and compounding as in example (4.52).

---

[53]cf. [kèkpídíʸ'á] 'puppy'.

[54]cf. [dàrìsíŋ] Gichode.

[55]This is irregularly found (by agreement) in Class 3.

132

(4.52)

Underlying HL reduplicated

  kpál'ákpálà   kpala+kpala   *mat*

Underlying LH reduplicated

  tòlót'óló   tolo+tolo   *turkey*

Underlying L plus stem kpʋdʋ (*HL) 'dog' with suffix

  sùŋmkpʋdê: suN+kpʋdʋ-a   *rat*

Underlying LH plus HLH (compound)

  àgúbíʸ'áʷ   agu+biau[56]   *cat*

This still leaves a few nouns for which I must posit underlying tonal patterns with unusual prelinkings, and one new tone pattern, HLHL. Some of these nouns appear to be compounds, but so far I have not been able to discover any meaning of any one part of the words to prove they are synchronically compounds. I list these items in (4.53)) with my proposed underlying forms.

(4.53)

Underlying *LHL with first L prelinked to third TBU

  bùsùlùwɔ̂:   busul*uwɔ-a   *dust*

Underlying L*HL with H prelinked to second and third TBU

  Jànáʸʋsà   Jan*a*ʋsa   *burial*

---

[56]This is made up of the word for 'cat' àgú plus the sound the cat makes bíʸ'áʷ. The compound is now used almost exclusively to describe the animal, with the short form only rarely used (and usually only by older speakers).

Underlying H*LH with L prelinked to second and third TBU

        tákàlàdá   tak*al*ada   *paper/book*

Underlying HLHL

        témpèlém̀   tɛNpɛlɛ-m   *roach*

Finally, this leaves four words in the data unaccounted for. I could propose complex melodies with prelinking for each of these, but as this would not be revealing, I will simply list them as residue in (4.54).

(4.54)

Forms where underlying tones are not accounted for:

        àlìčíd'ílí   *ablution pot*
        ɟíɟâ: *elephant*
        káláŋ'áwúlà   *cripple*
        kpɩ́:l'úwɔ̂:   *boat*
        nɔ̀ŋfàlɩʸ'é   *mustache*

5. POSTLEXICAL PROCESSES

There are several tonal lexical rules in Foodo which also apply postlexically. These are: OCP Repair I (3.11), OCP Repair II (3.12),[1] and L-Delinking (3.18). The only solely postlexical tonal process already mentioned is L-Docking (3.29). Section 5.1 discusses the postlexical application of L-Delinking. Section 5.2 discusses Snider's (1990c) application of Register Tier theory to account for downstep in Oti Guang languages, and shows how it can apply to Foodo as well.

5.1 L-Delinking

The rule of L-Delinking (3.18) applies postlexically across word boundaries. I restate the rule in (5.1).

(5.1) L-Delinking: Lexical and Postlexical
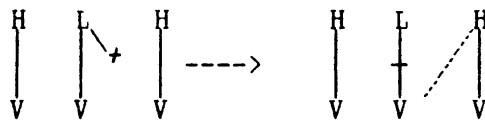
Condition: The V associated with the L is not part of
              a long vowel.
              A boundary must intervene on one side of
              the V associated with the L.

---

[1]Following Snider (1990c:465), I assume the OCP is valid in both the lexical and postlexical components of the grammar. Therefore, the rules of OCP Repair are postlexical as well as lexical.

Whenever a L tone is between two H tones, the L delinks and the H to the right spreads leftward onto the TBU which was linked to the L. The effect is a surface form of H'HH. This rule must also occur postlexically since it occurs across word boundaries. Some examples of postlexical application of L-Delinking are shown in (5.2).[2]

(5.2)

| òdúlò | gé | ---> | òdúl'ó gé |
| granary | EMPHATIC | | It's really a granary! |

| díbílì | gé | ---> | díbíl'í gé |
| seed | EMPHATIC | | It's really a seed! |

| ɔ̀čám̀ | gé | ---> | ɔ̀čá'm̀ gé |
| guinea fowl | EMPHATIC | | It's really a guinea fowl! |

| dɩ̀kàdɩ̀ | dùmúlí | ---> | dɩ̀kàdɩ̀ d'úmúlí |
| cricket | head | | cricket's head |

| àkànɔ́ | àmó: | ---> | àkànɔ́ 'ámó: |
| crickets | heads | | crickets' heads |

| kùnáàʊ́ | dùmúlí | ---> | kùnáàʊ́ d'úmúlí |
| cow | head | | cow's head |

| àmó: | àsá | ---> | àmó: 'ásá |
| heads | three | | three heads |

| ɩ́m̀féyɩ́ | dɩ̀kpɩ́ndɩ̀ | ---> | ɩ́m̀éyɩ́ d'ɩ́kpɩ́ndɩ̀ |
| if they not | large | | if they are not large |

| ɔ̀ɔ́mɔ́: | làŋɔ́: | ---> | ɔ̀ɔ́mɔ́: l'áŋɔ́: |
| he killed | hare | | He killed a hare. |

---

[2]In some texts that I have transcribed, there are instances where a L at a word boundary is between two Hs. It is not clear in these instances whether there is a slight pause before or after the word with the L tone, which would explain why the rule is not applicable, or if the vowel with the low tone is in fact long.

The first condition on long vowels is necessary in the postlexical application of L-Delinking for the same reason it is in the lexical application. For example, in the associative construction ɔɲʉ̃ čè:čé 'the man's bicycle' the rule does not apply.

Since Postlexical rules are not cyclic (and thus do not adhere to the Strict Cycle) they apply across-the-board. The rule must contain a condition concerning the presence of a boundary to prevent it from applying within words, such as fí:bìlí: 'turn around!' (you plural imperative). The boundary may occur on either side of the TBU with which the L is associated.

In the other four Oti Guang languages, Snider (1990c:457) states that there is a postlexical rule of H-Spread where the H to the left of the L spreads onto the delinked L. This results phonetically in a downstep on the TBU that is after the TBU with a L. This is similar to the Foodo rule of L-Delinking, but in Foodo the spreading of the H comes from the H on the right which spreads leftward, resulting phonetically in a downstep H on the TBU that had the L.

5.2 Register Tier Theory

Snider (1990c) argues for the inclusion of a register tier in tonal theory, citing as evidence the case of tonal upstep in Krachi, another Oti Guang language. While Foodo does not exhibit any evidence

of tonal upstep, the concept of a register tier does help account for downstep (both automatic and non-automatic) in Foodo.[3]

One of the central claims of Snider (1990c:470) is that register shifts in African languages should be accounted for by distinctive features in the phonological component (as opposed to the phonetic component). To account for this, Snider proposes a multiplane representation of tone consisting of four autosegmental tiers--a Register Tier, a Modal Tier, a Tonal Node Tier, and a TBU Tier. I repeat in (5.3) Snider's (1990c:461) representation:

(5.3)
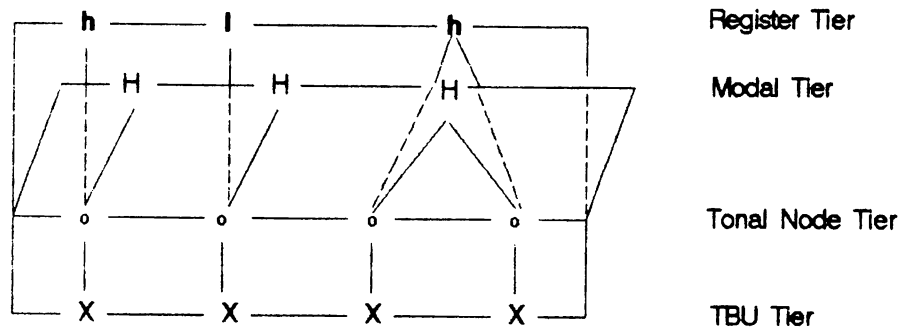
The TBU Tier is associated with the Tonal Node Tier. The Tonal Node Tier serves to link the features of the Modal Tier and the Register

---

[3]As I have already pointed out in section 2.1.3, downstep and downdrift are basically the same process differing only by the presence of a surface L tone in the latter. Snider (1990c:454) uses "downstep" to refer to both phenomena. When necessary to distinguish between the two phenomena, he uses the terms automatic downstep (downdrift) and non-automatic downstep (downstep). In this section I will follow Snider's terminology.

Tier to the TBU Tier and is purely structural. This creates "a hierarchically-organized geometrical structure for feature representations" (Snider 1990c:460). The Modal Tier is the equivalent of what has been refered to in this thesis as the Tonal Tier with two modes--H and L. Snider (1990c:461) defines the Register Tier in the following way:

> The REGISTER TIER is so named because there are 'registers' or degrees of height associated with it (theoretically, an unlimited number). The features on this tier are represented by l (one step lower than the preceding register) and h (one step higher than the preceding register). The difference between the features on the Modal Tier and the features on the Register Tier is crucial. Two consecutive L's on the Modal Tier will not involve any change. However, two consecutive l's on the Register Tier indicate that a Tonal node associated with the second l is realized on a lower register than a Tonal node associated with the first l.[4]

A language with two discrete levels of tone without downstep would have underlying representations as in (5.4) (adapted from Snider (1990c:463)):

(5.4)

---
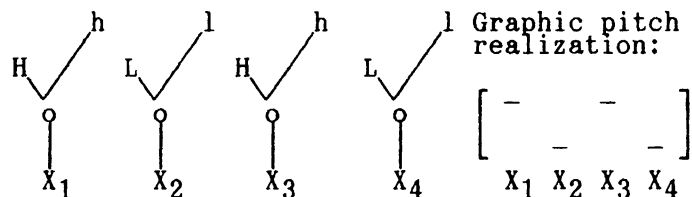
[4]Snider does not address the implications of this system for the OCP. While he indicates the operation of the OCP in derivations on the Modal Tier, he does not invoke the OCP on the Register Tier, where it is clearly violated in one derivation (1990c:466).

In Snider's analysis, a H mode on one register is equivalent to a L mode on the next higher register. Similarly, a L mode on one register is the same as a H mode on the next lower register (but see footnote 5 below). Since consecutive l or h registers have a cumulative effect in this system, the number of possible registers is open-ended.

Snider (1990c:463) proposes the following postlexical rule of l-Spread for Oti Guang languages to account for downstep, which I also claim is a postlexical rule in Foodo. (Notice that this rule only involves the Register and Tonal Node Tiers.)

(5.5)   l-Spread in Oti Guang (Downstep):
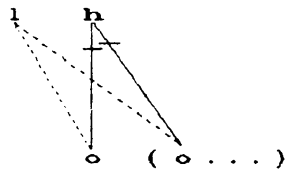
The effect of this rule on the same H-L-H-L sequences as in (5.4) can be seen in (5.6) (also adapted from Snider (1990c:463)):

(5.6)
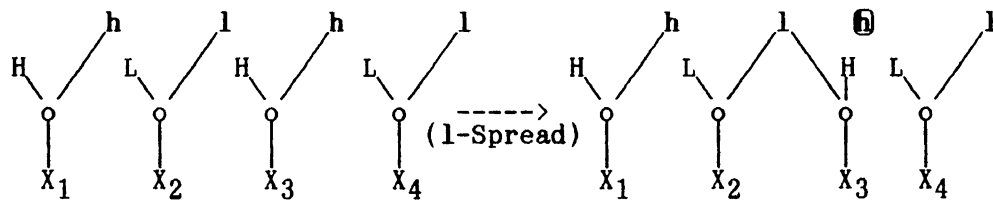
Graphic pitch realization:

$$X_1 \ X_2 \ X_3 \ X_4$$
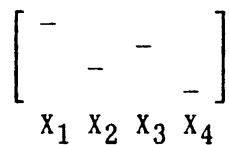
The interpretation of the features in (5.6) is the same as for those in (5.4), but X_3 now shares the lower register with X_2, even though it is associated with the H mode. The result is that X_3 is realized at a pitch halfway between X_1 and X_2. The h register which is now floating no longer affects the register. (At the end of the derivation it will be deleted by a convention known as Stray Erasure before the representation is interpreted.) This means that the second l now directly follows the first l. Therefore, X_4 is realized on the next lower register on the L mode of that register.

Snider proposes that in Oti Guang languages the Register Tier is not specified until the postlexical component. He assumes that "postlexical default rules assign register h and l to tonal nodes associated with modal H and L, respectively, at some point prior to the application of rules that refer to these register features" (1990c:465).

One of the consequences of adopting Register Tier theory is that the processes described in this thesis as associating, delinking or spreading tones to TBUs must be conceived of as associating, delinking, or spreading from the Tonal Node Tier to the TBU Tier. For example, the rule of L-Delinking would be restated as:

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(5.7)   L-Delinking: Lexical & Postlexical (Restated)

Condition: The V associated with the L is not part of
a long vowel.
A boundary must intervene on one side of
the V associated with the L.

The one exception to the above interpretation regards the application of the Association Convention and the rules of OCP Repair. Following Snider (1990c:464), I assume for Foodo that "each TBU is associated with a unique Tonal node in underlying representations." The Association Convention (and the supplement rule of Tone Spread) would operate from the Modal Tier to the tonal node tier as in (5.8).

(5.8)

Also following Snider (1990c:464), I assume that the OCP will operate for the Modal Tier, but not collapse adjacent tonal nodes. The rule of OCP Repair I would be interpreted as follows:

(5.9) OCP Repair I: Lexical and Postlexical (Restated)
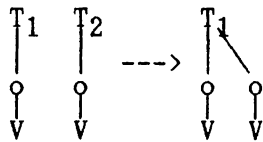
Condition: $T_1 = T_2$

I now show two examples of what happens in Foodo using the representations given, and the rule of l-Spread to account for downstep. Example (5.10) illustrates an occurrence of downstep where a L floats due to a postlexical rule.

(5.10)

scorpion's head
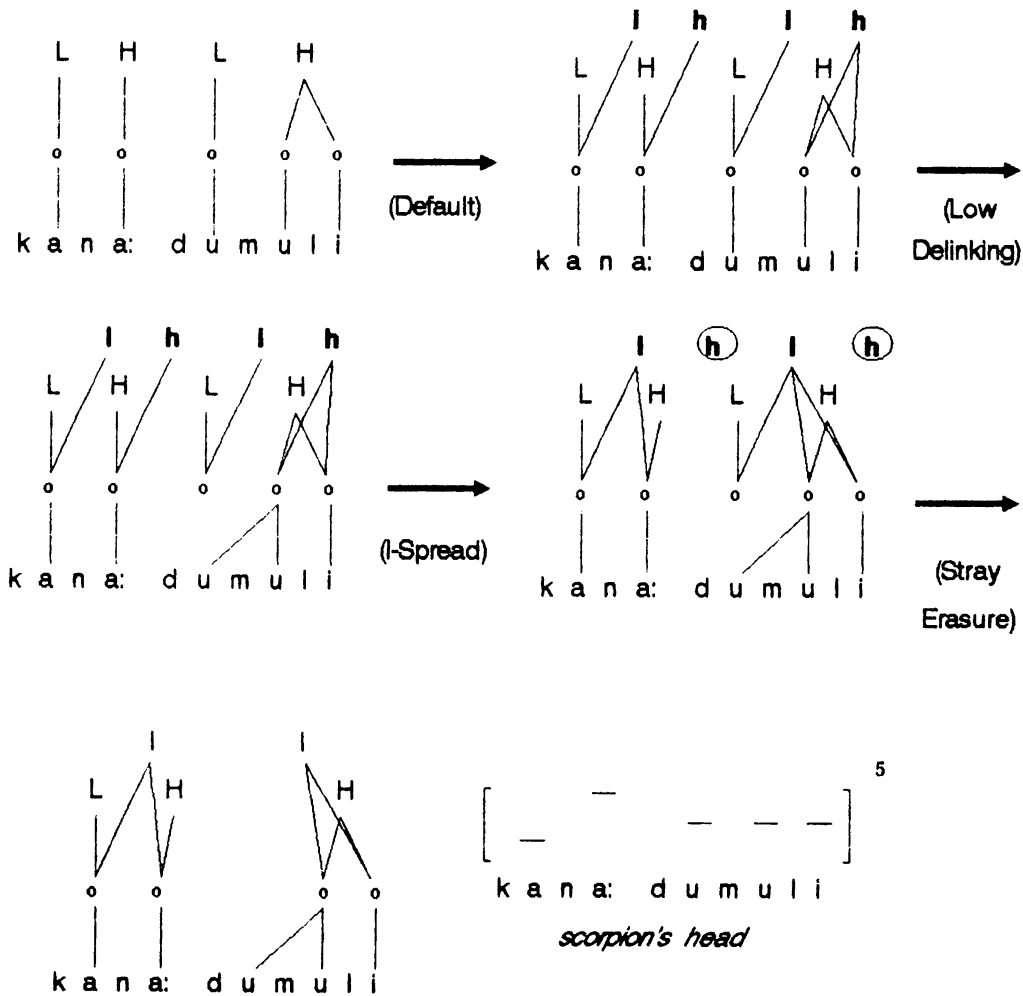
[5]Snider, as already stated, would equate the pitch of the 'H with the pitch of the preceding L, so one would expect a pitch for this utterance as [-‾——]. Preliminary investigations in Foodo, however, indicate the 'H is not realized quite as low in pitch as the preceding L. (See example (2.12) for an instrumental measurement example of a similar

Example (5.11) shows what happens postlexically to a word in which

a L became floating in the lexical phonology.

(5.11)
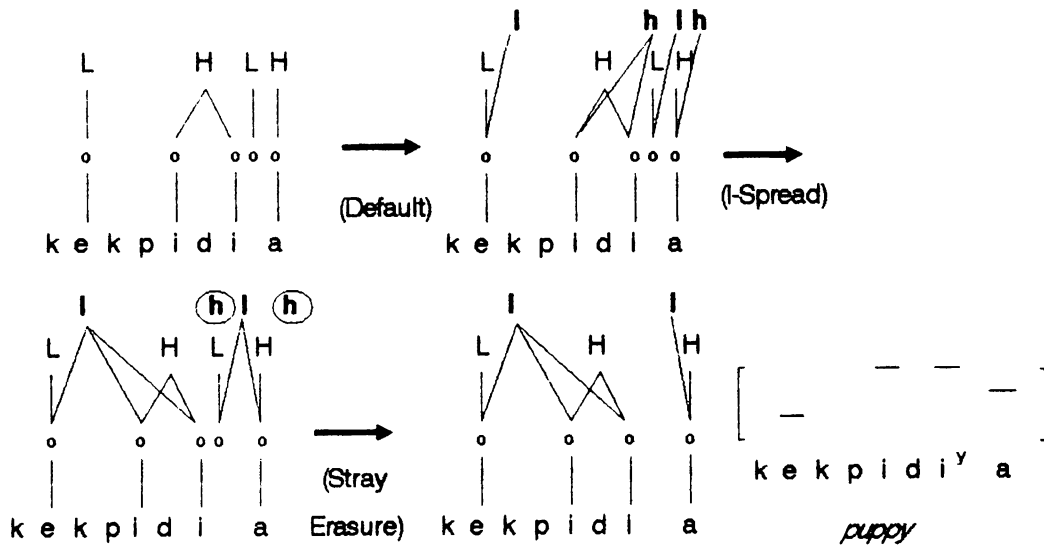
case.) This could be accounted for by simply stating that in Foodo changes in register are not by whole units, but rather by around .50 or .75 units. It would require instrumental measurements to determine the amount.

CHAPTER 6

6. THEORETICAL IMPLICATIONS

This chapter looks at two theoretical issues. First, it shows that a cyclic application of rules is necessary to account for Foodo surface tones in nouns. Second, it discusses the problem of satisfactorily defining the TBU of Foodo.

6.1 Cyclic vs. Non-cyclic application

As is probably already clear from the derivations given to this point, lexical rules must be cyclic in Foodo. This section focuses on the specific phenomena which require cyclicity.

First, it would be very difficult without cyclic application of rules to account for the fact that all regular nouns with suffixes end in H, 'H, L, or HL tones. One would be forced to posit extra noun-class suffixes, several with the same segmental aspects but different tones. Consider the case of the Class 5 suffixes -lI and -dI, with the following surface forms:

(6.1)

	Surface Form	Underlying Tone of Stem	Surface tone of Suffix	Gloss
a.	díbílì	L	L	*unit/seed*
b.	dìsí:lí	H	H	*horn*
c.	dʊ̀čàdʊ́	LH	H	*town*
d.	dʊ̀dʊ́kʊ̀ɲjàlʊ́	HL	H	*bat*
e.	dúpúlùbìlí	L	H	*intestine*
f.	dʊ̀júd'ʊ́lʊ́	HL	H	*baboon*
g.	dʊ́ɲɔ́w'ɔ́lʊ́	L	H	*breast*

One could, for example, argue that the tone of the suffix comes from the tone of the stem, i.e., the suffix is inherently toneless. This would account for the forms in (6.1a,b,c). The underlying tone of the stem is L in (6.1a), which would account for the L on the suffix from Tone Spreading (part of the Association Convention). To maintain that the suffix is inherently toneless in (6.1d) one would have to posit an additional H in the stem (HLH instead of HL) and prelink the L to the third TBU of the stem to account for the surface Ls on the word. Similarly, in (6.1e) one would have to posit an additional H in the stem (LH instead of L), which would necessitate rewriting the rule assigning the H tone to the prefix (my Prefix Delinking rule) for this form, and even then, one would expect (by the Association Convention) that the H would associate to the second TBU of the stem instead of only associating with the suffix. In (6.1f-g) one would have to account for the downstepped H in the syllable preceding the suffix. I do not see any solution but to posit that the suffix in these two forms has a H tone. Assuming that some -lI suffixes are toneless and some other -lI

suffixes are H would solve the above mentioned problems in an approach that did not assume cyclicity.

A cyclic analysis, however, need only posit that all the -lI suffixes (and all the other suffixes in all noun classes) are underlying H. If the -lI suffix is posited as always being underlying H, a non-cyclic analysis of a form like (6.1a) would produce an incorrect form as shown in (6.2).

