

SONORITY AND SYLLABLE WEIGHT

IN FUR

by

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Abstract

SONORITY AND SYLLABLE WEIGHT
IN FUR

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This dissertation is a study of sonority and syllable weight and their effects within Fur phonology. It is assumed that a wide range of phenomena are affected by syllable weight and that it is specific to the processes in which it is observed rather than a language universal (Gordon 2007, Fitzgerald 2012, and others).

In this study, I show how sonority is used to organize both the syllable and the word in Fur. The Syllable Contact Law (Clements 1990) is particularly important to the organization of words, with non-sonorous codas generally avoided in coda position of heterosyllabic C.C sequences. Using Autosegmental Phonology, this study also presents the lexical tone patterns of Fur and shows how contour tones and complex contour tones are licensed, in part, by the weight of the syllable. In this context, long vowels and sonorous codas are considered heavy (CVV and CVR) and short vowels, whether open or closed with a non-sonorous consonant, are considered light (CV(C)). Moreover, I show how sonority is important in both alliteration and rhyme, with each of these phenomena being important organizing principles in reduplication and in songs. The iambic foot is also shown in this study to be an important organizing tool in reduplication, reflecting how syllable weight is important in this language. For example, bases with the structure of an iambic foot are only seen in examples of total reduplication.

Beyond showing how sonority and syllable weight are important within Fur phonology, this study also seeks to further the knowledge about this lesser-studied language by describing several phenomena that have been neglected in the language: geminates, contour tone distribution, reduplication, and meter. It is hoped that this study will help broaden the knowledge of the Fur language and that of the Nilo-Saharan language family, while also contributing typologically to the areas of syllable weight and sonority.

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Chapter 1

Introduction

1.1 Overview

The focus of this dissertation is Fur, a Nilo-Saharan language spoken in the Darfur region of The Sudan. The goal of this dissertation is twofold: First, to show the importance of sonority as an important organizing tool within the language, and second, to provide an account of syllable weight. In order to accomplish these goals, I have chosen to focus on both the syllable and the mora in this language. This is the first study of this language that does so in depth, thus providing an important contribution in this area.

Much of the phenomena that are explored in this study have been neglected in the literature about Fur, providing a ripe opportunity to examine them, allowing for the literature about Fur and the knowledge about how a Nilo-Saharan language handles weight to be furthered. The results of my analysis show that, contrary to Gordon's (2007) findings about Fur, syllable weight is shown to be a very important factor in many processes and that the syllables considered heavy in some processes include not only CVV(C) syllables, but also those syllables with short vowels that have sonorant codas (CVRs); further, while short vowels with obstruent codas (CVOs) are generally considered light, in some cases, these syllables are forced to be heavy as well.

In this study, there are several phenomena that I explore. First, sonority is shown to be an important organizing factor for syllables, words, and larger texts like songs. For example, I show that the sonority of the segments impacts syllable formation (shown in Chapter 2), word-formation processes like verbal constructions (shown in Chapter 2), reduplication (shown in Chapter 5), and the construction of songs through alliteration, rhyme, and even weight (shown in Chapter 6).

I also show how weight is an important organizing factor in the language. For example, I show that the minimum word in Fur is bimoraic and that there are restrictions on the types of syllables that may occur in the language (see Chapter 2 and 3); for example, long syllables closed by a glide do not occur because these syllable types are too heavy in Fur. Further, in the distribution and licensing of contour and complex contour tones, I show how heavy syllables—syllables with long vowels or diphthongs and also short syllables closed by a sonorant coda—attract contour tones and complex contour tones (see Chapter 4). Even reduplication found in nouns is affected by syllable weight. I show in Chapter 5 that the iambic foot, which is a weight-base foot, is the shape of the reduplicant in fully reduplicated forms.

The Fur language and specifically sonority and syllable weight within this language are important to study for several reasons. First, while some observations concerning the sonority of segments have been made (Jakobi 1990, Kutsch Lojenga and Waag 2004), and some observations regarding tone and moras, and vowel shortening and moras have been made for Fur (Waag 2010), there has not been a study that only focuses on sonority and weight. Second, the phenomena analyzed in this study have not been examined at all or not in sufficient depth, usually because the focus of previous studies on Fur have been on different topics; therefore, more about minimum word requirements, contour tone distribution, reduplication, and the phonological organizing principles in Fur songs adds to the knowledge about this language and also to the knowledge about Nilo-Saharan languages in general. Third, specifically concerning my examination of meter, the dance songs analyzed in Chapter 5 have not been previously analyzed linguistically, and therefore there is significant contribution here and to studies in meter in general. By looking at texts like songs, and processes like reduplication, we

are able to add cross-language examples for typological purposes. Fourth, the topics covered in this dissertation are hoped to advance the documentation of this language.

The remainder of this chapter is laid out as follows. §1.2 provides theoretical assumptions that are assumed in this study. §1.3 then provides background and sociolinguistic information about the language. §1.4 summarizes the previous work on the Fur language. §1.5 discusses the source data for this study. §1.6 summarizes the organizational structure of the dissertation.

There is a need for discussion of sonority and syllable weight in languages like Fur for several reasons.

First, Gordon's (2007) work shows the importance of looking at both widely and lesser-studied languages in order to broaden our understanding of syllable weight. Our understanding of Fur therefore expands our typological understanding of possibilities concerning syllable weight restrictions of languages in general. Second, the need for more studies—particularly in those of Nilo-Saharan languages—is important. There are a broad range of languages in this language family, with many of these language not yet described or studied; therefore, there is a need for a greater understanding of this language family. Meter, for example, has been a neglected area in this language family (Dimmendaal 2012), and tone, reduplication, and other processes helps us broaden our understanding of this language family. Our understanding of Nilo-Saharan languages thus broadens our understanding of languages in general. Third, with groups like the Fur Language Development Committee (FLDC)¹ promoting the education of the Fur language and the more recent orthography, documenting more of this language is important for pedagogical purposes.

¹ Facebook page: <https://www.facebook.com/FurLanguageDevelopmentCommitteeFIdc>

The knowledge about the culture and the environment in which the Fur have lived are also documented through this type of analysis. For example, in reduplication, most examples are specific names for plants, animals, etc. There is also a cultural value or motivation for working with texts in the verbal arts like songs and poems. For example, several important cultural aspects of the Fur people are reflected in the Dance Songs analyzed in this dissertation. As Muhammad (1996) mentions, verbal art in the Sudan can be a means to document historical events such as natural disasters and wars; verbal arts are also a way to document the physical features of the landscape like rivers, mountains, etc. In Chapter 6 we see documentation of such historical events like wars, famines, invasions, etc. We also see that literature is a way to express political resistance (Muhammad 1996). For example, Dance Song 1 expresses that “The Fur maintain that they can shoo away the Arabs like birds” (Beaton 1940: 315), which shows some of the resistance to the Arab invasion during that time. Finally, these oral traditions are a way to express grief, hope, struggles, and other emotions, as evidenced in Chapter 6.

1.2 Some Theoretical Assumptions

In this dissertation, I follow some basic theoretical assumptions. First, I assume that the syllable is organized according to sonority (Clements 1990). The most sonorous part of the syllabus is the nucleus and sonority then decreases when moving away from the nucleus. Further, I have adopted the sonority hierarchy discussed in Clements (1990), and used by others (Zec 2007) in this dissertation. For Fur, this means that I use a hierarchy like that of Zec (2007)—for example, because fricatives are fairly rare, I include them with the obstruents.

I also assume that sonority is connected to syllable weight and that syllable weight may not be consistent from one phenomenon to the next (Gordon 2007, Fitzgerald

2012, and others). For example, I do not assume that short, closed syllables (CVCs) are heavy concerning contour tone distribution because they are heavy in the minimum word (see Chapter 3).

I also have adopted the mora as the means of representing syllable weight (Hayes 1989, 1995). While there are other ways to represent syllable weight, including the onset/rhyme representation (Levin 1985, etc.), I agree with Yip (2002), Zec (2007) and others that the mora is the simplest way to represent syllable weight. Further, because the onset does not contribute in syllable weight in Fur, I attach the onset directly to the syllable node (following Hayes 1989 and others); moraic theory allows for this simple distinction between weight-bearing and non-weight-bearing segments. Also concerning tone, I have chosen to use Autosegmental Phonology (Clements 1976, Goldsmith 1976, and Kenstowicz 1995) in Chapter 4 and in Chapter 5.

Finally, the foot typology in Hayes (1995) has been adopted in this dissertation. In Hayes (1995), there are three basic foot types. I use these foot types to look at prosodic morphology in Fur (i.e., morphophonological processes like reduplication in Chapter 5) and meter in the Dance Songs (see Chapter 6). In McCarthy and Prince (1986), they use the same foot types as Hayes (1995: 78), which Hayes argues for in support of his theory—i.e., these foot types are at both the morphological level and the metrical level. In particular, I look for prominence or quantitative patterns at both levels, so I use Hayes' foot types in order to scan the texts. I am also following Fitzgerald's (2006) study of Somali where she uses each of the three parsings (syllabic trochee, moraic trochee, and iambic foot) to study iambic meter in Somali—she also bases her study off of Hayes (1995).

1.3 Language and Sociolinguistic Background

According to the *Ethnologue* (Lewis, et al 2013), there are 78 languages in the Sudan, with 75 living and 3 extinct. The Fur² language is a lesser-studied, Nilo-Saharan language³, spoken in the western region of the Sudan, mainly in Darfur, meaning 'land of the Fur,' and in parts of Eastern Chad.



Figure 1.1 Map of Sudan from UCLA International Institute (2006) with the area of Fur speakers circled

The Fur are the largest group who reside in the Darfur region of the Sudan, making their languages one of the dominant languages of that area. Other surrounding languages include Zaghawa and Masalit. A current population count of Fur speakers has

² Other names used in the literature for Fur include: For, Fora, Fordunga, Kungara, Yerge, Onage, Korra, Kadirgi, Kurka, Dala, Lali, Furakang, Forta, Forok, or Furawi or Fouraoui (after the Arabic) or Forien (in French), after a once ruling clan-Kongara, Kondjara, Konjara, (Jacobi 1990; Waag 2009; Lewis, et. al 2013). I have chosen to use *Fur* in order to be consistent with the most recent work completed on this language.

³ While Fur is considered to be part of the Nilo-Saharan language family, scholars differ on its placement (cf. Greenberg 1963, Bender 2000, and Ehret 2001; Sands 2009). At one point, Fur was considered a language isolate (Greenberg 1963); however, Amdang (Biltine) is now considered a closely related language, and therefore is grouped under the Fur branch.

been difficult to ascertain because of the more recent war and ethnic genocide in Darfur which has internally displaced many people and caused others to emigrate to other countries, including the United States. Previous researchers, who quote estimates from the 1980s, have noted a population ranging from 502,000 to 720,000 (Waag 2009; Lewis, et al. 2013). Others suggest that there are around 900,000 speakers (Kutsch Lojenga and Waag 2004; El-Fadel Arbab, p.c.).

According to the *Ethnologue*, Fur is a *developing language*, meaning that this language is “in vigorous use, with literature in a standardized form being used by some though this is not yet widespread or sustainable” (Lewis, et. al 2013). A grammar of the language has been established, and there is an orthography that has been recently developed for this language (see Waag 2010); some books with children’s stories have been created in the language and are being distributed.⁴ Many Fur also speak Sudanese Spoken Arabic (Lewis, et al 2013); according to Waag (2010), in some areas Sudanization is spreading more quickly, and in others, there is a resurgence in culture. Corbet (2012) argues that there has been a decades-long shift to the dominant language of Sudanese Arabic, but that because of the more recent conflict in the region, the shift in the geographic region, and the socioeconomic status, the Fur people have become more self-aware about the status of their language and their culture. Corbet (2012) predicts that the Fur language is in resurgence and that it will be maintained—the language is shifting away from language death and towards vitality. The Fur Cultural Revival in Maine (US) (see footnote in section 1.3 above) and other organizations in Europe and in Africa are evidence to this resurgence in the language and culture.

⁴ I was given the opportunity to acquire some of these texts during my trip to Portland, ME.

1.4 Previous Work on Fur

Although Fur is a lesser-studied language, there have some key pieces of literature on the language (cf. Beaton 1968, 1940; Tucker and Bryan 1966; Jernudd 1983; Jakobi 1990, Kutsch Lojenga and Waag 2004, Kutsch Lojenga 2006; Noel 2008; Waag 2010, 2008, 2006). Jakobi (1990: 1-13) presents earlier linguistic contributions on the Fur language and should therefore be referenced for further detail. The main contributors to Fur whose research is relevant to this project are chronologically outlined below. Data from the language are analyzed in the next chapters; therefore, none is presented in this section.

In *A Grammar of the Fur Language* (1968), Beaton's observations about Fur grammar during the 1930's were published as a source for teaching the language; this text includes exercises at the end of each chapter to aid the language learner. This is the text accessed by Gordon (2007) from which he bases his analysis of syllable weight of Fur (see Chapter 3 for further discussion), and Beaton's text is one of the main sources cited by typological references like WALS and others when mentioning Fur. Besides his pedagogical book on Fur grammar, Beaton (1940; 1941; 1948) provides an ethnographic account of the Fur people; among his observations about the people he has included some short texts in Fur, which he has translated. In particular interest for the scope of this dissertation is Beaton's work titled *Fur Dance Songs* (1940). In this work, he describes nine different dance genres and includes several transcriptions of the songs that accompany each type of dance. Further details about each type of dance and the songs that accompany them appear in Chapter 6.

In her book *A Fur Grammar*, Jakobi (1990) makes a significant contribution to the description and analysis of the phonology, phonotactics, morphophonology, and morphology of the Fur language. She provides the phonemes, allophones, and the

syllable structure of the language, along with a description of the morphological processes found in many of the word classes (e.g., nouns, adjectives, verbs, etc.). Jakobi also provides a lot of data in the language, including words, sentences, and some texts. Because Jakobi's work had been the most thorough account of Fur to date, it has been the most-cited reference concerning Fur. For example, Jakobi's work is cited in discussions of processes like metathesis (Hume 2000, 2001), in typological literature (Dryer and Haspelmath 2013), and other processes like verbal suppletion (Veselinova 2006). It is clear that Jakobi's contribution to the documentation of this language has been important in this field.

Following Jakobi, Kutsch Lojenga and Waag (KLW) are the next linguists to analyze the Fur language. In their work entitled *The Sounds and Tones of Fur* (2004), they analyze the phonology of the language by expanding on the syllable and word structure, consonants, vowels, and tones of Fur; KLW also present a possible system for an orthography of the language.⁵ In their description, they also provide examples of syllable templates and of tone.

Noel (2008) is the first to examine the tones of Fur by an acoustic method: she analyzes the data using F_0 pitch trajectory plots and posits that, contra to KLW, there are three level tones in the language. Her analysis also shows that some examples with glides should be transcribed as vowels because the length of those segments corresponds better to vowels than that of consonants. Besides her discussion of tone in this language, which is an area in the language that has needed further study, her paper is the first acoustic analysis of this language, providing an important insight into the segments and syllable structure of the language.

⁵ See section 1.3 above for more details on the orthography of the language.

Following K LW, Waag's *The Fur Verb and Its Context* (2010) is the most recent study of Fur. Their work is a study on verbs, the verbal clause, and sentence structure in Fur. She includes a brief overview of the phonology of the language, referencing the manuscripts mentioned in the previous paragraphs (Jakobi 1990 and others) for a more in-depth look at the phonology, and she also covers some word classes and their phrases. However, the main focus of her study is the Fur verb and describing it along with clause and sentence structure. It is important to note that her work is the first to describe and analyze structures beyond the morphological level of the language, as she analyzes clause and sentence structure. Her book also provides a description of tone, and she marks tone on all of her examples.

The literature on Fur that presented in this section has provided a significant contribution to the documentation, description, and analysis of this language. Even with all of these strengths, there are still areas open for analysis, including those explored in this dissertation.

1.5 Source Data for This Study

In order to collect data on Fur, I conducted fieldwork and I also mined previous works on Fur, using those works as a corpus.

In my fieldwork, I worked with a native Fur speaker in the Dallas-Fort Worth (DFW) area during two field methods classes at The University of Texas at Arlington, and also through outside work after these classes had ended. I also traveled to Portland, Maine, to work with the community of Fur speakers there in order to collect data for this study.⁶ The group in Portland, ME call themselves The Fur Cultural Revival.⁷ Through the Trudy and Ben Termini Graduate Student Research Grant, I was able to work with

⁶ The IRB protocol numbers for this work are #07.293s and #2009-01455.

⁷ Their website is <https://sites.google.com/site/furculturalrevivalme/>.

the Fur community on their language. I primarily worked with El Fadel Arbab, who is the Vice President of their organization.

The three speakers I worked with in DFW and in Maine were men and women, ranging in age from their 20s to 50s. The data was collected in word lists, utterances, and in several texts. All speakers are native speakers of Fur and also speakers of Standardized Spoken Arabic; we communicated through English, which is a third language for these speakers.

In addition to fieldwork, I also culled data from Beaton (1940), Jakobi (1990), Kutsch Lojenga and Waag (2004), Waag (2010), and an unpublished Fur dictionary. Some of the sources are used in specific sections of this dissertation. For example, Beaton (1940) is the source for the Dance Songs analyzed in Chapter 6, and the unpublished dictionary is the source for most of the nouns with reduplication analyzed in Chapter 5.

Each example throughout the dissertation is marked according to its source, with a parenthetical citation after the example: McKeever fieldnotes = M, (Jakobi 1990) = J, Kutsch Lojenga and Waag (2004)= K LW, Waag (2010) = W, and the unpublished dictionary = D. Beaton (1940) is only used in Chapter 6, and this work is the only source data in that chapter; therefore, the examples in that chapter are not marked.

1.6 Overview of the Dissertation

The rest of the dissertation is outlined as follows. Chapter 2 presents the background on the segments and the syllable structure of Fur. Specific attention is paid to the sequencing of segments within the syllable along with the sonority of those segments. Further, this chapter looks at sequences of C.Cs that occur word-internally in Fur, and explores some processes in the language that tie into segment sequencing and sonority. Chapter 3 provides an analysis of syllable weight, focusing on the minimum

word, geminates, and some phenomena within the language that are weight-based. Chapter 4 then discusses lexical tone in Fur and the distribution and licensing of contour and complex contour tones. Chapter 5 provides an analysis of reduplicative forms found within nouns. Chapter 6 provides an analysis of several Fur dance songs, showing how there are phonological principles organizing these songs. Finally, Chapter 7 concludes the dissertation by connecting all of the analyses in regard to syllable weight, and ties this discussion to the typology of syllable weight in the world's languages; this chapter also indicates areas for further study in this area of the language. In each chapter a discussion of the types of constraints important to Fur along with a portion of data is discussed using Optimality Theory.

Chapter 2

Phonotactic Constraints in Fur

The purpose of this chapter is to provide an overview of the phonotactics of Fur. As such, this chapter provides a brief summary of tone in Fur and then summarizes the segmental inventory of this language. The four syllable types of Fur are then established. Further, sonority is important in the organization of segments into syllables; thus, sonority is shown to be an important organizing factor of syllables and words in this language.

2.1.1 Brief Introduction to Tone

Fur is a tone language, exhibiting both lexical and grammatical tone. Because of the importance of tone, it is relevant to introduce some aspects of tone in this chapter in order to orient readers to its function in the language and so that readers understand the examples presented in this chapter and in Chapter 3. A more in-depth analysis and discussion of tone is presented in Chapter 4 of this dissertation.

There are two level tones in Fur: high (H) and low (L), which I mark with an acute accent (´) and a grave accent (`) respectively in the examples that follow in this dissertation. These two level tones can be combined to produce both rising LH and falling HL contour tones, which I mark with a wedge (ˇ) and a circumflex (^), respectively. The examples in (1) below show how tone is marked using all of these symbols:

- (1) a. H dáy 'he goat' b. HL dâý 'Lalob tree'
 c. L dèy 'oil' d. LH dăý 'ant, sp.'

Further, as shown in section 2.2.3.1 below, there are short and long vowels in Fur. When distinguishing short vowels from long vowels, I have chosen to use one vowel for a short vowel and two vowels for a long vowel. This follows the current literature on Fur (Jakobi 1990, Kutsch Lojenga and Waag 2004, and Waag 2010), which is discussed

in more detail in section 2.2.3.1 below. There can be level and contour tones on both short and long vowels; I mark tone in the manner found in (2) below:

(2)	short vowels	long vowels
	tòŋ 'house' (M)	pòòr ~ fòòr 'Fur' (M)
	sát~sót 'red cap of student' (W 36)	lós 'place' (W 63)
	pûl peanut (W 36)	yáà 'woman' (W 44)
	ŕr 'giraffe' (KLW)	sòón millet (W 36)

Tone is marked the same way on diphthongs: diò 'stomach' (W 24), díá 'wound' (D, W 58), pié ~ fiè 'rabbit' (M), yiè 'dream' (W 24), pié 'lie' (W 36).

There can also be up to three tones on one syllable, thus a LHL or a HLH can form. The HLH form usually surfaces as a downstepped high H!H, but can be pronounced as HLH over morpheme boundaries or careful speech for some speakers (Waag 2010). In the data examples of this chapter, I follow KLW's (2004) example when representing complex tones on long vowels: the first tone in the complex contour is placed on the first vowel and the circumflex or wedge is placed on the second vowel, as in (2).

(3) wùò 'flour'

The reason for this assignment of tone is because the contour tone usually splits during morphological processes. For example, with the addition of the plural morpheme suffix the L or H of the contour spreads to the plural morpheme, as in (4):

(4) wùó-ŋà 'flour'
 gùrbét 'wild cat, sp.' gùrbét-à 'wild cat, sp. pl' (W 49)

In examples that have closed syllables with short vowels, and a complex contour tone is present (note that these are very rare, as discussed in Chapter 4), part of the contour is placed on the sonorant coda consonant:

(5) mûf 'revision'

Chapter 4 requires that the coda consonant carries a mora in these cases, thus allowing for an assignment of tone.⁸

2.1.2 Organization of Chapter 2

The organization of this chapter is laid out as follows. The sound inventory and phonological processes involving these sounds are discussed in sections 2.2 and 2.3, respectively. The distribution of sounds is presented in section 2.4 with a specific connection to their sonority. Section 2.5 shows how consonant cluster sequences across syllable boundaries (C.Cs) in Fur are generally constrained by the Syllable Contact Law (Clements 1990). Finally, the findings in this chapter are summarized in 2.6.

2.2 The Segmental Inventory

Except for a few disagreements, which will be laid out in the following sections, the established inventory for Fur follows Jakobi (1990), Kutsch Lojenga and Waag (2004), and Waag (2010).

2.2.1 Consonant Inventory

While there have been different consonant inventories proposed for Fur, most of the phonemes have been established in the more recent work of Jakobi (1990), Kutsch Lojenga and Waag (2004), and Waag (2010). Where there are differences in opinion, I will present them below.

There are 17 consonant phonemes in Fur with six manners of articulation and five places of articulation. This would be classified as a moderately small consonant inventory (Maddieson 2013). The consonant inventory of Fur is presented in Table 2.1 below.