(6.2)   Non-cyclic application of rules

$$\left[\left[\begin{array}{c} H L \\ dI \end{array}\right]\left[\begin{array}{c} L \\ bi \end{array}\right]\right]\begin{array}{c} H \\ lI \end{array}\right]$$

First concatenate morphemes

$$\left[\left[\begin{array}{c} H L \\ dI \end{array}\right]\left[\begin{array}{c} L \\ bi \end{array}\right]\right]\begin{array}{c} H \\ lI \end{array}\right]$$

Association Convention

$$\left[\left[\begin{array}{c} H \\ dI \end{array}\right]\left[\begin{array}{c} L \\ bi \end{array}\right]\right]\begin{array}{c} H \\ lI \end{array}\right]$$

Prefix Delinking, OCP Repair I, and H-Spread

*díbíl'í

In a non-cyclic approach, the Association Convention would associate the H of the suffix to the suffix before any rules apply. This would require the positing of rules to repair this situation in L stems with one TBU, or else one would have to assume that some -lI suffixes are underlyingly H and others are underlyingly toneless.

Only by cyclic rule application can one maintain that there is only one -lI suffix (with H tone), and at the same time account for the surface L tone of the suffix in words like díbílì 'seed'. Example (6.3) shows how the L of the stem, in such cases, is made to float on the 2nd

cycle due to Prefix Delinking and H-Spread, so that it is free to associate with the suffix on the 3rd cycle.

(6.3)

Structure	Process
[L / bì]	Cycle 1: Association Convention
[H L [L / bì]] dì	Cycle 2: Add Prefix Prefix Delinking
[H [L / bì]] dì	OCP Repair II H-Spread
[[H L / dì bì] H lì]	Add Suffix
[[H L / dì bì] H lì]	Cycle 3: Association Convention

díbílì
seed
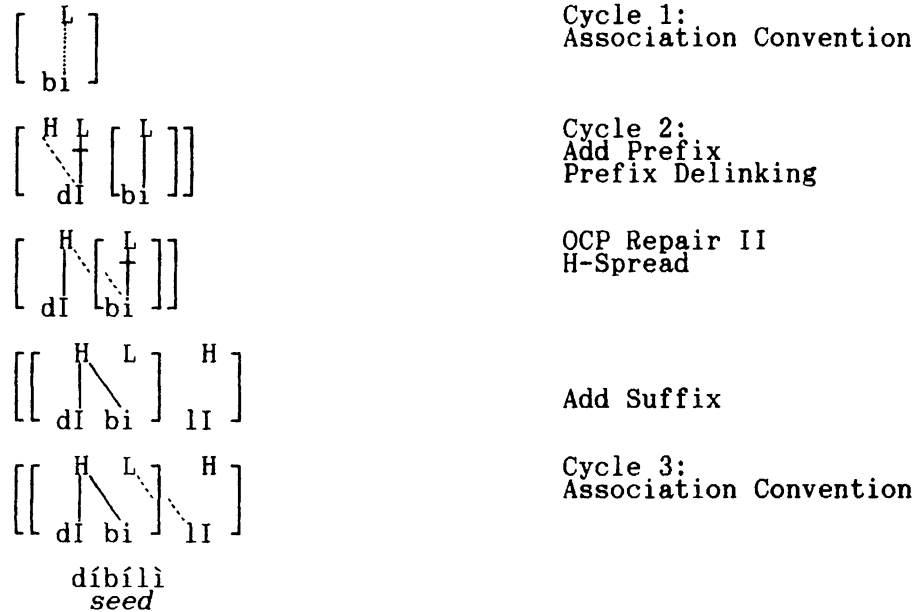
Cyclic application not only allows for the positing of fewer suffixes, it also accounts for a distributional constraint in the language. In nouns of all classes with noun-class suffixes, there is never a surface tone pattern ending in LL. That is, one never finds in these words a H+HL+L or a L+HL+L (where + indicates a morpheme boundary). This is accounted for in a cyclic analysis assuming that all noun-class suffixes have an underlying H tone. The only way a suffix will surface with a L tone is if a preceding L in the stem is free to associate by the Association Convention. If the L is already associated, then the H of the suffix will associate with that suffix. This rules out the possibility of forms like (6.4) being the output of

the lexical phonology in Foodo. (I have maintained the morpheme brackets to make clear where the prefixes and suffixes are.)

(6.4)

$$ {}^{*}\begin{bmatrix} \begin{bmatrix} \begin{bmatrix} \overset{L}{\underset{X}{|}} \end{bmatrix} \begin{bmatrix} \overset{H}{\underset{X}{|}} & \overset{L}{\underset{X}{\diagdown}} \overset{H}{\underset{}{|}} \end{bmatrix} \end{bmatrix} \overset{H}{\underset{X}{\diagdown}} \end{bmatrix} \quad \text{or} \quad {}^{*}\begin{bmatrix} \begin{bmatrix} \begin{bmatrix} \overset{H}{\underset{X}{|}} & \overset{L}{\underset{X}{\diagdown}} \overset{H}{\underset{X}{|}} \end{bmatrix} \end{bmatrix} \overset{H}{\underset{X}{\diagdown}} \end{bmatrix} $$

Since prefixes are affixed to stems on a cycle before suffixes, Prefix Delinking frees the L tone (in stems of one TBU) to associate with the suffix, as in (6.3). The rule of H-Deletion accounts for the lack of any application of L-Delinking which would create a downstepped H. In L tone stems of two TBUs, as in (6.1g), the L is not left floating after Prefix Delinking, which means the H of the suffix is free to associate. This sets up the environment for L-Delinking, ultimately resulting in a HH'HH tone pattern on these stems.

It would be difficult to account for the distributional constraint against a surface LL tone pattern with a non-cyclic analysis. If some suffixes are inherently toneless (as a non-cyclic analysis would imply), one would expect that when a suffix was affixed to two-syllable stems with underlying L or HL tone that a L would surface on the suffix. Such a hypothetical situation is illustrated in (6.5):

(6.5)

$$\left[\left[\begin{smallmatrix}^{HL}\\ \mid\\ X\end{smallmatrix}\right[\begin{smallmatrix}L\\ \mid\\ X\ X\end{smallmatrix}\right]\right]_X\right]\qquad\text{Association Convention}$$
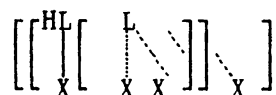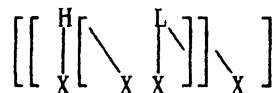
$$\left[\left[\begin{smallmatrix}^{H}\\ \mid\\ X\end{smallmatrix}\right[\begin{smallmatrix}L\\ \mid\\ X\ X\end{smallmatrix}\right]\right]_X\right]\qquad\begin{array}{l}\text{After application of}\\ \text{Prefix Delinking,}\\ \text{OCP Repair II, and}\\ \text{H-Spread}\end{array}$$

A non-cyclic analysis would account for such a lack of forms (ending in LL) by a generalization prohibiting stems of two or more syllables with underlying tone patterns of L and HL from taking toneless suffixes (and requiring that they take H tone suffixes). A non-cyclic analysis would thus have to account for a distributional property of Foodo nouns by means of a morphological constraint, whereas a cyclic analysis naturally accounts for the same distributional property without any additional constraints.

This section has shown the importance of cyclic application of tonal rules in the lexical phonology. It makes no claims that cyclic application is required in all languages, or even that there is no level in Foodo which is non-cyclic. The claim is only that on the level where nouns are formed, rules must be applied cyclically.

6.2 Tone-Bearing Unit

In this section I present alternatives to choosing [+syllabic] elements (V) as the TBU in Foodo, and show how each alternative (including the choice of V) has both strengths and weaknesses.

There are three phenomena relating to the choice of the TBU in Foodo, which any alternative should be able to handle adequately. The three phenomena are:

1) There are different kinds of long vowels (or syllables with long vowels). Some act like one TBU and others like two TBUs.

2) Most nasals do not act like they are TBUs, but the nasal prefix N- and the nasal suffix -ɱ do act like TBUs (i.e. they receive a tone distinct from their neighboring TBUs).

3) Prelinking of tones is needed in the lexicon.

Regarding the first phenomenon, long vowels normally behave like short vowels tonally. For example, when the L of stems with an underlying tone pattern of L gets delinked by H-Spread, the result is the same for stems with a short and long vowel, as shown in (6.6):

(6.6)

	Surface Form	UR of Stem	UL Tone of Stem	Gloss
a.	dɪ́bélɪ̀	bɛ	L	*palm nut*
b.	dɪ́bɔ́:lɪ̀	bɔ:	L	*shallow hole*

If long vowels were two TBUs instead of one (as is commonly seen in other languages where V is the TBU), then H-Spread would only spread to the first TBU resulting in *dɪ́bɔ̂:lɪ̀. To maintain the position that long vowels are two TBUs, the rule of H-Spread would need to be rewritten with some condition such as: spread the H to every TBU up to a C. Such a rule would suggest that the syllable, or perhaps the

syllable nucleus, might be a better choice as TBU, an issue which I discuss later in this section.

I have shown in this thesis that most long vowels act as one TBU. Still, there are examples where long vowels act as two TBUs. One example is the gerund of verbs like be:si (with underlying L) 'make a mistake'. There are two possible pronunciations of the gerund depending on the speaker, bíbé:s'é: or bíbê:sě: (see (4.7)). The form with falling tone suggests some speakers analyze the long vowel as two TBUs (see (4.12) for the derivation).[1]

The second phenomenon involves the tone-bearing status of nasals in the language. While it would be very rare for syllable initial nasals to bear tone in a language,[2] it is possible for nasals in coda position to bear tone. This does not seem to be the case in Foodo, however, for the same reason given for long vowels--the application of H-Spread with L tone stems. Thus, the L tone stem laN is realized dɩ́lándɩ̀ 'thigh' not *dɩ̀lãndɩ̀. But there are nasals in the language that do appear to bear tone. The nasal class prefix N- often receives a tone distinct from the stem as in ŋkéń 'day'.

The nasal class suffix -m also seems to be tone-bearing, though this is less obvious than the nasal prefix. The only time the -m suffix

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[1]These same speakers say dɩ́bɔ̂:lɩ̀ 'shallow hole' not *dɩ́bɔ̂:lɩ̀.

[2]Odden (1988b:14) claims this is an assumption of linguistic theory "since no language has been reported with tone-bearing syllable onset consonants."

may be L is when it is suffixed to a L tone one syllable stem.[3] This
creates a falling contour on the final syllable of a word as in ódû̀
'tail'.

Throughout my data (in this thesis and Appendix B) I indicate the
contour as v̂̀ (where v is a vowel) and not v̂̄ or v̂̀. Odden
(1988b:17) attributes to Larry Hyman the observation that "languages
with contour tones never contrastively mark the position within the
syllable where the tone rises or falls. Thus, no language contrasts the
hypothetical syllables ā̂ with à̂ or à̂." Partially due to my
analysis, and partially to my acoustic perception of the data, I mark
the fall as not occurring until the nasal. This whole point raises the
question as to whether the sequence Vm is one or two syllables. Hyman's
point (or Odden's, as it is not clear if the example is from Hyman or
Odden) assumes that Vm is one syllable. Any view of syllable based on
sonority would come to this conclusion. However, the fact that a nasal
bears tone in this position leads to the possibility that a Vm sequence
can be two syllables and not one. In my analysis I have assumed that
this is indeed the case initially, but at some stage (postlexically) in
the derivation it resyllabifies to one syllable (cf. section 2.2.1).

---

[3]The only way the suffix -m will not receive the H tone (which it has
underlyingly) is when there is a floating L in the stem which (by the
Association Convention) can associate with the -m. This parallels
precisely the instances involving the -li suffix, particularly example
(6.1a). The -m will not receive the H tone only in one syllable L tone
stems (after H-Spread). In two or more syllable stems, the L would
still be associated with a TBU of the stem (after H-Spread) and thus not
free to associate (by the Association Convention) to the suffix.

Example (6.7) shows that across a word boundary ódúm patterns similarly to words that clearly contain three TBUs, and not like words that have only two TBUs. (See example (3.26) for similar examples of (6.7a).)

(6.7)

	Pre- Pause	Before /H/ word	Before /L/ word	
a.	ódúm̀	ódú'm̄ gé	ódúm̀ dò	*tail*
b.	kúʝóù	kúʝó'ú gé	kúʝóù dò	*yam*
c.	óbê:	óbé: g'ê	óbé: dò	*child*

In (6.7c) the L tone only surfaces (directly) in pre-pause position. In (6.7a,b) the L tone surfaces in pre-pause position and before another L tone. Before a H in all three forms the L is reflected on the surface by a downstepped H. It is significant that in (6.7a,b) the downstep occurs on the word with the L tone, and not on the following word as in (6.7c). The above facts can easily be accounted for if the words have the form in (6.8) as the output of the lexical phonology.

(6.8)

tail   *yam*   *child*
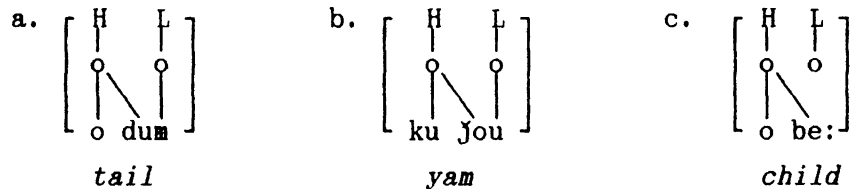
In the form for 'child', the L tone is associated by the postlexical rule of L-Docking before a pause. In other environments the L of óbê:

remains floating, which accounts for the fact that it remains H both before a word with H tone and a word with L tone. If the following word begins with a H tone, that H is downstepped due to the presence of the floating L in the preceding word (or more precisely due to the spread of the l on the Register Tier).

In the forms for 'tail' and 'yam' (6.8a,b), the L is associated in both cases. Therefore, before a pause and before a word beginning with a L tone, both words end in a falling tone. Before a word beginning with a H tone, the rule of L-Delinking applies as seen in (6.9). The result is that a 'H occurs at the end of both words.

(6.9)

$$
\left[\begin{array}{cc} H & L \\ | & | \\ \circ & \circ \\ | & | \\ \circ & dum \end{array}\right]\left[\begin{array}{c} H \\ | \\ \circ \\ | \\ g\epsilon \end{array}\right]
$$
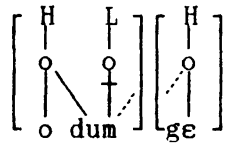
Tonally, words like ódúà (6.7a) behave like kújóù (6.7b) and not then, like óbê: (6.7c). The choice of TBU should reflect this similarity between ódúà and kújóù and the contrast between ódúà and óbê:.

The third phenomenon involves the need to prelink certain tones. In section 4.1 I have shown how one class of verb stems must be prelinked. There are other instances throughout this thesis where some stems require prelinking (particularly sections 4.7.1, 4.7.2, and

4.7.3). Whatever is chosen as the TBU must be available for prelinking in the underlying representation.

The solution proposed in this thesis has been to choose V as the TBU in Foodo. I call this the V solution. I have sought to handle the three phenomena in the following way. First, since most long vowels are only one TBU, I have analyzed these as VC. Those that are two TBUs, I analyze as VV. Second, the tone-bearing status of nasals is handled in a similar manner. Those nasals that are not tone-bearing I analyze as C, while those that are tone-bearing (the N- prefix and the -m suffix) I analyze as V. Third, prelinking is easily handled in an analysis where V is the TBU. Since I assume V and C to be in underlying form, the Vs are available in the underlying form to be prelinked.

One possible objection that could be raised with this analysis is the treatment of long vowels as VC. More importantly, it has been pointed out by many phonologists (most notably Levin (1985)) that the features V and C on the skeletal tier are redundant. The notion of syllabicity is already carried in the syllable structure by the node Nucleus, which is linked to the skeletal tier. In such a view, the skeletal tier is composed only of timing units (represented by X's). If this structure is assumed, then one solution would be to make the TBU the Nucleus or to specify which X's on the skeletal tier may sanction tones. I call this the Nucleus solution.

Such a solution would handle the first two phenomena involving
nasals and long vowels in similar ways to the V solution. Those nasals
which are TBU would be specially marked in the lexicon as having a
nucleus, as in (6.10).

(6.10)

```
N
|
X
|
m
```

The distinction between long vowels would be handled in a similar
manner as in (6.11):

(6.11)

```
    X   X              N
     \ /              |
      V          X  X  \ /
                 |      X
      b  ɔ       b  i   l  i
    One TBU        Two TBUs
```
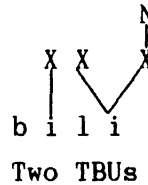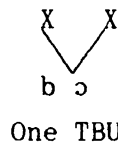
Only the case of two TBUs (the exceptional case) has the nucleus
specified in the underlying form. The complete structure would be
spelled out by syllabification rules to produce (6.12):

(6.12)

```
      N              N  N  N
     / \             |  |  |
    X   X            X  X  X
     \ /             |   \ /
      V              |    V
    b  ɔ           b  i   l  i
  One TBU            Two TBUs
```
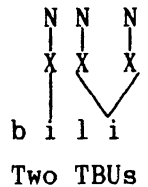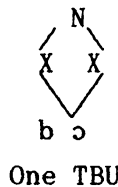
The Nucleus solution would analyze prelinked tones in a similar way as shown in (6.13):

(6.13)

```
    H   L
     \
       \
        N
        |
    X   X
    |   |
    b a l a
```
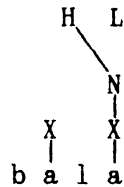
Basically, the only difference between the V solution and the Nucleus solution is moving the TBU up one level from the skeletal tier to the Nucleus. The two analyses both have a major weakness in the way they handle the nasal suffix -m. In order to make it tone-bearing it must be posited as syllabic underlyingly (either a V or associated with a Nucleus). Yet it would seem that at some point it must resyllabify to be part of the same syllable with the preceding vowel, since phonetically the only indication that the m could possibly be syllabic is its tone-bearing nature.

Furthermore, if it is true that the surface form of, say, ódúm has two syllables, it means this is a case of absolute neutralization. The specially marked suffix -m is later neutralized in the postlexical phonology, since all specially marked nasals at the end of words are not syllabic (i.e. they are on the surface C or a Coda depending on whether it is the V or Nucleus solution) on the surface. Such an absolute

neutralization is in violation of Kiparsky's Alternation Condition (see section 3.2.2).[4] This is the most problematic area of the V solution.[5]

An alternative solution to handling the three phenomena detailed above would be to consider the mora as the TBU. (I call this the Mora solution.) However, the basic definition of mora is that long vowels and closed syllables are two morae not one, which does not address the problem in Foodo that long vowels (and closed syllables) are normally one TBU.

A more viable solution would be to consider the syllable the TBU (the Syllable solution). This would give a straightforward explanation for why Vowel Coalescence results in one TBU where once there were two. This is handled by the V solution (i.e. in this thesis) by the rules of TBU Conflation and Contour Simplification. The Syllable solution would not need a rule like TBU Conflation. Resyllabification would take care of the reduction in TBUs, and only a rule similar to Contour Simplification would be needed.

---

[4]Since Kiparsky wrote his article before the advent of lexical phonology, it is not clear if he would have intended the Alternation Condition to hold in the postlexical phonology.

[5]The situation is even more complex than described here. Words which have a CVN stem with L tone which take a null suffix (like kútâŋ 'placenta') end in a contour just like the nouns with the -m suffix. I have not gathered sufficient data to be sure, but I believe such words behave tonally postlexically the same as words like ódúm 'tail'. This whole area needs further investigation.

The Syllable solution would naturally account for the fact that most long vowels are only one TBU. Those long vowels that are two TBUs would need to be specially marked, perhaps by designating the second V as in (6.14) from which two syllables would be constructed over the long vowel.

(6.14)

```
                  N
                  |
       V  V     V
       |    \   /
       |     \ /
    b  i  l   i
```
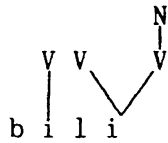
This solution has problems in that the surface forms of such long vowels, as well as -ṃ suffixes seem to be part of one syllable, not two. Thus, the -ṃ of ódúṃ would be marked syllabic in underlying form but resyllabify at some point in the derivation. At whatever stage where ódúṃ and óbê: resyllabify from three syllables to two the L tone would somehow need to remain linked in the case of ódúṃ and not in the case of óbê:.

Thus, the Syllable solution runs into the same problems as the V solution. An additional problem is how to handle prelinking if the syllable is the TBU . Generally, it is assumed that syllable structure is predictable from language specific rules, and thus syllable structure is not contained in underlying representation. Prelinking would require some syllables to be present in the underlying representation if the syllable is to be prelinked to a tone.

This section has examined three problematic phenomena bearing on what constitues a TBU in Foodo, and looked at four possible choices as the TBU in the language: the vowel, the nucleus, the mora, and the syllable. While each choice could handle most of the facts of the language, each choice has some shortcomings. It seems that current phonological theory has not adequately addressed the issue of what may constitute a TBU in various languages. No currently available theoretical construct adequately handles all the tonal facts of Foodo.

6.3 Summary

In this chapter I have looked at two theoretical issues. First, I have shown that cyclic application of rules is necessary to account for Foodo surface tones in nouns. Second, I discussed the problem of satisfactorily defining the TBU of Foodo. The problem centers around the tone-bearing unit status of nasal affixes and the apparent change in tone-bearing unit status after vowel coalescence between a stem-final vowel and a suffix.

This thesis has shown how the theoretical assumptions of autosegmental and lexical phonology are helpful in describing apparently very complex tonal patterns in Foodo nouns. The theoretical apparata have enabled the formulation of relatively simple and straightforward rules and the positing of simple underlying tones for both stems and affixes.

APPENDIX A

SUMMARY OF AFFIXES

This Appendix lists the underlying form of all prefixes and suffixes which occur on the Foodo nouns in my data (listed in Appendix B). For noun-class affixes, I give the class(es) with which the affix is usually used.[1] For derivational affixes, I give the definition. The abbreviated representation used for the morpheme in Appendix B is given below the class or definition. The lack of an affix is indicated in Appendix B by stating that the form has no prefix or no suffix.

NOUN-CLASS PREFIXES

H L	H L	H L	H L
O	a	kU	dI
Class 1	Class 2	Class 3	Class 5
	Class 4		
Abbr. O-		Abbr. kU-	Abbr. dI-
	Abbr. a-		

---

[1]Occasional irregularities of the system are not noted in the definitions.

```
H L                L                H L                H L
  |                |                  |                  |
  I                I                 ka                  N
```

Class 6   Class 6   Class 7   Class 8
                                                         Class 9

Abbr. I-   Abbr. I- L   Abbr. ka-
                                                         Abbr. N-

```
H L
  |
 bI
```

Class 9
(Gerunds)

Abbr. bI-

NOUN-CLASS SUFFIXES

```
   H                H                 H                  H
                    |                                    |
                    |                                    |
   a                a                 m                  m
```

Classes 1, 2,   Class 7   Classes 1, 2,   Class 8
4, 6, 7, 8, 9   4, 6, 8, 9   Class 9
                   Abbr. -*a   (Gerunds)
Abbr. -a   Abbr. -m
                                                         Abbr. -*m

```
H L                H                 H                  H
```

ana   U   lI   dI

Class 2   Class 3   Class 5   Class 5

Abbr. -ana   Abbr. -U   Abbr. -lI   Abbr. -dI

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H	H	H	H
I	nO	nO	lO
Class 5	Class 4	Class 9	Class 1[3]
	Class 6	(Gerunds)[2]	Class 4
Abbr. -I	Class 8		Class 8
		Abbr. -n*O	
	Abbr. -nO		Abbr. -lO

H
|
yɛ

Class 6
(1 Word)

Abbr. -yɛ

DERIVATIONAL SUFFIXES

L	L		H L
wɔ	teNde	bi	sɛ
Agentive suffix	[+ATR]	[+ATR]	Class 8 Plural Extension suffix
Abbr. -wɔ	[-H-Spread]	Diminutive suffix	Abbr. -sɛ
	Locative suffix	Abbr. bi	
	Abbr. -teNde		

[2]This suffix replaces the second syllable (1I) of the stem.

[3]There is only one example of this suffix in Class 1.

L

sɛ

Adjective
suffix[4]

Abbr. -sɛ L

---

[4]This suffix is only found on the plural of 'peanut' ŋkákásě: Class 8 (see section 4.7.2 for analysis) and the word kàlɔ́lɔ́sâ: 'bile' Class 7.

APPENDIX B

LIST OF DATA

This appendix lists the data of all nouns collected between April
1989 and March 1991 in Sèmèrè, Republic of Benin. For a list of the
names of the principal sources for this data see section 1.2 of the
thesis.

The forms listed in this appendix are citation forms as they are
pronounced in pre-pausal position. The phonetic transcriptions in this
data are generally broad and leave out certain allophonic processes.

One of these is vowel centralization, which occurs between two
consonants in a phonological word. Nasalized vowels nor the [+ATR]
variant of /a/ are also not indicated in the data. These are discussed
in section 2.2.3. Nasals are always homorganic with a following
consonant. Before l the resulting nasal is a lateral nasal, [l̃].
Before w the resulting nasal is a velar nasal with rounded lips, [ŋʷ].
I transcribe the [l̃] as n and the [ŋʷ] as ŋ. The following l or w will
make it clear that the nasal is realized as either a lateral nasal or a
rounded velar nasal.

Both d and t are alveolar stops in Foodo. č and ǰ represent
alveopalatal affricates. A voiced palatal glide is transcribed as y. A

raised ^{y} and ^{w} represent slight glides which occur between a high or mid vowel and a. Any combination of velar and bilabial stop (oral or nasal) represents a double articulation (i.e. **kp** is a voiceless labio-velar stop). The vowels ι, ε, ɔ, and ʋ represent [-ATR] variants of i, e, o, and u respectively. All other phonetic symbols follow IPA.

Tone is indicated by the accents ´ (high), ` (low), ^ (falling), and �‌ˇ (rising) above the vowel (or nasal when the nasal is a separate morpheme). 'v̌ indicates a downstepped high. [1]

The data is arranged by Agreement Class. Within each class, the nouns are subdivided by the affixation on each noun (prefixes and suffixes). The prefix and suffix is given in an abbreviated form in this appendix. Please refer to Appendix A for the full underlying representation of each prefix and suffix. For each entry, the surface form is first given, followed by the underlying segmental form of the stem, then the underlying tone of the stem,[2] followed by the gloss. A plus (+) in the underlying form (both segmental and tone) indicates a compound stem.

---

[1]Ls in utterance final position immediately preceded by another L are falling. This is a regular phonetic process, which I have systematically ignored in my phonetic transcriptions.

[2]For about ten forms, the underlying tones are not accounted for. These are marked with two question marks (??). See section 4.7.3 of the thesis for the explanation of why these underlying tones are not accounted for.

An asterisk (*) in the underlying tone indicates the following tone is prelinked. The prelinking is to be interpreted as being to the second TBU of the stem, unless there is an asterisk in the underlying stem as well, in which case the starred tone is prelinked to the immediately following vowel. Two examples are shown in (B-1) below:

(B-1)

```
dɔwɛ   *HL                    busul*uwɔ     *LHL
H  L                          L  H  L
 \                             \
  \                             \
  dɔwɛ                          busuluwɔ
```

There are a few examples where there are two asterisks in the stem of an underlying form. This means that the tone is prelinked to both starred TBUs.

[-P-Del] is an abbreviation to indicate that the stem is an exception and does not undergo the rule of Prefix Delinking.

Class 1 Nouns

Surface Form	Stem	Tone	Gloss

No prefix, no suffix

Surface Form	Stem	Tone	Gloss
àkpà?	akpa	L	*tire*
čòkòtò	čokoto	L	*pants(sg)*
hì:ʝè?	hi:ʝe	L	*wedding*
là:kpàlɩ̀	la:kpalɩ	L	*truth*
lòtòlò	lotolo	L	*throat*
lɔ̀kɔ̀	lɔkɔ	L	*well*
pàpà~pà:pà	papa	L	*fan*
wà:lɩ̀	wa:lɩ	L	*awale*
àdá?	ada	LH	*machete*
àgú	agu	LH	*cat*
čè:čé?	čɛ:čɛ	LH	*bicycle*
čèčá	čeča	LH	*traditional cloth*
čùká?	čuka	LH	*type of dance*
gɔ̀:ʝɩ́?	gɔ:ʝɩ	LH	*neem tree*
gù:gá?	gu:ga	LH	*well bucket*
kùntú	kuNtu	LH	*sheet*
tèɲʝú	teNʝu	LH	*straw hat*
dèfèlí	defeli	*LH	*pillow*
ʝàŋàsɩ́	ʝaŋasɩ	*LH	*chameleon*
tèkènté	tekeNte	*LH	*veil*
àlɩ́kùkù	alɩkuku	LHL	*pigeon*
fà:wɩ̂:~fàwɩ̂:	fa:wɩ	LHL	*chat*
fɩ̀tɩ́là	fɩtɩla	LHL	*lamp*
gɔ̂:lɔ̀	gɔɔlɔ	LHL	*cola*
hàwê:	hawe:[3]	LHL	*paternal aunt*
kòdólòkò	kodoloko	LHL	*bridge*
ʝàná^{y}ɩ̀sà	ʝan*a*ɩsa	L*HL	*burial*
čàʝà:lê	čaʝa:lɛ	*LHL	*light*
lòkòtólò	lokotolo	*LHL	*hospital*
tòlót'óló	tolo+tolo	LH+LH	*turkey*
àgúbí^y'á^w	agu+biau[4]	LH+HLH	*cat*
bó:sí^{y}á	bo:sia	H	*bowl*
čútú	čutu	H	*rhinoceros*
fálándɩ́	falaNdɩ	H	*quarter*
gádó~gódó	gado	H	*bed*
gúndí	guNdi	H	*lion*
ʝíɲá:lɩ́	ʝiɲa:lɩ	H	*feast*

---

[3]The plural **hàwé:'ánà** shows the long vowel is from the stem and not the result of a suffixal **-a.**

[4]**biau** is onomatopoeic for the sound a cat makes. This accounts for the unusual tonal pattern and the unusual vowel cluster.

Class 1 Nouns

Surface Form	Stem	Tone	Gloss

No prefix, Suffix -a

Surface Form	Stem	Tone	Gloss
čàndĕ:	čaNdɛ	L	*buffalo*
nàndĕ:	naNdɛ	L	*squirrel*
sàndĕ:	saNdɛ	L	*sheep*
tàndĕ:	taNdɛ	L	*lizard*
bìɲJé:	biNJe	LH	*horse*
làŋɔ́:~lɔ̀ŋɔ́:	laŋɔ	LH	*hare*
dànɩnsɛ́:	danɩNse	*LH	*pot*
àdák'á:	adaka	LHL	*suitcase*
bàlâ:	bala	LHL	*monkey*
kpà:lô:	kpa:lo	LHL	*hawk*
kpàsɔ̂:	kpasɔ	LHL	*leopard*
lèŋâ:~làŋâ:	leŋa	LHL	*frog*
ɲàmɩ́l'é:	ɲamɩle	LHL	*heart*
sàmɩ́l'é:	samɩle	LHL	*porcupine*
wèJíy'á:	weJiya	LHL	*harmattan*
sùŋmkpɩ́dê:	suN+kpɩdɩ	L+*HL	*rat*
bùsùlùwɔ̂:	busul*uwɔ	*LHL	*dust*
tàndùwɔ̂:	taNduwɔ	*LHL	*beard*
kpɔ́ŋɔ́:	kpɔŋɔ	H	*entrance hall*
dál'é:	dalɛ	HL	*dream*
ŋmá:w'ɔ́:	ŋma:wɔ	HL	*rice*
sálàŋɔ̌:	salaŋɔ	HL	*end of rainy season*
sɩ́s'á:	sɩsa	HL	*people*
wúl'á:	wula	HL	*chief*
dɔ́wê:	dɔwe	*HL	*partridge*
kpɩ́dê:	kpɩdɩ	*HL	*dog*
JíJ'â:	JiJa	??	*elephant*
kpɩ́:l'úwɔ̂:	kpɩ:luwɔ	??	*boat*

No prefix, Suffix -m

Surface Form	Stem	Tone	Gloss
Jàsàḿ	Jasa	L	*fly*
ɲàlàḿ	ɲala	L	*crab*
ŋmàsàḿ	ŋmasa	L	*bee*
yùkùḿ	yuku	L	*God*
fɩ̀ntáḿ	fɩNta	LH	*rock*
kèlém̀	kele	LHL	*chicken*
wɔ̀lúm̀	wɔlu	LHL	*nail*
líndʼáḿ	liNda	HL	*root*
nɔ́ndɔ́l'úm̀	nɔNdɔlu	*HL	*tongue*
témpèlém̀	teNpele	HLHL	*roach*

Class 1 Nouns

Surface Form	Stem	Tone	Gloss
óbê:	bi	L	*child*
ɔ̀bʋ̀l'é:	bʋlɛ	L	*old man*
ɔ̀bɔ̂:	bɔ	L	*hole*
óbúk'á:	buka	L	*daughter-in-law*
óbúnd'é:	buNde	L	*corpse*
ɔ̀čámb'ɔ̂:	čaNbɔ	L	*grave*
ɔ̀fê:	fɛ	L	*rope*
ɔ̀fɔ̂:	fɔ	L	*foreigner*
ɔ̀ɉâ:	ɉa	L	*fire*
ókpê:	kpe	L	*witch*
óɲê:	ɲe	L	*mother*
ɔ̀sê:	sɛ	L	*father*
ɔ̀súmb'ɔ̂:	sʋNbɔ	L	*miser*
ɔ̀támb'ɔ̂:	taNbɔ	L	*blind person*
ówê:	we	L	*sun*
ɔ̀čànná:	čaNna	LH	*friend*
òbìčísê:	bi+či:se	L+*HL	*daughter*
òbìɲísê:	bi+ɲʋse	L+*HL	*son*
òbó:	bo	H	*room*
ɔ̀búlɔ́:	bulɔ	H	*voice*
ɔ̀fé:	fe	H	*broom*
ɔ̀kpá:	kpa	H	*road/path*
ɔ̀lɔ́:	lɔ	H	*sore*
ɔ̀kúnàmbɔ̌:	kʋnaNbɔ	HL	*leper*
òpúl'é:	pule	HL	*hedgehog*
òyô:	yo[6]	HL	*thief*
òčíbʋ̀l'é:	či:+bʋle	H+L	*old woman*
ɔ̀čúfɔ̂:	čufɔ	*HL	*buttock*
ɔ̀súmbɔ̂:	sʋNbɔ	*HL	*messenger*

---

[6]This is similar to the verb **yu:li** (*HL) 'steal'.

Class 1 Nouns

Surface Form	Stem	Tone	Gloss
Prefix -O, Suffix -m			
ɔ̌čúm̀	ču	L	*mustard*
ódúm̀	du	L	*tail*
ɔ́ná:m̀	na:	L	*grandparent;grandchild*
ɔ́ɲɩ̀m̀	ɲɩ	L	*nail*
ɔ́sá:m̀	sa:	L	*son-in-law;parent-in-law*
òčí:ḿ	či:	H	*woman*
ɔ̀lʊ́ḿ	lʊ	H	*strength*
ɔ̀ɲɩ̀ḿ	ɲɩ	H	*man*
ɔ̀ŋmáḿ	ŋma	H	*nose*
ɔ̀ŋmɩ̀ɲɩ̀ḿ	ŋmɩɲɩ	H	*mosquito*
ɔ̀čám̀	ča	HL	*guinea fowl*

Prefix -O, no suffix

Surface Form	Stem	Tone	Gloss
ɔ̌čʊ́lʊ̀	čʊlʊ	L	*brother-in-law of older sister*
ókúlò	kulo	L	*husband*
ɔ́pɩ̂	pɩ	L	*house*
ɔ́sénɔ̀	sɛnɔ[7]	L	*hip*
ɩ̀kénɔ́	kɛnɔ	H	*boundary*
òyúló	yulo	H	*cold*
òdúlò	dulo	HL	*grainery*
ɔ̀lɔ́lɔ̀	lɔlɔ	HL	*penis*

---

[7]Since the plural, ɩ̀sénɔ̀, also shows the nO, I consider it part of the stem and not a suffix.

Class 1 Nouns

Surface Form	Stem	Tone	Gloss

Prefix -O, Derivational Suffix -wɔ, and Noun-class Suffix -a

Surface Form	Stem	Tone	Gloss
ɔ̆čá:w'ɔ̆:	ča:	L	dancer
ɔ̆čésɩ̆wɔ̆:	česɩ	L	cutter
ɔ̆čɔ́lɩ̆wɔ̆:	čɔlɩ	L	fetiche worshiper
ɔ̆dálɩ̆wɔ̆:	dalɩ	L	greeter
ɔ̆dɔ́:w'ɔ̆:	dɔ:	L	farmer
ódûŋwɔ̆:	duŋE	L	biter
ɔ̆fé:sɩ̆wɔ̆:	fe:sɩ	L	rester
ójíw'ɔ̆:	ji	L	eater
ɔ̆kɔ́:w'ɔ̆:	kɔ:	L	defecater
ɔ̆sálɩ̆wɔ̆:	salʋ[8]	L	farmer
ɔ̆sɔ́:w'ɔ̆:	sɔ:	L	buyer
ɔ̆sɔ̂ŋwɔ̆:	sɔŋE	L	fighter
ɔ̆tâŋwɔ̆:	taŋE	L	forgeter
ɔ̆tɔ̂w'ɔ̆:	tɔ	L	payer
ɔ̆tú:w'ɔ̆:	tu:	L	hunter
ɔ̀čáwɔ̂:	ča	H	healer
ɔ̀dá:wɔ̂:	da:	H	taster
ɔ̀féwɔ̂:	fe	H	merchant
ɔ̀fúlúwɔ̂:	fulɩ	H	cleaner
ɔ̀fúŋwɔ̂:	fuŋE	H	whistler
ɔ̀gbɩ́lɩ́wɔ̂:	gbɩlɩ	H	blacksmith
ɔ̀kálɩ́wɔ̂:	kalɩ	H	counter
ɔ̀láŋwɔ̂:	laŋE	H	drummer
ɔ̀lúwɔ̂:	lu	H	weaver
ɔ̀pɔ́lúwɔ̂:	pɔlɩ	H	potter;builder
ɔ̀čɔ́sɩ̆wɔ̆:	čɔsɩ	HL	beginner
ɔ̀dɩ́w'ɔ̆:	dɩ	HL	sleeper
ɔ̀fúw'ɔ̆:	fʷɩ[9]	HL	one who throws things away
ògbéliwɔ̆:	gbeli	HL	bather
ònûŋwɔ̆:	nuŋE	HL	drinker
ɔ̀tɔ́lɩ̆wɔ̆:~ɔ̀tɔ́lùwɔ̆:	tɔlɩ	HL	epileptic (i.e. faller)
ɔ̀dɩ́náw'ɔ̆:	dɩna	*HL	cook (i.e. boiler)
ɔ̀féyɩ́w'ɔ̆:	feyɩ	*HL	sweeper
ɔ̀fúlí:w'ɔ̆:	fuli*i	*HL	jumper
ògbélí:w'ɔ̆:	gbeli*i	*HL	merchant
ɔ̀káŋw'ɔ̆:	kaŋE	*HL	speaker
ɔ̀kɩ́:w'ɔ̆:	kɩɩ	*HL	searcher

[8]To my knowledge, there is no verb salʋ currently used in the language.

[9]I do not know why the vowel and labialized stop change in the agentive form.

Class 1 Nouns

Surface Form	Stem	Tone	Gloss
ɔ̀kúlúw'ɔ́:	kʊlʊ	*HL	*one who prays*
ɔ̀kpándáw'ɔ́:	kpaNda	*HL	*mixer*
òmʷíw'ɔ́:[10]	mʷii	*HL	*sucker*
ɔ̀sáŋw'ɔ́:	saŋE	*HL	*untier/unbinder*
ɔ̀télêŋwɔ́:	tɛlɛŋE	*HL	*one who is late*
òyú:líw'ɔ́:	yu:li	*HL	*thief (i.e. stealer)*

Prefix -O, Derivational Suffix -teNde, and Noun-class Suffix -a

Surface Form	Stem	Tone	Gloss
ɔ́bá:tèndě:	ba:	L	*place for sewing*
ɔ́fɛ́:sɪ̀tèndě:	fɛ:sʊ	L	*place for resting*
ɔ́gbʊ́:tèndě:	gbʊ:	L	*place for singing*
ɔ́kɔ́:tèndě:	kɔ:	L	*place for excreting*
ókúsìtèndě:	kusi	L	*place of consultation*
ɔ́sɔ́ntèndě:	sɔŋE	L	*place for fighting*
ɔ̀dá:tèndě:	da:	H	*place for tasting*
ɔ̀dátèndě:	da	H	*place for playing*
ɔ̀fʊ́lʊ́tèndě:	fʊlʊ	H	*place for cleaning*
ɔ̀lántèndě:	laŋE	H	*place for playing (drums)*
ɔ̀čɔ́sɪ̀tèndě:	čɔsʊ	HL	*place for beginning*
ɔ̀dʊ́tèndě:	dʊ	HL	*place for sleeping*
ɔ̀tɔ́lʊ̀tèndě:	tɔlʊ	HL	*place for falling*
òčínátèndě:	čina	*HL	*place for sitting*
ɔ̀féyʊ̀tèndě:	fɛyʊ	*HL	*place for sweeping*
òfúlí:tèndě:	fuli*i	*HL	*place for jumping*
ɔ̀kálʊ̀tèndě:	kala	*HL	*place for counting*
ɔ̀kántèndě:	kaŋE	*HL	*place for speaking*
ɔ̀kúlʊ́tèndě:	kʊlʊ	*HL	*place for praying*
òpúlátèndě:	pula	*HL	*cemetery*

Prefix -ka, no suffix

Surface Form	Stem	Tone	Gloss
kàsʊ́	sʊ	H	*earth*

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[10] I am unsure of the length of the stem vowel in this form.

Class 2 Nouns

Surface Form	Stem	Tone	Gloss
Prefix a-, no suffix			
áčúlɩ̀	čʊlɩ	L	*brother-in-laws of older sisters*
ákúlò	kulo	L	*husbands*
Prefix a-, Suffix -a			
ábê:	bi	L	*children*
ábɩ̀l'é:	bʊlɛ	L	*old men*
ábúk'á:	buka	L	*daughters-in-law*
áfɔ̂:	fɔ	L	*foreigners*
áɲê:	ɲe	L	*mothers*
ásê:	sɛ	L	*fathers*
ásúmb'ɔ́:	sʊNbɔ	L	*misers*
átámb'ɔ́:	taNbɔ	L	*blind people*
àčànná:	čaNna	LH	*friends*
àbìčísê:	bi+či:sɛ	L+*HL	*daughter*
àbìɲísê:	bi+ɲʊsɛ	L+*HL	*sons*
àkúnàmbɔ̌:	kunaNbɔ	HL	*lepers*
àčíbɩ̀l'é:	či:+bʊlɛ	H+L	*old women*
àsúmbɔ̂:	sʊNbɔ	*HL	*messengers*
Prefix a-, Suffix -m̩			
áná:m̀	na:	L	*grandparents; grandchildren*
ásá:m̀	sa:	L	*son-in-laws; parent-in-laws*
àčí:m̀	či:	H	*women*
àɲɩ́m̀	ɲʊ	H	*men*
Prefix a-, Suffix -lo			
àfɔ́lɔ́	fɔ	H	*boys*

Class 2 Nouns

Surface Form	Stem	Tone	Gloss

Prefix **a-**, Derivational Suffix **-wɔ**, and Noun-class Suffix **-a**

Surface Form	Stem	Tone	Gloss
áčá:w'ɔ:	ča:	L	dancers
áčésɩwɔ̌:	česɩ	L	cutters
áčɔ́lɩwɔ̌:	čɔlɩ	L	fetiche worshipers
ádálɩwɔ̌:	dalɩ	L	greeters
ádɔ́:w'ɔ:	dɔ:	L	farmers
ádûŋwɔ̌:	duŋE	L	biters
áfɛ́:sɩwɔ̌:	fɛ:sɩ	L	resters
áɟíw'ɔ:	ɟi	L	eaters
ákɔ́:w'ɔ:	kɔ:	L	defecaters
ásálɩ̀wɔ̌:	salu[11]	L	farmers
ásɔ́:w'ɔ:	sɔ:	L	buyers
ásɔ̂ŋwɔ̌:	sɔŋE	L	fighters
átâŋwɔ̌:	taŋE	L	forgeters
átɔ́w'ɔ:	tɔ	L	payers
átʊ́:w'ɔ:	tʊ:	L	hunters
àčáwɔ̂:	ča	H	healers
àdá:wɔ̂:	da:	H	tasters
àfɛ́wɔ̂:	fɛ	H	merchants
àfʊ́lʊ́wɔ̂:	fʊlɩ	H	cleaners
àgbɩ́lɩ́wɔ̂:	gbɩlɩ	H	blacksmiths
àkálɩ́wɔ̂:	kalɩ	H	counters
àláŋwɔ̂:	laŋE	H	drummers
àlúwɔ̂:	lu	H	weavers
àpɔ́lúwɔ̂:	pɔlɩ	H	potters;builders
àčɔ́sɩwɔ̌:	čɔsɩ	HL	beginners
àdɩ́w'ɔ:	dɩ	HL	sleepers
àfʊ́w'ɔ:	fʷɩ[12]	HL	persons who throw things away
àgbélɩ̀wɔ̌:	gbeli	HL	bathers
ànûŋwɔ̌:	nuŋE	HL	drinkers
àtɔ́lɩwɔ̌:~àtɔ́lɩ̀wɔ̌:	tɔlɩ	HL	epileptics (i.e. fallers)
àdɩ́náw'ɔ:	dɩna	*HL	cooks (i.e. boilers)
àfɛ́yɩw'ɔ:	fɛyɩ	*HL	sweepers
àfʊ́lí:w'ɔ:	fuli*i	*HL	jumpers
àgbélí:w'ɔ:	gbeli*i	*HL	merchants
àkʊ́lʊ́w'ɔ:	kʊlɩ	*HL	people who pray
àkáŋw'ɔ:	kaŋE	*HL	speakers

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[11]To my knowledge, there is no verb **salʊ** currently used in the language.