⁸ It should be noted, however, that while consonants may bear tone, tone is always realized on the vowel during speech.

Table 2.1 Phonemic Consonant Inventory of Fur⁹

	Labial	Coronal			Dorsal
	bilabial	alveolar	postalveolar	palatal	velar
stops	p, b	t, d	j		k, g
fricatives		s, z			
nasals	m	n		ɲ	ŋ
laterals		l			
approximant		r			
glides	w				y

Table 2.1 shows that in Fur, the alveolar consonants are the most common type in this language, which is common among the languages of the world (Moravcsik 2013). The bilabial and velar consonants are the next most common type of consonant in this language. There is a small fricative set, which includes only two fricatives, /s/ /z/.¹⁰ These fricatives occur rather infrequently in the language. /z/ seems to have a very restricted distribution, and in fact may actually be a borrowed phoneme or an allophone, probably from Arabic. According to Maddieson (2013), typologically, the absence of fricatives is one of the more commonly seen classes-- besides bilabials, nasals, and

⁹ In keeping with previous literature, I have used the symbol /j/ for the postalveolar stop/dʒ/ and the fricative /ʒ/, the symbol /y/ for the velar glide /j/, and the symbol /r/ for the alveolar approximant /ɹ/. All other symbols follow the IPA symbols.

¹⁰ The fricative [ʃ] is used in Beaton's (1940) transcription of the dance songs, which I analyze in Chapter 6. This segment is not discussed in any of the literature on Fur, and I would suggest it is a difference in dialect or that the segment has been borrowed into the language in some cases. There are two reasons for suggesting that this sound is a borrowed from Arabic. First, the Sudanese Arabic word for 'money' is *garoosh* or *guroosh*; from my elicitations, *gersha* 'money' was stated as the word in Fur for money. Further, the highest number of occurrences of the fricative [ʃ] and of the glottal fricative [h]—noted below to probably be a borrowed sound from Arabic—is in the Jombole songs. These songs are sung by the Fiki's pupils and are probably influenced by Arabic. Most of the other song genres do not include these fricatives.

laterals— that might be absent in a language. He notes that the Nilo-Saharan languages of Dinka and Lango completely lack fricatives.

The bilabial plosives in Table 2.1 are also important to discuss. For some speakers, the voiceless bilabial plosives, which are represented with /p/ in Table 2.1, are in free variation with each other. In my fieldwork, I observed the fricative [f] in free variation with the plosive [p]:

(6) piè ~ fiè 'hare'

(7) pòòr ~ fòòr 'Fur'

Besides [f], Waag (2010) observes several other sounds in free variation, including [pf], [ɸ], [pɸ].¹¹ Waag (2010: 27) suggests that these variations may be the result of dialectal differences or that monolingual speakers tend to or only use [p] while other variants like [f] may be used by those who also speak Arabic.¹² For example, speakers will say that their language is the *bé/é pòòr* 'Fur language', not *bé/é fòòr*. Therefore, the argument can be made that the variant [f] has been borrowed from Arabic. I have chosen to use [p] in my transcriptions and in the consonant inventory above as Waag (2010) does because monolingual speakers tend to use [p].

2.2.1.1 The glottal sounds

The status of the glottal consonants /h/ and /ʔ/ in the consonant inventory has been debated in the literature on Fur.¹³

¹¹ I also noticed these variations being used by Fur speakers for words in English that begin with [f].

¹² In fact, the name of the region where the Fur live is taken from Arabic: *Dar Fur* 'land of the Fur'.

¹³ Jakobi (1990: 18ff) believes that the glottal fricative /h/ is a marginal phoneme but that this phoneme does not play a role in any of her phonological arguments. She argues that this phoneme is found only in two words, one of which is in free variation with the glottal stop. Further, during the adaptation of loanwords that have the glottal fricative [h] or pharyngeal fricative, she shows that both are deleted in Fur. In her inventory, she includes the glottal fricative, but notes that this sound is marginal by using parenthesis

During elicitation sessions, I found the glottal fricative [h] to be very rare in Fur. I only have two examples¹⁴:

- (8) a. [həmù] ‘steam’
b. [híllâ] ‘there (far)’

[h] is limited in its distribution: this sound only occurs before vowels in word-initial position. Waag also noted these other three examples (taken from Waag 2010:15-6):

- (9) a. hěrrà ~ ?ěrrà ‘radiation, light’
b. hśò ~ hǒò ‘free of charge, easy, nonsensical, idle, useless’
c. hâw ‘encouragement for a donkey to speed up’

An important note about each example in (8) in (9) is that (8a,b and 9a) are loanwords from Arabic and (9b,c) are interjections (Waag 2010). Whether or not to include sounds that occur only in loanwords is controversial, and generally those sounds introduced within more recent generations from the spread of world languages like Arabic have been excluded (Maddieson 2005a). Sudanese Arabic is widespread in the Sudan, but this language has had an influence for a long time, perhaps more than a few generations. As noted above, however, there are monolingual Fur speakers—speakers who only speak Fur and not Arabic.

Further evidence that [h] may be borrowed from Arabic comes from some of the words in the Jombole Dance genre transcribed by Beaton. These songs are sung by the Fiki’s pupils who are studying Arabic and the Koran. Within the corpus of dance songs

around the segment. Jakobi also considers the glottal stop /ʔ/ “a redundant feature of vowel-initial words spoken in isolation”; therefore, she does not include this sound in her inventory. On the other hand, Waag (2010) includes the glottal stop as part of the phonemic inventory and considers the glottal fricative [h] to be a variant of the glottal stop /ʔ/. Waag sees the glottal stop /ʔ/ as a phoneme for two reasons. First, she argues that the glottal stop is used as a subject reference marker of the verb, which should make this segment part of the inventory. Second, she argues that all vowel-initial words are preceded by the glottal stop at “the structural level.”

¹⁴ Waag found these same examples in free variation with the glottal stop.

analyzed in Chapter 6, this genre has the most occurrences of [h] and of [ʔ], as noted previously. Some of the words Beaton transcribed may have been loanwords from Arabic used specifically in these songs because of the context in which these songs were created and sung.

Because of the limited distribution of the glottal fricative [h], its rare occurrence in the language, and the fact that the examples in which the glottal fricative are found are loanwords or interjections, I have excluded this segment from the inventory. I posit that the glottal fricative [h] has a marginal status in the consonant phoneme inventory of Fur¹⁵ presented in Table 2.1 above.

Concerning the glottal stop, I also agree with Jakobi, arguing that the glottal stop has a more marginal status in Fur. For Waag, the glottal stop has a limited distribution, occurring only before vowel-initial words. Further, Waag acknowledges that native speakers sometimes will include or not include a glottal stop in speech; she also notes that the more recently created orthography used by Fur speakers does not include the glottal stop. I find that her argumentation is not convincing enough to include this segment as a phoneme in the inventory. Further, there are no minimal pairs that include the glottal stop, as there are in Hausa, for example, where *saaʔàa* 'hour' differs from *saatàa* 'theft' (Maddieson 2013). There are also no examples in which the glottal stop has a secondary articulation like the labialization of the *k^w* (Maddieson 2013) segment in Fur¹⁶. I therefore have chosen to omit the glottal stop from the consonant inventory, and again note that this sound has a marginal status.

¹⁵ Jakobi (1990) also does not include [h] in the sound inventory of Fur.

¹⁶ See Chapter 3 of this dissertation for discussion of the *kw/gw*, word-initial consonant cluster.

consonant counterparts; her acoustic analysis of glides correspond with the morphological evidence from (12), since these words take the plural morpheme for nouns ending in a vowel.

2.2.1.3 The k^w/g^w word initial segment

Finally, while no consonant clusters have yet been presented in this section, there is one type of complex sound in this language that should be noted: k^w/g^w . This segment is interpreted as rounding of the velar obstruents because “this sound is so short that it is clearly distinct from other words with the sequence CuV or C υ V” (Waag 2010: 27).¹⁷ There are only three nouns with this sound and one verb form (reproduced from Waag 2010)¹⁸:

- (13) a. $k^w\grave{a}$ ‘people’ (plural of $du\acute{o}$ – ‘person’)
 $k^w\grave{\xi}$ ‘child (plural: $kw\grave{a}$)’
 $g^w\grave{t}$ ~ ‘wiit thread’
- b. $k^w\grave{a}$ ‘we said’
 $k^w\grave{a}$ ‘(s)he said’
 $w\grave{a}$ ‘I said’

With this rounding also being rare in distribution and limited to the velars, I have also chosen to represent this segment as $[k^w]$ and $[g^w]$.

True consonant clusters may occur across syllable boundaries, and they are dependent upon sonority. CCs are discussed in section 2.3 below.

2.2.1.4 Summary of consonants

This section has presented the 17 consonant phonemes of Fur. There are several processes in the language that produce the allophones of consonants. One process was already mentioned above, where a high vowel is interpreted as a glide

¹⁷ An acoustic study analyzing the duration of these segments is needed to document how k^w and g^w differ from the CuV or C υ V sequences.

¹⁸ Waag (2010) transcribes each of these clusters as $[kw]$ and $[gw]$, rather than using a superscript to represent that the segments are rounded.

syllable-finally. There are also other processes like nasal assimilation, metathesis, lenition, and consonant deletion that will be presented during the discussion of sonority in section 2.3.

2.2.2 Vowel Inventory

As with the consonant inventory for this language, different vowel inventories have been proposed for Fur. More recent studies (Waag 2010; Kutsch Lojenga 2006; Kutsch Lojenga and Waag 2004) posit a (somewhat) symmetrical, eight vowel system, similar to Beaton's (1968), which is reproduced below. I tentatively have adopted KLV's (2006) and Waag's (2010) vowel inventory as I was not able to consistently observe the [+/- ATR] contrasts¹⁹.

Table 2.2 Vowel inventory of Fur (reproduced from KL 2006: 2)

		front	central	back
[+high]	[+ATR]	i		u
	[-ATR]	ɪ		ʊ
[-high]	[+ATR]			
	[-ATR]	ɛ		ɔ
[+low]	[+ATR]		ə	
	[-ATR]		a	

As seen in Table 2.2, there are eight vowel phonemes in Fur; among languages of the world, this inventory is considered to be large (Maddieson 2013).²⁰ In this inventory, there are five [-ATR] vowels and 3 [+ATR] vowels. The high vowels /i, ɪ/, /u, ʊ/, and low vowels /a, ə/ have [+/-ATR] contrasts while the mid vowels /ɛ/ and /ɔ/ do not, phonemically, which is typologically unusual.

¹⁹ Noel (2008) was also not able to consistently observe the ATR contrasts with her speaker.

²⁰ The consonant-to-vowel ratio in Fur is moderately low according to WALS (Maddieson 2013). The number of consonants is moderately small, while the number of vowel qualities is large.

ATR harmony, along with the asymmetrical nature of this inventory—where the mid front /ɛ/ and mid back /ɔ/ vowels do not have [+ATR] counterparts—are discussed in section 2.2.2.2 below.

2.2.2.1 Long vowels

There are short and long vowels in Fur, which contrast; as is customary (Maddieson WALS), these distinctions have not been included in the inventory above. In representing long vowels, I have chosen to use two short vowels instead of a short vowel with a colon. As mentioned above in section 2.1.1.2, using two vowels instead of one vowel allows for contour and complex contour tones to be more easily represented²¹, and there is evidence that long vowels shorten and split in this language.

The examples of long vowels in (14)-(16) are from Waag 2010.

(14) a.	dil ‘stagnant water’ pírí ‘leg’	díil ‘placenta’ bíírí ‘grasshopper, sp.’
b.	bún coffee súrù right side	búùn fist zùúrù bird, sp.
c.	nè̀mù cold bárá disease (on gum) that makes wound in the mouth	nè̀mù crocodile báárá wild plant, sp. (with edible fruit)

In (14) are minimal pairs for the [+ATR] segments /i/, /u/, and /ə/, and the [-ATR] counterparts /ɪ/, /a/, and /ʊ/. The syllable structures of both (14a) and (14b) are important to note as the [+ATR] minimal pairs are both monosyllabic (CVC and CVVC) and the [-ATR] minimal pairs are disyllabic: (CV.CV) and CVV.CV. Further, the [-ATR] examples each have a voiceless initial consonant /p/ and /s/ for the short vowel examples and a [+voice] initial consonant /b/ and /z/ for the long vowel examples. The tone is also different for the examples in (14a) and (14b). In (14c), the examples are disyllabic and all have a voiced initial consonant. The tone is not different in these examples. These differences show

²¹ This notation follows that of Jakobi (1990), K LW (2004), and Waag (2010).

Three sets of vowels have +/- ATR contrasts in Fur: the high, front vowels of /i/ and /i/, the high back vowels of /u/ and /ʊ/, and the mid central vowels of /a/²² and /ə/. (17) below shows minimal pairs for each of these phonemes (reproduced from Waag (2010)):

(17)	[-ATR]	[+ATR]
a.	pírí 'leg' t̩nd̩il 'tree, sp.'	pírí 'smith' t̩nd̩il 'rubbish heap'
c.	kùùr 'wild cat, gen.' túúú 'ant, sp.'	kùùr moss, sp. túúú squirrel, sp.
d.	kàldàm 'stutterer, stutter'	kàldèm 'failure to recall'

As Waag notes, minimal pairs only have examples with the same vowel. She also presents a table with the possible combinations of [-ATR] vowels in disyllabic words (reproduced from Waag 2010)²³:

Table 2.3 Possible combinations of [-ATR] vowels

		<i>Second vowel</i>				
		<i>ɪ</i>	<i>ɛ</i>	<i>a</i>	<i>ɔ</i>	<i>ʊ</i>
<i>First vowel</i>	<i>ɪ</i>	k̩l̩í 'armpit'	ìrè 'poverty'	n̩mà 'shadow, shade'	b̩rò 'coward'	----
	<i>ɛ</i>	(t̩l̩l̩ɪŋ) (flame) probably not monom.	r̩ètè (burning coal)	k̩èwà (blood)	m̩èrsò (onelegged) one ex. only	k̩èébù (sickle)
	<i>a</i>	d̩ágí (tooth)	j̩àré (husband)	áŋá (paternal aunt)	p̩ànd̩g (buttock)	g̩àjú (eggshell)
	<i>ɔ</i>	t̩òrí (finger, toe)	g̩òbè (clawed animal)	b̩òrà (milk)	k̩òrò (water)	----
	<i>ʊ</i>	úrí (star)	ùmè (snow)	j̩ùdà (forest)	d̩ùró (upper arm)	k̩ùrù (tree, gen.)

²² /a/ is technically a low vowel.

²³ Table 2.3 and 2.4 present the initial vowel + the second vowel of each disyllabic word, so that the gaps of vowel combinations (e.g., *ɪ + ʊ*) are shown.

Table 2.3 shows that most combinations of [–ATR] vowels in words may occur. The only vowels not noted are those examples with the first vowel of /ɪ/ or /ɔ/ and the second vowel /ʊ/. Now consider Table 2.4 (reproduced from Waag), which shows the possible combinations of [+ATR] vowels in disyllabic words:

Table 2.4 Possible combinations with [+ATR] vowels

		Second vowel				
		<i>i</i>	<i>ɛ ~ [e]</i>	<i>ə/a</i>	<i>ɔ~[o]</i>	<i>u</i>
First vowel	<i>i</i>	pítí 'bed'	ɲírè ~ ɲírè 'cotton'	síwà 'unbraided hair' (no [+ATR] a)	díló ~ díló 'ear'	tíírú 'stone for sharpening grinder) one ex. only
	<i>e</i>					
	<i>ə</i>	bègì (respect)	sèbkè~ sèbkè (cave)	kèrəl (hiding place)	kèwíó~ kèwíó (cow dung)	bèrù (country)
	<i>o</i>					
	<i>u</i>	jùrì (cloth)	ùmé~ ùmé (fog, mist)	tùmà (greediness)	púgó~ púgó (mountain)	mùùrú (lion)

According to Tables 2.3 and 2.4, a word must have the same value for all its [ATR] counterparts: The [+high] vowels /i/, /ɪ/ and /u/, /ʊ/ only occur as all [–ATR] (as in Table 2.4) or as all [+ATR] vowels (as in Table 2.4).

In this table there are no words with the first vowel as a mid [+ATR] /e/ or /o/. These vowels only seem to occur as the second vowel of a word, in free variation with their [–ATR] counterparts, as with *díló ~ díló* 'ear'. Further, when there is no consonant intervening, /e/ or /o/ may only partially assimilate to the [+ATR] vowels that proceed them. Both Waag (2010) and Kutsch Lojenga (2006) note that the allophonic [+ATR]

counterparts [e] and [o] to /ɛ/ and /ɔ/ only partially assimilate to a [+ATR] vowel: this process is a “surface assimilatory process which is gradient and which also depends to a certain extent on the speed of speech” (KL 2006:2)—this partial assimilation is especially prominent when no consonant intervenes between the vowels:

Consider (18), reproduced again from Waag:

- (18) a. yíè ‘dream’
 b. dìò ‘stomach’
 c. sùè ‘bellows’
 d. wùòŋ ‘herder’

According to Waag, vowels (ɛ and ɔ) do not occur before [+ATR] vowels at all, not even as [+ATR] e or o. She writes that “these two vowels are opaque for progressive vowel harmony. Therefore, in Fur, vowel harmony is mainly regressive and does not necessarily affect the whole word” (Waag 2010: 24).

If there is more than one of these –ATR vowels, they remain –ATR even though preceded by a [+ATR] vowel (from Waag 2010):

- (19) sùkèndé ‘kind of dog disease’

Concerning the vowels /a/ and /ə/, Waag (2010) notes the following. First, if all vowels in the word are of this low quality²⁴, they remain +/[–ATR]: *ájá* ‘paternal aunt’ or *kèrèl* ‘hiding place’. Second, if the second vowel is a high vowel, the vowels are either both [+ATR], as in *bègi* ‘respect’, or both [–ATR], as in *dági* ‘tooth’. Third, if the second vowel is the mid front or back vowel ɛ as with *jàré* ‘husband’ or back ɔ as in *pàndóg* ‘buttock’, the low vowel basically retains its [–ATR] quality.

Further, “If the [low] vowel follows a [high] vowel, it is [–ATR] and behaves like the other open vowels, unless it is followed by another [+ATR] vowel, as in [(18)]” (Waag 2010: 23):

²⁴ Waag considered /ə/ to be low, here.

(20) mubədi ‘beginner’

Finally, Waag notes that there is one mono-morphemic example where the low vowel is preceded by a high vowel with no consonant separating them. Here, both vowels are [+ATR]:

(21) libiə ‘Libya’

Also, polymorphemic words behave the same as monomorphemic words in regard to ATR harmony. The only difference is that besides ATR harmony, there is also regressive harmony that includes height (cf. Waag 26).

The feature [+ATR] seems to be preferred with some forms. For example, with a –ATR prefix or a –ATR root, the [+ATR] feature will spread to the –ATR prefix and root. In (22a), we see an example of the –ATR first person singular prefix à- and [+ATR] root, and in (22b), the root is –ATR, thus the prefix à- remains [-ATR] (reproduced from Waag 2010):

(22)	3s IPV	1s IPV	gloss
a.	bũŋ-él	ə-múŋ-él	‘(s)he/it is / I am spending the day’
b.	t̩t̩l	à-t̩l	‘(s)he/it is / I am correcting the shape’

Here is an example of the third person plural suffix /-i/, which is [+ATR], causing the root to become [+ATR]:

(23)	3s CPL	3Nhp CPL	gloss
a.	báà	bé-í	‘(s)he/it / they drank’
b.	óóŋ-á	úúŋ-ì	‘(s)he/it / they spent the night’

/a/ becomes [ə] in (23a); further, (23b) shows not only ATR assimilation, but also height assimilation, with the mid vowel /ɔ/ changing to [u].

In (24) the third person plural of verbs with the perfective suffix has two forms: -ɔ/ and -ul.

(24)	3s CPL	3Nhp CPL		gloss
a.	rìg-ò	rìg-òl	rìg-ùl	‘(s)he/it / they tied (s.th.)’
b.	lìg-ò	lìg-òl	lìg-ùl	‘(s)he/it / they hung (s.th.) up’
c.	kèll-ò	kèll-òl	kìll-ùl	‘(s)he/it / they pulled’

d.	pààg-ò	pààg-òl	pèèg-ùl	'(s)he/it / they arrived'
e.	àyg-ò	àyg-òl	àyg-ùl	'(s)he/it / they were more passionate'
f.	ògòtgòt-ò	ògòtgòt-òl	ùgùtgùt-ùl	'(s)he/it / they gave (s.o.) a tap'
g.	rùg-ò	rùg-òl	rùg-ùl	'(s)he/it / they planted'
h.	tùùm-ò	tùùm-òl	tùùm-ùl	'(s)he/it / they built'

With the [+ATR] suffix *-ul*, we see the [+ATR] feature spreading to the rest of the vowels in the word, showing regressive assimilation.

Examples (25) and (26) show the imperfective forms of some verbs. These examples can be sorted into three groups by the suffix which forms the imperfective, as of (25), (26) and (27). The past tense suffix of the imperfective is *-éŋí*, *-èŋì* or *-ìŋì*.

(25)		3s.IPV	3s.IPV-PST	gloss
	a.	pààl	páál-éŋí	'(s)he/it is/was dancing'
	b.	lìt	lí-éŋí	'(s)he/it is/was washing'
	c.	kùrtù	kúrt-éŋí	'(s)he/it is/was killing'
	d.	ìriw	íriw-éŋí	'(s)he/it is/was killing'
	e.	běw	běw-ìŋì	'(s)he/it is/was carrying'
(26)	a.	lìg-èl	lìg-èl-ìŋì	'(s)he/it is/was hanging (s.th.) up'
	b.	dús-él	dús-él-ìŋì	'(s)he/it is/was tearing (off)'
(27)	a.	píŋ-ítì	píŋ-ítì-éŋì	'(s)he/it is/was going back'
	b.	búl-ítì	búl-ítì-éŋì	'(s)he/it is/was finding'

In (25), the suffixes *éŋí*, *-èŋì* or *-ìŋì* are shown to be opaque for ATR—the suffixes are not affected by the root.

From Waag:

The verbs in examples [(28)] do not have an imperfective suffix. In [(28a)] and [(28b)] the root of the verb is [-ATR], in [(28c)] to [(28e)] it is [+ATR]. In examples [(28a)] to [(28d)] the past tense suffix is [-ATR] without assimilation. In example [(28e)] the whole verb with past tense suffix is [+ATR] including rising of the vowel. In this case, the feature [+ATR] does not belong to the verb root, but to the imperfective (the perfective forms of this verb are [-ATR]).

(28)		3s.IPV	3s.IPV-PST	gloss
	a.	pààl	páál-éŋí	'(s)he/it is/was dancing'
	b.	lìt	lí-éŋí	'(s)he/it is/was washing'
	c.	kùrtù	kúrt-éŋí	'(s)he/it is/was killing'
	d.	ìriw	íriw-éŋí	'(s)he/it is/was killing'

e. bǎw bǎw-inji '(s)he/it is/was carrying'

2.2.2.4 Summary of vowels

In this section, the eight vowel phonemes of Fur, along with some allophonic variation, have been presented. ATR harmony was shown to be an important organizational tool in this language. In words that have [+ATR] vowels and –ATR vowels, the [+ATR] vowel always occurs first.