[12]I do not know why the vowel and labialized stop change in the agentive form.

Class 2 Nouns

Surface Form	Stem	Tone	Gloss
àkʊ́:wꞌɔ̀:	kʊʊ	*HL	*searchers*
àkpándáwꞌɔ̀:	kpaNda	*HL	*mixers*
àmʷíwꞌɔ̀:[13]	mʷii	*HL	*suckers*
àsáŋwꞌɔ̀:	saŋE	*HL	*untiers/unbinders*
àtélêwɔ̀:	telɛŋE	*HL	*people who are late*
àyú:líwꞌɔ̀:	yu:li	*HL	*thieves (i.e. stealers)*

No prefix, Suffix -ana

àkpǎ:nà	akpa	L	*tires*
àdá:nà	ada	LH	*machetes*
àgʷá:nà	agu	LH	*cats*
àdákꞌá:nà	adaka	LHL	*suitcases*
àlʊ́kʊ̀kʷǎ:nà	alʊkʊkʊ	LHL	*pigeons*
hàwé:ꞌánà	hawe:	LHL	*paternal aunts*
àgúbíʸꞌáʷánà	agu+biau	LH+HLH[14]	*cats*
áfꞌá:nà	afa	HL	*pigs*
àlìčídꞌílá:nà	alićidili	??	*ablution pots*

Prefix a-, Suffix -ana

àɲɔ́ʷánà	ɲɔ	H	*twins*

Prefix ka-, Suffix -a

kádʊ́ʸà	dʊ[15]	L	*people*

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[13]I am unsure of the length of the stem vowel in this form.

[14]**biau** is onomatopoeic for the sound a cat makes. This accounts for the unusual tonal pattern and the unusual vowel cluster.

[15]This stem takes the prefix **ka-** (Class 7), but takes agreement markers for Class 2. There is no corresponding singular for this word.

Class 3 Nouns

Surface Form	Stem	Tone	Gloss
Prefix kU-, Suffix -U			
kúbɔ̀ù	bɔ	L	*neck*
kíčéù~kúčéù	če	L	*rainy season*
kúfáù	fa	L	*grass*
kújóù	jo	L	*yam*
kúlá:l'ú:	la:lʊ	L	*baobab*
kɔlɔ̀tɔ́ʊ	lɔtɔ [-P-Del]	L	*goiter*
kúɲát'áú	ɲata	L	*tool*
kúpí:'ú	pʊʊ	L	*forest*
kúsúsùlǔ:	susulu	L	*sweat*
kítá:ù	ta:	L	*cloth*
kítí:ù~kútí:ù	tʊ:	L	*goat*
kúyû:	yi	L	*tree*
kùsɔ̀ŋɔ́:	sɔŋɔ[16]	LH	*heat*
kìtě:t'éú~kùtě:t'éú	tɛɛtɛ	LHL	*feather*
kùtɔ̀fútɔ̀ù	tɔfut*ɔ	L*HL	*animal*
kùbá:ú	ba:	H	*arm*
kùfélú:	fɛlʊ	H	*moon;month*
kìná:ú~kùná:ú	na:	H	*cow*
kùsú:	su	H	*ear*
kùtáú	ta	H	*bow*
kùwɔ́:ú	wɔ:	H	*snake*
kùkéù	ke	HL	*false mahogany*
kìɲí:s'ú:~kùɲí:s'ú:	ɲi:su	HL	*sand*
kùyéù	yɛ	HL	*cheek*
kùfádáù	fada	*HL	*leaf*
kùífáù[17]	ʊfa	*HL	*millet leaf*
kùpúdû:	puNdu	*HL	*hat*

Prefix kU-, Suffix -U alternating with -m			
kùsúnd'ú:~kùsúnd'úm̀	suNdu	HL	*mat*

[16]Since stems that take kU- invariably take either no suffix or -U, I posit that this also takes the suffix -U, but through the influence of the stem ɔ, it assimilates. This is the only case where this happens. Usually, the stem vowels assimilates to the suffix -U (cf. kúyû: with stem yi).

[17]This form is unusual (both in the singular and the plural, see àˠɩ́fâ: in Class 4 for the plural) as it seems to be affixing noun-class markers on a stem that already has the noun-class prefix I- (cf. kúfáù/ɩ́fâ: 'grass').

Class 3 Nouns

Surface Form	Stem	Tone	Gloss
No prefix, No suffix			
kùnùŋ	kunuN[18]	L	*language*
No prefix, Suffix -a			
čɩ̀čàkɔ̀:	čɩčakɔ	*LHL	*farmhouse*
Prefix kU-, no suffix			
kúlûŋ	luN	L	*animal pen*
kɩ́tâŋ	taN	L	*forgetfulness*
kɩ́tâŋ~kútâŋ	taN	L	*placenta*

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[18]The plural is ɩ̀kùnùŋ which shows that the ku is part of the stem and not the suffix kU- as would be expected.

Class 4 Nouns

Surface Form	Stem	Tone	Gloss
Prefix a-, Suffix -a			
ábê:	bɛ	L	*palm nuts*
ábê:	bi	L	*units/seeds*
ábɔ̂:	bɔ	L	*necks*
áčê:	čɛ	L	*beans*
ágbâ:	gba	L	*markets*
álá:l'é:	la:lɩ	L	*baobabs*
ánsê:	Nsi	L	*eyes*
áɲát'á:	ɲata	L	*tools*
áɲén'é:	ɲɛnɛ	L	*tiredness*
áɲê:	ɲi	L	*teeth*
áɲɔ́w'ɔ́:	ɲɔwɔ	L	*breasts*
áyê:	yi	L	*trees*
áyô:	yu	L	*millet*
àsàndìbé:	saNdɩ+bi [-P-del]	L+L	*lambs*
àkɔ̀:lé:	kɔ:lɩ	LH	*drums*
àfùdâ:	fʋda	LHL	*lungs*
àsà:lâ:	sa:la	LHL	*molars*
àsɔ̀nsɔ̂:	sɔNsɔ	LHL	*insects*
àtàlâ:	tala	LHL	*palm branches;door*
àtɔ̀fútɔ̂:	tɔfʋt*ɔ	L*HL	*animals*
àdá:	da	H	*blood*
àmó:	mu	H	*heads*
àsé:	si:	H	*horns*
àsɔ́:	sʋ	H	*ears*
àtá:	ta	H	*bows*
àbʷê:	bu	HL	*rocks*
àʝúl'é:	ʝʋlɩ	HL	*baboons*
àkpê:	kpi	HL	*kind of bird*
àlɩ̀kùɲʝa:	lɩkʋNʝa	HL	*bats*
àwál'é:	walɩ	HL	*testicles*
àyê:	yɛ	HL	*cheeks*
àná:bé:	na:+bi	H+L	*calves*
àʸɩ̀fâ:[19]	ɩfa	*HL	*millet leaves*
àkɔ́ɲʝâ:	kɔNʝa	*HL	*slaves*
àkpákpâ:	kpakpa	*HL	*shoulders*
àsímbê:	siNbi	*HL	*works*
àčú:l'â:	ču:la	HL*HL[20]	*mushrooms*

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[19]This form is unusual (both in the singular and the plural, see kùɩ̀fáù in Class 3 for singular) as it seems to be affixing noun-class markers on a stem that already has the noun-class prefix I- (cf. kúfáù/ɩ̀fâ: 'grass').

Class 4 Nouns

Surface Form	Stem	Tone	Gloss
Prefix a-, Suffix -m̀			
ábél'ém̄	beleN	L	*devils*
ábɔ́:m̀	bɔ:	L	*holes not deep*
áčím̀	čiN	L	*veins*
áfʊ́m̀	fʊ	L	*wind*
áfʊ́l'ʊ́m̄	fʊlʊ	L	*millet stalks*
ákám̀	kaN	L	*chests*
ákʊ́m̀	kuN	L	*fists*
ákʊ́m̀	ku	L	*hunger*
álám̀	laN	L	*thighs*
àlɔ̀tɔ́m̄	lɔtɔ [-P-Del]	L	*goiters*
álʊ̀m̀	lʊN	L	*animal pens*
ápʊ́:'m̄	pʊʟ	L	*forests*
ásí:m̀	si:	L	*termites*
átá:m̀	ta:	L	*cloths*
àtɔ̀mpɔ́m̄	toNpoN [-P-Del]	L	*vaginas*
áwúm̀	wu	L	*bones*
áyá:m̀	ya:	L	*legs*
àpùlúm̄	pulu	LH	*navels*
ànàntàlám̄	naNtala	*LH	*sandals*
àtĕ:t'ém̄	teete	LHL	*feathers*
àbá:m̄	ba:	H	*arms*
àbʊ́:m̄	bʊ:	H	*mountains*
àbɔ́m̄	bɔ	H	*falsehood*
àgbɔ́:m̄	gbɔ:	H	*fogs*
àɲʊ́m̄	ɲʊN	H	*names*
àsóm̄	so	H	*ashes*
àwɔ́:m̄	wɔ:	H	*snakes*
àbɔ́l'ʊ́m̄	bɔlu	HL	*eggs*
àŋmíl'ím̄	ŋmili	HL	*knees*
àsúnd'úm̄	suNdu	HL	*mats*
àyém̀	yɛ	HL	*mice*
àfádàm̀	fada	*HL	*leaves*
àŋmámbʊ́:'m̄	ŋmaNbʊ:	*HL	*fleas*
àpúndúm̀	puNdu	*HL	*hats*

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[20]The only way to account for the placement of the downstep in this word is to posit a very unusual underlying tone.

Class 4 Nouns

Surface Form	Stem	Tone	Gloss
Prefix a-, Suffix -lO			
ákpálɔ̀	kpa	L	*proverbs*
àfélɔ́	fɛlʋ	H	*months*
àwúlɔ́	wʋ	H	*animal skins*
Prefix a-, Suffix -nO			
ásánɔ̀	sa	L	*fields*
ásínò	si	L	*abcesses*
àčànɔ́	ča	LH	*towns*
àkànɔ́	ka	LH	*crickets*
àkɔ́:nɔ́	kɔ:la	H	*hunchbacks*
àkɔ́:nɔ́	kɔ:lʋ	H	*backs*
àpúnó	pu	H	*stomaches*
àpánɔ̀	pa	HL	*pounded yams*
àsʋkpʋ́nɔ̀	sʋkpʋ	*HL	*foreheads*
Prefix a-, No suffix			
átâŋ	taN	L	*placentas*
ànɔ̀ɲčɔ́lɔ́	nɔNčɔlɔ	LH	*saliva*
Prefix a-, Derivational Suffix -bi, Noun-class Suffix -a			
àdàmbě:	daN [-P-Del]	L	*roads*
ánsíb'é:	Nsi	L	*lips*
ápúlùbě:	pulu	L	*intestines*
àkìmbé:	kiN	LH	*fish(pl)*
àlùmbé:	luN	LH	*medicines*
àŋmà:lʋ́bé:	ŋma:lʋ	LH	*letters of alphabet*
àsùmbé:	suN	LH	*words*
àwèlèbé:	wele	*LH	*princes*
àbá:bé:	ba:	H	*fingers*
àfélébé:	fɛlʋ	H	*stars*
ànámbé:	naN	H	*toes*
àŋmámbé:	ŋmaN	H	*hairs*
àtó:bé:	to:	H	*clitorises*
àčú:b'é:	ču:	HL	*anuses*

Class 5 Nouns

Surface Form	Stem	Tone	Gloss
			Prefix dI-, Suffix -lI

Prefix dI-, Suffix -lI

Surface Form	Stem	Tone	Gloss
dɩ́bɛ́lɩ̀	bɛ	L	*palm nut*
díbílì	bi	L	*unit/seed*
dɩ́bɔ́:lɩ̀	bɔ:	L	*hole not deep*
dɩ́čélɩ̀	če	L	*bean*
dúfúl'ɩ̀:	fulu	L	*millet stalk*
dɩ́gbálɩ̀	gba	L	*market*
dɩ́kpálɩ̀	kpa	L	*proverb*
dínsílì	Nsi	L	*eye*
díɲílì	ɲi	L	*tooth*
dɩ́ɲɔ́w'ɔ́lɩ̀	ɲɔwɔ	L	*breast*
dúpɔ́:lɩ̀	pɔ:	L	*weariness*
dúpú:lɩ̀	pu:	L	*Djougou*
dísí:lì	si:	L	*termite*
dúwúlì	wu	L	*bone*
dɩ́yálɩ̀	ya:	L	*leg*
dúyúlì	yu	L	*millet seed*
dùkɔ́:dɩ́lɩ́	kɔ:lɩ	LH	*drum*
dɩ̀nàntàdɩ́lɩ́	naNtala	*LH	*sandal*
dùfùdálɩ̀	fuda	LHL	*lung*
dɩ̀sà:lálɩ̀	sa:la	LHL	*molar*
dɩ̀sɔ̀nsɔ́lɩ̀	sɔNsɔ	LHL	*insect*
dɩ̀tàlɩ́lɩ̀	tala	LHL	*palm branch*
dɩ̀bɩ́:lɩ́	bɩ:	H	*mountain*
dìčí:gbélí	či:gbe	H	*filth*
dùfɔ́lɩ́	fɔ	H	*boy*
dùgbɔ́:lɩ́	gbɔ:	H	*fog*
dùkɔ́lɩ́	kɔ	H	*credit*
dùkɔ́:dɩ́lɩ́	kɔ:lɩ	H	*back*
dùmúlí	mu	H	*head*
dìsí:lí	si:	H	*horn*
dùwúlɩ́	wu	H	*animal skin*
dùbúlì	bu	HL	*rock*
dùjúd'úlɩ́	julɩ	HL	*baboon*
dìkpílì	kpi	HL	*kind of bird*
dɩ̀dɩ́kùɲàlɩ́	lɩkuNJa	HL	*bat*
dɩ̀pálɩ̀	pa	HL	*pounded yam*
dɩ̀wád'ɩ́lɩ́	walɩ	HL	*testicle*
dɩ̀yélɩ̀	yɛ	HL	*mouse*
dɩ̀kɔ́ɲálɩ̀	kɔNJa	*HL	*slave*
dɩ̀kpákpálɩ̀	kpakpa	*HL	*shoulder*
dɩ̀ŋmámbɩ́:l'ɩ̀	ŋmaNbɩ:	*HL	*flea*

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Class 5 Nouns

Surface Form	Stem	Tone	Gloss
dìsímbílì	siNbi	*HL	work
dìčú:l'álì	ču:la	HL*HL[21]	mushroom

Prefix **dI-**, Suffix **-dI**

Surface Form	Stem	Tone	Gloss
díbél'éndí	beleN	L	devil
díčíndì	čiN	L	vein
dɩ́kándɩ̀	kaN	L	chest
dúkúndì	kuN	L	fist
dɩ́lándɩ̀	laN	L	thigh
dɩ́sádɩ̀	sa	L	field
dísídì	si	L	abcess
dìtòmpòndí	toNpoN [-P-Del]	L	vagina
dɩ̀čàdɩ́	ča	LH	town
dɩ̀kàdɩ́	ka	LH	cricket
dìbídí	bi	H	darkness
dɩ̀ɲɩ́ndɩ́	ɲɩN	H	name
dùpúdí	pu	H	stomach
dɩ̀sɩ́kpɩ́dɩ̀	sɩkpɩ	*HL	forehead

Prefix **dI-**, Suffix **-I**

Surface Form	Stem	Tone	Gloss
dùpùlí:	pulu	LH	navel
dùbɔ́l'ɩ́:	bɔlu	HL	egg
dìŋmíl'í:	ŋmili	HL	knee

No prefix, Suffix **-a**

Surface Form	Stem	Tone	Gloss
díč'ó:	dičo	HL	sieve

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[21]The only way to account for the placement of the downstep in this word is to posit a very unusual underlying tone.

Class 5 Nouns

Surface Form	Stem	Tone	Gloss

Prefix dI-, Derivational Suffix -bi and Noun-class Suffix -lI

Surface Form	Stem	Tone	Gloss
dìdàmbìlí	daN [-P-Del]	L	*road*
dínsíb'ílí	Nsi	L	*lip*
dúpúlùbìlí	pulu	L	*intestine*
dìkìmbílí	kiN	LH	*fish*
dìlùmbílí	luN	LH	*medicine*
dìnɔ̀ɲčɔ́lɔ́bílí	nɔNčɔlɔ	LH	*saliva*
dìŋmà:lɩ́bílí	ŋma:lɩ	LH	*letter of alphabet*
dùsùmbílí	suN	LH	*word*
dùwèlèbílí	wele	*LH	*prince*
dɩ̀bá:bílí	ba:	H	*finger*
dìfélébìlí	felɩ	H	*star*
dɩ̀námbílí	naN	H	*toe*
dɩ̀ŋmámbílí	ŋmaN	H	*hair*
dìtó:bílí	to:	H	*clitoris*
dùčú:b'ílí	ču:	HL	*anus*

Class 6 Nouns

Surface Form	Stem	Tone	Gloss
Prefix I-, No suffix			
ìsénɔ̀	sɛnɔ[22]	L	*hips*
ìkénɔ̀	kenɔ	H	*boundaries*
ìdúlò	dulo	HL	*graineries*
ìlɔ́lɔ̀	lɔlɔ	HL	*penises*
Prefix I-, Suffix -nO			
ípúnò	pu	L	*belly*
Prefix I-, Suffix -ye			
ìpɩ́y'é	pɩ	L	*houses*
Prefix I-, Suffix -a			
ìbɔ̂:	bɔ	L	*holes*
íbúnd'é:	buNde	L	*corpses*
ìčámb'ɔ́:	čaNbɔ	L	*graves*
ìfâ:	fa	L	*grasses*
ìfê:	fɛ	L	*ropes;cotton*
ìɉâ:	ɉa	L	*fires*
íɉô:	ɉo	L	*yams*
íkpê:	kpe	L	*witches*
íwê:	we	L	*suns*
ìmè:lé:	mɛ:le	LH	*nasal mucus*
ìbó:	bo	H	*rooms*
ìbúlɔ́:	bulɔ	H	*voices*
ìfé:	fɛ	H	*brooms*
ìkpá:	kpa	H	*roads/paths*
ìlɔ́:	lɔ	H	*sores*
ìsé:	sɩ	H	*ground*
ìkê:	kɛ	HL	*false mahoganies*
ìpúl'é:	pule	HL	*hedgehogs*
ìyô:	yo[23]	HL	*thieves*
ìčúfɔ̂:	čufɔ	*HL	*buttocks*

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[22]Since the singular, ɔ́sénɔ̀, also shows the nO, I consider it part of the stem and not a suffix.

[23]This is similar to the verb **yu:li** (*HL) 'steal'.