2.2.3 Summary of Segments

This section has provided the basis for the discussion of the syllable in Fur and presented a sound inventory of a total of 25 phonemes in the language: 17 consonants and 8 vowels.

2.3 Sonority

The sonority of the segments within the syllable is important in several processes, and segments are also relevant to syllable weight, which is discussed further in Chapter 3.

The Sonority Sequencing Principle (SSP) states that segments usually rise in sonority towards the nucleus/peak and fall in sonority at the outer-edges. The kinds of segments that are considered to be sonorous can vary from language to language.

Below is an example of the Sonority Hierarchy, reproduced from Zec (2007):

(29) The Sonority Scale

- V** low vowels
 mid vowels
 high vowels
- G** glides
- L** Rhotics
 Laterals
- N** Nasals
- O** voiced fricatives

voiced stops
voiceless fricatives
voiceless stops

The set of syllabic segments in a language varies, but generally, the most sonorous segment(s) can be syllabic and carry a mora.²⁵ Further, segments that may be moraic may be different—in some languages (like Fijian), only the vowel (V) is moraic, while in others like Cairene Arabic, all segments (vowels, liquids, nasals, and obstruents) can be moraic (Zec 2007). In Fur, the onset does not contribute to the weight of the syllable; therefore, the sonority of the coda consonant is the important segment when determining the weight of a syllable in this language.

In this section, I first present the four syllable types of Fur, and then I discuss the sonority of the consonants in Fur. Specifically, I focus on segments in C.C sequences across syllable boundaries, as these segments show how sonority plays a role in organizing the syllable and the word in Fur.

2.3.1 Syllable Types

There are four syllable shapes in Fur: (C)V, (C)VV²⁶, (C)VC, and (C)VVC. The examples in (30) represent each of the syllable types:

- | | | | |
|------|---------|---|--|
| (30) | a. CV | <u>á</u> .sà ‘dog’ (M) | <u>k^wà</u> ‘people’ (W: 254) |
| | b. CVC | <u>ǒr</u> ‘giraffe’ (M) | <u>rùs</u> ‘belt’ (W 48) |
| | c. CVV | <u>ùù</u> ‘word’ (KLW) | <u>ròò</u> ‘well, river, stream, liake, sea’ (M) |
| | d. CVVC | <u>ààr</u> ‘stick of firewood’
(KLW) | <u>tààr</u> ‘leg’ (W 46) |

²⁵ In some languages, only vowels are syllabic (like Bulgarian), while in other, vowels and liquids are syllabic (Slovak); still, in others, vowels, liquids, and nasals are syllabic (English), while in others vowels, liquids, nasals, and obstruents are syllabic (Imdlawn Tashlhiyt Berber) (Zec 2007).

²⁶ I follow Waag and Jakobi’s notations in representing long vowels as a sequence of two short vowels.

(30) shows that there are syllables with onsets and syllables without onsets. In the sections below I show which consonants may be onsets and which consonants may not be onsets.

Open and closed syllables along with long and short vowels are allowed, as shown in Table 2.5:

Table 2.5 Syllable Shapes in Fur

	Open syllable	Closed Syllable
Short Vowel	(C)V	(C)VC
Long Vowel	(C)VV	(C)VVC

CVVC is the maximal syllable template in Fur.

There are no complex onsets or codas in Fur: *CCV or *VCC. Consonant clusters only occur across syllable boundaries, as in (31):

(31) bəm.bûs ‘pawpaw tree’ W 57

In the next sections, the types of segments allowed in each position of the syllable are discussed.

2.3.2 Distribution of Segments in Coda Position

In this section, I present a short overview of the distribution of consonants in coda position so that these patterns can be referred to in the rest of the dissertation.

There are more restrictions in distribution with coda consonants than onset consonants—any segment may be an onset consonant in word-initial position, and word-internally, all segments except /z/ and /h/ may occur syllable initially.

2.3.2.1 Obstruents in coda position

First, concerning voiced stops, all may occur in coda position, but two have a more limited distribution. /d/ is only in an Arabic loanword (see 30b)²⁷, and /j/ is only found in one word.

(32) [+voice] stops

- a. /b/ kàràb animal, thing (W 36)
dòrgòb 'to crumple up' (W)
- b. /d/ lààd 'Sunday' < Arabic (KLW) (one example only)
- c. /g/ díg 'other' (W70)
tòg 'one' the numeral (W90)
díg 'one' the numeral, used with the meaning 'some (unspecific)' (W90)
sòg 'day' (W)
jólòg 'to vomit' (W)
físìg prop.name, fem (W 43)
- d. /j/ kòj 'very old thing' (W58) (one example only)

Concerning voiceless stops, only /t/ may occur in coda position:

(33) [-voice] stops

- a. /p/ --
- b. /t/ sát ~ sót 'red cap of student' (W46)
wíit thread (W 36)
ìlgìt 'to neglect' (W)
- c. /k/ --

Voiceless stops are less frequent than their voiced counterparts in this position.

Next, /s/ can occur in word-final position. There are more examples of the fricative /s/ in syllable-final position than with the voiceless stops, but there are no examples with /z/:

²⁷ This finding corresponds to KLW's findings.

(34) fricatives

- a. /s/ tùs 'stable thing' (W 48)
 rùs belt (W 48)
 bìis 'cat' (M)
 pèùs 'to move'
 pàgùs 'maize'
 kèlèèss 'tired condition' (W 38)
 bèmbùs 'pawpaw tree' (W 57)
- b. /z/ -----

There are very few examples of words with /z/ in general, making this segment suspect for being a borrowed sound and part of loanwords.

Concerning obstruents, then, there are not many examples showing them in coda position; further, /p/, /k/, and /z/ are not found in this position. Obstruents can occur in coda position, but as the least sonorous segments, they occur more infrequently than sonorant segments, as will be shown in the following examples.

2.3.1.2 Nasals in coda position

There are four nasal phonemes in Fur. These phonemes are more frequent²⁸ in coda position than obstruents:

(35) **nasals** **non-final**

- a. /m/ àmpâr 'friendship' (W 44)
 tómbòl 'drum'(M)
 gùmbòrj 'big storage' (W 36)
 gùmbòrj 'dove, sp.' (W 36)
 bèmbùs 'pawpaw tree' (W 57)
- b. /n/ sòndù 'date' (W 36)
 mènédúul 'bad wound' (W 29)
 súkèndé 'kind of dog disease' (W 24)

word-final

- núúm 'snake' (M)
jâm 'nmlz.eating' (W 71)
j ìm 'to show' (W)
sòòm 'school' (W 44)
òròm 'hut' (D)
mèèràmm princess, queen (W 36)
kèrtúm 'Khartoum' (W 63)
tógórùm 'termite, sp.' (W 36)
- sòón 'millet' (W 36)
ìn 'sing.this' (W69)
kìn 'plural.this' (W 89)
àtìn (W 51)
sègên 'leather flask' (W 39)
tààjôn 'small pot, sp.' (W 36)
tilpisiyôn – 'television' ~

²⁸ The exception is (35c).

		tipisiyóón –‘television’ (W 30)
c.	/ŋ/	àrmìŋ ‘to crush’ (W)
d.	/ŋ/	tòŋ house (M)
		ŋééŋ ‘scorpion’ (M)
		nùŋ ‘food’ (W117)
		wùòŋ ‘herder’ (W)
		kímíŋ ‘chick’ (W 36)
		dàlàŋ ‘niece (child of sister)’ (W 36)
		káwróŋ ‘broken pot’ (W 36)
		gùmbòŋ ‘big storage container’ (W 36)
		diwíŋ ‘rip’ (W 36)
		gùmbòŋ ‘dove, sp.’ (W 36)

The only nasal with limited distribution is /ŋ/. This segment only occurs in one example, which is word-finally. All of the other nasals--/m/, /n/, and /ŋ/--occur word-finally and in the coda position of non-final syllable of the word. Further, there are many examples for each of these segments.

2.3.1.3 Liquids in coda position

Now consider the liquids in coda position:

(36) liquids	non-final	word-final
a.	/l/	
	àldí ‘story’ (M)	pûl ‘peanut’ (W46)
	sàlgí ‘saliva’ (W 36)	èl ‘to come’ (W41)
	ìlgít ‘to neglect’ (W)	bùùl ‘hippopotamus’ (W)
	tilpisiyôŋ – ‘television’ ~	lèèl ‘donkey’ (W 36)
	tipisiyóón –‘television’ (W 30)	páàl ‘leading bull’ (W 36)
		lùùl ‘night’ (W 50)
		dúàl ‘moon, month’ (W)
		tùríl ‘dust’ (W 36)
		diwil ‘thigh’ (W 57)
		dààgùl ‘termite hill’ or ‘hedgehog’ (W 27, 39)
		jààwíl ‘sky’ (W 36)
		tómbòl ‘drum’ (M)
		mèndúùl ‘bad wound’ (W 29)
b.	/r/	
	bùrtó ‘watermelon’ (M)	mùf ‘revision’ (W46)
	kùrtù ‘to dig a hole’ (W)	ùr ‘giraffe’ (KLW)
	tárnè ‘ring’ (W 36)	ààr ‘stick of firewood’ (KLW)
	zǎrti ‘sling’ (W 36)	gàâr ‘sheet of paper’ (W 36)
	d-irbo ‘shelter’ (W 57)	jǐir ‘sorghum flour’ (W 39)

d-àrmà 'skin' (W 58)
 dùrtê 'soft' (W 48)
 àrmīŋ 'to crush' (W)
 dòrgòb 'to crumple up' (W)
 kàrtùm 'Khartoum' (W 63)
 kùŋírtá 'plant, sp.' (W 36)
 kùŋírti 'tree, sp.' (W 36)
 kótòrgó 'snake, sp.' (W 36)
 gòmôrgò 'basket, sp.' (W36)

tààr 'leg' (W 46)
 wààr 'short time' (W 50)
 pòòr 'Fur' (M)
 ìwàr 'to lay out to dry' (W)
 dégàr 'palate' (W 36)
 s̀ìb̀ìr 'noon' (W 50)
 àngír 'elephant' (M)
 àmpàr 'friendship' (W 44)

There are several examples with both // and /r/ in word-final position, along with several examples with these segments in the coda position of the non-final syllable of the word.

Liquids and nasals are by far the most frequent segments in coda position in Fur.

2.3.1.4 Glides in coda position

Finally, the glides in coda position are shown in these examples:

(37) glides	non-final syllable	word-final
a. /w/	kěwłó 'dried cow-dung' (W 36) máló 'God' (W 44) káwróŋ 'broken pot' (W 36) d̀ìwłíŋ 'rip' (W 36)	bàw 'pond' (W37) b̀èw 'axe' (KLW) t̀èw 'waterpot' (KLW) t̀àw 'salamander' (KLW) èw 'two' (KLW) g̀èw 'round hat' (KLW) k̀àyàwk̀àyàw 'wild plant, like onion' (KLW)
b. /y/	d̀èytèn 'name of month: Moharan' (KLW) ỳéwyéw 'one string of a rope' (KLW) d̀àyd̀ây 'storage place' (KLW)	d̀éy 'he-goat' W46 d̀èy 'oil' (KLW) d̀ěy 'ant' (KLW) d̀êy 'lalob tree' (KLW) d̀ăy 'grass, gen.' (KLW) d̀ùy 'pus' (KLW) p̀èy 'room' (W 27) ẁèy pain

Glides are the most sonorous segments (besides vowels). These segments have been transcribed as glides, but they could also be transcribed as vowels. One argument supporting the transcriptions of these segments as vowels (so *b̀àù* 'pond' instead of *b̀àw* W37) rather than consonants is the fact that the plural is formed with *-ŋa*,

which is used when a noun ends in a vowel, rather than *-a*, which is used when a root ends in a consonant.²⁹

Further, as discussed in Chapter 2, with long, closed syllables (CVVCs), there are no examples with glides (CVVW or CVVY); most are liquids (CVVL and CVVR) with a few obstruents (stops and fricatives). I argue that CVVG syllables would be considered too heavy, because the glide is functioning as a vowel. High vowels and glides are only represented as such based on their position in the syllable.

The examples in (36) (reproduced from Waag 2010) show how these glides can change between a vowel and a glide within one paradigm of the word, depending upon the position of the glides in the words:

- (38) a. ʔ-əlu 'I am seeing'
b. ləw '(s)he/it is seeing'
c. ləw-ε 'they (animals) are seeing'

In this example, there is metathesis. The root is in (38b) and can be interpreted as a glide or vowel (Waag 2010), although to keep with the consistency of the transcriptions in this dissertation, the segment should be transcribed as a glide. Due to metathesis in (38a), the /w/ becomes a [u], because this segment is now part of the nucleus rather than a coda consonant; in (38c), the segment remains a [w], because now this segment is functioning as an onset. In (38a), the consonant cluster in coda position *lw is avoided by the /w/ becoming a vowel, and in (38c), by /w/ staying as a glide, this segment avoids a series of three vowels *əu-ε.

²⁹ The reduplicant forms are noted to use the *-a* suffix; however, this could be a particular of reduplicants.

One argument for positing that syllables ending in a high vowel should be transcribed as a glide is that some examples can take the *-ŋa* plural suffix instead of the *-a* suffix (Waag 2010), as in (39):

(39) a. gèw gèw-ŋà 'round hat or flap' (D)

This argument is plausible because the sonorant /r/ in syllable-final position can also be followed by the plural suffix *-ŋa* (reproduced from Waag 2010):

(40)	Singular	Plural
a.	kóór	kór-ŋá 'war' * kór-á
b.	tír	tír-ŋá 'path' * tír-á
c.	sòòr	sòr-ŋà 'back (body part)' * sòr-à
d.	bára	bâr-ŋà 'brother' * bâr-à

Here in (40) the vowels shorten, and /r/ can be argued to be moraic, triggering the *-ŋa* suffix rather than the *-a* suffix. There are examples where a word ending in a liquid takes the *-a* suffix, however (reproduced from Waag 2010):

(41) a.	mǔf	pl. mǔr-à revision
b.	gǎàr	pl. gǎàr-à sheet (paper)
c.	jǐr	pl. jǐr-à sorghum flour

In these examples, the long vowels are not shortened, as opposed to the others.

2.3.2 The Sonority of C_1, C_2 Sequences Across Syllable Boundaries

In Fur, neither complex codas nor complex onsets are permitted. This restriction means that *CCV and *VCC are prohibited in Fur, and that word-internally, sequences of *C.CCV and *VCC.C are also prohibited.

Even though consonant clusters are prohibited in these environments, CCs are allowed across syllable boundaries. There are several examples of words with word-

internal consonant sequences; these examples are presented in this section with analysis supported by Clements (1990). This section shows that $C_1.C_2$ sequences generally follow the (Extended) Syllable Contact Law, where C_1 is more sonorous than C_2 as described by Clements (1990), but that in the cases of geminates and examples with the same sonority, this law is violated in a more minor manner; further, in the cases of reduplicants, this law is violated in major ways in favor of structure preservation.

2.3.2.1 The syllable contact law

When considering the consonant sequences that occur word-internally in Fur, The Syllable Contact Law (Clements 1990: 319) is important to reference: “the preferred contact between two consecutive syllables is one in which the end of the first syllable is higher in sonority than the beginning of the second.”³⁰ For example, *tal.ta* is optimal while *tat.la* is not because according to the Sonority Hierarchy presented above, the liquid [l] is more sonorous than the obstruent [t].

Below is the table Clements proposes in relation to the Syllable Contact law, where V = vowel, G = glide, L = liquid, N = nasal, and O = obstruent. Note that the $C_1.C_2$ sequences attested in Fur³¹ are shaded.

³⁰ Clements (1990) also recognizes that this law can be extended via Murray and Vennemann (1983) who propose that this principle of syllable contact can also be applied to heterosyllabic segments. The Extended Syllable Contact law is where “the optimality of two adjacent, heterosyllabic segments increases in proportion to the extent that the first outranks the second in sonority. In this view, a sequence such as *am.la*, for example, constitutes a lesser violation than a sequence such as *at.ya* [... and that] sequences like *at.a* exemplify the worst possible syllable contact and *a.ta* the best” (Clements 1990: 319).

³¹ The shaded areas also include sequences of V.C syllables and of geminates (discussed in Chapter 3), which are also present in Fur. The C.C sequences of reduplicative forms are treated separately in section 2.3.4 below and are not included in this table.

Table 2.6 Sonority of C.Cs

	V	G	L	N	O
V	V.V	V.G	V.L	V.N	V.O
G	G.V	G.G	G.L	G.N	G.O
L	L.V	L.G	L.L	L.N	L.O
N	N.V	N.G	N.L	N.N	N.O
O	O.V	O.G	O.L	O.N	O.O

The optimal contact types are above and to the right, which are the optimal sequences argued by Clements. These sequences are shown to be the preferred types of sequences word-internally in Fur.³² In the next sections, C₁.C₂ sequences in Fur are presented. In each section, the sequences are organized by sonority, in relation to Clement's table. After these examples are presented, the types of sequences allowed in Fur are charted and any patterns and gaps are discussed.

2.3.3 C₁.C₂ Sequences that Adhere to the (Extended) Syllable Contact Law

First, let us consider examples of C₁.C₂ sequences that adhere to the (Extended) Syllable Contact Law.

In (42) are examples of vowel.consonant (V.C) sequences:

(42)	contact type	Sequence	Example
	V.O	ú.t	ùtù 'fire' (D, W)
		a.s	ásà 'dog' (M)
	V.N	u.m	úmé dirt (W 57)
	V.L	ə.r	èrì 'thing' (W 66)
	V.G	i.y	ìyà 'mother'

³² There are no examples with a G.V, L.V, N.V, or O.V sequences. In these cases, the consonant is syllabified as the onset of the next syllable rather than as the coda of the previous syllable: *tù.ríl* 'dust' (W 36), not **tùr.íl* 'dust'. This example would also violate the SSP, also making the example non-optimal.

There are several other examples of V.C sequences that are not included here. The examples above present a representation of what occurs in the language. The types of sequences allowed in Fur are presented in the table below, darkened for convenience.

Table 2.7 V.C sequences

	V	G	L	N	O
V	V.V	V.G	V.L	V.N	V.O

Now consider C.C sequences. In (43) are examples of glide.consonant (G.C) sequences:

(43)	contact type	Sequence	First Word	Second Word
	G.O	y.t	dàytên 'name of month: Moharan' (KLW)	
		w.d	gàwdé 'tree, sp. with edible fruit' (KLW)	
		w.g	dàwgánj 'bark, shell' (D, KLW)	
		w.t	bəwtên 'hoe' (W)	
	G.N	w.n	àwné 'stirring stick' (KLW)	
	G.L	w.r	tíwrí 'animal fat' (KLW)	d-àwrà 'leftover porridge' (KLW) (note: 2 other examples with w.r)
		w.l	k-ìwli 'ribs' (KLW) dáwlánj 'shoe' (D)	kəwlò 'wind' (KLW) kəwló 'dry cow dung' (KLW) díwlinj 'earthworm' (D)

There are several examples with a w.C sequence, but only one example with a y.C sequence. Further, most of the examples are G.O or G.L. The only G.G sequences in Fur are with geminates (see Chapter 3). There are no *w.y or *y.w sequences.

Concerning the optimal sequences of C.Cs, I have reproduced the table from earlier below, to include G.C combos:

Table 2.8 C.C sequences

	V	G	L	N	O
V	V.V	V.G	V.L	V.N	V.O
G	G.V	G.G	G.L	G.N	G.O

Recall that the optimal types of contact are above and to the right of the table. In Fur, the most preferred types of contact are shown to be: G.L, G.N, and G.O, following the optimal types suggested by Clements (1990).

In (44) liquid.consonant (L.C) sequences are presented:

(44)	contact type	Sequence	First Word	Second Word
a.	R.O	r.b	àrbá 'Wednesday'	dìrbò 'kind of shelter' (KLW) gùrbêt 'wild cat sp.' (KLW)
		r.d	bàrdà 'little fish'	bàrdà 'grass, sp.' (KLW)
		r.g	pòrgò 'esophagus'	èrgèl 'clay wall of hut' (KLW) kèrgèb 'cave, hole' (KLW)
		r.t	mòrtà 'horse'	dórté 'clay dish' (KLW) (2 more examples)
		r.f	Dárfùr 'land of the Fur'	
		r.s	kúrsìŋ 'chair'	mèrsò 'limping, one-legged' (one example only, KLW)
		r.ʃ	gérʃà 'money'	
		r.j	kórxé 'vervet monkey' (KLW)	
b.	R.N	r.m	d-àrmà 'skin' (KLW)	
		r.n	gùdùrnè 'edible plant, sp.' (KLW)	
		r.ɲ	bôɲò 'fox'	
c.	L.O	l.b	dólbòské 'frog, sp.'	dílbàn ~ dílfàn 'trap, sp.'
		l.d	àldí 'story' àldá 'tree, sp. not edible' (D)	bàldà 'wooden beam' (KLW) zàldà 'rock' (KLW)
		l.g	kèlgèŋ 'tree, sp.'	ùlgù 'wattle, dewlap' (KLW)
		l.p	dòlpá 'horn'	
		l.f ~ l.b	dílfàn ~ dílbàn 'trap, sp.'	
		l.j	bàljùg 'edible plant,	

			sp.'	
d.	L.N	l.m	kilmá 'heart'	zilmè 'fish, sp.' (KLW) (2 other examples with l.m)

In these examples from (32), the prominent C.C sequence is L.O and also a few L.N sequences, which is the second optimal sequence. There are no sequences of l.r (L.L) sequences. According to Clement's table, the two sequences allowed are the two better sequences preferred:

Table 2.9 C.C sequences

	V	G	L	N	O
V	V.V	V.G	V.L	V.N	V.O
G	G.V	G.G	G.L	G.N	G.O
L	L.V	L.G	L.L	L.N	L.O

Now consider these examples in (45), which have a N.C sequence:

(45)	contact type	Sequence	First Word	Second Word
a.	N.O	m.b	tómbòl 'drum'	jímbìr 'needle' (KLW) (3 other examples)
		m.p	àmpâr 'friend'	
		m.t	nùmtì ~ nùntì 'tree, sp.'	
		m.s	nàmsáj 'feather'	
b.	N.N	m.ɲ	dòmɲà 'island' (KLW)	n-ìmpná 'hyrax. Singular' k-ìmpná 'hyrax plural' (KLW)
	N.O	n.d	bòndè 'upper lip'	tìndìl 'rubbish heap' (KLW) n-ándúr 'shell' (KLW)
c.		n.g	sùngóp 'hoe, sp'	
		n.t	nùntì 'tree, sp.' (KLW)	
		n.s	mànsírè 'part of a woman's hairstyle (special plait)	n-ànsú 'breast' ònsòr ~ ònzòr 'mane of a horse/donkey'
		n.j	ínjìl 'tree, sp.'	
		ɲ.j	bìrɲjâl 'tomato' (in notes, but also KLW) probable loanword àɲjìmà 'female born on Friday' (D) prob. loan	
d.	N.O	ɲ.b	tonɲbab 'door'	

	η.g	áηgír 'elephant' àηgà 'very old hyena, also old, experienced thief/chief' (D)	áηgúrηà 'tree, sp.' (KLW) zòηgòbè 'jaw' (KLW)
	η.s	nùηsú 'breast'	

In each of the examples in (45), the optimal sequence of N.O is the most prominent sequence found, with the exception of N.N.

Table 2.10 C.C sequences

	V	G	L	N	O
V	V.V	V.G	V.L	V.N	V.O
G	G.V	G.G	G.L	G.N	G.O
L	L.V	L.G	L.L	L.N	L.O
N	N.V	N.G	N.L	N.N	N.O

Fur follows the Syllable Contact Law in all of these examples, which shows the importance of this law to the organization of segments—by sonority—in this language.

Finally, consider the last three examples in (46):

(46)	contact type	Sequence	Word
a.	O.O	b.d	ábdàr 'grass, sp.'
b.		s.b	kósbòr 'plant, sp.'
c.		s.k	kìtíbíské 'clay cover for container'

Given the strong tendency of these sequences to obey the Syllable Contact Law, the few examples of O.O sequences presented in (46) are not surprising. The optimal contact type when C₁ is an obstruent is for C₂ to also be an obstruent:

Table 2.11 C.C sequences

	V	G	L	N	O
V	V.V	V.G	V.L	V.N	V.O
G	G.V	G.G	G.L	G.N	G.O
L	L.V	L.G	L.L	L.N	L.O
N	N.V	N.G	N.L	N.N	N.O
O	O.V	O.G	O.L	O.N	O.O

In these examples, two obstruents of different place can occur, as opposed to glides and liquids, which do not allow for two segments of the same manner. Only geminates are allowed in Fur.

Table 2.12 shows the types of C.C sequences presented above.

Table 2.12 C.C sequences in nouns

		C2																		
		← Sonority →																		
C1	Sonority ↑ ↓	y	w	r	l	m	n	ɲ	ŋ	z	ʙ	d	g	s	p	t	k	h	j	
		y															x			
		w			x	x		x					x	x			x			
		r					x	x	x			X	x	x	x		x			x
		l					x					X	x	x		x				x
		m							x			X			x	x	x			
		n											x	x	x		x			x
		ɲ																		x
		ŋ										X		x	x					
		z																		
		b											x							
		d																		
		g																		
		s										X						x		
		p																		
		t																		
		k																		
h																				
j																				

Table 2.12 summarizes consonant sequences that occur word-internally across syllable boundaries. The common theme this table reflects is that C₁ is equal to or greater in sonority than the C₂ consonant. Table 2.12 also shows that there is a greater preference for glides, liquids, and nasals in the C₁ position.

There are several important gaps to notice in this table. First, there are no consonant sequences that involve the C₁ as a [-voice] stop (/p, t, k/). The voiced counterparts of these segments (/b,d,g/) are also underrepresented, with a sequence of

b.d only observed in the data one time and no sequences with /d/ or /g/ as C₂. Both the absence or near absence of the voiced and voiceless stops along with the absence of a C₁ beginning with /j/ makes sense as these types of segments are the least sonorous in terms of the Sonority Hierarchy. In this language, the least sonorous segments are avoided in C₁ position, following the Syllable Contact Law. Further, as noted in section 2.3.1 above, these segments can be found syllable or word finally, but there are not many of them in the data set.

A second observation about Table 2.10 reveals that consonant sequences with the same sonority (i.e., plateaus) are allowed, but that these CCs are few. The few examples are found with one sequence of nasals m.n in *dòmɲà* 'island' and *n-ìɲɲá* 'hyrax. singular' and *k-ìɲɲá* 'hyrax plural', and one sequence of voiced stops b.d in *ábdàr* 'grass, sp.' As geminates occur in this language, it is reasonable to assume that segments that agree in manner and sonority could be allowed in this environment.

Fur therefore does not have any major violations of the Syllable Contact Law except for those few examples above of *m.n* and *b.d*, and of the geminates that are in the language, both of which have equal sonority. In these cases, these violations are still one of the better types of contact; we never see examples where C₂ is greater in sonority than C₁.

There are also three examples of loanwords that should be mentioned. The first sequence involves r.f as in *Dárfúr* 'land of the Fur'. This name is taken from Arabic. The second sequence is similar with a liquid followed by a fricative l.f *dílɲàn* 'trap, sp.', but this segment can also be pronounced with a /b/ as *dílɲàn*. Recall that /p/ can have variants [p, f, ɸ] based on both dialect and on whether or not the speaker also speaks Arabic in addition to Fur. A third example is *gérɲà* 'money'. The segment [ɲ] is not included in the sound inventory presented in this chapter and is very rare. A few examples of [ɲ] can be

seen in the songs analyzed in Chapter 5, but this segment is not mentioned by Jakobi, KLW, or Waag. I would suggest that this segment is borrowed from Sudanese Arabic and used by speakers who are also speakers of that language. The Sudanese Arabic word for money is *Garoosh/Guroosh*³³, providing further evidence that this word and segment [ʃ] is borrowed from Arabic. Perhaps because the segment [ʃ] is not found in Fur, it is not allowed word-finally and is therefore reincorporated to the position of C₂ in the consonant sequence. The sequence *r.f* follows the tendency already seen in Fur consonant sequences as a rhotic is more sonorous than a fricative. These are the only three examples of these borrowed segments in a C.C sequence, but they do show that these segments are allowed in Fur and that these segments follow the main constraint of C₁ being higher in sonority than C₂.

A final note is that in Table 2.6 there is no kw/gw cluster in this environment; therefore this cluster does not occur word-internally, across syllable boundaries within a word. This observation confirms the position presented in section 2.2.1.3 above that these word-initial clusters are the results of rounding (k^w and g^w) and that these clusters are not consonant clusters that occur word-initially in this language.

2.3.4 C₁.C₂ Sequences in Reduplicants: Violations of the Syllable Contact Law

Examples in Fur that exhibit reduplication show that the Syllable Contact Law is mostly adhered to, but that this law can also be violated. In these cases, preservation of the base (BR-Faith) is more important than violating the syllable contact law. First, there are several examples where the law is adhered to, with C₁ being more sonorous than C₂:

³³ <http://turningsudanese.wordpress.com/2014/03/06/sudanese-arabic-useful-words-phrases/>

(47)	contact type	Sequence	First Example	Second Example
a.	V.O	a.g	gà-gám 'wild plant, sp.'	
		i.s	túsi-sí 'bird, sp.'	
	V.N	a.n	sàn-àn 'vine'	
		V.L	o.r	tóròró 'rat, sp.'
b.	G.O	y.d	dày-dây 'hanging storage place' (KLW)	
		w.s	sàw-sâw 'wild cat, sp.'	
		w.k	kàyàw-káyàw 'wild plant, like onion' (KLW)	kìrìw-kìrìw 'bird, sp.'
c.	R.O	r.d	dir-dir 'small bird, sp.'	
		r.g	gòr-gòr 'fish, sp.'	kótòrgó 'snake, spl.' gòmôrgò 'type of basket' (D, W)
		r.t	tár-tár 'kind of animal fat'	tòr-tòr 'round tool (net, eg. for catching birds or playing) made of a round stick and a net of rope' bùrtù-tù 'frog, sp.'
		r.s	sàr-sàrè 'bird, sp.'	
d.	R.N	r.m	mìr-mìr 'plant, sp. not edible'	múr-mùr 'plant seeds, sp.'
		r. ɲ	ɲír-ɲír 'plant, sp. edible'	
e.	L.O	l.b	bèl-bèl 'grass, sp.'	
		l.d	dòl-dòl 'bird, sp.'	
		l.g	gòl-gól 'skull; amago fruit'	
		l.p	pìl-pìl 'hot pepper' (<Arabic) (KLW)	
		l.t	tùl-tùl 'circle made up of sticks used in building'	
		l.k	kùl-kùl 'tree, sp., not edible'	
f.	N.O	ɲ.j	jâl-jâl 'person who travels around (not stable)'	
		ɲ.b	bìrìɲ-bìrìɲ 'wild cat, sp.'	
		ɲ.g	gèrèɲ-géréɲ 'Adam's apple'	gùràɲ-gù 'crane (bird), same as gùrág'
		ɲ.t	kùtíɲ-tíɲ 'bird, sp.'	

The sequences G.O, L.O, L.N, and N.O have all been seen in the non-reduplicant examples and are therefore not surprising here. One interesting point is that the nasals do not assimilate in place to the following obstruent, like with *bìrìɲ-bìrìɲ* 'wild

cat, sp.', not **bìrìm-bìrìŋ* as they do in other morphological processes of the language.

These examples are further support for faithfulness in these forms.

There are also a few examples where C_1 is equal in sonority to C_2 :

(48)	contact type	Sequence	First Example	Second Example
a.	G.G	w.y	yéw-yéw 'one string of rope' (KLW)	
b.	L.L	r.r	sárráàbà 'traditional drawing art'	
c.	O.O	d.d	dód-dòré 'wild cat'	
		g.t	ògòt-gòt-ò '3sCpl.s/he gave (s.o.) a tap' (W 25)	ògòt-gòt-òl '3sCpl.it gave (s.o.) a tap' (W 25) ùgùt-gùt-ùl '3sCpl.they gave (s.o.) a tap' (W 25)
		g.t	tòg-tògè 'bird, sp.'	
		t.t	tát-táágò 'grasshopper, sp' (D, W)	tút-tùrù 'insect, sp.' (note that tùrù 'ant, sp.' exists)
		t.g	kétêt-gè 'bird, sp.' (W 44)	

There are both geminate forms where the segments agree in place, manner, and voicing, and non-geminate forms that agree in manner. The G.G and the R.R sequences do not occur in the examples above, but these sequences do occur as geminates in other forms of words, so these examples are not surprising.

In addition to examples that follow the Syllable Contact Law, there are also a few examples of reduplicants that violate the Syllable Contact Law, where C_1 is less sonorous than C_2 .

Consider these examples in (49):

(49)	contact type	Sequence	First Word
a.	L.G	r.w	wàrwâr 'stirring stick for stirring stew'
b.	O.G	t.w	wítwít 'bird, sp.'
c.	O.L	g.r	rùgrùgè 'bird, sp.' (KLW)

Here we see an L.G, O.G and O.L sequence. These sequences are the least optimal contact types (not including those examples with vowels L.V or O.V) according to the table by Clements:

Table 2.13 C.C sequences

	V	G	L	N	O
V	V.V	V.G	V.L	V.N	V.O
G	G.V	G.G	G.L	G.N	G.O
L	L.V	L.G	L.L	L.N	L.O
N	N.V	N.G	N.L	N.N	N.O
O	O.V	O.G	O.L	O.N	O.O

When looking at reduplicants, it is clear that there are conflicting constraints regarding faithfulness to the input and violations of the Syllable Contact Law. The violations of syllable contact seen in Table 2.13 are allowed in reduplication, because preservation of the base is more important than adhering to the Syllable Contact Law for these forms with reduplication.

Optimality Theory (McCarthy and Prince 1986, 1990, 1995, and others) offers a framework to account for the notion of conflicting constraints. It also offers a framework that accounts for particular constraints being surface true in one area of the phonology, but being violated in another area.

Table 2.14 below shows the distribution of C.C sequences in reduplicants.

Table 2.14 C.C sequences in reduplicants

		SECOND CONSONANT																		
		← Sonority →																		
FIRST C O N S O N A N T	Sonority ↑ ↓	y	w	r	l	m	n	ɲ	ŋ	z	b	d	g	s	p	t	k	h	j	
		y											x							
		w	x												x			x		
		r		x	x		x		x				x	x	x		x			
		l										x	x	x		x	x	x		x
		m																		
		n																		
		ɲ										x		x			x			
		ŋ																		
		z																		
		b																		
		d											x							
		g				x											x			
		s																		
		p																		
		t		x											x		x			
		k																		
h																				
j																				

In forms with reduplication, there is a clearer preference for C₁ to be a liquid, which corresponds to those examples in section 2.3.3 above; however, reduplicants differ from the examples in 2.3.3 in that there are more glides and nasals in C₁ position.³⁴

2.3.6 C₁.C₂ sequences in Verbs: Metathesis and Deletion

Now we turn to examples with verbs, as these examples have been considered derived C₁.C₂ sequences via metathesis. This metathesis is motivated by the avoidance

³⁴ In loanwords, the tendency is for illicit C.C sequences to be broken up by vowel epenthesis as in *tikinilôjà* ‘technology’ (Waag 2010: 326, text). Here the k.n sequence of English is broken up with a vowel in Fur, and shows how this consonant sequence is avoided in the language. /k/ is not allowed in the syllable final position in this language, as shown from discussions above and from KWL. Further, the sequence k.n (O.N) violates the Syllable Contact Law because C₁ is less sonorous than C₂. The only types of violations seen of this nature are in forms with reduplication, where I argue that these violations of the law are allowed over a violation of faithfulness in these forms. In the loanword (50), however, a violation of input structure is better than a violation of the Syllable Contact Law.

of syllable initial consonant clusters. Recall from section 2.3.2 above, that no tautosyllabic CCs are allowed in Fur: *CCV and *VCC. In Fur, the person prefixes of verbs are generally consonants; thus, when the person prefixes are joined to the verb root, if that root begins with a consonant, that C₁ of the verb can metathesize or delete in order to avoid forms like *CCV.

2.3.6.1 Forms with metathesis

In this section, specific emphasis on those examples with derived C₁.C₂ sequences from metathesis are presented. The following examples of permitted sequences are taken from Jakobi (1990: 67-70). She does not include tone and she does not include the complete paradigms of these forms; further, examples with [f] have been changed to [p] in keeping with the present consonant inventory.³⁵ In (50), the examples are organized based on the sonority of the C₁ consonant in C₁.C₂ sequences.

(50)	contact type	Sequence	root	metathesis	gloss
a.	G.L	w.r	wur-	-awr-	'refuse; deny'
b.	L.N	l.m	biil-	-ilm-	'twist'
		l.m	lem-	-elm-	'lick'
		l.m	lim-	-ilm-	'moisten'
c.	L.O	l.b	lub-	-ulb-	'unfold'
		l.d	lat-	-ald-	'beat; hit'
		l.d	luturj-	-uldurj-	'change'
		l.g	leg-	-alg-	'hang up'
d.	R.N	r.j	ruj-	-urj-	'raise'
e.	R.O	r.g	rig-	-irg-	'tie'
		r.g	rug-	-urg-	'plant out'
		r.s	risij-	-irsij-	'speak'

³⁵ The complexity of the verbal paradigms is well noted in the literature, with vowel changes—including insertion, deletion, and quality changes—tone changes, etc. Some of the differences are the results of changes in tense. These differences are ignored for present purposes in order to focus on the C₁.C₂ sequences and the weakening of many of the segments in syllable-final position.

The examples in (50) show that the Syllable Contact Law is being adhered to, with the more sonorous segment being C_1 and the less sonorous segment being C_2 . These derived C.C sequences are following the general tendency of Fur to adhere to the Syllable Contact Law, as discussed in the sections above.

There are also some examples with lenition of C_1 :

(51)	weakening	root	metathesis	gloss
a.	$p \rightarrow w$	piŋ-	-awŋ-	'return; decrease'
b.	$b \rightarrow n$	bet-	-and-	'cut' and 'pass'
		but-	-und-	'pluck'
c.	$d \rightarrow n$	dus-	-uns-	'tear, tr.'

In these examples, the stops are weakened when metathesized. Through this weakening, the Syllable Contact law is again followed. This might be thought of as violating the underlying manner features in order to better satisfy the Syllable Contact Law, following an OT-inspired perspective. Further, with the examples in (51b), the nasal assimilates in place to the stop that follows it.

There are also a few examples with an apparent double metathesis or non-local metathesis along with lenition. Consider the examples in (52):

(52)	weakening	contact type	Sequence	root	metathesis	gloss
a.	$b \rightarrow m$	L.N	l.m	bel-	-alm-	'say, pt'
b.	$b \rightarrow m$	L.N	l.m	bul-	-ulm-	'find'

These examples provide strong evidence that adhering to the Syllable Contact Law in Fur is better rather than faithfulness, as the output form's C_1 is greater in sonority than that of C_2 . For example, with 'say, pt', *-alm-* is the optimal choice rather than **-aml-*, which is still better than **-eb/-*.

In Table 2.15, the types of C.C sequences found through metathesis are presented.

Table 2.15 C.C Sequences as the Result of Metathesis

		SECOND CONSONANT																		
		← Sonority →																		
F I R S T C O N S O N A N T	Sonority ↑ ↓	y	w	r	l	m	n	ɲ	ŋ	z	b	d	g	s	p	t	k	h	j	
		y																		
		w			x					x										
		r							x					x	x					
		l					x					x	x	x						
		m																		
		n											x		x					
		ɲ																		
		ŋ																		
		z																		
		b																		
		d																		
		g																		
		s																		
		p																		
		t																		
		k																		
h																				
j																				

Note the sonority distances in Table 2.15: The chart above shows that nasals, liquids, or glides may be C₁, while liquids, nasals, or obstruents may be in C₂ position. These findings follow the Syllable Contact law.

There are, however, several examples of consonant weakening³⁶ during metathesis that do not result in a C.C sequence:

(53)	weakening	root	metathesis	gloss
	p → w	pi-	-aw-	'do; make'
		po-	-aw-	'fall'
		pu-	-aw-	'kill'
b.	b → f	baaŋ-	-afuŋ-	'jump up and down'
		baaŋ-	-ufuŋ-	'descend'
c.	b → m	bi-	-ami-	'beget'

³⁶ Jakobi (1990) analyzes these examples as strengthening, while K LW (2004) and Waag (2010) analyze them as weakening.

		bo-	-om-	'reach'
		boor-	-omor-	'fatten'
		bu-	-um-	'tire'
		buuŋ-	-amuŋ-	'spend the day'
d.	d → n	du-	-an-	'go (pt)'
e.	d → r	du-	-ur-	'break, tr.'
f.	s → y	su-	-uy-	'burn'

In some of the examples above, the consonants weaken when they occur in coda position of the root, as with *bo* → *--om-* 'reach'; however, there are also examples like *boor-* → *-omor-* 'fatten' where the consonant is an onset. With examples like *boor-* → *-omor-* 'fatten', the obstruents all occur between two vowels; the weakening of these obstruents may be because they occur between two vowels. But, recall that obstruents occur in coda position (see 2.3.1.1 above)—there are just not many examples of them; there are, however, several examples of sonorants in coda position.

While there are many examples where the metathesized segment weakens, there are several instances where this segment does not weaken in these same environments. In (54), we would expect that the segment would weaken, but it does not:

(54)	no weakening	root	metathesis	gloss
a.	b	ba-	-ab-	'drink'
		bau-	-abu-	'take; carry'
b.	m	maarŋ-	-imarŋ-	'smell, itr' and 'smell, tr'
c.	n	neen-	-enen-	'bewitch'
		ni-	-in-	'roll up'
d.	t	teer-	-eter-	'forge'
		ti-	-it-	'strain; filter'
		tiiir-	-itiiir-	'join'
		tuo-	-uto-	'be unable'
		tuum-	-utum-	'build'
		tuur-	-utur-	'bump into'
e.	s	saar-	-asar-	'expose for sale'
f.	l	le-	-al-	'wake up, itr'
		liiŋ-	-iliiŋ-	'swallow'

		li-	-al-	'wash'
		lu-	-ul-	'smear on' and 'follow'
g.	r	raaŋ-	-araŋ-	'take out'
		ri-	-ir-	'snatch'
h.	ŋ	naal-	-aŋal-	'put evil eye on'
		ŋer-	-eŋer-	'tear'
		ŋi-	-iŋ-	'increase' and 'knead'

Further, /ŋ/ and /r/ never weaken, but [g] is added after [ŋ] in the examples

below:

(55) ŋaar- -aŋgar- 'divide; share'

naal- -aŋgil- 'pull out'

A better onset is desired in these examples word-internally, so the [g] is epenthesized.

2.3.6.2 Forms with deletion

In some examples, the initial consonant is deleted instead of metathesized. I suggest that in these cases, the metathesized consonant would be less harmonic in terms of the Syllable Contact Law in C₁ position of the C₁.C₂ sequence. Exceptions to these observations are explored after this section.

First, there are examples where the resulting C₁.C₂ sequence from metathesis would be illicit in that C₁ would be less sonorous than C₂, violating the Syllable Contact Law. Instead, the C₁ is deleted. Consider the examples in (56).

(56)	root	deletion	illicit C.C	gloss
a.	tariŋ-	-ariŋ-	*[-ATR]iŋ-	'call'
	tin-	-in-	*-itn-	'agree; obey'
b.	pul-	-ul-	*-upl-	'untie'
c.	duŋ-	-uŋ-	*-udŋ-	'suck'
d.	jab-	-ab-	*-ajb-	'drop'
	jag-	-ag-	*-ajg-	'lift'
	jig-	-ig-	*-ijg-	'squeeze'
	jagil-	-agil-	*-ajgil-	'see (pf and sb)'
	jaw-	-aw-	*-ajw-	'give back; water; sharpen'
	jiŋ-	-iŋ-	*-ijŋ-	'pour'

	jul-	-ul-	*-ujl-	'buy; sell'
	jum-	-um-	*-ujm-	'cover; embrace'
e.	kar-	-ar-	*-akr-	'enter'
	keŋ-	-aŋ-	*-akŋ-	'be (somewhere)'
	kir-	-ir-	*-ikr-	'cook'
	kit-	-it-	*-ikt-	'tremble'
	kom-	-om-	*-okm-	'cry'
	kuy-	-uuy-	*-uky-	'weed; skin'
	kur-	-ur-	*-ukr-	'touch; go out'
f.	ŋaŋiŋ-	-aŋiŋ-	*-aŋŋiŋ-	'insult'

There is a strong tendency for the voiceless segments /t,k/ and for /j/ to delete. /p/ sometimes deletes but most often metathesizes with weakening. In fact, /k/ and /j/ always delete—these segments never metathesize. In some cases, the voiceless segments are deleted because these sounds are generally avoided in syllable-final position, a claim made in section 2.3.1.1 above.