Class 6 Nouns

Surface Form	Stem	Tone	Gloss
Prefix I-, Suffix -m			
ìčúm̀	ču	L	*mustards*
ídúm̀	du	L	*tails*
íǰís'ím̀	ǰisi	L	*smoke*
ìɲùm̀	ɲu	L	*nails*
ìtù:m̀	tu:	L	*goats*
ìčá:m̀	ča:	H	*pubic hairs*
ìfúm̀	fu	H	*body hair*
ìlúm̀	lu	H	*song*
ìná:m̀	na:	H	*cows*
ìnúm̀	nu	H	*meat*
ìŋmám̀	ŋma	H	*noses;hair*
ìŋmùɲùm̀	ŋmuɲu	H	*mosquitos*
ìčám̀	ča	HL	*guinea fowls*

Prefix I-, Derivational Suffix -wɔ and Noun-class Suffix -a

ìfúŋwɔ̀:	fuŋE	H	*whistlers*

Prefix I-, Derivational Suffix -teNde and Noun-class Suffix -a

Surface Form	Stem	Tone	Gloss
ìbá:tèndě:	ba:	L	*places for sewing*
ìfé:sùtèndě:	fɛ:su	L	*places for resting*
ìgbù:tèndě:	gbu:	L	*places for singing*
ìkɔ́:tèndě:	kɔ:	L	*places for excreting*
íkúsìtèndě:	kusi	L	*places of consultation*
ìsɔ́ntèndě:	sɔnE	L	*places for fighting*
ìdá:tèndě:	da:	H	*places for tasting*
ìdátèndě:	da	H	*places for playing*
ìfúlùtèndě:	fulu	H	*places for cleaning*
ìlántèndě:	laŋE	H	*places for playing (drums)*
ìčɔ́sùtèndě:	čɔsu	HL	*places for beginning*
ìdùtèndě:	du	HL	*places for sleeping*
ìtɔ́lùtèndě:	tɔlu	HL	*places for falling*
ìčínátèndě:	čina	*HL	*places for sitting*
ìféyùtèndě:	fɛyu	*HL	*places for sweeping*
ìfúlí:tèndě:	fuli*i	*HL	*places for jumping*
ìkálùtèndě:	kala	*HL	*places for counting*
ìkántèndě:	kaŋE	*HL	*places for speaking*
ìkúlùtèndě:	kulu	*HL	*places for praying*
ìpúlátèndě:	pula	*HL	*cemeteries*

Class 6 Nouns

Surface Form	Stem	Tone	Gloss

Prefix I- L, No suffix

Surface Form	Stem	Tone	Gloss
ìčòkòtò	čokoto	L	*pants(pl)*
ìhì:ʤèʔ	hi:ʤe	L	*weddings*
ɩ̀kὺnὺŋ	kunuŋ	L	*languages*
ɩ̀là:kpàlɩ̀	la:kpalɩ	L	*truths*
ìlòtòlò	lotolo	L	*throats*
ɩ̀lɔ̀kɔ̀	lɔkɔ	L	*wells*
ɩ̀pàpà~ɩ̀pà:pà	papa	L	*fans*
ɩ̀wà:lɩ̀	wa:lɩ	L	*awales*
ɩ̀čὲ:čéʔ	če:če	LH	*bicycles*
ɩ̀čèčá	čeča	LH	*traditional cloth(pl)*
ɩ̀čùkáʔ	čuka	LH	*type of dance(pl)*
ɩ̀gɔ̀:ʤɩ́ʔ	gɔ:ʤɩ	LH	*neem trees*
ìgù:gáʔ	gu:ga	LH	*well buckets*
ɩ̀kὺntú	kuNtu	LH	*sheets*
ìtèɲʤú	teNʤu	LH	*straw hats*
ìdèfèlí	defeli	*LH	*pillows*
ɩ̀ʤàŋàsɩ́	ʤaŋasɩ	*LH	*chameleons*
ìtèkènté	tekeNte	*LH	*veils*
ɩ̀fà:wɩ̂:~ɩ̀fàwɩ̂:	fa:wɩ	LHL	*chats*
ɩ̀fɩ̀tɩ́là	fɩtɩla	LHL	*lamps*
ɩ̀gɔ̌:lɔ̀	gɔɔlɔ	LHL	*colas*
ìkòdólòkò	kodoloko	LHL	*bridges*
ɩ̀ʤàná^yɩ̀sà	ʤan*a*ɩsa	L*HL	*burials*
ìlòkòkólò	lokotolo	*LHL	*hosptials*
ìtòlót'óló	tolo+tolo	LH+LH	*turkeys*
ìbó:sí^yá	bo:sia	H	*bowls*
ìčútú	čutu	H	*rhinoceros(pl)*
ɩ̀fálándɩ̀	falaNdɩ	H	*quarters*
ìgádó~ìgódó	gado	H	*beds*
ìgúndí	guNdi	H	*lions*
ìʤíŋá:lɩ̀	ʤiŋa:lɩ	H	*feasts*
ɩ̀kpálɩ́bá	kpalɩba	H	*bottles*
ɩ̀kpáŋá	kpaŋa	H	*tibias*
ɩ̀sɔ́bɔ́lɔ́	sɔbɔlɔ	H	*mosquito nets*
ɩ̀télɔ́	telɔ	H	*story[24]*
ìtógóló	togolo	H	*windows*
ìzílígí~ìsílígí	ziligi	H	*trains*
ɩ̀lá:mà	la:ma	HL	*numbers*
ɩ̀tá^yɩ̀	taɩ	HL	*sling shots*
ɩ̀tɩ́là	tɩla	HL	*Korans*
ìví:yàyà~ìfí:yàyà	vi:yaya	HL	*swings*

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[24]The Foodo word is a plural form with a singular meaning.

Class 6 Nouns

Surface Form	Stem	Tone	Gloss
ìdó:mâ	do:ma	*HL	beginning of rainy seasons
ìsílíbà?	sιlιba	*HL	pots
ìtákàlàdá	tak*al*ada	H*LH	papers/books
ìkpál'ákpálà	kpala+kpala	HL+HL	mats
ìkálàŋ'ábéʸι	kalaŋabeι	??	cripples

Prefix I- L, Suffix -a

ìčàndě:	čandε	L	buffalos
ìnàndě:	naNde	L	squirrels
ìsàndě:	saNde	L	sheep(pl)
ìtàndě:	taNde	L	lizards
ìbìɲJé:	biNJe	LH	horses
ìfù:lé:	fu:le	LH	whistling
ìlàŋó:~ìlɔ̀ŋó:	laŋo	LH	hares
ìdànιnsé:	danιNse	*LH	pots
ìbàlâ:	bala	LHL	monkeys
ìkpà:lô:	kpa:lo	LHL	hawks
ìkpàsɔ̂:	kpasɔ	LHL	leopards
ìlèŋâ:~ìlàŋâ:	leŋa	LHL	frogs
ìɲàmίl'é:	ɲamιle	LHL	hearts
ìsàmίl'é:	samιle	LHL	porcupines
ìwèJíy'á:	weJiya	LHL	harmattans
ìsùŋmkpίdê:	suN+kpιdι	L+*HL	rats
ìbίlιJâ:	bιlιJa	*LHL	pastes(of sorghum)
ìčίčàkɔ̂:	čιčako	*LHL	farmhouses
ìtàndùwɔ̂:	taNduwo	*LHL	beards
ìkpóŋó:	kpoŋo	H	entrance halls
ìdál'é:	dale	HL	dreams
ìŋmá:w'ɔ́:	ŋma:wo	HL	rice(pl)
ìsálàŋɔ́:	salaŋo	HL	end of rainy seasons
ìdɔ́wê:	dowe	*HL	partridges
ìkpίdê:	kpιdι	*HL	dogs
ìJíJ'â:	JiJa	??	elephants
ìkpί:l'úwɔ̂:	kpι:luwo	??	boats

Class 6 Nouns

Surface Form	Stem	Tone	Gloss

Prefix I- L, Suffix -m

Surface Form	Stem	Tone	Gloss
ìɈàsám̀	Ɉasa	L	*flies*
ìɲàlàm̀	ɲala	L	*crabs*
ìŋmàsàm̀	ŋmasa	L	*bees*
ìfʊntám̀	fʊNta	LH	*rocks*
ìkèlém̀	kɛlɛ	LHL	*chickens*
ìwɔlúm̀	wɔlʊ	LHL	*nails*
ìlínd'ám̀	liNda	HL	*roots*
ìnɔ́ndɔ́l'úm̀	nɔNdɔlʊ	*HL	*tongues*
ìtémpèlém̀	teNpɛlɛ	HLHL	*roaches*

Class 7 Nouns

Surface Form	Stem	Tone	Gloss
No prefix, no suffix			
káká	kaka	H	*peanut*
kɔ́lɔ̀	kɔlɔ	HL	*river*
No prefix, Suffix -a			
kálá:	kala	H	*fence*
kéč'é:	keče	HL	*black bean*
ká:s'â:	ka:sa	HL*HL	*cayman*
Prefix kU-, Suffix -U			
kɔ́nɔ́ù	nɔ	L	*mouth*
Prefix ka-, No suffix			
káčâ:	ča:[25]	L	*dance*
kàyúlà	yula	HL	*body*
kèʸɩ̀tâ	ɩta[26]	*HL	*evening*

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[25]This is from the verb ča: 'to dance'.

[26]This is one of the few cases of a noun stem beginning with a vowel.

Class 7 Nouns

Surface Form	Stem	Tone	Gloss
Prefix **ka-**, Suffix **-a**			
kágbâ:	gba	L	*chair*
káɟâ:	ɟa	L	*wood*
kékpóʷà	kpo	L	*sorcery*
kélíʸà	li	L	*funeral*
káɲâ:	ɲa	L	*night*
kásâ:	sa	L	*dowry*
kásúʷà	su	L	*year*
kásúl'á:	sʊla	L	*load*
kèbìdá:	bida	LH	*girl*
kàfʊ̀ntáɲá	fʊNtaN	LH	*rock*
kèlèbá:	leba	LH	*jar*
kètè:bá:	te:ba	LH	*scarf*
kɔ̀nɔ̀ŋmgbɔ́w'á:	nɔNgbɔwa	LHL	*chin;jaw*
kàdɔ́ʷá	dɔ:	H	*field*
kàfúŋá	fʊN	H	*side*
kàkɔ́:lá:	kɔ:la	H	*hunchback*
kɔ̀kɔ́:lá:	kɔ:la	H	*bump*
kàlúwá:	lʊwa	H	*loom*
kàná:	na	H	*scorpion*
kàpá:	pa	H	*noon*
kàsúlá:	sʊla	H	*hearth*
kàwúlá:	wʊla	H	*skin;cloud*
kòbún'á:	buna	HL	*entrance*
kàbúʷà	bu	HL	*game*
kàčɔ́ʷà	čɔ:	HL	*ax*
kàkúnàmbǎ:	kunaNba	HL	*leprosy*
kàɲí:s'á:	ɲi:sa	HL	*sand*
kàsá:làsǎ:	sa:lasɛ	HL	*calabash for water*
kàwâ:	wa	HL	*calabash*
kèyúʷà~kàyúʷà	yu	HL	*theft*
kàbánâ:	bana	*HL	*courtyard*
kàbúmbút'á:	buNbuta	*HL	*madness*
kàtúlâ:	tʊla	*HL	*large hoe*

Class 7 Nouns

Surface Form	Stem	Tone	Gloss

Prefix **ka-**, Suffix **-*a**

Surface Form	Stem	Tone	Gloss
kàbàᵞ ̩ᵞá	balʊ [-P-Del]	L	*wall*
kábɔ́ʷà	bɛ:	L	*palmtree*
kéké ᵞ'á	kɛ:	L	*basket*
kéɲéŋ'á	ɲɛN	L	*morning*
kàsàndìbì ᵞá	sandʊ+bi [-P-Del]	L+L	*lamb*
kèkì ᵞá	ki	LH	*knife*
kèbìdí ᵞ'á	bidi	LHL	*little girl*
kàčàlʊ́ ᵞ'á	čalʊ	LHL	*village*
kàčɔ̀bʊ́ ᵞ'á	čɔbʊ	LHL	*gnat*
kèkě: ᵞ'á	kɛlɛ	LHL	*chick*
kèyèlíŋ'á	yeliN	LHL	*branch*
kèkéŋá	keN	H	*day*
kàtʊ́ŋá	tʊN	H	*compound*
kàbʷʊ́ ᵞ'á	bʷʊ	HL	*bird*
kàsʊ́ ᵞ'á	sʊ	HL	*scar*
kàná:bí ᵞ'á	na:+bi	H+L	*calf*
kèpí: ᵞ'á	pili:	*HL	*jar*
kèkpídí ᵞ'á	kpʊdʊ	*HL	*puppy*

Prefix **ka-**, Diminutive suffix **-bi** and Noun-class suffix **-*a**

kàtúlúb'í ᵞá	tʊla	*HL	*hoe*

Prefix **ka-**, Adjective suffix **-sɛ** L and Nounclass suffix **-a**

kàlɔ́lɔ́sâ:[27]	lɔlɔ	H	*bile*

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[27]Since there is no corrseponding plural for this word, I cannot be sure that the **sa** is not part of the stem. I analyze this as having the adjective suffix **-sɛ** because this word has the same stem as the adjective 'bitter' which for Class 1 is ɔ̀lɔ́lɔ́. I do not have the form of this adjective for Class 7 so I cannot compare it for the word for bile. As stated in section 4.7.2, mid front vowels in Class 7 are replaced by the vowel **a** before the suffix **-a**. In this form H-Spread applies from the stem to the adjective suffix. In ŋ̀kákásě: and in many adjectives with **-sɛ** H-Spread does not apply. Further research is necessary to make any firm conclusions about the adjective suffix.

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Class 8 Nouns

Surface Form	Stem	Tone	Gloss

Prefix N-, Suffix -a

Surface Form	Stem	Tone	Gloss
ŋmgbâ:	gba	L	*chairs*
ɲɟâ:	ɟa	L	*wood(pl)*
ɲlê:	li	L	*funerals*
ɲnɔ̂:	nɔ	L	*mouths*
ɲsô:	su	L	*years*
ɲsʊ́l'á:	sʊla	L	*loads*
m̀bìdé:	bida	LH	*girls*
ǹlèbé:	leba	LH	*jars*
ǹtè:bé:	te:ba	LH	*scarves*
ǹnɔ̀ŋmgbɔ́w'á:	nɔNgbɔwaa	LHL	*chins;jaws*
ǹná:	na	H	*scorpions*
ǹsʊ́lá:	sʊla	H	*hearths*
m̀bún'á:	buna	HL	*entrances*
m̀bʷê:	bʊ	HL	*game(pl)*
ǹsá:làsɛ̌:	sa:lasɛ	HL	*calabashes for water*
ǹsê:	sʋ	HL	*scars*
ŋwê:	wa	HL	*calabash*
m̀bánâ:	bana	*HL	*courtyards*
ǹtʊ́lâ:	tʊla	*HL	*large hoes*

Prefix N-, Diminutive Suffix -bi and Noun-class Suffix -*m

Surface Form	Stem	Tone	Gloss
ǹtʊ́lúb'í:m̄	tʊla	*HL	*hoes*

Prefix N-, Suffix -lo

Surface Form	Stem	Tone	Gloss
ŋwʊ́lɔ́	wʊla	H	*skins;clouds*

Prefix N-, Suffix -m

Surface Form	Stem	Tone	Gloss
ŋbɛ́:m̀	bɛ:	L	*palmtrees*
ŋkɛ́:m̀	kɛ:	L	*baskets*
m̀bʊ̀lɨ́:m̀	bulu[28]	LHL	*illnesses/diseases*
ǹdɔ́:m̄	dɔ:	H	*fields*
ŋ̀fʊ́m̄	fʊN	H	*sides*
ɲčɔ́:m̀	čɔ:	HL	*axes*

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[28]I do not know why the second vowel of the stem becomes front in the plural form. The singular is **bʊ̀lɔ̂:** (Class 9), which suggests the stem has a back vowel.

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Class 8 Nouns

Surface Form	Stem	Tone	Gloss
Prefix N-, Suffix -*m			
m̀bàlʊ̀:m̄	balʊ [-P-Del]	L	*walls*
ŋ̀kì:m̄	ki	LH	*knives*
m̀bìdí'm̄	bidi	LHL	*little girls*
ɲ̀čàlʊ́'m̄	čalʊ	LHL	*villages*
ɲ̀čɔ̀bʊ́'m̄	čɔbʊ	LHL	*gnats*
ŋ̀kèlé:'m̄	kɛlɛ	LHL	*chicks*
ɲ̀yèlí'm̄	yeliN	LHL	*branches*
ŋ̀kém̄	keN	H	*days*
ǹtɪ́m̄	tʊN	H	*compounds*
m̀bʷʊ́'m̄	bʷʊ	HL	*birds*
ŋ̀mkpídí'm̄	kpʊdʊ	*HL	*puppies*
m̀pílí:'m̄	pili:	*HL	*jars*
Prefix N-, Suffix -nO			
ŋ̀kɔ́:nɔ́	kɔ:la	H	*bumps*
Prefix N-, Plural Extension Suffix -se and -a			
ŋ̀kálásê:	kala	H	*fences*
ŋ̀kéč'é:sê:	keče	HL	*black beans*
ŋ̀kɔ́l'ɔ́sê:	kɔlɔ	HL	*rivers*
ŋ̀wúl'ásê:	wula	HL	*chiefs*
ŋ̀yúl'ásê: [29]	yula	HL	*bodies*
ŋ̀ká:s'ásê:	ka:sa	HL*HL	*caymans*
Prefix N-, Adjective Suffix -se L and Noun-class Suffix -a			
ŋ̀kákásɛ̌: [30]	kaka	H	*peanuts*

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[29] In this form the nasal prefix is exceptionally realized as a velar nasal not as a palatal nasal.

[30] Both H-Spread and L-Delinking do not apply to this form. It is possible that this is not a proper plural of peanuts. Usually people refer to the plural with the singular form, as if it were a mass noun.

Class 9 Nouns

Surface Form	Stem	Tone	Gloss
No Prefix, Suffix -a			
bɩlɩ́jâ:	bɩlɩja³¹	*LHL	*paste (of sorghum)*
bùlɔ̂:	bulu³²	HL	*illness/disease*
Prefix N-, No suffix			
m̀búló	bu	H	*urine*
Prefix N-, Suffix -a			
m̀bɔ̂:	bɔ	L	*brain*
ńsɔ̂:	sɔ	L	*salt*
ńtâ:	ta	L	*drink*
ńnô:čǒ:	noo+čo	L+L	*mother's milk*
ŋ̀fɔ́:	fɔ	H	*red oil*
ŋ̀kó:	ko	H	*oil*
n̄ná:čô:	na:+čo	H+L	*milk*
n̄súsúč'ó:	nu+su+čo	H+L+L	*tears*
Prefix N-, Suffix -m			
m̀bí:ḿ	bi:	H	*excrement*
j̀čɔ́ḿ	čɔ	H	*water*
n̄tál'áḿ	tala	HL	*palm wine*

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³¹Since the plural is ɩ̀bɩlɩ́jâ: (Class 6), this form has no suffix and should be in Class 1. It is probably in Class 9 due to the similarity with the bI- prefix for gerunds which take Class 9 agreement.

³²As with bɩlɩ́jâ:, this word is probably in Class 9 due to the similarity the gerund bI- prefix. The plural m̀bùlɩ́:ɩ̀ (Class 8) shows that bu is part of the stem.

Class 9 Nouns (Gerunds)

Surface Form	Stem	Tone	Gloss
bɩ̀bâ:	ba	L	*come*
bɩ̀bál'á:	bala	L	*bring/carry*
bíbé:s'é:~bíbê:sě:	be:si~beesi	L	*make a mistake*
bɩ̀bɔ̂:~búbɔ̂:	bɔ	L	*hatch;roughcast*
bíbúŋ'é:~búbúŋ'é:	buŋE	L	*cover;sit (on eggs); wrap up*
bɩ̀búŋ'é:~búbúŋ'é:	buŋE	L	*crow*
bɩ̀čúŋ'é:~búčúŋ'é:	čuŋE	L	*leave;pass*
bɩ̀čés'é:	česɩ	L	*cut/butcher*
bɩ̀čál'á:	čala	L	*help*
búčɔ̂:l'é:~búčɔ̂:lě: ³³	čɔ:lɩ	L	*deny*
bɩ̀čɔ̂t'é:~búčɔ̂t'é:	čɔtɩ	L	*wash (clothes)*
bíčúk'é:~búčúk'é:	čuki	L	*wrinkle*
bɩ̀dá:l'é:~bɩ̀dâ:lě:	da:lɩ~daalɩ	L	*lie down/spread out*
bídúŋ'é:~búdúŋ'é:	duŋE	L	*bite*
bɩ̀fé:s'é:~bɩ̀fê:sě:	fe:sɩ~feesɩ	L	*rest*
bɩ̀fét'é:	fetɩ	L	*fan;blow (wind)*
búfɔ̂: (*bɩ̀) ³⁴	fʊ	L	*arrive*
bɩ̀gbâ:	gba	L	*put on smth*
bɩ̀gbɔ̂: (*bú)	gbɔ	L	*rot*
bɩ̀há:w'é:	ha:wɩ	L	*disturb/annoy*
bɩ̀ʝâ:	ʝa	L	*hunt/chase away*
bíʝê:	ʝi	L	*eat*
bɩ̀ʝún'é:~búʝún'é:	ʝunɩ	L	*think*
bɩ̀ké:s'é:~bɩ̀kê:sě:	ke:sɩ~keesɩ	L	*turn aside*
bɩ̀kát'é:	katɩ	L	*shut out;come across*
bíké:l'é:~bíkê:lě:	ke:li~keeli	L	*go round*
bíkús'é:~búkús'é:	kusi	L	*ask (question)*
bɩ̀kpɩ̀t'é:	kpɩtɩ	L	*tighten*
bɩ̀kpɩ̀tɩ̀lǎ:	kpɩtɩla	L	*approach*
bílút'é:~búlút'é:	luti	L	*take off*
bɩ̀ɲɩ̀ŋ'é:	ɲɩŋE	L	*wring out*

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³³This form may also begin with bɩ̀.

³⁴For most gerunds of verbs with round vowels, there is free variation of the noun-class prefix (bi~bu or bɩ~bʊ). For some gerunds of verbs with round vowels, however, there is only one possible surface form of the prefix. For those instances where the prefix must be round (bu or bʊ) I place a starred form of the unrounded prefix (*bi or *bɩ) to indicate that the form may not have an unrounded prefix. Similarly, I place a starred rounded prefix (*bu or *bʊ) to indicate the form must have an unrounded prefix (bi or bɩ).

Class 9 Nouns (Gerunds)

Surface Form	Stem	Tone	Gloss
bɪ̀ɲɔ́t'έ:~búɲɔ́t'έ:	ɲɔtʋ	L	burn;light
bɪ̀pɔ̂:~búpɔ̂:	pɔ	L	knead
bɪ̀sέ:d'έ:~bɪ̀sɛ̂:dɛ̌:	sɛ:dʋ~sɛɛdʋ	L	comb
bɪ̀sáŋ'έ:	saŋE	L	be left/leave
bísíŋ'έ:	siŋE	L	shut
bɪ̀sɔ́ŋ'έ:~búsɔ́ŋ'έ:	sɔŋE	L	fight;put on (clothing)
búsô: (*bí)	su	L	cry/weep
bɪ̀táŋ'έ:	taŋE	L	forget
bítít'έ:	titi	L	bump into
bɪ̀tɪ́lʋ̀kɛ̌:	tʋlʋkʋ	L	smash/crush
bɪ̀tɔ̂:~bútɔ̂:	tɔ	L	pay
bɪ̀túl'á:~bútúl'á:	tʋla	L	find/recover
bɪ̀wás'έ:	wasʋ	L	boil (intr.)
bíwélèsɛ̌:	welesi	L	listen to
búwô: (*bí)	wu	L	see
bɪ̀yɛ̂:	yɛ	L	share/divide
bɪ̀yâ:	ya	L	put/place
bɪ̀yɔ̂:~búyɔ̂:	yɔ	L	accompany
búyɔ́:s'έ:~búyɔ̂:sɛ̌: [35]	yɔ:sʋ~yɔɔsʋ	L	slacken
bɪ̀bá:	ba	H	split
bɪ̀bó:~bùbó:	bu	H	harvest
bɪ̀čá:	ča	H	cure; carry on shoulders
bɪ̀čɔ́:~bùčɔ́:	čɔ	H	be big
bɪ̀dá:	da	H	play;rain;hit
bɪ̀fá:	fa	H	dry (tr.)
bɪ̀fɛ́:	fɛ	H	sell
bɪ̀fúŋé:~bùfúŋé:	fuŋE	H	blow/whistle;honk
bɪ̀gbá:	gba	H	float
bɪ̀kɔ́: (*bù)	kɔ	H	fight
bɪ̀kpá:	kpa	H	shake out; dig up/harvest (yams)
bìkpé:	kpe	H	go home;flow
bɪ̀láŋé:	laŋE	H	play (drum)
bɪ̀lɔ́:~bùlɔ́:	lʋ	H	weave
bìnó:~bùnó:	nu	H	hear/understand
bɪ̀ɲɛ́:	ɲɛ	H	receive/find
bɪ̀sá:	sa	H	give
bɪ̀sɔ́:~bùsɔ́:	sɔ	H	meet (tr.)
bɪ̀sɔ́ŋé:~bùsɔ́ŋé:	sɔŋE	H	shine (of sun)
bìsúŋé:~bùsúŋé:	suŋE	H	send (someone)
bɪ̀tá:	ta	H	finish/be used up
bɪ̀táŋé:	taŋE	H	greet/thank

[35]This form may also begin with bɪ̀.

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Class 9 Nouns (Gerunds)

Surface Form	Stem	Tone	Gloss
bìtɔ́:~bùtɔ́:	tɔ	H	singe
bìbús'é:~bùbús'é:	busi	HL	repeat;add
bìčí:d'é:	či:di	HL	shake/stir
bìčɔ́s'é:~bùčɔ́s'é:	čɔsʋ	HL	begin
bìfʷê:~bùfʷê:	fʷʋ	HL	throw away
bìgbá:n'é:	gba:nʋ	HL	be silent
bìká:s'é:	ka:sʋ	HL	spit
bìkí:l'á:	ki:la	HL	give back
bìkó:d'é:~bùkó:d'é:	ko:di	HL	bend/fold;hem
bìkpás'é:	kpasʋ	HL	pour
bìlé:l'é:	le:li	HL	last;delay
bìnúŋ'é:~bùnúŋ'é:	nuŋE	HL	drink
bìtál'á:	tala	HL	conclude
bìtánl'á:	taNla	HL	swear
bìtá:s'é:	ta:sʋ	HL	scratch (ground)
bìtékìlǎ:	tekila	HL	touch
bìtú:l'é:~bùtú:l'é:	tu:li	HL	stumble
bìwá:n'é:	wa:nʋ[36]	HL	yawn
bìwánlâ:	waNla	HL	want/love
bìwí:l'é:	wi:li	HL	stare at
bìwê:~bùwê:	wʋ	HL	chew
bìyás'é:	yasʋ	HL	spread out
bìbálâ:	bala	*HL	hide (intr. & tr.)
bìbíê:	bii	*HL	become black
bìbílíê:	bili*i	*HL	turn round
bìbɔ́lâ:~bùbɔ́lâ:	bɔla	*HL	fill
bìbúwê:~bùbúwê:	buwi	*HL	uncover
bìbúŋâ:~bùbúŋâ:	buŋa	*HL	send (smth)
bìčâ:	čaa[37]	*HL	tie together
bìčálâ:	čala	*HL	raise (animals)
bìčá:lê:	ča:lʋ	*HL	tighten
bìčáŋê:	čaŋE	*HL	continue
bìčásê:	časʋ	*HL	urinate
bìčélʋ̂ê:	čelʋ*ʋ	*HL	vary/exchange
bìčíê:	čii	*HL	pull out
bìčínâ:	čina	*HL	sit
bìčíŋê:	čiŋE	*HL	wake up
bìčísâ:	čisa	*HL	walk;trample
bìčʋ́más'é:	čʋmasʋ	*HL	sneeze
bìčʋ̂nʋ̂ê:	čʋnʋ*ʋ	*HL	tear

[36]The finite form of the verb is **wá:nʋ̀** not **wâ:ŋ**.

[37]I analyze the long vowel as VV because the gerund takes the -a suffix and not the -*m suffix as do most verbs ending in long vowels.

Class 9 Nouns (Gerunds)

Surface Form	Stem	Tone	Gloss
bɩ̀čɔ́:lê:~bʊ̀čɔ́:lê:	čɔ:lɩ	*HL	*put into smth*
bɩ̀čɔ́wâ:~bʊ̀čɔ́wâ:	čɔwa	*HL	*have fun*
bìčúlâ:~bùčúlâ:	čula	*HL	*answer*
bɩ̀dɩ́nâ:	dɩna	*HL	*boil (tr.);cook (tr.)*
bɩ̀dɩ́:sâ:	dʊ:sa	*HL	*ask for*
bìdó:lê:~bùdó:lê:	do:li	*HL	*raise/lift up*
bìdú:lâ:~bùdú:lâ:	du:la	*HL	*extinguish*
bɩ̀féyê:	fɛyʊ	*HL	*sweep*
bìfú:lê:	fu:li	*HL	*become white*
bìfúlíê:~bùfúlíê:	fuli*i	*HL	*jump*
bɩ̀fú:lâ:~bʊ̀fú:lâ:	fu:la	*HL	*add*
bìgbélíê:	gbeli*i	*HL	*trade*
bɩ̀gbɩ́:dê:	gbʊ:dʊ	*HL	*pull*
bɩ̀gbɩ́:lâ:	gbʊ:la	*HL	*learn*
bɩ̀ʝɔ́lâ:	ʝɔla:	*HL	*hang (tr. & intr.)*
bɩ̀ʝɔ́wê:~bʊ̀ʝɔ́wê:	ʝɔwʊ	*HL	*grasp/seize*
bɩ̀kálâ:	kala	*HL	*measure/weigh;imitate*
bɩ̀ká:lê:	ka:lɩ	*HL	*crawl*
bɩ̀káŋê:	kaŋE	*HL	*speak*
bìkínâ:	kina	*HL	*refuse*
bɩ̀kɩ́dâ:	kɩda	*HL	*hold;bring up (child)*
bɩ̀kɩ́ê:	kʊʊ	*HL	*look for*
bìkótâ:~bùkótâ:	kota	*HL	*bend down*
bɩ̀kɔ́lê:~bʊ̀kɔ́lê:	kɔlʊ	*HL	*accept*
bùkúlâ: (*bɩ̀)	kula	*HL	*assemble/meet; gather (together)*
bùkúlê: (*bɩ̀)	kulɩ	*HL	*pray*
bùkúlɩ́ê: (*bɩ̀)	kulʊʊ	*HL	*bear (child)*
bùkúsê:~bùkúsɔ̂: (*bɩ̀)	kusu[38]	*HL	*rise/get up/go up;fly*
bɩ̀kpá:lê:	kpa:lɩ	*HL	*wipe off;dust*
bɩ̀kpálɩ́ê:	kpalʊʊ	*HL	*vomit*
bɩ̀kpándâ:	kpaNda	*HL	*mix*
bɩ̀kpásâ:	kpasa	*HL	*lean (tr. and intr.)*
bɩ̀kpátâ:	kpata	*HL	*carry in arms*
bɩ̀kpɩ́lɩ́ê:	kpʊlʊʊ	*HL	*go down*
bɩ̀lé:lê:	lɛ:lʊ[39]	*HL	*take away; unload(child)from back*
bɩ̀lɔ́lâ:~bʊ̀lɔ́lâ:	lɔla	*HL	*fix/repair/arrange*
bɩ̀lúwâ:~bʊ̀lúwâ:	luwa	*HL	*mix*
bɩ̀mátâ:	mata	*HL	*glue;press against*

[38]The finite form of the verb is **kúsû:**. I do not know why the gerund has a variable pronunciation with a front vowel.

[39]This is the gerund of the finite verbs **lé:lɩ̂** and **lê:**.

Class 9 Nouns (Gerunds)

Surface Form	Stem	Tone	Gloss
bìmílíê:	milii	*HL	*wander*
bìmílí:l'á:	mili:la	*HL	*surround;* *wander around* *(w/merchandise)*
bɩ̀mɔ́sê:~bùmɔ́sê:	mɔsʋ	*HL	*laugh*
bìmú:sâ:	mu:sa	*HL	*sniff at*
bìmʷíê:~búmʷíê:	mʷii	*HL	*suck*
bɩ̀ná:lâ:	na:la	*HL	*frighten*
bɩ̀ɲúmpɔ́l'é:~bùɲúmpɔ́l'é:	ɲuNpɔlʋ	*HL	*tickle*
bɩ̀ɲá:lâ:	ɲa:la	*HL	*lose*
bɩ̀ɲálɩ́ê:	ɲalʋʋ	*HL	*melt*
bɩ̀ɲándâ:	ɲaNda	*HL	*spoil/break*
bɩ̀ɲáŋâ:	ɲaŋa	*HL	*gnash (teeth)*
bɩ̀ɲáŋê:	ɲaŋE	*HL	*let/leave*
bɩ̀ɲásê:	ɲasʋ	*HL	*roast*
bìɲíndâ:	ɲinda	*HL	*lick;show/teach*
bìɲíŋê:	ɲiŋE	*HL	*remember*
bɩ̀ɲɩ́ʸâ:	ɲʋa	*HL	*press against*
bɩ̀ɲɩ́lɩ́nd'é:	ɲʋlʋNdʋ	*HL	*shine (of metal)*
bɩ̀ɲɔ́wê:~bùɲɔ́wê:	ɲɔwʋ	*HL	*suck (of child)*
bɩ̀ŋmá:lê:	ŋma:lʋ	*HL	*write*
bɩ̀ŋmésê:	ŋmesʋ	*HL	*weed*
bìŋmíndâ:	ŋmiNda	*HL	*bind/tether*
bɩ̀ŋmɩ́ɲɩ́ŋ'é:	ŋmʋɲʋŋE	*HL	*sprinkle*
bɩ̀pá:lâ:	pa:la	*HL	*lend*
bɩ̀péyê:	peye[40]	*HL	*become red*
bɩ̀pɔ́:lâ:~bùpɔ́:lâ:	pɔ:la	*HL	*wet (tr.)*
bɩ̀pɔ́lɩ́ê:~bùpɔ́lɩ́ê:	pɔlʋʋ	*HL	*bud*
bìpú:dê:~bùpú:dê:	pu:di	*HL	*stick*
bìpúlâ:~bùpúlâ:	pula	*HL	*bury*
bìpúnâ:~bùpúnâ:	puna	*HL	*swell*
bɩ̀pútê:~bùpútê:	pʋtʋ	*HL	*swim;cut open;burst*
bɩ̀sá:lê:	sa:lʋ	*HL	*insult*
bɩ̀sáŋê:	saŋE	*HL	*unbind/untie/untether;* *unroll*
bɩ̀sásâ:	sasa	*HL	*glean*
bìsíŋê:	siŋE	*HL	*open*
bɩ̀sɩ́lê:	sʋlʋ	*HL	*run*
bɩ̀sɔ́tâ:~bùsɔ́tâ:	sɔta	*HL	*put into/betw smth*
bɩ̀súlâ:~bùsúlâ:	sula	*HL	*carry on head*
bɩ̀súwê:~bùsúwê:	sʋwʋ	*HL	*take (smth) off (smth);* *unload (fr.head)*
bɩ̀tá:lê:	ta:lʋ	*HL	*glue;be able*

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[40]The finite form of the verb is pê:.

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Class 9 Nouns (Gerunds)

Surface Form	Stem	Tone	Gloss
bìtélèŋ'é:	telɛŋE	*HL	*delay*
bìtíê:	tii	*HL	*pierce*
bìtí:tâ:	ti:ta	*HL	*follow*
bìtɩ́lê:	tʊlɩ	*HL	*call*
bìtó:lê:~bùtó:lê:	to:li	*HL	*make a mistake*
bìtɔ́:sê:~bùtɔ́:sê:	tɔ:sʊ	*HL	*pick up*
bùwálâ:~bùwá:lâ:	wala~wa:la[41]	*HL	*do/make*
bìwɔ́:lê:~bùwɔ́:lê:	wɔ:lɩ	*HL	*scratch*
bìwɔ́tâ:~bùwɔ́tâ:	wɔta	*HL	*cough*
bìwɔ́tê:~bùwɔ́tê:	wɔtʊ	*HL	*pound*
bìwúlɩ̀ê:~bùwúlɩ̀ê:	wʊlʊ	*HL	*pour into/on*
bìwútâ:~bùwútâ:	wʊta	*HL	*push*
bìyálâ:	yala:	*HL	*open (mouth)*
bìyálɩ̀ê:	yalʊ	*HL	*stretch*
bìyɩ̀lâ:	yʊla	*HL	*put down (on ground)*
bìyɩ̀lê:	yʊlɩ	*HL	*stop*
bìyó:lê:~bùyó:lê:	yo:li	*HL	*scream*
bìyú:lê:~bùyú:lê:	yu:li	*HL	*steal*

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[41]The finite form of the verb is **wa:.**

Class 9 Nouns (Gerunds)

Surface Form	Stem	Tone	Gloss

Prefix bI-, Suffix -*m̄

Surface Form	Stem	Tone	Gloss
bɩ̀bá:ꞌm̄	ba:	L	*sew*
bɩ̀bɔ́:ꞌm̄~búbɔ́:ꞌm̄	bɔ:	L	*roll up*
bɩ̀čá:ꞌm̄	ča:	L	*dance*
bɩ̀čέ:ꞌm̄	čε:	L	*filter*
bɩ̀dɔ́:ꞌm̄~búdɔ́:ꞌm̄	dɔ:	L	*cultivate*
bɩ̀dú:ꞌm̄~búdú:ꞌm̄	du:	L	*drip*
bífé:ꞌm̄	fe:	L	*tell*
bɩ̀gbɩ́:ꞌm̄	gbʋ:	L	*sing*
bíɟó:ꞌm̄	ɟo:	L	*wait*
bɩ̀kɩ́:ꞌm̄	kʋ:	L	*fry*
bɩ̀kɔ́:ꞌm̄~búkɔ́:ꞌm̄	kɔ:	L	*excrete*
bíkú:ꞌm̄~búkú:ꞌm̄	ku:	L	*cut;fell*
bílí:ꞌm̄	li:	L	*catch;* load child on back
bɩ̀lɩ́:ꞌm̄	lʋ:	L	*go out/leave;* rise (of sun)
bɩ̀ɲá:ꞌm̄	ɲa:	L	*disappear*
bɩ̀pá:ꞌm̄	pa:	L	*borrow*
bɩ̀pɔ́:ꞌm̄~búpɔ́:ꞌm̄	pɔ:	L	*be wet;fade*
bɩ̀sέ:ꞌm̄	sε:	L	*cut hair/shave*
bɩ̀sɔ́:ꞌm̄~búsɔ́:ꞌm̄	sɔ:	L	*buy*
bɩ̀sú:ꞌm̄	su:	L	*set (trap)*
bítí:ꞌm̄	ti:	L	*fence off*
bɩ̀tú:ꞌm̄~bútú:ꞌm̄	tu:	L	*throw (smth at);shoot;* lay (egg);vote
bɩ̀wɔ́:ꞌm̄~búwɔ́:ꞌm̄	wɔ:	L	*copulate with*
bíyí:ꞌm̄	yi:	L	*plant a stick*
bìčú:m̄~bùčú:m̄	ču:	H	*take*
bɩ̀dá:m̄	da:	H	*taste*
bɩ̀dɩ́:m̄	dʋ:	H	*go up/climb*
bìdú:m̄~bùdú:m̄	du:	H	*plant/sow*
bɩ̀gbá:m̄	gba:	H	*break*
bɩ̀gbɩ́:m̄	gbʋ:	H	*know*
bìkí:m̄	ki:	H	*return*
bìkpú:m̄~bùkpú:m̄	kpu:	H	*belch*
bɩ̀mɔ́:m̄~bùmɔ́:m̄	mɔ:	H	*kill;wound*
bɩ̀ná:m̄	na:	H	*walk/go*
bɩ̀ŋmá:m̄	ŋma:	H	*drop;fell*
bɩ̀sá:m̄	sa:	H	*draw (water)*
bɩ̀té:m̄	te:	H	*pick (fruit)*

Class 9 Nouns (Gerunds)

Surface Form	Stem	Tone	Gloss
bὺyá:m̄	ya:	H	*fall (leaves); drop (seeds)*
bìló:'m̄~bùló:'m̄	lo:[42]	*HL	*enter/go in*

Prefix bI-, Suffix -n*O

Surface Form	Stem	Tone	Gloss
bὺbὺn'ɔ́	bὺlὺ	L	*grow;be ripe/cooked*
bὺčɔ́n'ɔ́~búčɔ́n'ɔ́	čɔlὺ	L	*sacrifice*
bὺdán'ɔ́	dalὺ	L	*greet*
bídún'ó~búdún'ó	duli	L	*leak*
bífín'ó	fili	L	*twist*
bὺkὺn'ɔ́	kὺlὺ	L	*look at*
bὺkɔ́n'ɔ́~búkɔ́n'ɔ́	kɔlὺ	L	*sprout*
bὺmán'ɔ́	malὺ	L	*roof*
bímún'ó~búmún'ó	muli	L	*sink*
bὺtán'ɔ́	talὺ	L	*plug*
bὺtún'ɔ́~bútún'ɔ́	tulὺ	L	*thread*
bὺwún'ɔ́~búwún'ɔ́	wulὺ	L	*dry (intr.)/wither*
bὺfún ɔ́~bùfún ɔ́	fulὺ	H	*wash*
bὺfán ɔ́	falὺ	H	*cross*
bὺgbὺn ɔ́	gbὺlὺ	H	*forge*
bὺkán ɔ́	kalὺ	H	*count;read*
bὺkɔ́n ɔ́~bùkɔ́n ɔ́	kɔlὺ	H	*iron;mill/grind/crush*
bìkúnó~bùkúnó	kuli	H	*dig*
bìkpínó	kpili	H	*rub*
bὺkpὺn ɔ́	kpὺlὺ	H	*sharpen*
bὺmén ɔ́	melὺ	H	*swallow*
bὺpán ɔ́	palὺ	H	*finish/complete;brew*
bὺpɔ́n ɔ́~bùpɔ́n ɔ́	pɔlὺ	H	*build/make (w/earth)*
bὺsén ɔ́	selὺ	H	*sharpen (point);polish; peel/carve/sculpt*
bὺsɔ́n ɔ́~bùsɔ́n ɔ́	sɔlὺ	H	*bear (fruit)*
bìwúnó~bùwúnó	wuli	H	*row/paddle*
bὺyén ɔ́	yɛlὺ	H	*groan*
bìgbén'ó	gbeli	HL	*bathe*
bὺtɔ́n'ɔ́~bùtɔ́n'ɔ́	tɔlὺ	HL	*fall*

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[42]See section 4.2.4 for an explaination of why I analyze this stem VC.

Class 9 Nouns (Gerunds)

Surface Form	Stem	Tone	Gloss

There are three gerunds which are not formed with the bI- prefix. They are listed below:[43]

Surface Form	Stem	Tone	Gloss

Prefix dI-, Suffix -lI

dɩ̀ŋmέlɩ̀	ŋmɛ	HL	*be sated*

Prefix I-, Suffix -a

ɩ̀dê:	dʋ	HL	*sleep*

Prefix lo-, Suffix -a

lòwó:	wu	H	*die*

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[43]Since these are irregular, I do not list the prefixes in Appendix A. There is no reason to posit a different underlying tone for these prefixes than the other noun-class prefixes, so I posit that they are all H*L. I am unsure whether these forms fit into Class 9 by agreement phenomena or whether they take agreement phenomena of other classes.

ENGLISH-FOODO INDEX

This index is meant to help one locate the corresponding singular or plural of a Foodo noun given in Appendix B. The listing includes an English gloss, the Foodo surface forms (variants are not included), and a number referring to the noun class (a G indicates a gerund which is part of Class 9). Since the list in Appendix B is organized by noun class, it is not easy to know a word's plural (or singular) form from the listing. This list will help in identifying a word's corresponding singular or plural, since one can look up the English gloss's singular or plural. With this information one can easily find the form in Appendix B.[1]

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[1]This index is only meant as a reference to Appendix B. In the event of any discrepancies between the two lists, the reader should refer to the information given in Appendix B.