In other cases, segments are deleted because via metathesis, a triple consonant sequence would result:

(57)	deleted	root	output	illicit	illicit	illicit	gloss
a.	p	pull-	-ull-	*-upll-	*-upl-	*-ulp-	'dry'
		pulŋ-	-ulŋ-	*-uplŋ-	*-upl-	*-ulp-	'show; teach'
		purg-	-urg-	*-uprg-	*-upr-	*-urp-	'grind thoroughly'
b.	t	tall-	-all-	*-atll-	*-atl-	*-alt-	'chew'
		tung- pung ~	-uŋg-	*-utŋg-	*-utŋ-	*-ugt-	'peel'
c.	s	sakk-	-akk-	*-askk-	*-ask-	*-aks-	'run'
d.	j	jolg-	-olg-	*-ojlg-	*-ojl-	*-ogj-	'vomit'
		julb-	-ulb-	*-ujlb-	*-ujl-	*-ulj-	'miss (a target)'
		jurr-	-urr-	*-ujrr-	*-ujr-	*-urj-	'drive out'
		jund-	-und-	*-ujnd-	*-ujn-	*-unj-	'leave'
e.	k	karr-	-arr-	*-akrr-	*-akr-	*-ark-	'split; plough'
		kell-	-ell-	*-ekll-	*-ekl-	*-elk-	'pull'
		kirgijŋ-	-irgijŋ-	*-ikrgijŋ-	*-ikrijŋ-	*-irk-	'scratch'
		kull-	-ull-	*-ukll-	*-ukl-	*-ulk-	'steal; cough'
		kurt-	-urt-	*-ukrt-	*-ukr-	*-urk-	'dig'

*VCC.CV and *VC.CCV are not allowed in Fur. Further, the segment deleted is the least sonorous segment, with the liquid being a better candidate for the C₁ position. The

/s/ does not occur syllable finally (or word finally), as noted in section 2.3.1.1 above, so this constraint would provide motivation for this segment deleting in (61a). With the initial segment metathesizing in (61b), the motivation is that the metathesized segment becomes the initial consonant of the next syllable, which is allowed in Fur. The final example with weakening corresponds to the other examples with lenition.³⁸ (62) is reproduced from Waag (2010):

(62) fortis/lenis opposition	
fortis	lenis
b	m
d	n
p/f/ɸ	w
t	r
s	y

This opposition shows how sonority is important to syllable structure in Fur: there are obstruent (fortis) and sonorant (lenis) counterparts for these segments.

2.3.6.3 Summary of sonority within verbs

Section 2.3 has shown how sonority is an important organizing tool in Fur verbal morphology. Specifically, derived C₁.C₂ sequences are constrained by the Syllable Contact Law. Further, because of the avoidance of tautosyllabic initial CCs in Fur, these potential CCs are repaired by either metathesis or deletion. In these cases, the sonority of the segment and whether or not an optimal C.C cluster might be derived is important in whether or not metathesis or deletion is employed. Weakening (lenition) also occurs with some segments, resulting in some C.Cs, but a resulting C.C is not always the case. This

³⁸ Waag (2010:28-9) also notes that in “the verb paradigms, some consonants occur in a “fortis-lenis” opposition, as this contrast is sometimes called in the description of West African languages (see for example, Stewart, 1975). [...] This consonant alternation is also common in other Nilo-Saharan languages, like the t/r alternation in Shilluk (Gilley, 1992; 178-79) or Tama (Dimmendaal, 2009b).”

weakening shows how a sonorant coda consonant is preferred when C.Cs formed; in other examples, the restrictions on types of Cs allowed in onset position are also seen.

When looking at the data from an Optimality Theory perspective, faithfulness violations like FAITH and Linearity or Alignment are important to consider. First, concerning C₁.C₂ sequences of G.L, L.N, L.O, R.N, R.O are derived via metathesis which follow the SC law; in these cases, faithfulness to the input is violated to avoid initial CCs, but there are no violations of the SC law. Second, in cases with metathesis and lenition, the derived C₁.C₂ sequences also follow the syllable contact law (e.g., G.N and N.O); these examples show that underlying manner features are violated in order to better satisfy the SC law. Third, in cases of non-local metathesis and lenition, the resulting C₁.C₂ sequences (e.g., L.N) (adhere to SC law); in these examples, again faithfulness to the input is violated to avoid CC initial sequences, but an illicit C.C is formed, so again, Linearity is violated in order to adhere to SC law.

In cases with deletion of the initial segment, faithfulness to the input is also violated in favor of allowing the SC law to be violated; further, deletion occurs when metathesis would result in three consonants (CCC). In this case, all of the segments that delete are obstruents that, resulting in optimal C.Cs according to SC law.

To summarize the types of segments and patterns that are affected by sonority and the selection of metathesis or deletion, we see the following: 1. Obstruents: /t/s either delete or do not undergo any change, /d/s either weaken or delete, /p/s weaken or delete, /b/s always metathesize, either weakening or not undergoing any change, /k/ always deletes, and /j/ always deletes; 2. Nasals: These segments never weaken—they either delete or metathesize. 3. Liquids: // either do not undergo any change or geminate to [ll], and /r/ never weakens or strengthens. 4. Glides: these segments always metathesize.

Further, the observations about the non-predictability of the segments /p/ and /t/ above are also discussed by Jakobi, who believes that for verbal roots with the shape of CV or CVVC, metathesis or deletion cannot be predicted. I would further add that the sonority of the segment and the resulting C.C sequence (if applicable to the root) also play a role in what segments metathesize or delete.

In a different analysis of Fur metathesis, Jakobi (1990) mentions that certain consonant sequences are allowed in Fur while others are not admitted. According to Jakobi (1990: 56-7, 71), the sequences admitted in Fur verbs are “wɾ, ɪm (<ml), nd, wr, ns, ld, lg, lb, rg, rs, and rɲ, that is, in general, sonorant plus obstruent and glide or liquid plus nasal.” I would suggest that these C.C sequences are important, but that the sonority of the segments involved plus the adherence to the Syllable Contact Law is what provides motivation for these verb forms more so than the types of C.Cs that are allowed in this language: relative sonority distance is important in these processes.

Jakobi (1990) also mentions that certain sequences are not admitted in Fur: *pl*, *tr*, *tn*, *dɲ*, and *ɲɲ*, and therefore the initial C of the verb root is deleted rather than metathesized. If we incorporate the analysis above with Jakobi’s observations, each of the sequences *pl*, *tr*, *tn*, and *dɲ* violate the Syllable Contact Law: C₁ is less sonorous in these cases than C₂. There are also very few sequences of nasals in the language, as evidenced in our discussions above; therefore avoiding the sequence *ɲɲ* would be better, so it is better to delete the initial C of the verb root.

Jakobi also mentions that with CVCC verb roots, C₁ of the verb root is deleted because three consonants are not admitted in Fur, and there is not secondary metathesis (see the examples in (51) above). I again agree with Jakobi that there is a preference for preservation of the segment through metathesis, but 1) *VCC.CV and *VC.CCV clusters are avoided in Fur because consonant clusters are not allowed syllable initially or finally

(or word initially or finally) and 2) deletion and secondary metathesis sometimes provides a better candidate, but in other cases these processes do not; further, these are two extra processes that must apply instead of just one: therefore, it is better to delete the initial C of the verb root instead of metathesizing the segments because word-internal clusters of more than three consonants are not allowed in Fur.

2.4 Formalizing some of the Findings of this Chapter through Optimality Theory

What has been observed so far in these examples is that there are more instances of metathesis than deletion³⁹ that are used to avoid CCs. These examples show that faithfulness to segments is important in this language, but that linearity constraints can be violated.

The sonority of segments must also be factored into the analyses to help account for these differences. As discussed in the sections above, besides reduplicants, words in Fur adhere to the Sonority Sequencing Principle (SSP) in regard to CCs. In CVC syllables we see that certain CCs from metathesis are admitted (*wŋ, lm, nd, wr, ns, ld, lg, lb, rg, rs, rn*), while certain CCs are not admitted, and are therefore deleted:

- (63) a. *ub-* → *Cp-ulb-* ‘unfold’
 b. *-tin-* → *Cp-*itn-* → *Cp-in-* ‘agree; obey’

Constraints important to consider in further analysis of the data include those listed in (64)⁴⁰:

³⁹ I observed in my analyses that metathesis of C1 includes the sounds *b, m, w, t, s, n, l, r*, and *f/w, b/f, b/m, d/n, d/r, s/y, l/l, ŋ/ŋg*, while deletion of C1 includes the sounds *f, w, t, d, s, ʃ, k*, and *ŋ*. Further, J (1990) mentions that *f, t, ʃ, k* are always deleted no matter what the syllable structure of the stem is.

⁴⁰ Many constraints, definitions of constraints, and sources mentioning those constraints which are used in this dissertation have been accessed through the Excel data file via Ashley, Disch, Ford, MacSaveny, Parker, Unseth, Williams, Wong, and Yoder’s (2010) GIAL’s *Occasional Papers in Applied Linguistics* essay entitled “No. 9. How many constraints are there? A preliminary inventory of OT phonological constraints.”

(64)	Constraint	Definition
a.	NO-CODA	'Syllables do not have codas' (Prince and Smolensky 1993)
b.	*COMPLEX	'no more than one C or V may associate to any syllable position node' (Prince and Smolensky 1993) 'tautosyllabic consonant clusters are prohibited, i.e., "avoid consonant clusters"' (Hume 1997, 2004)
c.	ONSET	'Syllables must have onsets' (Prince and Smolensky 1993)
d.	DEP-IO	'every segment of the output has a correspondent in the input' i.e., no epenthesis' (McCarthy and Prince 1999)
e.	HNUC	'consonants are not syllable peaks' (Prince & Smolensky 1993)
e.	SYLLABLECONTACT	'the onset of a syllable must be less sonorous than the last segment of the immediately preceding syllable, and the greater the slope of sonority the better' (Bat-El 1996)
f.	σCONTSLOPE	'the greater the slope in sonority between the onset and the last segment in the immediately preceding syllable the better' (Bat-El 1996)
g.	*Plateau	'assign a violation mark for every sequence of two segments in the output in which both segments have the same degree of sonority' (Coetzee 2008) Note: universally outranked by *Fall
h.	SonCoda	'codas are [+sonorant]' (Lombardi 2002)
i.	SonoritySequencingGeneralization (SSG)	'elements of an onset must rise in sonority; elements of a coda must fall' (Bat-El 1996)
j.	*Fall	'sonority must not fall within a syllable onset' (Bat-El 1996)

2.5 Conclusion

In this chapter, the phonemes and allophones of Fur have been discussed along with some of the important phonological processes that occur in this language. Further, by considering the distribution of consonants in coda position, and by examining C.C sequences across syllable boundaries in content words, this chapter shows that sonority is an important organizing principle in this language. Specifically, The Syllable Contact Law is an important component in the organization of syllables into words.

Chapter 3

Syllable Weight in Fur

3.1 Overview

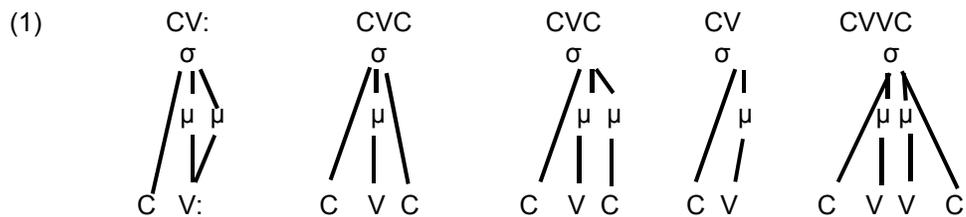
Chapter 2 established four syllable types. In this chapter, we look at whether syllables are heavy or light in Fur. The syllable structure of Fur is represented through moraic theory (Hayes 1989, 1995). The sonority of segments in relation to syllable weight is also discussed in this chapter.

Recall from Chapter 2 that there are four types of syllable shapes in this language: CV, CVV⁴¹, CVC, and CVVC. Open and closed syllables along with long and short vowels are allowed, as shown in Table 3.1:

Table 3.1 Syllable Shapes in Fur

	Open syllable	Closed Syllable
Short Vowel	(C)V	(C)VC
Long Vowel	(C)VV	(C)VVC

Regarding weight, these syllables can be represented as such through moraic theory:



The examples in (1) show that CVC syllables have one of two possible moraic representations based on the process and its distribution. As proposed in Gordon (2007), I am assuming that syllable weight distinctions may be different in different phenomena⁴²—there are prosodic inconsistencies (Fitzgerald 2012) in Fur. Most of the

⁴¹ I follow Waag and Jakobi's notations in representing long vowels as a sequence of two short vowels.

⁴² Fitzgerald (2012) and others also argue for prosodic inconsistency within languages.

phenomena explored in this dissertation are those processes covered or at least mentioned in Gordon (2007): minimum word requirements, compensatory lengthening (or at least segment lengthening and shortening) (both are covered in Chapter 3), contour tone distribution (discussed in Chapter 4), reduplication (discussed in Chapter 5), and meter (discussed in Chapter 6).

The rest of this chapter is outlined as follows. In section 3.2, some of the theoretical underpinnings of the syllable, mora, and sonority are discussed. In section 3.3 the minimum word for Fur is established, supplemented by a discussion of syllable weight. Section 3.4 discusses how short, closed syllables (CVC), long open syllables (CVV), and long closed syllables (CVVC) pattern in relation to weight. Section 3.5 discusses geminates in relation to syllable weight. Section 3.5 discusses some processes involving weight, showing that moras are preserved during deletion of segments. Finally, in section 3.6, concluding points about syllable weight and sonority are presented.

3.2 The Syllable and the Mora

The segments of Fur were discussed in Chapter 2, along with some relevant distributional facts. In this chapter, the focus is on the internal structure of the syllable; specifically, syllable weight is represented through moras.

The syllable is a domain for segment sequencing, a representational device used to show groups of segments that are significant, while also showing patterns of sounds and meter, allowing for syllables to therefore be grouped into feet (Zec 2007). These segments can occur in the onset, nucleus, and coda positions of the syllable. While there are not any clear phonetic correlates for the syllable (Ladefoged and Maddieson 1996), there is general consensus that this abstract, phonological constituent exists.

3.2.1 *The Internal Structure of the Syllable and Representations of Weight*

Just as there are differences among languages concerning the sonority threshold (Prince and Smolensky 1993; Zec 2007) of segments in the nucleus of the syllable and those of the mora, there are also differences among languages in which syllables are considered heavy or light.

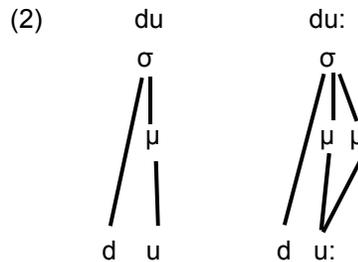
What makes a syllable heavy or light? Gordon (2007) writes that “While the exact definition of syllable weight is elusive, it may be defined very broadly as that property which differentiates syllables with respect to their prosodic behavior. The difficulty in explicitly defining syllable weight lies in determining which prosodic aspects of language fall under the rubric of weight.” In this section, the notion of syllable weight and how it is formally represented is presented using a moraic model following Hayes (1989, 1995).

3.2.1.1 The moraic model of syllable weight

There are several arguments in favor of using the moraic model for representing weight. For example, Zec (2007) posits that the mora is a much more simply presented constituent than the rime constituent in terms of domains of phonological processes. Also, in her study on prenuclear glides, Yip (2003) argues that the Onset/Rime (O/R) model is weak, and that a moraic model (in lieu of other models at that point in time) coupled with phonotactic requirements are sufficient and sometimes preferable to that of the O/R model. Both Zec (2007) and Yip (2003) also argue that the moraic model is the better model to use at this time; specifically, the mora as a sub-syllabic constituent is more simple than the rime constituent, and as Yip (2003) argues, must be excised according to Occam’s Razor.

I have adopted the moraic theory of representation for syllable weight in this dissertation. In many languages, there is a single distinction with syllables: syllables can

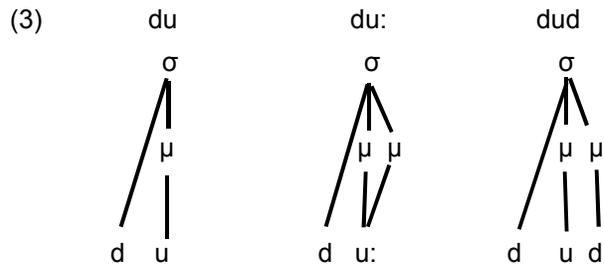
be light or heavy.⁴³ In moraic theory, a light syllable contains one mora and a heavy syllable contains two moras. For example, *du* is represented as light through the assignment of a single mora and *du:* (or *duu*) would be represented as heavy through the assignment of two moras:



The mora is a subsyllabic constituent which functions as a weight-bearing unit and as a timing unit in language (Hayes 1995). By using a moraic model, the focus is placed on the vowel as the weight bearing unit and not the preceding consonant (Hayes 1995:54). In this model, two moras represent a heavy syllable. This assignment of moras can also then represent the CVV, CVC heavy distinction of Latin and other languages where CVC is considered heavy:

⁴³ While this model account for languages like Fur with this single distinction in syllable weight—either the CVV,CVC > CV heavy criterion or only a CVV > CVC, CV heavy criterion—it has proven argued to be less effective in accounting for languages with three (or more) distinctions in syllable weight (i.e., greater than a binary weight distinction). Here, syllables like CVV have a greater weight than syllables of CVC, and CVC greater than CV: CVV > CVC > CV (Gordon 2006). With these systems, the representations with moras would give the CVV syllable three moras—a violation of “the principle that representations of weight are projected from contrasts in length. This principle dictates that long vowels should receive two and not three moras” (Gordon 2006:5).

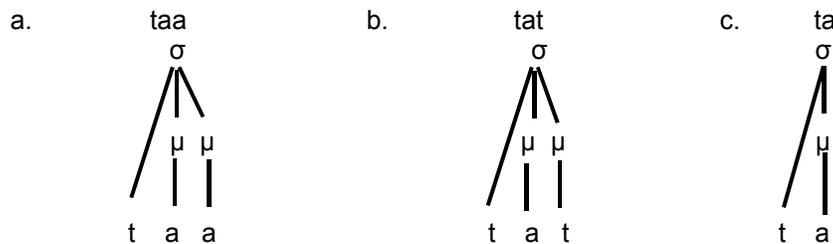
Further, Gordon (2006) argues that the moraic model represents weight according to segment length not quality, so the moraic model has proven to be difficult to account for some languages where weight distinctions are created by vowel quality rather than segment count or phonemic length (Gordon 2006).



The types of syllables that contain long or short vowels can be broken up into light or heavy syllables, where only short, open syllables are light (C)VV(C), (C)VC > (C)V or where only syllables containing long vowels or diphthongs are heavy (C)VV(C) > (C)VC, (C)V.

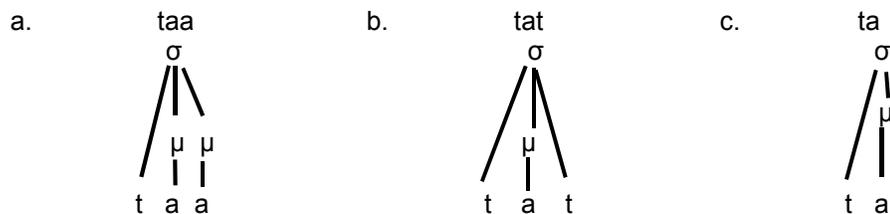
In moraic theory, CVV, CVC are represented as heavy and CV as light. Here this model follows Hyman (1985) and Hayes (1989) (modified from Gordon (2007)):

(4) A moraic model for languages with codas that contribute weight:



In this example, a mora is assigned to the coda consonant of (4b) *tat*, giving the syllable two moras. This syllable patterns with the (4a) *taa* and is considered heavy. There are also languages like Khalkha (cf. Gordon 2007) where CVC is considered to be light:

(5) Moraic model for languages that consider the coda consonant light:



In (5), the coda consonant in (5b) *tat* is not linked to a mora; thus, this example only has one mora and is considered light, patterning with (5c) *ta*. In moraic theory, the Weight by Position parameter (Hayes 1989) accounts for languages that allow for codas to bear weight and for those that do not—it is a language-specific parameter (Gordon 2007).

3.2.2 Sonority

As discussed in Chapter 2, sonority is an important factor in the organization of syllables and words in Fur. Sonority is also relevant to the analyses of syllable weight—whether or not a segment may be moraic can be tied to that segment’s sonority.

The Sonority Sequencing Principle (SSP) (Clements 1990; Zec 2007) states that segments usually gain sonority towards the nucleus/peak and lose sonority at the outer-edges. The kinds of segments that are considered to be sonorous vary from language to language. Below is the Sonority Scale reproduced from Zec (2007):

(6)	The Sonority Scale
V	low vowels mid vowels high vowels
G	glides
L	rhotics laterals
N	nasals
O	voiced fricatives voiced stops voiceless fricatives voiceless stops

The set of syllabic segments in a language varies, but generally, the most sonorous segment(s) can be syllabic and carry a mora.⁴⁴ Further, whether or not a

⁴⁴ In some languages, only vowels are syllabic (like Bulgarian), while in other, vowels and liquids are syllabic (Slovak); still, in others, vowels, liquids, and nasals are syllabic

segment is moraic varies in different languages—in some languages (like Fijian), only the vowel (V) is moraic, while in others like Cairene Arabic, all segments (vowels, liquids, nasals, and obstruents) can be moraic (Zec 2007). Because the onset does not contribute to weight (in most languages), the sonority of the coda consonant is then important when determining the weight of a syllable.

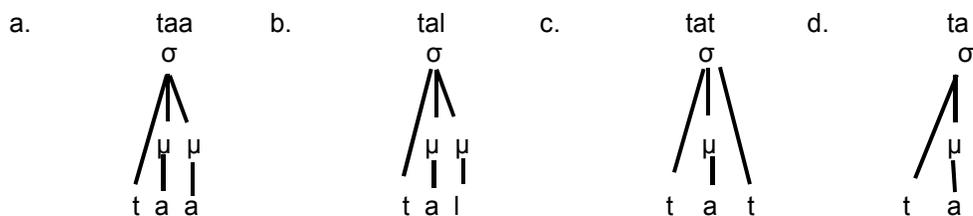
3.2.2.1 The moracity threshold

In Fur, only the vowel is syllabic; however, the moracity threshold includes the vowel and other segments; in some processes, the coda consonant may also be moraic when it is a sonorant like a nasal, liquid, or glide. In other phenomena (like minimum word requirements), obstruents may also pattern as moraic.

In Fur, I show that in some phenomena, the consonant coda may be moraic when it is a sonorant (CVR) while in other cases, the consonant coda may not be moraic when the consonant is an obstruent (CVO); thus, CVR is considered heavy and CVO light in some processes. Again, these syllables are only forced to be heavy when considering contour tone distribution (see Chapter 4), reduplication (Chapter 5), and in meter (Chapter 6).

(7) presents such a schemata using the examples above.

(7) CVR as heavy and CVO as light



(English), while in others vowels, liquids, nasals, and obstruents are syllabic (Imdlawn Tashlhiyt Berber) (Zec 2007).

In (7), (7a) and (7b) pattern together with two moras and are considered heavy, and (7c) and (7d) pattern together with a single mora and are considered light.

3.3 Determining the Minimum Word in Fur

When considering minimum word constraints, only content words (i.e., nouns, verbs, modifiers—adjectives and adverbs, etc.), rather than function words (i.e., determiners, pre/post positions, etc.) should be analyzed.⁴⁵

Concerning weight and the minimum word, Gordon (2007) writes that “The most common minimum word requirement is CVC, although the CVV and disyllabic minimal words requirement are attested in a significant minority of languages.” In this section, I show that the minimum word in Fur is bimoraic CVC (ConsonantVowelObstruent (CVO) and ConsonantVowelSonorant (CVR)). Further, in Chapter 5 on reduplication, I show that the minimum, fully reduplicated base is equal to this minimum word in Fur.