English	Form	No.
abcess	dísídì	5
abcesses	ásínò	4
ablution pots	àlìčíd'ílí	1
ablution pots	àlìčíd'ílá:nà	2
accept	bùkɔ́lê:	G
accompany	bíyɔ̂:	G
add	bìbús'é:	G
add	bùfú:là:	G
animal	kùtɔfútɔ̀ù	3
animal pen	kúlûŋ	3
animal pens	álúm̀	4
animal skin	dùwúlí	5
animal skins	àwúlɔ́	4
animals	àtɔfútɔ̂:	4
answer	bìčúlà:	G
anus	dùčú:b'ílí	5
anuses	àčú:b'é:	4
approach	bíkpítìlǎ:	G
arm	kùbá:ú	3
arms	àbá:m̀	4
arrive	búfɔ̂:	G
ashes	àsóm̀	4
ask for	bìdí:sâ:	G
ask(question)	bíkús'é:	G
assemble/meet	bùkúlà:	G
awale	wà:lì	1
awales	ìwà:lì	6
ax	kàčɔ́ʷà	7
axes	ɲčɔ́:m̀	8
baboon	dùʝúd'úlí	5
baboons	àʝúl'é:	4
back	dùkɔ́:dílí	5
backs	àkɔ́:nɔ́	4
baobab	kúlá:l'ú:	3
baobabs	álá:l'é:	4
basket	kékéʸ'á	7
baskets	ŋké:m̀	8
bat	dìdíkùɲʝàlí	5
bathe	bìgbén'ó	G
bather	ògbéliwɔ̌:	1
bathers	àgbéliwɔ̌:	2
bats	àlíkùɲʝǎ:	4
be able	bùtá:lê:	G
be big	bìčɔ̌:	G
be left/leave	bísáŋ'é:	G
be ripe/cooked	bíbín'ɔ́	G
be sated	dìŋmélì	G
be silent	bìgbá:n'é:	G
be wet	bípɔ̂:'m̀	G
bean	díčélì	5
beans	áčê:	4
bear(child)	bùkúlíê:	G
bear(fruit)	bìsɔ́nɔ́	G
beard	tàndùwɔ̂:	1
beards	ìtàndùwɔ̂:	6
become black	bìbíê:	G
become red	bìpéyê:	G
become white	bìfú:lê:	G
bed	gádó	1
beds	ìgádó	6
bee	ŋmàsàm̀	1
bees	ìŋmàsàm̀	6
begin	bìčɔ́s'é:	G
beginner	ɔčɔ́sìwǒ:	1
beginners	àčɔ́sìwǒ:	2
belch	bìkpú:m̀	G
belly	ípúnò	6
bend down	bìkótâ:	G
bend/fold	bìkó:d'é:	G
bicycle	čè:čé?	1
bicycles	ìčè:čé?	6
bile	kàlɔ́lɔ́sâ:	7
bind/tether	bìŋmíndâ:	G
bird	kàbʷíʸ'á	7
birds	m̀bʷí'm̀	8
bite	bídúŋ'é:	G
biter	ódûŋwǒ:	1
biters	ádûŋwǒ:	2
black bean	kéč'é:	7
black beans	ŋ̀kéč'é:sê:	8
blacksmith	ɔgbílíwɔ̂:	1
blacksmiths	àgbílíwɔ̂:	2
blindpeople	átámb'ɔ́:	2
blindperson	ɔ́támb'ɔ́:	1
blood	àdá:	4
blow/whistle	bìfúŋé:	G
blow(wind)	bífét'é:	G
boat	kpí:l'úwɔ̂:	1
boats	ìkpí:l'úwɔ̂:	6
bodies	ɲ̀yúl'ásê:	8
body	kàyúlà	7
body hair	ìfúm̀	6
boil(intr)	bíwás'é:	G
boil(tr)	bìdínâ:	G
bone	dúwúlì	5
bones	áwúm̀	4
borrow	bípá:'m̀	G
bottle	kpálíbá	1
bottles	ìkpálíbá	6
boundaries	ìkénɔ́	6
boundary	ìkénɔ́	1

bow	kùtáú	3	carry in arms	bɩ̀kpátâ:	G
bowl	bó:síʸá	1	carry on head	bɩ̀súlâ:	G
bowls	ìbó:síʸá	6	carry on shoulders	bɩ̀čá:	G
bows	àtá:	4	cat	àgú	1
boy	dùfɔlɩ́	5	cat	àgúbíʸ'áʷ	1
boys	àfɔlɔ́	2	catch	bílí:'m̀	G
brain	m̀bɔ̂:	9	cats	àgúbíʸ'áʷánà	2
branch	kèyèlíŋ'á	7	cats	àgʷá:nà	2
branches	ɲ̀yèlí'm̀	8	cayman	ká:s'â:	7
break	bɩ̀gbá:m̀	G	caymans	ŋ̀ká:s'ásê:	8
breast	dɩ́ɲɔ́w'ɔlɩ́	5	cemeteries	ìpúlátèndě:	6
breasts	áɲɔ́w'ɔ:	4	cemetery	òpúlátèndě:	1
brew	bɩ̀pánɔ́	G	chair	kágbâ:	7
bridge	kòdólòkò	1	chairs	ŋ́mgbâ:	8
bridges	ìkòdólòkò	6	chameleon	jàŋàsɩ́	1
bring/carry	bɩ́bál'á:	G	chameleons	ɩ̀jàŋàsɩ́	6
bring up(child)	bɩ̀kɩ́dâ:	G	chat	fà:wɩ̂:	1
broom	ɔfé:	1	chats	ɩ̀fà:wɩ̂:	6
brooms	ɩ̀fé:	6	cheek	kùyéù	3
brother-in-law			cheeks	àyê:	4
of older sister	ɔčúlɩ̀	1	chest	dɩ́kándɩ̀	5
brother-in-laws			chests	ákám̀	4
of older sisters	áčúlɩ̀	2	chew	bɩ̀wê:	G
bud	bɩ̀pɔlɩ́ê:	G	chick	kèkě:ʸ'á	7
buffalo	čàndě:	1	chicken	kèlém̀	1
buffalos	ɩ̀čàndě:	6	chickens	ɩ̀kèlém̀	6
build/make(w/earth)	bɩ̀pɔnɔ́	G	chicks	ŋ̀kèlé:'m̀	8
builder	ɔpɔlúwɔ̂:	1	chief	wúl'á:	1
builders	àpɔlúwɔ̂:	2	chiefs	ŋ̀wúl'ásê:	8
bump	kɔkɔ́:lá:	7	child	óbê:	1
bump into	bítít'é:	G	children	ábê:	2
bumps	ŋ̀kɔ́:nɔ́	8	chin	kɔ̀nɔ̀ŋmgbɔ́w'á:	7
burial	jànáʸɩ̀sà	1	chins	ǹnɔ̀ŋmgbɔ́w'á:	8
burials	ɩ̀jànáʸɩ̀sà	6	cleaner	ɔfúlúwɔ̂:	1
burn	bɩ́ɲɔ́t'é:	G	cleaners	àfúlúwɔ̂:	2
burst	bɩ̀pútê:	G	clitoris	dìtó:bílí	5
bury	bìpúlâ:	G	clitorises	àtó:bé:	4
buttock	ɔčúfɔ̂:	1	cloth	kɩ́tá:ù	3
buttocks	ɩ̀čúfɔ̂:	6	cloths	átá:m̀	4
buy	bɩ́sɔ́:'m̀	G	cloud	kàwúlá:	7
buyer	ɔsɔ́:w'ɔ́:	1	clouds	ŋ̀wúlɔ́	8
buyers	ásɔ́:w'ɔ́:	2	cola	gɔ́:lɔ̀	1
			colas	ɩ̀gɔ́:lɔ̀	6
calabash	kàwâ:	7	cold	òyúló	1
calabash	ŋ̀wê:	8	comb	bɩ́sé:d'é:	G
calabash for water	kàsá:làsǎ:	7	come	bɩ́bâ:	G
calabashes			come across	bɩ́kát'é:	G
for water	ǹsá:làsě:	8	compound	kàtɩ́ŋá	7
calf	kàná:bíʸ'á	7	compounds	ǹtɩ́m̀	8
call	bɩ̀tɩ́lê:	G	conclude	bɩ̀tál'á:	G
calves	àná:bé:	4	continue	bɩ̀čáŋê:	G

cook(N)	ɔdínáw'ɔ́:	1	deny	búčɔ́:l'é:	G
cook(tr)	bìdínâ:	G	devil	díbél'éndí	5
cooks	àdínáw'ɔ́:	2	devils	ábél'éḿ	4
copulate with	bíwɔ́:'ḿ	G	die	lòwó:	G
corpse	óbúnd'é:	1	dig	bìkúnó	G
corpses	íbúnd'é:	6	dig up/harvest(yam)	bìkpá:	G
cotton	ífê:	6	disappear	bíɲá:'ḿ	G
cough	bìwɔ́tâ:	G	disturb/annoy	bíhá:w'é:	G
count	bìkánɔ́	G	Djougou	dúpú:lì	5
counter	ɔ́kálíwɔ̂:	1	do/make	bùwálâ:	G
counters	àkálíwɔ̂:	2	dog	kpídê:	1
courtyard	kàbánâ:	7	dogs	ìkpídê:	6
courtyards	m̀bánâ:	8	door	àtàlâ:	4
cover/sit(on eggs)	bíbúŋ'é:	G	dowry	kásâ:	7
cow	kìná:ú	3	draw(water)	bìsá:ḿ	G
cows	ìná:ḿ	6	dream	dál'é:	1
crab	ɲàlàḿ	1	dreams	ìdál'é:	6
crabs	ìɲàlàḿ	6	drink	bìnúŋ'é:	G
crawl	bìká:lê:	G	drink	ńtâ:	9
credit	dùkɔ́lí	5	drinker	ònûŋwɔ̌:	1
cricket	dìkàdí	5	drinkers	ànûŋwɔ̌:	2
crickets	àkànɔ́	4	drip	bídú:'ḿ	G
cripple	káláŋ'áwúlà	1	drop	bìŋmá:ḿ	G
cripples	ìkáláŋ'ábéˠì	6	drop(seeds)	bìyá:ḿ	G
cross	bìfánɔ́	G	drum	dùkɔ̀:dílí	5
crow	bíbúŋ'é:	G	drummer	ɔ́láŋwɔ̂:	1
cry/weep	búsô:	G	drummers	àláŋwɔ̂:	2
cultivate	bídɔ́:'ḿ	G	drums	àkɔ̀:lé:	4
cure	bìčá:	G	dry(intr)/wither	bíwún'ɔ́	G
cut	bíkú:'ḿ	G	dry(tr)	bìfá:	G
cut/butcher	bíčés'é:	G	dust	bìkpá:lê:	G
cut hair/shave	bísé:'ḿ	G	dust	bùsùlùwɔ̂:	1
cut open	bìpútê:	G			
cutter	ɔ́čésìwɔ̌:	1	ear	kùsú:	3
cutters	áčésìwɔ̌:	2	ears	àsɔ́:	4
			earth	kàsí	1
dance	bìčá:'ḿ	G	eat	bíɟê:	G
dance	káčâ:	7	eater	óɟíw'ɔ́:	1
dancer	ɔ́čá:w'ɔ́:	1	eaters	áɟíw'ɔ́:	2
dancers	áčá:w'ɔ́:	2	egg	dùbɔ́l'í:	5
darkness	dìbídí	5	eggs	àbɔ́l'úḿ	4
daughter	òbìčísê:	1	elephant	ɟíɟ'â:	1
daughter	àbìčísê:	2	elephants	ìɟíɟ'â:	6
daughter-in-law	óbúk'á:	1	end of rainy season	sálàŋɔ̌:	1
daughters-in-law	ábúk'á:	2	end of		
day	kèkéɲá	7	rainy seasons	ìsálàŋɔ̌:	6
days	ŋ̀kéḿ	8	enter/go in	bìlɔ́:'ḿ	G
defecater	ɔ́kɔ́:w'ɔ́:	1	entrance	kòbún'á:	7
defecaters	ákɔ́:w'ɔ́:	2	entrance hall	kpɔ́ŋɔ́:	1
delay	bìlé:l'é:	G	entrance halls	ìkpɔ́ŋɔ́:	6
delay	bìtéléŋ'é:	G	entrances	m̀bún'á:	8

epileptic	ɔtɔ́lɩ̀wɔ̌:	1	finish/be used up	bɩ̀tá:	G
epileptics	àtɔ́lɩ̀wɔ̌:	2	finish/complete	bɩ̀pánɔ́	G
evening	kèʸɩ́tâ	7	fire	ɔɟá:	1
excrement	m̀bí:m̄	9	fires	ɩ̀ɟâ:	6
excrete	bɩ́kɔ́:'m̄	G	fish	dìkìmbílí	5
extinguish	bìdú:lâ:	G	fish(pl)	àkìmbé:	4
eye	dínsílì	5	fist	dúkúndì	5
eyes	ánsê:	4	fists	ákúm̄	4
			fix/repair/arrange	bɩ̀lɔ́lâ:	G
fade	bɩ́pɔ́:'m̄	G	flea	dɩ̀ŋmámbɩ́:l'ɩ̀	5
fall	bɩ̀tɔ́n'ɔ́	G	fleas	àŋmámbɩ́:'m̄	4
fall(leaves)	bɩ̀yá:m̄	G	flies	ɩ̀ɟàsàm̄	6
false mahoganies	ɩ̀kê:	6	float	bɩ̀gbá:	G
false mahogany	kùkéù	3	flow	bìkpé:	G
falsehood	àbɔ́m̄	4	fly	bùkúsê:	G
fan	bɩ́fét'ɛ́:	G	fly	ɟàsàm̄	1
fan	pàpà	1	fog	dùgbɔ́:lɩ́	5
fans	ɩ̀pàpà	6	fogs	àgbɔ́:m̄	4
farmer	ɔdɔ́:w'ɔ́:	1	follow	bìtí:tâ:	G
farmer	ɔsáluwɔ̌:	1	forehead	dɩ̀sɩ́kpɩ̀dɩ̀	5
farmers	ádɔ́:w'ɔ́:	2	foreheads	àsɩ̀kpɩ̀nɔ̀	4
farmers	ásáluwɔ̌:	2	foreigner	ɔfɔ̀:	1
farmhouse	čɩ̀čàkɔ́:	3	foreigners	áfɔ̀:	2
farmhouses	ɩ̀čɩ̀čàkɔ́:	6	forest	kúpɩ́:'ú	3
father	ɔsê:	1	forests	ápɩ́:'m̄	4
fathers	ásê:	2	forge	bɩ̀gbɩ́nɔ́	G
feast	ɟíɲá:lɩ́	1	forget	bɩ́táŋ'ɛ́:	G
feasts	ìɟíɲá:lɩ́	6	forgeter	ɔtâŋwɔ̌:	1
feather	kɩ̀tɛ̌:t'éú	3	forgeters	átâŋwɔ̌:	2
feathers	àtɛ̌:t'ém̄	4	forgetfulness	kɩ́tâŋ	3
fell	bíkú:'m̄	G	friend	ɔčànná:	1
fell	bɩ̀ŋmá:m̄	G	friends	àčànná:	2
fence	kálá:	7	frighten	bɩ̀ná:lâ:	G
fence off	bítí:'m̄	G	frog	lèŋâ:	1
fences	ŋkálásê:	8	frogs	ɩ̀lèŋâ:	6
fetiche worshiper	ɔčɔ́lɩ̀wɔ̌:	1	fry	bɩ́kɩ́:'m̄	G
fetiche worshipers	áčɔ́lɩ̀wɔ̌:	2	funeral	kélíʸà	7
field	dɩ́sádɩ̀	5	funerals	ńlê:	8
field	kàdɔ́ʷá	7			
fields	n̄dɔ́:m̄	8	game	kàbúʷà	7
fields	ásánɔ̀	4	game(pl)	m̀bʷê:	8
fight	bɩ̀kɔ́:	G	gather(together)	bùkúlâ:	G
fight	bɩ́sɔ́n'ɛ́:	G	girl	kèbìdá:	7
fighter	ɔsɔ̂ŋwɔ̌:	1	girls	m̀bìdé:	8
fighters	ásɔ̂ŋwɔ̌:	2	give	bɩ̀sá:	G
fill	bɩ̀bɔ́lâ:	G	give back	bìkí:l'á:	G
filter	bɩ́čɛ́:'m̄	G	glean	bɩ̀sásâ:	G
filth	dìčí:gbélí	5	glue	bɩ̀mátâ:	G
find/recover	bɩ́túl'á:	G	glue	bɩ̀tá:lê:	G
finger	dɩ̀bá:bílí	5	gnash(teeth)	bɩ̀ɲáŋâ:	G
fingers	àbá:bé:	4	gnat	kàčɔ̀bɩ́ʸ'á	7

English			English		
gnats	ɲčɔbɩ́'m̄	8	hear/understand	bìnó:	G
go down	bɩ̀kpɩ́lɩ́ê:	G	heart	ɲàmɩ́l'é:	1
go home	bìkpé:	G	hearth	kàsúlá:	7
go out/leave	bɩ́lɩ́:'m̄	G	hearths	ǹsúlá:	8
go round	bíké:l'é:	G	hearts	ɩ̀ɲàmɩ́l'é:	6
go up/climb	bɩ̀dɩ́:m̄	G	heat	kùsɔ̀ŋɔ́:	3
goat	kɩ́tɩ́:ù	3	hedgehog	òpúl'é:	1
goats	ɩ́tɩ́:m̀	6	hedgehogs	ìpúl'é:	6
God	yùkùm̄	1	help	bɩ́čál'á:	G
goiter	kɔ̀lɔ̀tɔ̀ú	3	hem	bìkó:d'é:	G
goiters	àlɔ̀tɔ̀m̄	4	hide(intr&tr)	bɩ̀bálâ:	G
graineries	ìdúlò	6	hip	ɔ́sénɔ̀	1
grainery	òdúlò	1	hips	ɩ́sénɔ̀	6
grandchild	ɔ́ná:m̀	1	hit	bɩ̀dá:	G
grandchildren	áná:m̀	2	hoe	kàtúlúb'íʸá	7
grandparent	ɔ́ná:m̀	1	hoes	ǹtúlúb'í:m̄	8
grandparents	áná:m̀	2	hold	bɩ̀kɩ́dâ:	G
grasp/seize	bɩ̀ʃɔ́wê:	G	hole	ɔ́bɔ̂:	1
grass	kúfáù	3	hole not deep	dɩ́bɔ́:lɩ̀	5
grasses	ɩ́fâ:	6	holes	ɩ́bɔ̂:	6
grave	ɔ́čámb'ɔ́:	1	holes not deep	ábɔ̂:m̀	4
graves	ɩ́čámb'ɔ́:	6	honk	bɩ̀fúŋé:	G
greet	bɩ́dán'ɔ́	G	horn	dìsí:lí	5
greet/thank	bɩ̀táŋé:	G	horns	àsé:	4
greeter	ɔ́dálɩ̀wɔ̌:	1	horse	bìɲʃé:	1
greeters	ádálɩ̀wɔ̌:	2	horses	ìbìɲʃé:	6
groan	bɩ̀yénɔ́	G	hospital	lòkòtólò	1
ground	ɩ̀sé:	6	hosptials	ìlòkòkólò	6
grow	bɩ́bɩ́n'ɔ́	G	hot water	číʃâ	1
guinea fowl	ɔ̀čám̀	1	house	ɔpɩ̂	1
guinea fowls	ɩ̀čám̀	6	houses	ɩ́pɩ́y'é	6
			hunchback	kàkɔ́:lá:	7
hair	dɩ̀ŋmámbílí	5	hunchbacks	àkɔ́:nɔ́	4
hair	ɩ̀ŋmám̄	6	hunger	ákúm̀	4
hairs	àŋmámbé:	4	hunt/chase away	bɩ́ʃâ:	G
hang(tr&intr)	bɩ̀ʃɔ́lâ:	G	hunter	ɔ́tú:w'ɔ́:	1
hare	làŋɔ́	1	hunters	átú:w'ɔ́:	2
hares	ɩ̀làŋɔ́	6	husband	ókúlò	1
harmattan	wèʃíy'á:	1	husbands	ákúlò	2
harmattans	ìwèʃíy'á:	6			
harvest	bìbó:	G	illness/disease	bùlɔ̂:	9
hat	kùpúdû:	3	illnesses/diseases	m̀bùlɩ́:m̀	8
hatch	bɩ́bɔ̂:	G	imitate	bɩ̀kálâ:	G
hats	àpúndúm̀	4	insect	dɩ̀sɔ̀nsɔ́lɩ̀	5
have fun	bɩ̀čɔ́wâ:	G	insects	àsɔ̀nsɔ̂:	4
hawk	kpà:lô:	1	insult	bɩ̀sá:lê:	G
hawks	ìkpà:lô:	6	intestine	dúpúlùbɩ̀lí	5
head	dùmúlí	5	intestines	ápúlùbě:	4
heads	àmó:	4	iron	bɩ̀kɔ́nɔ́	G
healer	ɔ̀čáwɔ̂:	1			
healers	àčáwɔ̂:	2			

jar	kèlèbá:	7	lie down/spread out	bɩ́dá:l'é:	G
jar	kèpí:ʸ'á	7	light	bɩ́ɲ̀ɔt'é:	G
jars	ǹlèbé:	8	light	čàɟà:lê	1
jars	m̀pílí:'m̀	8	lion	gúndí	1
jaw	kɔ̀nɔ̀ŋmgbɔ́w'á:	7	lions	ìgúndí	6
jaws	ǹnɔ̀ŋmgbɔ́w'á:	8	lip	dínsíb'ílí	5
jump	bìfúlîê:	G	lips	ánsíb'é:	4
jumper	òfúlí:w'ɔ́:	1	listen to	bíwélèsě:	G
jumpers	àfúlí:w'ɔ́:	2	little girl	kèbìdíʸ'á	7
			little girls	m̀bìdí'm̀	8
kill	bɩ̀mɔ́:m̀	G	lizard	tàndě:	1
kind of bird	dìkpílì	5	lizards	ɩ̀tàndě:	6
kind of bird	àkpê:	4	load	kásʋ́l'á:	7
knead	bɩ́pɔ̀:	G	load child on back	bílí:'m̀	G
knee	dìŋmíl'í:	5	loads	ńsʋ́l'á:	8
knees	àŋmíl'ím̀	4	look at	bɩ́kɩ̀n'ɔ́	G
knife	kèkìʸá	7	look for	bɩ̀kɩ́ê:	G
knives	ŋ̀kì:m̀	8	loom	kàlʋ́wá:	7
know	bɩ̀gbɩ́:m̀	G	lose	bɩ̀ɲá:lâ:	G
Koran	tɩ́là	1	lung	dùfʋ̀dálɩ̀	5
Korans	ɩ̀tɩ́là	6	lungs	àfʋ̀dâ:	4
lamb	kàsàndìbìʸá	7	machete	àdáʔ	1
lambs	àsàndìbé:	4	machetes	àdá:nà	2
lamp	fɩ̀tɩ́là	1	madness	kàbʋ́mbʋ́t'á:	7
lamps	ɩ̀fɩ̀tɩ́là	6	make a mistake	bíbé:s'é:	G
language	kùnùŋ	3	make a mistake	bìtó:lê:	G
languages	ɩ̀kùnùŋ	6	man	ɔ̀ɲɩ́m̀	1
large hoe	kàtʋ́lâ:	7	market	dɩ́gbálɩ̀	5
large hoes	ǹtʋ́lâ:	8	markets	ágbâ:	4
last	bìlé:l'é:	G	mat	kùsúnd'ú:	3
laugh	bɩ̀mɔ́sê:	G	mat	kpál'ákpálà	1
lay(egg)	bɩ́tʋ́:'m̀	G	mats	ɩ̀kpál'ákpálà	6
leaf	kùfádáù	3	mats	àsúnd'úm̀	4
leak	bídún'ɔ́	G	measure/weigh	bɩ̀kálâ:	G
lean(tr&intr)	bɩ̀kpásâ:	G	meat	ìnúm̀	6
learn	bɩ̀gbɩ́:lâ:	G	medicine	dìlùmbílí	5
leave	bɩ́čʋ́ŋ'é:	G	medicines	àlùmbé:	4
leaves	àfádám̀	4	meet(tr)	bɩ̀sɔ́:	G
leg	dɩ́yálɩ̀	5	melt	bɩ̀ɲálɩ́ê:	G
legs	áyá:m̀	4	men	àɲɩ́m̀	2
lend	bɩ̀pá:lâ:	G	merchant	ɔ̀féwɔ̀:	1
leopard	kpàsɔ̂:	1	merchant	ògbélí:w'ɔ́:	1
leopards	ɩ̀kpàsɔ̂:	6	merchants	àféwɔ̀:	2
leper	ɔ̀kʋ́nàmbɔ̌:	1	merchants	àgbélí:w'ɔ́:	2
lepers	àkʋ́nàmbɔ̌:	2	messenger	ɔ̀súmbɔ̂:	1
leprosy	kàkʋ́nàmbǎ:	7	messengers	àsúmbɔ̂:	2
let/leave	bɩ̀ɲáɲê:	G	mice	àyém̀	4
letter of alphabet	dɩ̀ŋmà:lɩ̀bílí	5	milk	ǹná:čô:	9
letters of alphabet	àŋmà:lɩ̀bé:	4	mill/grind/crush	bɩ̀kɔ́nɔ́	G
lick	bɩ̀ɲíndâ:	G	millet	áyô:	4

millet leaf	kùɩ́fáù	3	noon	kàpá:	7
millet leaves	àʸɩ́fâ:	4	nose	ɔ̀ŋmám̄	1
millet seed	dúyúlì	5	noses	ɩ̀ŋmám̄	6
millet stalk	dúfúl'ɩ̀:	5	number	lá:mà	1
millet stalks	áfúl'úm̄	4	numbers	ɩ̀lá:mà	6
miser	ɔ́súmb'ɔ̀:	1			
misers	ásúmb'ɔ̀:	2	oil	ŋkó:	9
mix	bɩ̀kpándâ:	G	old man	ɔ̀bɩ́l'é:	1
mix	bɩ̀lúwâ:	G	old men	ábɩ́l'é:	2
mixer	ɔ̀kpándáw'ɔ̀:	1	old woman	òčíbɩ́l'é:	1
mixers	àkpándáw'ɔ̀:	2	old women	àčíbɩ́l'é:	2
molar	dɩ̀sà:lálɩ̀	5	one who is late	ɔ̀télêŋwɔ̌:	1
molars	àsà:lâ:	4	one who throws		
monkey	bàlâ:	1	things away	ɔ̀fúw'ɔ̀:	1
monkeys	ɩ̀bàlâ:	6	open	bìsíɲê:	G
month	kùfélú:	3	open(mouth)	bɩ̀yálâ:	G
months	àfélɔ́	4			
moon	kùfélú:	3	palm branch	dɩ̀tàlɩ́lɩ̀	5
morning	kéɲéŋ'á	7	palm branches	àtàlâ:	4
mosquito	ɔ̀ŋmɩ́ɲɩ́m̄	1	palm nut	dɩ́bélɩ̀	5
mosquito net	sɔbɔlɔ	1	palm nuts	ábê:	4
mosquito nets	ɩ̀sɔ́bɔ́lɔ́	6	palm wine	ǹtál'ám̄	9
mosquitos	ɩ̀ŋmɩ́ɲɩ́m̄	6	palmtree	kábɔ́ʷà	7
mother	ɔ́ɲê:	1	palmtrees	ŋ́bé:m̀	8
mothers	áɲê:	2	pants(pl)	ìčòkòtò	6
mother's milk	ńnô:čǒ:	9	pants(sg)	čòkòtò	1
mountain	dɩ̀bɩ́:lɩ́	5	paper/book	tákàlàdá	1
mountains	àbɩ́:m̄	4	papers/books	ɩ̀tákàlàdá	6
mouse	dɩ̀yélɩ̀	5	parent-in-law	ɔ́sá:m̀	1
mouth	kɔ́nɔ́ù	7	parent-in-laws	ásá:m̀	2
mouths	ńnɔ̂:	8	partridge	dɔ́wê:	1
mushroom	dìčú:l'álì	5	partridges	ɩ̀dɔ́wê:	6
mushrooms	àčú:l'â:	4	pass	bɩ́čúŋ'é:	G
mustache	nɔ̀mfàlɩ́ʸ'ɛ́	1	paste (of sorghum)	bɩ̀lɩ̀jâ:	9
mustard	ɔ́čúm̄	1	pastes(of sorghum)	ɩ̀bɩ̀lɩ̀jâ:	6
mustards	ɩ́čúm̄	6	paternal aunt	hàwê:	1
			paternal aunts	hàwé:'ánà	2
nail	ɔ́ɲɩ́m̄	1	pay	bɩ́tɔ̂:	G
nail	wɔ̀lúm̄	1	payer	ɔ́tɔ́w'ɔ̀:	1
nails	ɩ́ɲɩ́m̄	6	payers	átɔ́w'ɔ̀:	2
nails	ɩ̀wɔ̀lúm̄	6	peanut	káká	7
name	dɩ̀ɲɩ́ndɩ́	5	peanuts	ŋkákásě:	8
names	àɲɩ́m̄	4	peel/carve/sculpt	bɩ̀sénɔ́	G
nasal mucus	ɩ̀mè:lé:	6	penis	ɔ̀lɔ́lɔ̀	1
navel	dùpùlí:	5	penises	ɩ̀lɔ́lɔ̀	6
navels	àpùlúm̄	4	people	kádɩ́ʸà	2
neck	kúbɔ́ù	3	people	sɩ́s'á:	1
necks	ábɔ̂:	4	people who is late	àtélêwɔ̌:	2
neem tree	gɔ̀:jɩ́ʔ	1	persons who throw		
neem trees	ɩ̀gɔ̀:jɩ́ʔ	6	things away	àfúw'ɔ̀:	2
night	káɲâ:	7	pick(fruit)	bɩ̀té:m̄	G

English	Form	Cl.	English	Form	Cl.
pick up	bὶtɔ́:sê:	G	plant/sow	bìdú:m̋	G
pierce	bìtíê:	G	play	bὶdá:	G
pig	áfà	1	play(drum)	bὶláŋé:	G
pigeon	àlɛ́kùkù	1	plug	bɛ́tán'ɔ́	G
pigeons	àlɛ́kùkʷǎ:nà	2	polish	bὶsénɔ́	G
pigs	áf'á:nà	2	porcupine	sàmɛ́l'έ:	1
pillow	dèfèlí	1	porcupines	ὶsàmɛ́l'έ:	6
pillows	ìdèfèlí	6	pot	dànὶnsé:	1
place for:			pot	sɛ́lɛ́bà?	1
beginning	ɔ̀čɔ́sὶtèndě:	1	pots	ὶdànὶnsé:	6
cleaning	ɔ̀fúlɛ́tèndě:	1	pots	ὶsɛ́lɛ́bà?	6
consultation	ókúsὶtèndě:	1	potter	ɔ̀pɔ́lúwɔ̂:	1
counting	ɔ̀kálɛ́tèndě:	1	potters	àpɔ́lúwɔ̂:	2
excreting	ɔ̀kɔ́:tèndě:	1	pound	bὶwɔ́tê:	G
falling	ɔ̀tɔ́lὶtèndě:	1	pounded yam	dὶpálὶ	5
fighting	ɔ̀sɔ́ntèndě:	1	pounded yams	àpánɔ̀	4
jumping	òfúlí:tèndě:	1	pour	bὶkpás'έ:	G
playing	ɔ̀dátèndě:	1	pour into/on	bὶwúlɛ́ê:	G
playing	ɔ̀lántèndě:	1	pray	bùkúlê:	G
praying	ɔ̀kúlɛ́tèndě:	1	prayer	ɔ̀kúlúw'ɔ́:	1
resting	ɔ́fé:sὶtèndě:	1	prayers	àkúlúw'ɔ́:	2
sewing	ɔ̀bá:tèndě:	1	press against	bὶɲɛ́ʸâ:	G
singing	ɔ́gbɛ́:tèndě:	1	press against	bὶmátâ:	G
sitting	òčínátèndě:	1	prince	dùwèlèbílí	5
sleeping	ɔ̀dɛ́tèndě:	1	princes	àwèlèbé:	4
speaking	ɔ̀kántèndě:	1	proverb	dɛ́kpálὶ	5
sweeping	ɔ̀féyɛ́tèndě:	1	proverbs	ákpálɔ̀	4
tasting	ɔ̀dá:tèndě:	1	pubic hairs	ὶčá:m̋	6
placenta	kɛ́tâŋ	3	pull	bὶgbɛ́:dê:	G
placentas	átâŋ	4	pull out	bìčíê:	G
places for:			puppies	ŋ̀mkpídí'm̋	8
beginning	ὶčɔ́sὶtèndě:	6	puppy	kèkpídíʸ'á	7
cleaning	ὶfúlɛ́tèndě:	6	push	bìwútâ:	G
consultation	íkúsὶtèndě:	6	put down(on ground)	bὶyɛ́lâ:	G
counting	ὶkálɛ́tèndě:	6	put into/betw smth	bὶsɔ́tâ:	G
excreting	ɛ́kɔ́:tèndě:	6	put into smth	bὶčɔ́:lê:	G
falling	ὶtɔ́lὶtèndě:	6	put on(clothing)	bɛ́sɔ́ŋ'έ:	G
fighting	ɛ́sɔ́ntèndě:	6	put on smth	bɛ́gbâ:	G
jumping	ìfúlí:tèndě:	6	put/place	bɛ́yâ:	G
playing	ὶdátèndě:	6			
playing	ὶlántèndě:	6	quarter	fálándɛ́	1
praying	ὶkúlɛ́tèndě:	6	quarters	ὶfálándɛ́	6
resting	ɛ́fé:sὶtèndě:	6			
sewing	ɛ́bá:tèndě:	6	rain	bὶdá:	G
singing	ɛ́gbɛ́:tèndě:	6	rainy season	kɛ́čéù	3
sitting	ìčínátèndě:	6	rainy season beg	dó:mâ	1
sleeping	ὶdɛ́tèndě:	6	rainy seasons beg	ìdó:mâ	6
speaking	ὶkántèndě:	6	raise(animals)	bὶčálâ:	G
sweeping	ὶféyɛ́tèndě:	6	raise/lift up	bìdó:lê:	G
tasting	ὶdá:tèndě:	6	rat	sùŋmkpɛ́dê:	1
plant a stick	bíyí:'m̋	G	rats	ὶsùŋmkpɛ́dê:	6

English	Form	Code	English	Form	Code
read	bɩ̀kánɔ́	G	sandals	ànàntàlám̄	4
receive/find	bɩ̀ɲé:	G	scar	kàsɩ̀ʸ'á	7
red oil	m̀fɔ́:	9	scarf	kètè:bá:	7
refuse	bìkínâ:	G	scars	ǹsê:	8
remember	bìɲíŋê:	G	scarves	ǹtè:bé:	8
repeat	bìbús'é:	G	scorpion	kàná:	7
rest	bɩ́fé:s'é:	G	scorpions	ǹná:	8
rester	ɔ́fé:sɩ̀wɔ̌:	1	scratch	bɩ̀wɔ́:lê:	G
resters	áfé:sɩ̀wɔ̌:	2	scratch(ground)	bɩ̀tá:s'é:	G
return	bìkí:m̄	G	scream	bìyó:lê:	G
rhinoceros	čútú	1	searcher	ɔ̀kɩ́:w'ɔ́:	1
rhinoceros(pl)	ìčútú	6	searchers	àkɩ́:w'ɔ́:	2
rice	ŋmá:w'ɔ́:	1	see	búwô:	G
rice(pl)	ɩ̀ŋmá:w'ɔ́:	6	sell	bɩ̀fé:	G
rise/get up/go up	bʊ̀kʊ́sê:	G	send(smth)	bɩ̀búŋâ:	G
rise(of sun)	bɩ́lɩ́:'m̄	G	send(someone)	bìsúŋé:	G
river	kɔ́lɔ̀	7	set(trap)	bɩ́sʊ́:'m̄	G
rivers	ŋkɔ́l'ɔ́sê:	8	sew	bɩ́bá:'m̄	G
roach	témpèlém̄	1	shake out	bɩ̀kpá:	G
roaches	ɩ̀témpèlém̄	6	shake/stir	bìčí:d'é:	G
road	dìdàmbìlí	5	share/divide	bɩ́yê:	G
road/path	ɔ̀kpá:	1	sharpen	bɩ̀kpɩ́nɔ́	G
roads	àdàmbě:	4	sharpen(point)	bɩ̀sénɔ́	G
roads/paths	ɩ̀kpá:	6	sheep	sàndě:	1
roast	bɩ̀ɲásê:	G	sheep(pl)	ɩ̀sàndě:	6
rock	dùbúlì	5	sheet	kùntú	1
rock	fɩ̀ntám̄	1	sheets	ɩ̀kùntú	6
rock	kàfɩ̀ntáŋá	7	shine(of metal)	bɩ̀ɲɩ́lɩ́nd'é:	G
rocks	àbʷê:	4	shine(of sun)	bɩ̀sɔ́ŋé:	G
rocks	ɩ̀fɩ̀ntám̄	6	shoot	bɩ́tú:'m̄	G
roll up	bɩ́bɔ́:'m̄	G	shoulder	dɩ̀kpákpálɩ̀	5
roof	bɩ́mán'ɔ́	G	shoulders	àkpákpâ:	4
room	òbó:	1	show/teach	bìɲíndâ:	G
rooms	ìbó:	6	shut	bísíŋ'é:	G
root	línd'ám̄	1	shut out	bɩ́kát'é:	G
roots	ìlínd'ám̄	6	side	kàfʊ́ŋá	7
rope	ɔ́fê:	1	sides	m̀fʊ́m̄ FT	8
ropes	ɩ́fê:	6	sieve	díč'ó:	5
rot	bɩ́gbɔ̂:	G	sing	bɩ́gbɩ́:'m̄	G
roughcast	bɩ́bɔ̂:	G	singe	bɩ̀tɔ́:	G
row/paddle	bìwúnó	G	sink	bímún'ó	G
rub	bìkpínó	G	sit	bìčínâ:	G
run	bɩ̀sɩ́lê:	G	skin	kàwʊ́lá:	7
			skins	ŋ̀wʊ́lɔ́	8
sacrifice	bɩ́čɔ́n'ɔ́	G	slacken	bɩ́yɔ́:s'é:	G
saliva	dɩ̀nɔ̀ɲčɔ́lɔ́bílí	5	slave	dɩ̀kɔ́ɲɟálɩ̀	5
saliva	ànɔ̀ɲčɔ́lɔ́	4	slaves	àkɔ́ɲɟâ:	4
salt	ńsɔ̂:	9	sleep	ɩ̀dê:	G
sand	kìɲí:s'ú:	3	sleeper	ɔ̀dɩ́w'ɔ́:	1
sand	kàɲí:s'á:	7	sleepers	àdɩ́w'ɔ́:	2
sandal	dɩ̀nàntàdɩ́lɩ̀	5	sling shot	táʸɩ̀	1

sling shots	ìtáʸì	6	sweat	kúsúsùlǔ:	3
smash/crush	bìtìlìkě:	G	sweep	bìféyê:	G
smoke	íʃís'íɱ	6	sweeper	ɔféyìw'ɔ:	1
snake	kùwɔ:ú	3	sweepers	àféyìw'ɔ:	2
snakes	àwɔ:ɱ	4	swell	bìpúnâ:	G
sneeze	bìčìmás'é:	G	swim	bìpútê:	G
sniff at	bìmú:sâ:	G	swing	ví:yàyà	1
son	òbìɲísê:	1	swings	ìví:yàyà	6
song	ìlúɱ	6			
son-in-law	ɔsá:ɱ	1	tail	ódúɱ	1
son-in-laws	ásá:ɱ	2	tails	ídúɱ	6
sons	àbìɲísê:	2	take	bìčú:ɱ	G
sorcery	kékpóʷà	7	take away	bìlé:lê:	G
sore	ɔlɔ:	1	take off	bílút'é:	G
sores	ìlɔ:	6	take(smth)off(smth)	bìsúwê:	G
speak	bìkáɲê:	G	taste	bìdá:ɱ	G
speaker	ɔkáŋw'ɔ:	1	taster	ɔdá:wɔ:	1
speakers	àkáŋw'ɔ:	2	tasters	àdá:wɔ:	2
spit	bìká:s'é:	G	tear	bìčìnìê:	G
split	bìbá:	G	tears	ǹsúsúč'ó:	9
spoil/break	bìɲándâ:	G	teeth	áɲê:	4
spread out	bìyás'é:	G	tell	bífé:'ɱ	G
sprinkle	bìŋmìɲìŋ'é:	G	termite	dísí:lì	5
sprout	bìkɔn'ɔ	G	termites	ásí:ɱ	4
squirrel	nàndě:	1	testicle	dìwád'ìlì	5
squirrels	ìnàndě:	6	testicles	àwál'é:	4
star	dìfélébílí	5	theft	kèyúʷà	7
stare at	bìwí:l'é:	G	thief	òyô:	1
stars	àfélébé:	4	thief	òyú:líw'ɔ:	1
steal	bìyú:lê:	G	thieves	ìyô:	6
stick	bìpú:dê:	G	thieves	àyú:líw'ɔ:	2
stomach	dùpúdí	5	thigh	dìlándì	5
stomaches	àpúnó	4	thighs	áláɱ	4
stop	bìyìlê:	G	think	bìʃún'é:	G
story	ìtélɔ	6	thread	bìtún'ɔ	G
straw hat	tèɲʃú	1	throat	lòtòlò	1
straw hats	ìtèɲʃú	6	throats	ìlòtòlò	6
strength	ɔlúɱ	1	throw away	bìfʷê:	G
stretch	bìyálìê:	G	throw(smth at)	bìtú:'ɱ	G
stumble	bìtú:l'é:	G	tibia	kpáɲá	1
suck	bìmʷíê:	G	tibias	ìkpáɲá	6
suck(of child)	bìɲɔwê:	G	tickle	bìɲúmpɔl'é:	G
sucker	òmʷíw'ɔ:	1	tie together	bìčâ:	G
suckers	àmʷíw'ɔ:	2	tighten	bìčá:lê:	G
suitcase	àdák'á:	1	tighten	bìkpìt'é:	G
suitcases	àdák'á:nà	2	tire	àkpà?	1
sun	ówê:	1	tiredness	áɲén'é:	4
suns	íwê:	6	tires	àkpǎ:nà	2
surround	bìmílí:l'á:	G	toe	dìnámbílí	5
swallow	bìménɔ	G	toes	ànámbé:	4
swear	bìtánl'á:	G	tongue	nɔndɔl'úɱ	1

tongues	ìnɔ́ndɔ́l'úɱ́	6	vomit	bɩ̀kpálɩ́ê:	G
tool	kúɲát'áʋ́	3	vote	bɩ́tʋ́:'ɱ́	G
tools	áɲát'á:	4			
tooth	díɲílì	5	wait	bíʝó:'ɱ́	G
touch	bìtékìlǎ:	G	wake up	bìčíŋê:	G
town	dʋ̀čàdɩ́	5	walk	bìčísâ:	G
towns	àčànɔ́	4	walk/go	bʋ̀ná:ɱ́	G
trade	bìgbélíê:	G	wall	kàbàʸɩ̀ʸá	7
traditional cloth	čèčá	1	walls	m̀bàlɩ̀:ɱ́	8
trad. cloth(pl)	ɩ̀čèčá	6	wander	bìmílíê:	G
train	zílígí	1	wander around		
trains	ìzílígí	6	(w/merchandise)	bìmílí:l'á:	G
trample	bìčísâ:	G	want/love	bɩ̀wánlâ:	G
tree	kúyû:	3	wash	bɩ̀fʋ́nɔ́	G
trees	áyê:	4	wash(clothes)	bɩ́čɔ́t'é:	G
truth	là:kpàlɩ̀	1	water	ɲ̀čɔ́ɱ́	9
truths	ɩ̀là:kpàlɩ̀	6	weariness	dʋ́pɔ́:lɩ̀	5
turkey	tòlót'óló	1	weave	bɩ̀lɔ́:	G
turkeys	ìtòlót'óló	6	weaver	ɔ̀lʋ́wɔ̂:	1
turn aside	bɩ́ké:s'é:	G	weavers	àlʋ́wɔ̂:	2
turn round	bìbílíê:	G	wedding	hì:ʝè?	1
twins	àɲɔ́ʷánà	2	weddings	ìhì:ʝè?	6
twist	bífín'ó	G	weed	bɩ̀ŋmésê:	G
type of dance	čʋ̀ká?	1	well	lɔ̀kɔ̀	1
type of dance(pl)	ɩ̀čʋ̀ká?	6	well bucket	gù:gá?	1
			well buckets	ìgù:gá?	6
unbind/untie/			wells	ɩ̀lɔ̀kɔ̀	6
untether	bɩ̀sáɲê:	G	wet(tr)	bɩ̀pɔ́:lâ:	G
uncover	bìbúwê:	G	whistler	ɔ̀fʋ́ŋwɔ̂:	1
unit/seed	díbílì	5	whistlers	ɩ̀fʋ́ŋwɔ̂:	6
units/seeds	ábê:	4	whistling	ɩ̀fʋ̀:lé:	6
unload(child)			wind	áfʋ́ɱ̀	4
fr back	bɩ̀lé:lê:	G	window	tógóló	1
unload(fr.head)	bɩ̀sʋ́wê:	G	windows	ìtógóló	6
unroll	bɩ̀sáɲê:	G	wipe off	bɩ̀kpá:lê:	G
untier/unbinder	ɔ̀sáŋw'ɔ́:	1	witch	ókpê:	1
untiers/unbinders	àsáŋw'ɔ́:	2	witches	íkpê:	6
urinate	bɩ̀čásê:	G	woman	ɔ̀čí:ɱ́	1
urine	m̀búló	9	women	àčí:ɱ́	2
			wood	káʝâ:	7
vagina	dìtòmpòndí	5	wood(pl)	ɲʝâ:	8
vaginas	àtòmpòɱ́	4	word	dùsùmbílí	5
vary/exchange	bɩ̀čélɩ́ê:	G	words	àsùmbé:	4
veil	tèkènté	1	work	dìsímbílì	5
veils	ìtèkènté	6	works	àsímbê:	4
vein	díčíndì	5	wound	bɩ̀mɔ́:ɱ́	G
veins	áčíɱ̀	4	wrap up	bíbúɲ'é:	G
village	kàčàlɩ́ʸ'á	7	wring out	bɩ́ɲɩ̀ŋ'é:	G
villages	ɲčàlɩ́'ɱ́	8	wrinkle	bíčúk'é:	G
voice	ɔ̀búlɔ́:	1	write	bɩ̀ŋmá:lê:	G
voices	ɩ̀búlɔ́:	6			

yam	kúɟóù	3
yams	íɟô:	6
yawn	bɩ̀wá:n'έ:	G
year	kásúʷà	7
years	ńsô:	8

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