Below are examples of monosyllabic words in Fur—both open and closed syllables. Most examples are from nouns, but some verbs are included when the verb root can be isolated from the tense, aspect, and other markers of the language.⁴⁶ Modifiers, which would include adjectives and adverbs, are not included in this list as there are no monosyllabic modifiers in Fur. Modifiers are discussed below when

⁴⁵ Garrett reminds us that the line between content and function words can sometimes be blurred: “A second important cautionary note concerns the definitions of “function word” and “content word.” Usually, the class of function words will include determiners, pre/post-positions, exclamations and the like, but it may also include existential verbs, the words “yes” and “no,” personal pronouns, and other (arguably) intermediate cases” (Garrett 1999: 4).

⁴⁶ As Jakobi (1990), KLW (2004), and Waag (2010) have all noted, isolating the verb root can be very difficult, and there appear to be only a few monosyllabic verbs in the language.

discussing geminates. Note that in the examples that follow, a long dash (--) is used for any examples of structures not found in the language.⁴⁷

3.3.2 Argument for the Minimum Word

In Fur, the minimum word is bimoraic. First, as shown in Section 3.2.1 above, there are no monomoraic content words that consist of short, open syllables ((C)V).

Words with a single short, open syllable are rare in Fur, as shown in (8).

- | | | | |
|-----|----|------------------|---|
| (8) | a. | V | ---- |
| | b. | CV | ---- |
| | c. | C ^w V | k ^w à ‘people’ (W: 154)
k ^w ě ‘child’ (W 149)
k ^w ǎ ‘children’ (W) |

The examples in (8) above show that monomoraic content words with the syllable structure of V, CV, do not exist in Fur. There are no content words with an open syllable and an onset, as shown in (8b). Only function words exist like *nà* ‘and’ conj., and *ká* ‘1s.person pro’ that have this structure.⁴⁸ Function words are not counted when looking at the criteria for a minimum word.

Further, the three examples in (8c) *k^w à* ‘people’, *k^w ě* ‘child’, and *k^w ǎ* ‘children’ show examples of rounding. These are the only three examples known with this structure (besides one verb, as shown in Chapter 2). As onsets do not matter when discussing weight in Fur, these examples shed light on the fact that monomoraic content words in Fur are very rare. As these examples do exist, but are few, these examples constitute as counter-examples to the point that the minimum word requirement is bimoraic. In this

⁴⁷ The source from which I have taken the data is noted next to each example in my dissertation. My fieldnotes are M (for McKeever), Waag (2010) is W, Kutsch-Lojenga and Waag (2004) is KLW, Jakobi (1990) is J, and the unpublished Fur/English dictionary is D.

⁴⁸ “The CV pattern is used for several pronouns and grammatical words, but there is only one noun with this structure in the available data, namely ʔú – ‘cow’.” (Waag 2010:46)

case, I consider these few examples as either a) subminimal or b) the [w] is in the nucleus and the words are bimoraic.⁴⁹

Second, words with a long vowel, which are bimoraic, are allowed in Fur. Third, monomorphemic words with a long syllable or diphthong, closed by a glide (CVVGs) are avoided in Fur, and words with long vowel or diphthong which are closed by other coda consonants are also rare. Finally, CVCs pattern with the CVVs.

These observations, suggest that CVCs are bimoraic, and that every kind of coda can be conditionally moraic to satisfy minimum word requirements.

3.3.2.1 Words with Open and Closed Syllables that have Long Vowels or Diphthongs:

(C)VV(C)

Now consider the instances of monosyllabic words with long vowels, which are always bimoraic:

- | | | | | | | |
|-----|----|-------------------------------|---------------------------------|----|--------------------------------|--|
| (9) | a. | V _i V _i | ùù 'word' (KLW)
úú 'cow' (M) | b. | CV _i V _i | ròò 'well, river, stream, lake, sea' (M)
mòò prop.name, fem. Moo (W 44)
lós 'place' (W 63)
dii 'ash' (W 36)
d-úú 'stew' (W 57; plural is k-úw-tá)
bèè 'mash' (W 57)
yáà 'woman' (W 44)
bàà 'to drink' (W 57) |
|-----|----|-------------------------------|---------------------------------|----|--------------------------------|--|

There are only two examples of an onsetless⁵⁰, bimoraic V_i V_i syllable occurring as a content word: ùù 'word' and úú 'cow', along with only one example of a function word éé 'yes'.⁵¹

⁴⁹ The singular form of *k^w* à 'people' is *dùó* 'person' (W 28). These forms here may then be similar to some of the plurals of body parts where k- is used for the plural and d- for the singular [example]. This example also shows that the labialization of /k/ may be the result of the loss of the vowel /u/. These examples would then strengthen the argument that these segments should be considered bimoraic (or subminimal).

⁵⁰ As previously mentioned, this analysis differs from Waag (2010:39), who does not believe that there are any vowel-initial words in the language—according to her, all

In (10) are examples with closed syllables, again shown with coda consonants

arranged by increasing sonority:

(10)	a.	V _i V _i O	-----	CV _i V _i O	wiit thread (W 36) bĩis 'cat' (M, W 44)
	b.	V _i V _i N	-----	CV _i V _i N	núúm 'snake' (W 36) sòòm 'school' (W 44) sòón millet (W 36)
	c.	V _i V _i L	ààr 'stick of firewood' (KLW) ùùr 'to step' (W, but as CVVC)	CV _i V _i L	bùúl 'hippopotamus' (KLW, W) lùúl night (W 50) lèèl 'donkey' (W 36) páàl leading bull (W 36) tààr 'leg' (W 46) wààr short time (W 50) gààr sheet of paper (W 36) pòòr 'Fur' (W 63) jĩir sorghum flour (W 39)
	d.	V _i V _i G	-----	CV _i V _i G	-----

Comparing the examples in the left column of (10) to those in the right column, we see that there is again a preference for onsets in Fur, and that the coda consonants of both VC (7c) and VVC (8c) words are only liquids. Prevalence of all types of codas suggests CVVC never has a moraic coda, except that glides are always moraic no matter what and that is why CVVGs do not occur in Fur.

Also, while there are a greater number of examples with syllables closed by liquids in (10c) (C)VVC, than those in (8c) CVC above, there are no examples of long vowels closed by a glide (10d) *CVVG; glides are only in coda position of words with

vowel-initial words begin with a glottal stop, and are only phonetic. These examples therefore exist only as CVV or CVVC syllables.

⁵¹ Concerning úú 'cow', there has been some debate in the literature on whether the vowel is long or short. I have chosen to represent this vowel as a long vowel, as there are no other examples of an onsetless, monomoraic word in Fur. Further, in the orthography used by the Fur, this vowel is transcribed as a long vowel. The word for 'bull' in Fur is nùùŋ 'bull' (M, W 281, J) and the word for calf is nùùŋɪ 'calf' (M, W 147). Here, both words are bimoraic, suggesting that úú 'cow' is also a bimoraic word.

short vowels, as in (8d) CVG. This gap suggests that glides bear weight in this position where other sonorants do not; thus (10d) *CV_iV_iG would be too heavy in Fur and is not allowed. Compare (11a), (11b), and (11c) below:

(11) Examples showing the special status of glides in coda position following a long vowel

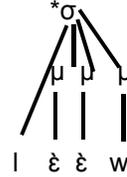
a. lèèl 'donkey' (W 36)



b. pèy 'room' (W 27)



c. *CV_iV_iG



In (11c), the word carries three moras instead of two, making the syllable too heavy, violating the norm for a bimoraic word minimum. If *CVVG were allowed, we would expect the syllable structure to be represented as in (11a), with the glide being associated with the syllable node instead of a mora. The fact that long syllables closed by a glide are not allowed is not surprising in that “Many processes that lengthen or shorten syllables or segments also have been argued to fall under the rubric of weight-based phenomena. For example, long vowels do not occur in closed syllables in many languages, a restriction that has been argued to result from constraints on the maximum weight of the syllable (Steriade 1991, Hayes 1995)” (Gordon 2006).

For example, (12) shows how vowels can be shortened in some instances (taken from Waag 2010):

(12)	Singular	Plural
a.	kóór	kór-ηά 'war' * kór-á
	sòòr	sòr-ηά 'back (body part)' * sòr-à
b.	tĩír	tĩr- ηά 'path' * tĩr-á
c.	bára	bâr-ηά 'brother' * bâr-à

Here in (12) the vowels shorten, but the mora count is preserved as evidenced by the contour tones falling on both (12b) and (12c). In fact, when the final vowel in (12c) is deleted, the tone spread to the remaining vowel on the root. In other examples of contour tones (see Chapter 4), the right-most level tone is delinked and spread to the next best available mora.

A related point about (12) is that these examples take the *-ŋa* suffix instead of the *-a* suffix like other consonants do. The feature of [+syllabic] is still there, triggering the *-ŋa* suffix rather than the *-a* suffix. There are examples where a word ending in a liquid takes the *-a* suffix, however (taken from Waag 2010):

- (13) a. m̀ùf pl. m̀ǔr-à ‘revision’
 b. gǎ̀àr pl. gǎ̀àr-à ‘sheet (paper)’
 c. jǐ̀r pl. jǐ̀r-à ‘sorghum flour’

- (14) pò̀òr pl. pò̀òr-a ‘Fur’

In the examples in (13) and (14), the long vowels are not shortened, as opposed to those in (12). I suggest that the underlying structure is different for those words in (12) as opposed to those in (13) and (14); further, in (13), the examples have complex contour tones. In (13a) a better mora becomes available via the vowel, and thus tone spreads to the suffix. In (13b,c), there is a long vowel; thus, enough moras are available in the root, and the tone only spreads to the suffix. (See Chapter 4 for more discussion of this matter.)

Now consider examples of open and closed syllables with diphthongs in (15):

(15)	a.	$V_i V_{ii}$	----	$CV_i V_{ii}$	díá 'wound' (D, W 58) piè ~ fiè 'rabbit' (M) piè 'lie' (W 36) yìè 'dream' (W 24) diò 'stomach' (W 24) sùè 'bellows' (W 24) dùó 'person' (W 44) wũò flour (W 36) dùâ 'cap' (W 36)
	b.	$V_i V_{ii} O$	----	$CV_i V_{ii} O$	pèûs 'to move' (W 36)
	c.	$V_i V_{ii} N$	----	$CV_i V_{ii} N$	wùòŋ 'herder' (W 24)
	d.	$V_i V_{ii} L$	----	$CV_i V_{ii} L$	dùâl 'moon, month' (KLW, W)
	e.	$V_i V_{ii} G$	----	$CV_i V_{ii} G$	----

The first column in (15 a-e) shows that there are no monosyllabic words in Fur that have the structure $V_i V_{ii}$ or $V_i V_{ii}C$. Again, this gap represents a preference for onsets in Fur, and while onsets do not bear weight, they are still important to the discussion of the minimum word.

Comparing (15) to (8) above, the high vowels are represented as glides in the coda consonant position of short, closed syllables in (8). These high vowels do not occur in any of the examples in (15b) in syllable-final position. One reason for this gap is that Waag and KLW transcribe vowels as glides when these segments occur in syllable final position. These examples could easily be included in the list in (15b) as vowels instead, creating a gap for CVG syllables in (8) but filling in more examples in (15).

By transcribing these segments as glides instead of high vowels, it does not take away the fact that glides are still moraic in coda position—this point was shown with the avoidance of *CVVG syllables, as these types of syllables are too heavy in Fur. Further, as with many languages, there are no sequences of more than two adjacent vowels allowed in Fur--*VVV; thus, the gap in CVVG syllables (and the existence of CVG

syllables) can be accounted for because these glides in final position are moraic like their high vowel counterparts.

Also concerning (15) above, there are very few closed syllables with diphthongs. The three examples in (15) mirror those of the long vowels in that an obstruent, a nasal, and liquid are present in coda position; further as with (15), there is no glide in coda position, again supporting the idea that glides are too heavy for that position.

From the examples above, we can conclude that most monosyllabic words with long vowels or diphthongs in Fur are of the structure CV_i V_i (C) or CV_i V_{ii} (C), showing a bimoraic tendency, along with a preference for an onset.

3.3..2.2 Words with Closed Syllables with Short Vowels: (C)V(C)

Now consider examples of content words that have a closed syllable with a single, short vowel:

(16)	a.	VO	-----	CVO	sòg 'day' (KLW, W) kòj very old thing (W 57) sát~sót 'red cap of student' (W 36) rùs belt (W 48) tùs stable thing (W 48)
	b.	VN	-----	CVN	tòŋ house (W 36) j ím 'to show' (W36)
	c.	VR	ǔr 'giraffe' (KLW) êl 'to come' (W as CVC)	CVR	pûl peanut (W 36) mùf revision (W 36)
	d.	VG	-----	CVG	dáy 'he-goat' (W) dǎy 'grass' (W 36) pày 'room' (W 27) bàw 'pond' (W 27)

There are not many examples in the data of words with the syllable shape (C)VC. There are a range of examples showing that obstruents (O), nasals (N), liquids (L) and

glides (G) can be coda consonants in Fur. And while onsets do not contribute to weight, VR and VO words (as shown in (8c)) may occur in Fur as content words.⁵²

These CVC words are thus considered to be bimoraic because there is a lack of monomoraic, open syllables in the language and because most words in Fur are disyllabic and thus bimoraic or greater, as shown in section 3.3.3 below; therefore, the (C)VC shape patterns with the CVV shape in Fur, making the minimum word bimoraic.⁵³

3.3.3 Discussion of Monosyllabic Words

The allowed types of syllables in Fur are presented below in Table 3.2 and Table 3.3. A plus sign + indicates that the type occurs in Fur and a minus sign indicates that that type is absent.

Table 3.2 Summary of Permissible Open Syllable Monosyllabic Words in Fur

	open syllable
short vowel	< 2
long vowel	+
diphthong	+

Table 3.2 shows that there are very few open-syllable, monosyllabic words in Fur with a short vowel, and that long vowels and diphthongs do occur in open syllables.

Table 3.3 shows the permissible words with closed syllables broken down by the type of coda (O = obstruent, N = nasal, R = liquid, and G = glide).

Table 3.3 Summary of Permissible Closed Syllable Monosyllabic Words in Fur

	closed σ: O	closed σ: N	Closed σ: R	Closed σ: G
short V	+	+	+	+
long V	+	+	+	-
diphthong	< 2	< 2	< 2	-

⁵² *in* 'this' (W 43) is VN, but it is a function word and not included in minimum word discussions.

⁵³ While onset consonants are not important to syllable weight, it is important to note that onsets are optional but preferred in Fur. There are not many monosyllabic words with onsetless syllables in this language, as evidenced in the discussions above. These suggest the emergence of the unmarked (TETU) (McCarthy and Prince 1994).

This table shows that monomoraic words that are composed of a closed syllable with a long or short vowel can have obstruent, nasal, or liquid codas. Only monomoraic words with a short vowel may be closed with a glide. Further, this table shows that monomoraic words with a diphthong are rarely closed by a coda.

Then we have VVs, which are always bimoraic; then turn to the CVCs (so reorder the two subsections) which are patterning with the CVVs and that, plus the absence of clearly monomoraic words (CV) suggests CVC are bimoraic, and that EVERY kind of coda can be conditionally moraic to satisfy min word.

3.3.5 Disyllabic Monomorphemic Words

In Fur, there are words that consist of a single heavy syllable (H), two light syllables (LL) and a light plus a heavy syllable (LH). In the examples that follow, L = light syllable, H = heavy syllable.

In this section, I show that the short, closed syllable (CVC) is light in disyllabic, monomorphemic nouns, and that a long, closed syllable in disyllabic, monomorphemic words is superheavy because of CVC's limited distribution. For example, two short, closed vowels (CVC.CVC) in a disyllabic word are allowed, but two long, closed syllables (*CVVC.CVVC) are not allowed. Further, two open syllables with long vowels or diphthongs (CVV.CVV) are rare.

First, consider bimoraic words in Fur with the structure light-light (LL). There are bimoraic words with two short, open syllables as in (13) below:

- (17) a. ása 'dog' (M)
 úmé 'dirt' (W 57)
- b. pítí 'bed' (M, W 36)
 kònà 'name' (W 36)

The words in (17) have structure of (LL).

In the examples in (18), there are two closed syllables with short vowels:

(18)	N, L	áŋgír	'elephant' (M)	b.	N, L	tómbòl	'drum' (W 36)
a.	N, L	àmpâr	'friendship' (W 44)		N, N	gũmbòŋ	big storage container (W 36)
	L, O	ilgit	'to neglect' (W)		N, N	gũmbòŋ	dove, sp. (W 36)
	L, N	àrmìŋ	'to crush' (W)			bèmbús	'pawpaw tree' (W 57)
					N, O	dòrgòb	'to crumple up'
					L, O		(W)
					L, N	kàrtùm	'Khartoum' (W 63)
					G, N	káwróŋ	broken pot (W 36)
					G, N	dìwlíŋ	rip (W 36)

The examples in (18) each contain two syllables. In the examples of (18), the coda consonants are generally all sonorants: glides, nasals, and liquids, with only two obstruents represented. The tone on these examples and the other examples in this section are discussed in depth in Chapter 4—I show there that in some cases, like *gũmbòŋ* 'dove, sp. (W 36)' or *kàrtùm* 'Khartoum' (W 63), those syllables with contour tones should be considered heavy—these syllables are forced to be in these instances. The asymmetries in regard to CVC being heavy or light are accounted for through contour tone distribution (Chapter 4) and reduplication (Chapter 5).

Now consider the examples in (19):

(19)	a.	Obstruent	-----	jólòg	'to vomit' (W 36)
				kàràb	animal, thing (W 36)
				tísìg	prop.name, fem (W 43)
				pàgùs	'maize' (W 36)
	b.	Nasal	àtìn (W 51)	sègên	leather flask (W 39)
			òròm 'hut' (D)	kímíŋ	chick (W 36)
				dàlàŋ	niece (child of sister) (W 36)
	c.	Liquid	ìwàr 'to lay out to dry' (W)	dégèr	palate (W 36)
				sìbír	noon (W 50)
				dìwil	'thigh' (W 57)
				tùríl	dust (W 36)
	d.	Glide	-----	-----	

In these examples, there is a short open syllable followed by a short closed syllable:
 ((C)V.CVC).

Now consider the examples in (20), where there is a closed syllable with a short vowel followed by an open syllable with a short vowel:

- (20) a. Glide ----- kǎwǎ 'dried cow-dung' (W 36)
 mǎwǎ 'God' (W 44)
 dǎwǎ 'leftover porridge' (W)
- b. Nasal ---- sǔndǔ 'date' (W 36)
 pángǎ 'wooden bowl' (W 36)
- c. Liquid àldí 'story' bǔrtó 'watermelon' (W)
 kǔrtù 'to dig a hole' (W)
 zǎrtì 'sling' (W 36)
 dǔrtê 'soft' (W 48) (adjective, so follows tone melody)
 d-irbo 'shelter' (W 57)
 tǎrnè 'ring' (W 36)
 d-àrmà 'skin' (W 58)
 sàlgí 'saliva' (W 36)
- d. Obstruent ----- -----

In these examples, there is a light syllable followed by a light syllable: (C)VC.CV.

The possibilities for disyllabic words with short vowels are presented below in Table 3.4.

Table 3.4 Disyllabic Words with Short Vowels

		second syllable	
		open	closed
first syllable	open	+	+
	closed	+	+

Table 3.4 shows that disyllabic words can have open or closed syllables with short vowels in the initial or final syllable—there is a symmetrical distribution.

Now consider examples with both short and long vowels with open syllables:

- (21) a. jàmáà 'disease caused by demon possession' (W) libiè 'Libya' (W 24; very rare)
 b. kǎlèàs 'tired condition' (W 38) --

There are very few examples with a structure of (LH), but they do exist.

Now consider the examples in (22):

- | | | | |
|------|----|---|---|
| (22) | a. | àásù 'chin'
óórà drought W 36
ààgé 'to finish' | -- |
| | b. | bùúrù 'mahogany tree' (W 36)
sáàgà 'loom' (W 36)
kàára 'doubt' (W 49)
gòòsò 'mane, goat beard' (W 36)
tòòrò 'hyena'
dèèbè 'to slaughter' (W)
wèélè 'market' (W 44) ~ wéìè market (W 39)
kèèrê 'light (not dense) fluid' (W 36)
sìisì 'saw' (W 39)
gìírì 'dove, sp.' (W 27)
tòòsà 'game, sp.' (W 36)
dáálí 'tongue' (W 57)
káárù 'nail (finger, toe), hoof' (W 36)
dààlú 'mud' (W 39)
tááyè 'fresh, obedient' (W 49)
sààrè 'morning' (W 50, 98) | siámà 'proper name, female'
(also the plural of the 9th
month of Ramadan) (D) |

There are more examples with a heavy syllable, followed by a light syllable than those with a light syllable followed by a heavy. Further, in the examples in (22) diphthongs are rare.⁵⁴ In (21), I suggest that these examples either have a structure of HL.

Now consider the examples in (23), which shows a gap in the data:

- | | | | |
|------|----|---------------------------------------|---|
| (23) | a. | CV _i V _i .CVC | dààgùl 'termite hill' or 'hedgehog' (W 27, W 39)
jààwìl 'sky' (W 36)
mèèrà̀m 'princess, queen' (W 36)
tààjòn 'small pot, sp.' (W 36) |
| | b. | CVC. CV _i V _i C | mè̀ndú̀l 'bad wound' (W 29)
orjáj̀j̀ 'last year' (W 98) |
| | c. | (C)VVC.CV | -- |

⁵⁴ I suggest that is is probably a loanword: *siámà* 'proper name, female' ('also the plural of the 9th month of Ramadan') (D) is the only example in the dictionary with this structure. The *-a* seems to be the diminutive suffix because *siám* is the male version of the name.

In (23), no diphthongs are observed in these few examples. Further, *méèrà̀m* ‘princess, queen’ (W 36) is probably borrowed from the Arabic *ameera*. Some of the other forms in (23) may also be loanwords. These examples show that even though no long, closed syllables may occur in the same word (*CVVC.CVVC) and that two long open syllables are rare (CVV.CVV), a long syllable can be followed by a short syllable (and vice versa).

Something that is not surprising or unusual typologically is that there are no examples with more than two tautosyllabic vowels or with more than two vowels across syllable boundaries:

- (24) (C)VVV(C) ---
 (C)V.VV (C) ---
 (C)VV.V (C) ---

Waag (2010) notes that three vowel sequences are usually broken up by a glide, meaning that one of the vowels is high and usually becomes a glide in coda position.

There are only two examples found with two open, long vowels, showing a heavy-heavy (H)(H) structure:

- (25) úúniè ‘wild dog, sp.’ (W)
 tùùmíè ‘anvil’ (W 36)

These words would have the structure of (H)(H), and again are rare.

There are several interesting points about these two examples. First, only a sequence of (C)V_i V_i.CV_i V_{ii} is allowed, meaning that a long vowel is only followed by a diphthong. Second, there are no examples in the language with two closed syllables with long vowels like the structure CVVC.CVVC. While I note above that CVVG syllables are avoided monosyllabically, some CVVC syllables are permissible in Fur in conjunction with other syllables; thus CVVC can be a monosyllabic word, but the few examples that do

(27)	a.	V.CV.CV	étíné to step on (something), to press (something) down (W 31)
	b.	CV.CV.CV	bápára 'cassava' (W 36) (redup?) tùrùṅà 'charcoal' (W 36) (redup?) tógórùm termite, sp. (W 36) kèbúró locust, sp. (W 36) rùsúgò pumpkin (W 36) (redup?) dògólá 'children' (W 44) mùbèdì 'beginner' (W 24)
	c.	CVC.CV.CV	dòmbòrè (W 106)
	d.	CV.CVC.CV	kùṅírtá 'plant, sp.' (W 36) kùṅírtì 'tree, sp.' (W 36) súkèndé 'kind of dog disease' (W 36) bìrìṅjál 'tomato' (W 28) (loanword?) tirimbil 'vehicle' (W 78) (loanword?)
	e.	V.CVV.CV	àṅáálù 'cassava plant' (D)
	f.	CVC.CV.CV.CVC CV.CV.CV.CVVC	tilpìsiyôn – 'television' ~ (loanword) tipìsiyóón – 'television' (W 30) (loanword)

Monomorphemic words with more than three syllables as in (26f) are rare—they are usually loanwords (Waag 2010), but may also be forms with reduplication (discussed in Chapter 5). I have chosen not to include any forms with reduplication because reduplication is usually seen as the result of a morphological process. Monomorphemic words in Fur may therefore have no more than three syllables.

3.3.5.1 Discussion

The roots of nouns and verbs in Fur are usually one or two syllables long, but can be up to three syllables; there are only a few examples with more than three syllables occurring in loanwords (not counting reduplicative forms) (Waag 2010: 38).

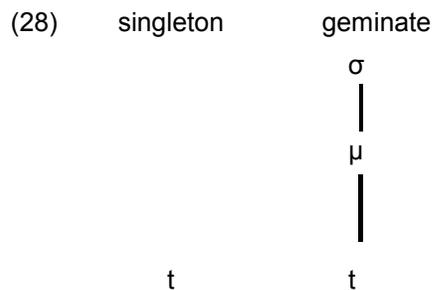
Because of the limited distribution of closed syllables with long vowels (CVVC) in either a monosyllabic word or as the final syllable in a disyllabic or trisyllabic word, and

because of the avoidance of *CVVG syllables, this constitutes evidence supporting a ban on trimoraic (superheavy) words in Fur.

3.4 Geminate in Fur

3.4.1 Geminate and Weight

According to Hayes (1989), geminates are inherently weight-bearing, represented as such:



Here, geminates according to Hayes bear a mora, while singleton consonants (inherently) do not. The sections below show how geminates function in Fur.

3.4.2 General Overview of Geminates

In Fur, geminates are found mostly in modifiers (i.e., adjectives and adverbs), but geminates can also be found in nouns and some verbs.

All consonants except for [zz], which is unattested in word-internal position (see Chapter 2), and [hh], which is a borrowed sound that only occurs word-initially, may be geminates (reproduced from Waag 2010):

(29)	Geminate	Example
	-pp-	kíppè 'restitution'
	-bb-	nàbbâl 'bow'
	-mm-	sìmmè 'reputation, past'
	-ww-	síwwà 'unbraided hair'
	-tt-	kùtti 'wooden chair'
	-dd-	gèddè 'circumcision; cutting'
	-ss-	gèssà 'nose ring'
	-nn-	ìnnè 'henna'

-ll-	èllè 'village'
-rr-	kèrrà 'salt'
-jj-	dùjjè 'bump on head'
-yy-	jèyyù 'quarrel'
-ŋŋ-	tŋŋà 'point'
-kk-	dòkkè 'flat stone for baking kisra (special kind of pancake) (or roasting pan)'
-gg-	àggà 'bird, sp.'
-ŋŋ-	òŋŋàl 'four'

Geminates only occur word-internally, between two vowels; thus, geminates never occur word initially or finally. These restrictions suggest that the syllable in Fur is weight-sensitive and that geminates contribute weight. As shown in Chapter 2, singleton consonants can occur before or after a long vowel/diphthong in Fur. (30) presents some examples:

- (30) a. bîis 'cat' (M, W 44)
b. diò 'stomach' (W 24)

If a geminate might be created word initially via a morphological process, there are different processes (see Chapter 2) in the language that would prevent that type of CC cluster from surfacing. For example, in most verbs where the person prefix, *k-* or *j-* is joined to the root, the initial root consonant deletes if the root begins with a /k/ or /j/ (taken from Waag 2010: 136):

- (31) a. jùndi '(s)he/it is ...' ʔ-undɪ 'I am ...' 'letting'
b. kúlŋiti '(s)he/it is ...' ʔ-ulŋiti 'I am ...' 'escaping'

As discussed in Chapter 2, section 2.3.6.2, not only do /k/ and /j/ only delete (they never metathesize), /t/ also always deletes. The reason for these deletions is because an illicit, internal C.C sequence would form—a sequence that does not obey the Syllable Contact Law of C₁ being more sonorous than C₂. So while /k/ and /j/ might delete to avoid a word-initial geminate *kk or *jj, it is a stronger argument to suggest that these segments delete to avoid an illicit C.C sequence word internally (reproduced from Chapter 2 of this dissertation):

(34a) shows how the plural is formed by adding the k-prefix and deleting the final consonant. In this example, the k-prefix and the final consonant are deleted. (34b) shows the k- prefix with the –a suffix. We do not see either **dármín-ŋa* or **dàlàn-ŋa*.

3.4.3 Geminates in Modifiers

In this section, a specific class of words is presented because most have geminates.

Within the word class of modifiers (adjectives and adverbs)⁵⁷ there are several that have a structure of CVC₁C₁V with a tone melody of L.HL or L.H.⁵⁸ Modifiers used adjectivally agree in number with the noun, so a plural suffix –*ŋa* is added to the modifier. The examples in (35) show the different forms of modifiers in Fur (taken from Waag 2010: 94-95):

(35)	Adjective	Adverb ⁵⁹	Gloss
a.	puttô tokkê sikkâ	puttó tokké sikká	'dry' 'hot' 'sharp'
b.	dússâ dikkô dírrô	dússá dikkó dírró	'tasteless' 'black' 'heavy'
c.	kakkírɛ	kakkíré	'strong'
d.	bírŋâ	bírŋá	'smooth'

The first syllable carries L tone (as in (35a) or an H tone (as in 35b), but the final syllable is either falling or high—these tones are grammatically determined. The falling tone

⁵⁷ Jakobi (1990) marks them as adjectives, but Waag (2010) marks them as modifiers, which includes both adjectives and adverbs.

⁵⁸ Jakobi (1990: 118-121) discusses adjectives, saying that adjectives are marked because they are disyllabic, have a geminated consonant, and specific tone melodies. Waag (2010:93) notes the CVCCV structure but mentions that CVCCVCV is also possible; both have geminate CCs and a fixed tone structure.

⁵⁹ High tone on these forms is also used to show the form as the complement with the copula, and in some rarer cases, as an adjective (Waag 2010: 95).

usually indicates that the example is functioning as an adjective (see column one), while the high tone usually indicates the example is functioning as an adverb (see column two) (Waag 2010: 95). Further, (35a,b) show the CVC_i.C_iV⁶⁰ structure, while (35c) shows the CVC_i.C_iV.CV structure and (35d) the CVC_i.C_{ii}V structure (without a geminate).

3.4.3.1 Derived modifiers

In a very few cases, geminates are derived word-internally in Fur during the process of a modifier being created from a noun. The derivation of geminates in these examples both mark these words as modifiers and show how syllable weight is important in this language.

In these cases, the suffix *-iŋ* is added to create the modifier, and the final consonant of the root modifier is lengthened into a geminate (taken from Waag 2010:48).

- | | | | | |
|------|----|----------------------|---|----------------------------|
| (36) | a. | rùs 'belt' | > | rússìŋ 'tight, driven' |
| | b. | tùs 'stable thing' | > | tùssìŋ 'stable, steady' |
| | c. | kòj 'very old thing' | > | kójjìŋ 'very old, decayed' |

In some cases of loanword adaptation of modifiers, gemination is also productive (from J 1990: 119):

- | | | | | |
|------|----|---|---|----------------|
| (37) | a. | djamil (Arabic) | > | jàmmáil 'nice' |
| | b. | sakkin (Arabic 'knife') and the noun in Fur from this same noun is sigîin 'knife' | > | sikká 'sharp' |

With geminates that are derived in this manner, they may be matching a syllable template, as most modifiers in the adjectival form have the syllable template of CVC_i.C_iV(C), also with a tone melody of L. HL.

⁶⁰ There are also onsetless modifiers like *àppá* 'big, large' (M) and *ittî* 'small' (M).

The opposite—deriving nouns from modifiers—does not cause degemination.

See (38) (reproduced from Waag 2010):

(38)	a.	àppâ big, large	>	əppɪŋ bigness
		wɛssɛ wet	>	wissɪŋ wetness
		ittî small	>	ittɪŋ smallness
		dirrɔ̄ heavy	>	dirriŋ heaviness
		tɔkkê hot	>	tukkiŋ hotness / heat
		lúllâ cold	>	lulliŋ coldness
		durtê soft	>	durtiŋ softness

The vowels of the verb root are only affected by the [+ATR] *-iŋ* suffix, causing them to become mid vowels and [+ATR]; if the word ends in a vowel, the modifier is deleted, and the modifier loses its tone as described by Waag (2010: 48).

3.4.4 Geminate in Nouns, Verbs, and Deictics

Because geminates are inherently weight-bearing, we also look at other geminates which are found in nouns, deictics, verbs, and coverbs. These examples help show that geminates play an important role in Fur beyond marking a word as a modifier.

(39) presents examples of geminates in nouns:

- (39) a. èllè village (M, J 122 < Arabic, W 39)
 àrrà evening (W 50)
- b. bòrrá 'hill' (W 39)
 kùtti 'chair' (W 36)
- c. nàbbâl 'bow' (W 36)

There are also examples of geminates in some deictics (W 96):

- (40) a. ettê, attê, ottô, attô 'today, this day'
 (h)íllâ 'there (far)'
- b. kerrɛg 'daily'
- c. tɛttɛbɛ 'continuously, often, regularly, temporally'
- d. ʔattáyŋá, ʔettěyŋá 'this year'
- e. addilla 'the same time (while)'

(40a)–(40c) are familiar shapes, as they have been seen in nouns and in modifiers.

(40d) is unique with a structure of VC₁.C₁VC₂.C₃V, and (40e) having two sets of geminates VC₁.C₁VC₂.C₂V.

Geminates are also in verbs:

- (41) a. əyyù ‘to pound (in mortar), to poke’ (W)
 əssi ‘bite’ (W 51)
- b. kùllò ‘steal’ (W 51)
- e. səkkié ‘run’ (W 51)

3.4.4.1 Derived gemination in verbs and coverbs

In some cases, geminates seem to be part of the underlying form:

- (42) a. ʔínnɪ ‘(s)he/it is giving’ ʔa-nnɪ ‘I am giving’ (W 123)
- b. karrel ‘(s)he/it is ...’ ʔ-arrel ‘I am ...’ ‘splitting (wood)’ W 126
 ʔəssíti ‘(s)he/it is ...’ ʔ-əssíti ‘I am ...’ ‘causing an argument/fight’ (W 126)
- c. ʔessel ‘(s)he/it is ...’ ʔ-essel ‘I am ...’ ‘biting’ (W 126)
 júrruŋ 3s.subjunctive ʔurruŋ 3s. imperfective ‘to chase’ (W 127)
 nɪɪ ‘(s)he/it is ...’ ʔa-nnɪ ‘I am ...’ ‘licking (with finger)’ (W 130)

In some cases, however, the geminates in verbs may be derived:

- (43) a. láá ‘to tear up’ 3sCPL ʔ-állà ‘to tear up’ 1sCPL (W 41)
- b. búliti ‘(s)he/it is finding’ ʔ-ummíti ‘I am finding’ (W 123)
 buel ‘(s)he/it is ...’ ʔ-um(m)el ‘I am ...’ ‘becoming exhausted’
 (W 133)⁶¹
- c. lìò ‘to wash’ 3sCPL ʔ-áló ‘to wash’ 1sCPL (W 41)⁶²
- d. ʔ-ílŋì ‘to walk, creep, crawl’ ilŋí ‘to walk, creep, crawl’ 3sCPL (W 41)
 1sCPL

Comparing (43a) to (43b), there is no gemination. Further, in (43c), the consonant sequence is unchanged in both forms.⁶³

⁶¹ These are two dialect variants, according to Waag (2010). One has a geminate and the other does not.

⁶² Imperfective form shows root to be *lìò* ‘to wash’ (W 114). There are several differences with vowels, tense, etc. That I will not go into detail here on.

In other examples of Fur with underlying geminates, the geminate remains and the initial consonant is deleted (examples repeated here from Chapter 2 for convenience):

(44)	deleted	root	output	illicit	illicit	illicit	gloss
a.	p	pull-	-ull-	*-upll-	*-upl-	*-ulp-	'dry'
		pulŋ-	-ulŋ-	*-uplŋ-	*-upl-	*-ulp-	'show; teach'
		purg-	-urg-	*-uprg-	*-upr-	*-urp-	'grind thoroughly'
b.	t	tall-	-all-	*-atll-	*-atl-	*-alt-	'chew'
		tung- ~ pung	-ung-	*-utng-	*-utŋ-	*-ugt-	'peel'
c.	s	sakk-	-akk-	*-askk-	*-ask-	*-aks-	'run'
d.	j	jolg-	-olg-	*-ojlg-	*-ojl-	*-ogj-	'vomit'
		julb-	-ulb-	*-ujlb-	*-ujl-	*-ulj-	'miss (a target)'
		jurr-	-urr-	*-ujrr-	*-ujr-	*-urj-	'drive out'
		jund-	-und-	*-ujnd-	*-ujn-	*-unj-	'leave'
e.	k	karr-	-arr-	*-akrr-	*-akr-	*-ark-	'split; plough'
		kell-	-ell-	*-ekll-	*-ekl-	*-elk-	'pull'
		kirgjn-	-irgjn-	*-ikrgjn-	*-ikrijn-	*-irk-	'scratch'
		kull-	-ull-	*-ukll-	*-ukl-	*-ulk-	'steal; cough'
		kurt-	-urt-	*-ukrt-	*-ukr-	*-urk-	'dig'

I would suggest that in (43) above, metathesis and degemination take place because a better C.C sequence is allowed that follows the Syllable Contact Law: l.d is better than d.d. In the examples in (44), however, a less harmonic consonant sequence would take place with metathesis followed by degemination, so the initial consonant is deleted instead.

There are also examples of gemination in coverbs. According to Waag, coverbs are used in the creation of new verbs in Fur for modern activities like writing, smoke bathing, etc. or for incorporating loanwords into the language—coverbs are considered an open class of verbs. In order to create a coverb, a light verb like *pɪá* 'to do' or *ɛ̀ɛ̀ŋ* 'to

⁶³ There is also an example with degemination: *laddɪ* '(s)he/it is ...' vs. *ʔ-aldɪ* 'I am ...' 'beating' (W 132). Here, metathesis occurs with degemination in order to avoid a sequence of three consonants, which is illicit in Fur.

be/become' is joined to a coverb. These coverbs are not inflected on their own and therefore are considered incomplete without the light verb.⁶⁴

Consider (45), examples with coverbs:

- | | | | | |
|------|----|---|---|-----------------------------------|
| (45) | a. | jarrab, yjarrɪb 'to try (out)' < Arabic | > | járrɪbéɲ pɪá 'try' (W 88) |
| | | dabɪɪh, dabɪa 'slaughter' < Arabic | > | dáábéɲ pɪá 'slaughter' (W 88) |
| | | zaal 'anger' < Arabic | > | zááɪɪɲ ɛɛɲ 'be angry' (W 88) |
| | | yanaʕɪl 'to curse' < Arabic | > | nááɪɪɲ áa 'to curse' (W 88) |
| | | pɪrjɛ 'strange, unusual' | > | pírjɛɲ pɪɪ 'to be strange' (W 88) |
| | | ʔóɔra 'scandal' | > | ʔóóɛɲ ʔɛɲa (W 88) |
| | | rɪm 'writing' < Arabic (W 88) | > | rímmeɲ pɪɪ 'writing' (W 88) |

In (45), gemination occurs in order to satisfy the template—when a long vowel occurs, there is no gemination of the consonant.⁶⁵ In these examples, *C/mora outranks *V/mora—consonantal moras are more marked.

3.4.5 Discussion of Weight and Gemination in Fur

The question of whether or not geminates in Fur occur across syllable boundaries (C_i.C_i), or whether they are in coda .C_iC_i or onset C_iC_i position must be addressed. In previous literature, C_i.C_i is argued to occur across syllable boundaries (Kutsch Loenga and Waag 2004, Waag 2010). The motivation is that there are no CC clusters that occur word/syllable initially or word/syllable finally in the language (as already discussed in Chapter 2)—any consonant clusters that are word-internal only occur across syllable boundaries (also see Chapter 2).

The combinations of CCs that occur across syllable boundaries is limited, though, as opposed to the geminate CCs, as any consonant⁶⁶ can be a geminate. The question is whether or not geminates in Fur behave like CCs clusters. Geminates do

⁶⁴ “These light verbs essentially lose their lexical meaning. *pɪá* is used for more transitive situations, *ʔɛɛɲ* for lesser ones, as the original meaning suggests. As opposed to nouns, coverbs exist only in a combination with one of these light verbs” (Waag 2010: 88).

⁶⁵ If the root is a loan word with gemination, the gemination remains.

⁶⁶ Any consonant besides [h], [z], and [ʔ], as these are borrowed sounds in Fur and rare.

behave like CCs in that geminates are avoided word-initially and finally, but do geminates behave as CCs clusters do syllable initially/finally? Should geminates be split across syllable boundaries or should they be associated with one syllable (whether as the onset or coda of that syllable)?

One important point is that there is never a long vowel or diphthong closed by a geminate: *CVVC₁ C₁ V. These forms do not occur even in reduplicants where it might be expected to occur (see Chapter 5). This gap shows that the coda consonant of a geminate is heavy in Fur.

3.6 Preliminary Discussion of OT Constraints Regarding Syllable Weight

In order to illustrate the minimum word in Fur, a preliminary analysis showing what types of constraints are important in a discussion of syllable weight in this language is presented.

In the sections above, the minimum word is argued to be bimoraic—in this analysis, words of the structure CVC and CVV are both heavy, and words with a structure of CV are considered subminimal. Further, *CVVG words are avoided in Fur. The examples in (46) illustrate these structures:

(46)	C ^w V	k ^w ɛ̃ 'child' (W 149)
	CVO	rùs belt (W 48)
	CVG	bàw 'pond' (W 27)
	CVV	ròò 'well, river, stream, lake, sea' (M)
	CVVO	bĩfs 'cat' (M, W 44)
	CVVG	-----

The examples in (46) above show how monosyllabic words in Fur are bimoraic. In this section, I focus on the bimoraic status of the minimum word and the disallowance of a *CVVG monosyllabic word, based on the fact that these structures are too heavy. Both show how the sonority of segments and how weight are important in this language.

Recall the three different types of permissible open syllable, monosyllabic words in Fur (Table 3.1 from above is reproduced below as Table 3.6 for convenience):

Table 3.6 Summary of Permissible Open Syllable Monosyllabic Words in Fur

	open syllable
short vowel	< 2
long vowel	+
diphthong	+

Table 3.6 shows that there are very few open-syllable, monosyllabic words in Fur with a short vowel, but that long vowels and diphthongs do occur in open syllables.

Also recall the permissible words with closed syllables broken down by the type of coda (O = obstruent, N = nasal, R = liquid, and G = glide) (Table 3.2 is reproduced as Table 3.7 below for convenience):

Table 3.7 Summary of Permissible Closed Syllable Monosyllabic Words in Fur

	closed σ: O	closed σ: N	Closed σ: R	Closed σ: G
short V	+	+	+	+
long V	+	+	+	-
diphthong	< 2	< 2	< 2	-

This table shows that monomoraic words composed of a closed syllable with a long or short vowel can have O, N, or L codas. Only monomoraic words with a short vowel may be closed with a glide. Further, this table shows that monomoraic words with a diphthong are rarely closed by a coda.

First, consider the minimum word in Fur. The minimum word in Fur is bimoraic, as evidenced by the few CV syllables that occur in the language. In the sections above, I argued that these few CV syllables are either subminimal, or they are bimoraic, with [w] becoming part of the nucleus. If we follow the argumentation that [w] is part of the nucleus and contributing to the weight of the syllable, then we need a constraint that allows for a consonant cluster (CC) at the beginning of the word as CCs are generally avoided syllable initially and finally in Fur: *Complex: "tautosyllabic consonant clusters

are prohibited, i.e., ‘avoid consonant clusters’” (Hume 1997, 2004) would have to be violable for these examples to surface. In this analysis, a constraint that allows for a glide to be moraic is also needed. Either *MoraicOnset: “moracic onsets are prohibited” (Topintzi 2008) and/or *Mora[cons]: “do not associate a mora with a consonant” (Morén 2000) would be useful. As glides can carry weight in coda position for some structures, some of these constraints would need to be violable.

Second, the maximum number of moras allowed for each monosyllabic word can be accounted for through by ranking constraints. There are no examples of syllables with long vowels closed by a glide *CVVG; glides are only allowed in coda position of words with short vowels (CVG). This gap suggests that glides bear weight in this position where other sonorants do not; thus *CV_i V_i G would be too heavy in Fur and is not allowed:⁶⁷ *Trimoraic > LxWord=PrWd > Obs/Mora > Nas/Mora > Liq/Mora > IdentMora, > Gli/Mora > Vowel/Mora.

We can represent this restriction on the number of moras again through the ranking of constraints. Here, three examples can be used to show how moras are restricted: *lɛ̀l* ‘donkey’ (W 36), *pə̀y* ‘room’ (W 27), and **leew*. The structure **leew* would be carrying three moras instead of two, making it too heavy in Fur; this structure would violate the norm for a bimoraic word minimum as the maximum weight of the syllable is two moras in Fur. The constraint, 3μ: “a syllable can contain no more than three moras” (Hall 2002) would be useful in this example. Further, a constraint dealing with glides

⁶⁷ If *CVVG were allowed, the glide in coda position would not bear weight. Because these forms do not surface at all as monosyllabic words show that in this context, these forms are superheavy—bear three moras—and are not allowed. This avoidance of *CVVG is not surprising in that “Many processes that lengthen or shorten syllables or segments also have been argued to fall under the rubric of weight-based phenomena. For example, long vowels do not occur in closed syllables in many languages, a restriction that has been argued to result from constraints on the maximum weight of the syllable (Steriade 1991, Hayes 1995)” (Gordon 2006).

would also be important in this analysis: *Mora[cons]: do not associate a mora with a consonant (Morén 2000) could be modified *Mora[glide]. In CVG structures, this constraint would be violated, but but not fatal, but in *CVVG structures, this would be a fatal violation.

Other constraints important to a further analysis of weight include those listed in

(47)⁶⁸:

(47)	Constraint	Definition
a.	NO-CODA	'Syllables do not have codas' (Prince and Smolensky 1993)
b.	*COMPLEX	'no more than one C or V may associate to any syllable position node' (Prince and Smolensky 1993) 'tautosyllabic consonant clusters are prohibited, i.e., "avoid consonant clusters"' (Hume 1997, 2004)
c.	ONSET	'Syllables must have onsets' (Prince and Smolensky 1993)
d.	DEP-IO	'every segment of the output has a correspondent in the input' i.e., no epenthesis' (McCarthy and Prince 1999)
h.	SonCoda	'codas are [+sonorant]' (Lombardi 2002)
i.	*H.H	'no consecutive heavy syllables' (Boersma and Hayes 2001)
j.	*L.L	'No consecutive light syllables' (Boersma and Hayes 2001)
k.	*Mora[cons]	'do not associate a mora with a consonant' (Morén 2000)
l.	*MoraicCoda	'moraic consonants are forbidden' (Kennedy 2005)
m.	*MoraicOnset	'moraic onsets are prohibited' (Topintzi 2008)

3.7 Conclusion

In this chapter, the weight of syllables in Fur has been presented, and the shapes of monosyllabic, disyllabic, and trisyllabic words was established. I have shown that the minimum word in Fur is bimoraic and that short, closed syllables are heavy because they are forced to be so in monosyllabic words, but that these syllables are light in disyllabic or trisyllabic words—again, these syllables are only forced to be heavy when considering

⁶⁸ Many constraints, definitions of constraints, and sources mentioning those constraints which are used in this dissertation have been accessed through the Excel data file via Ashley, Disch, Ford, MacSaveny, Parker, Unseth, Williams, Wong, and Yoder's (2010) GIAL's *Occasional Papers in Applied Linguistics* essay entitled "No. 9. How many constraints are there? A preliminary inventory of OT phonological constraints."

contour tone distribution (see Chapter 4), reduplication (Chapter 5), and in meter (Chapter 6). In many of these cases, the coda consonants of the short, closed syllables are a sonorant, which allows these codas to be heavy within these phenomena.

Concerning geminates, I have suggested that they are as Hayes (1989) argues, inherently moraic; thus, geminates contribute to weight within the word.

In the next chapter, lexical tone, along with the distribution/licensing of contour tones, are presented.

Chapter 4

Tone and Contour Tone Distribution in Fur

4.1 Overview⁶⁹

Tone is employed at both the lexical and grammatical level in Fur, but tone has often been neglected in the literature on the language for different reasons. For example, Beaton (1960) stated in the introduction to his grammar book of Fur that presenting tone would be too much of a burden to learn for readers. Jakobi (1990) in her seminal work on the Fur language did not include tone throughout her book, noting its complexity. In more recent discussions about Fur, tone has been receiving more focus. Kutsch Lojenga and Waag (2004) include tone on all of their examples, and devote a section of their paper to describing tone. Noel (2008) provides the first acoustic study of Fur, and part of her study focuses on tone. Finally, Waag (2010) devotes an entire section of her book on Fur verbs to tone, includes tone on all of her examples, and intersperses her discussions of different phenomena of Fur with discussions and notations about tone.

Even with the more recent discussions about tone in Fur, this area of the language is still in need of more description and analysis. This chapter provides a more thorough account of lexical tone through Autosegmental Phonology, and presents the underlying tones and shows how tones are combined to form the surface tones in the language. Further, weight has never been referenced in discussions of Fur tone, but weight is in this chapter. Finally, sonority has also been peripherally discussed in the language, with observations about the language made by scholars but the connections to

⁶⁹ Most of the data from this chapter has been culled from Waag (2010), KLU (2004), an unpublished Fur dictionary, and my field notes. The data is marked accordingly. Further, most examples are nouns, with some modifiers and grammatical words. There are also a few verbs in this chapter, but as previously mentioned, isolating the root of the verbs is difficult in this language—there are only a few forms that occur without a suffix/prefix. There is a short section on contour tone distribution in verbs within the section on derived contour tones.

weight and to contour tone and complex contour tone licensing have not been previously made.

I show that there are two level tones, low (L) and high (H), in this language. These level tones may surface in various ways, but underlyingly, they are combined into the lexical tone patterns for monomorphemic content words (mainly nouns and some verb roots) as L, H, LH, HL, LHL, and rarely HLH. These underlying forms may surface in various ways, through tone spreading and tone linking, as presented in section 4.2 of this chapter.

In Fur, the tone bearing unit (TBU) is the mora, which is in agreement with Waag (2010); however, in her discussion of tone (and of other phenomena in the language in which she mentions moras), she only associates the mora with vowels. Building on the argumentation presented in Chapter 3 concerning syllable weight, I argue that while vowels are moraic, consonants are forced to be moraic in some contexts in order to carry lexical tone patterns. Thus, while tone may be realized on vowels, the coda consonant can also be moraic in some examples and processes, forcing the consonant to carry tone. Further, Waag (2010) argues that moras may be able to carry more than one tone. While this may be the case in some instances, I suggest that in most examples of Fur a mora (or vowel) bearing more than one tone (i.e., contour tones and complex contour tones) really has a coda consonant contributing to weight.

Consonants are therefore able to carry tone, but on in speech, the tones are realized on vowels. This argument lies in the fact that in Fur, contour tones like (LH) and (HL) and complex contour tones like (LHL) and (HLH) are attracted to syllables with long vowels, diphthongs, and CVC syllables that have sonorous codas (CVRs). These structures are all heavy; thus, contour tone distribution and licensing is in part influenced by the weight of the syllables within content words. In this section on contour and

contour complex tones, contradictory data concerning contour tones on open syllables with short vowels are addressed. I argue that these short vowels are lengthened in order to accommodate contour tones. Further, the type of contour tone, whether it be rising (LH) or falling (HL) is also determined in part by the edge of the word with which the tone is associated, with falling contours only allowed in syllable final position.⁷⁰ The findings in this chapter show that, contrary to Gordon's (2007: 271) conclusions that there are "no weight sensitive restrictions on which tones or pitch accents may occur on different syllable types," in Fur, contour tones are licensed in the language according to syllable weight.

Throughout this chapter I use Autosegmental Phonology (Goldsmith 1976, Kenstowicz 1994, and others) to display the representations. Key principles like the Universal Association Convention (UAC) (Kenstowicz 1994), the Obligatory Contour Principle (OCP) (Kenstowicz 1994), spreading rules, delinking account for the realization of tone in Fur.

This chapter is organized as follows. In section 4.2 I present the lexical tone of (mostly) nouns in Fur, showing that there are six different patterns allowed in this word class. Section 4.3 shows the distribution and licensing of contour tones and complex contour tones, connecting these points to the sonority of the coda and also to the weight of the syllable. Finally, Section 4.4 concludes the chapter with areas for further exploration concerning tone.

4.1.1 The Number of Level Tones in Fur

The number of level tones in Fur is important to address before presenting the analysis in this chapter. In previous literature, there has been debate on whether there

⁷⁰ There are exception to the location of falling tones are forms with reduplication. These forms are discussed in Chapter 5.

are two level tones –high and low—or whether there are three level tones—high, low, and mid. There are Nilo-Saharan languages that have two level tones, like Dinka (Remijsen and Ladd 2008) and Nilo-Saharan languages that have three level tones, like Shilluk (Gilley 2004), so there is a precedent for either set of tones for Fur.

Jernudd (1983), the first scholar to address tone in Fur, suggests that there are three level tones in the language: (L), mid (M), and high (H). His analysis, although important at the time because no one had previously addressed tone in the language before, is only based off of a list of thirty-nine words.

Noel (2008) provides an acoustic analysis of tone, using an F_0 trajectory plot in which she agrees with Jernudd's analysis of three level tones. Her study provides an examination of tone in minimal environments.

Jakobi (1990), Kutsch Lojenga and Waag (2004), and Waag (2010) suggest that rather than there being three tones, the mid tone is really a realization of two level tones high (H) and low (L); Waag (2010) concludes that a down-stepped high tone can be part of the two level tones, and this down-stepped high may be what is being seen as a mid (M) tone by Jernudd (1983).⁷¹

In this dissertation, tone is modeled after that of Waag (2010), but her model is supplemented with discussions from Noel (2008) concerning sonority when contour tone distribution is presented, as Noel's is the first (and only) acoustic analysis of the language. As shown in Gordon (2007) and Zhang (2000), acoustic analyses can be

⁷¹ Waag (2010) mentions that Jernudd (1983) does not include examples of monosyllabic or disyllabic words to prove contrast for three tones, and that the mid tone he refers to is really a down-stepped high tone.

important indicators of what segments are more sonorous when looking at syllable weight and contour tone licensing.⁷²

As mentioned in Chapter 2, there are two level tones in Fur: high (H) and low (L), which I mark with an acute accent (*núúm* ‘snake’ (W 36)) and a grave accent (*tòŋ* ‘house’ (M)) respectively in the examples that follow. These two level tones can be combined to produce both rising LH and falling HL contour tones, which I mark as *bíis* ‘cat’ (W 50) and *páál* ‘leading bull’ (W 43), respectively. Tone may occur on short and long vowels, so examples with a level tone like L tone are as such: *tòŋ* ‘house’ (M) and *sòòr* ‘back (body part)’ (W 38), and examples of a contour tone like HL are as such: *pùl* ‘peanut’ (W 43) and *búùn* ‘fist’ (W 30).

Finally, there can be up to three tones that combine on one syllable, thus a LHL can occur, or a HLH can occur which usually surfaces as a downstepped high H¹ H, but can be pronounced as HLH over morpheme boundaries or careful speech for some speakers (Waag 2010). In the data examples of this chapter, I follow K LW’s (2004) example concerning complex tones on long vowels: the first tone in the complex contour is placed on the first vowel and the circumflex or wedge is placed on the second vowel. The reason for these assignments of tone is because the contour tone usually delinks from the final mora and spreads to the next available mora during morphological processes like the addition of the plural morpheme suffix with nouns. Further, the default tone is L in Fur (Waag 2010).

⁷² Another motivation for keeping with the level tones of H and L as presented by Jakobi, K LW, and Waag is that in Fur orthography and in teaching presentations of Fur found published by the Fur Language Education Committee on YouTube (<http://youtu.be/se11F3occDc>), L tone is unmarked, H is marked with an accent, HL is marked with a grave accent, and LH is marked with a wedge. There are no mid tones marked.

Along with the lexical function of tone, there are also grammatical functions of tone in Fur. Tone on a word may spread, it may be replaced, it may be neutralized, and it may be marked by opposite tone (polar tone) (Waag 2010). Some affixes carry tone, but affixes without tone may acquire tone through spreading, shape of the base, or through polar tone, and those morphemes without an underlying tone have a default low tone (Waag 2010).⁷³

4.2 Lexical Tone Patterns in Fur

The purpose of this section is to present the possible types of tone melodies in Fur nouns.⁷⁴ The specific tone pattern of adjectives was mentioned in Chapter 3 concerning geminates, but it will also be revisited in this chapter.

Tone is thus contrastive in Fur. In (1)⁷⁵ are four words that show this contrast:

- | | | | | | | |
|----------|------|-----------|-------|-------|--------------|-----------|
| (1) a. H | déy | 'he goat' | b. HL | dêy | 'Lalob tree' | |
| | c. L | dèy | 'oil' | d. LH | děy | 'ant, sp' |

As mentioned in the introduction of this chapter, I am assuming that the tone bearing unit (TBU) in Fur is the mora. In examples after this one, I use an autosegmental analysis presented like that in Kenstowicz (1994).

⁷³ One example of grammatical tone in the language is its use to indicate the locative case on nouns: *tòŋ* 'house' vs. *tóŋ* 'in, at the house'. This is an example of polar tone. The tone may affect the last mora or the whole word. While the grammatical function of tone is not the focus of this chapter, there are some discussions of this function in the section of derived contour tones. Note: An enclitic can also be used to indicate location, too: [insert example here] There is no difference in meaning between the tone and the enclitic when added. Only the enclitic or the reversal of tone is used—these two processes are not combined (check to make sure this is correct).

⁷⁴ The data includes some verbs (when the root can be isolated) and some function words, but the focus is on the nouns as these examples include the most data and the root of nouns are most easily isolated, as opposed to verbs where tense, aspect, and other items can be indicated by tone alone.

⁷⁵ In her acoustic analysis, Noel (2008) posits that the glides should be analyzed as vowels, which makes sense since these words take the plural morpheme for nouns ending in a vowel.

4.2.1 The Basics of Tone in Fur Through an Autosegmental Approach

In Fur, there are two level tones, H and L. These tones can occur on monosyllabic words as seen in (2) and (3) below.

- | | | | |
|-----|---|-----|---|
| (2) | a. nà 'and' conj. (W 154) | (3) | a. ká '1s.person pro' (W 154) |
| | b. tòn 'house' (M) | | b. sát ~ sót 'red cap of student' (W 43) |
| | c. ròn 'well, river, stream, lake, sea' (M)
diò 'stomach' (W 24) | | c. lós 'place' (W)
díá 'wound' (D, W 58) |
| | d. sòr 'back (body part)' (W 38)
wùòr 'herder' (W 24) diphthong | | d. kóór 'war' (W 38)
----- |

In (2a) and (3a) are examples of light syllables and in the rest of (2) and (3) are examples with heavy syllables.⁷⁶

The weight of these different syllables and how tone is represented is exemplified through (4) below, using low tone examples with short and long vowels. If we follow the Universal Association Convention (UAC) (Kenstowicz 1994, Goldsmith 1976, Pulleyblank 1986) and associate the L tone to the first mora (the TBU), and then associate the other tones one-to-one and left-to-right, we see the forms in (4) below.

- | | | | | | | | |
|--------|------------------------|----|---------------------------------|----|---------------------------------|----|-----------------------------------|
| (4) a. | L

μ

nà | b. | L
/ \
μ μ
/ \
t ò η | c. | L
/ \
μ μ
/ \
r ò ò | d. | L
/ \
μ μ
/ \
s ò ò r |
|--------|------------------------|----|---------------------------------|----|---------------------------------|----|-----------------------------------|

Recall from Chapter 3 that the minimum word in Fur has been established as bimoraic; thus, monomorphemic words with closed, short syllables (CVC) are considered heavy, just like CVV words. But, while the mora from the consonant contributes weight to

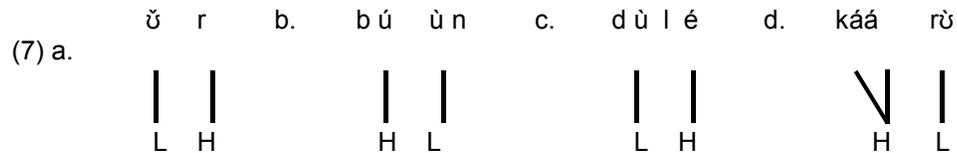
⁷⁶ The only gap noted in the data concerns closed syllables with diphthongs. Here there is only one example with low tone. I suspect that the gap in my data is merely lack of data in this case. In subsequent examples of this section I do not address the gaps in foot structure or syllable structure and tone. I address the types of tone patterns and gaps in below.

the syllable, the tone is not realized on the consonant—tone is only realized on the vowel in speech.

Besides the level tones of L and H in the language, there are also falls (HL) and rises (LH). These contour tones are derived from combining H and L tones.

- (5) a. ůr 'giraffe' (KLW 3) (6) a. búùn 'fist' (W 30) long
 b. dùlé 'sun' (W 36) b. káárù 'nail (finger, toe), hoof' (W 36)

The tones would be represented in an autosegmental fashion like (8) below:



Recall that the /r/ in (7a) is moraic and thus can carry tone, but that the tone is realized on the vowel.

Further, there are complex contour tones in Fur (LHL). Usually these melodies occur on a monomorphemic, monosyllabic word with a short, closed syllable or these melodies may occur over a long vowel or diphthong:

- (8) a. mùf 'revision'
 b. wùô 'flour'

These forms would be represented as in (9):



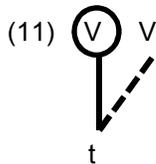
L tone or H tone also occur on polysyllabic words, where the tone spreads to subsequent moras; further, there are examples with a lexical pattern of HL or LH sequences where the H or L also spreads to subsequent moras. The examples below illustrate the types of spreading that can occur. The different tonal patterns that occur on

different shapes of words (combinations of heavies and lights) are presented in the next section (4.1.2).

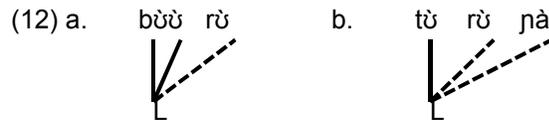
- (10) a. bǔǔrǔ 'mahogany tree' (W 36)
 b. tǔrǔnà charcoal (W 36)

In (10) is an example of a disyllabic and trisyllabic word with a lexical tone of L. With these examples, a spreading rule applies as in (11) (taken from Kenstowicz 1994: 318).

Again, the spreading will occur to the right⁷⁷:



(12) below shows how the examples in (10) spread:



In (12a) the tone on the long vowel (2 moras) spreads to the next available mora, while in (12b), the tone on the short vowel (the initial mora in the word) spreads to the subsequent moras that are available. Without this spreading rule, the Obligatory Contour Principle (Kenstowicz 1994, Goldsmith 1972) would be violated, where identical tones may not occur in succession:



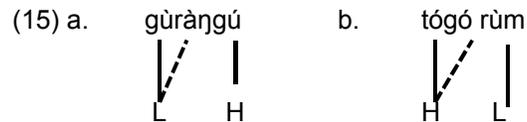
Both (13a) and (13b) have two and three low tones in succession on the same morpheme, violating the OCP; thus the representations in (12) above are better than these examples in (13) are.

⁷⁷ Spreading to the left in Fur is discussed in the sections below.

HL or LH can also occur as lexical tone along with spreading as in (15) below:

- (14) a. gùràṅgú 'crane, bird' (D)
 b. tógórùm 'termite, sp.' (W 36)

(15a) below shows an example of an L tone spreading to the right and (15b) of H tone spreading to the right:



In this section, I have shown that the level tones H and L can occur independently on words and that these tones can spread. Further, I have shown that the falling tone HL is a combination of a H and L tone and that a rising tone is a combination of the two level tones L and H. I have also shown that contour tones can spread. Finally, the pattern of HLH is not attested in these words⁷⁸—only LHL is found.

4.2.2 Lexical Tone Patterns⁷⁹

In Fur, lexical tone patterns on monomorphemic nouns all have the underlying patterns of L, H, LH, HL, LHL, or more rarely HLH. These patterns can be seen on monosyllabic words and in polysyllabic words. In polysyllabic words (as shown in section 4.1.1 above) tones can spread across the available moras. In this section, I show the possible combinations of tone patterns on nouns in order to show that these six patterns are the underlying patterns in Fur.

4.2.2.1 Open and Closed Syllables with Short and Long Vowels

The examples below provide the data available concerning tone patterns on these words. All of the possible lexical tone patterns are presented in the first column;

⁷⁸ HLH is universally marked (twin peaks).

⁷⁹ I present autosegmental analysis of contour tones and complex contour tones in section 4.2 of this chapter. This section is merely to represent what the possible lexical tone melodies are in Fur.

examples with nouns that have a short, open syllable are presented in the next column followed by short, closed syllables:

(16)	Tone	Open	Closed
	L	k ^w à ‘people’ (W: 154)	rùs ‘belt’ (W 53)
	H	-----	sát ~ sót ‘red cap of student’ (W 43)
	LH	k ^w ě ‘child’ (W 154)	řr ‘giraffe’ (KLW 3)
		k ^w ǎ ‘child.pl’ (W 154)	
	HL	-----	pûl ‘peanut’ (W 43)
	LHL	-----	mřr ‘revision’ (W 48)
	HLH	-----	-----

First, the data in this section show that words that are comprised of a single short, closed syllable may have all of the possible lexical tone patterns except for HLH.

On the other hand, there are several gaps in examples for words that are comprised of short, open syllables. These gaps are not surprising as Chapter 3 showed that with content words like nouns, short open syllables (C)V are rare in Fur. For example, there is no content word of this shape that takes a high (H) tone⁸⁰, which is consistent with *H >> *L. Further, only a LH contour takes place on these forms, which suggests that they are bimoraic. There are no HL contours. One possibility for this gap is that when looking at the singular for ‘people’, it is *dùó* ‘person’ (W 50, 37). I suggest that the plural marker *k-* is used in *k^wà* ‘people’ (W: 154), while the singular marker *d-* is used for *dùó* ‘person’ (W 50, 37). While these forms are fossilized, the V₁ vowel in the diphthong could have been devocalized, and then the tone linked to the next vowel. Further, there are only open syllables with diphthongs that have the LH tone—there are no long vowels in open syllables that carry this LH tone, but there are closed syllables with long vowels (CVVC) that do have a LH tone.

⁸⁰ There are function words like *ká* ‘1s.person pro’ (W 154) that do take a H tone, for example. There are only function words along with other affixes and clitics that take this shape. Therefore, the examples for this syllable shape are the only ones available in this language and are considered rare.

If words such as those in the first column of (17) only have a short vowel, and a single mora is carrying both tones, then a monosyllabic light syllable is carrying a contour tone and Gordon's (2007) assessment of Fur stands: if light syllables carry contour tones, then heavy syllables can also carry contour tones, and there is no distinction here concerning weight and contour tone licensing.

However, because a monosyllabic word with the structure (C)V is rare in Fur (see Chapter 3), the argument is more likely that the minimum word requirement of being bimoraic is affecting these words, and the contour tone can occur.⁸¹

Long vowels in open and closed syllables are considered heavy syllables.

Consider the examples in (17):

(17)	Tone	Open	Closed
	L	ròò 'well, river, stream, lake, sea' (M) dìò 'stomach' (W 24)	lùòl night (W 50) wùòŋ 'herder' (W 24)
	H	lók 'place' (W) díá 'wound' (D, W 58)	núúm 'snake' (W 36) -----
	LH	----- pié 'lie' (W 43)	bìís 'cat' (W 50) -----
	HL	yáà 'woman' (W 36) pié ~ fié 'rabbit' (M, W 43)	búùn 'fist' (W 30) dúàl 'moon' (W 38)
	LHL	----- wùò 'flour' (W 43, 75)	ŋèêt 'incisor' (W 20) -----
	HLH	-----	-----

In these examples, there are two gaps in the data. First, there are no examples of an open syllable with a long vowel for either LH or LHL; there are, however, examples with long vowels in closed syllables for both of these tone patterns, but no examples of closed syllables with diphthongs. With the HL examples, both long vowels and diphthongs in

⁸¹ It is likely that these examples in the first column of (17) are lengthened phonemically, as many contour tones—and specifically, rises LH (Zhang 2004)—are on heavy syllables; further, word-final syllables are usually phonemically lengthened (Yip 2002). Further investigation into this matter using a measurement of duration would be important.

open and closed syllables can occur. Finally, there is a gap in the data for a HLH word for both types of syllables: open and closed.

4.2.2.2 Disyllabic words with open and closed syllables

In this section, I present data that shows the types of tone melodies that can occur on disyllabic words with open and closed syllables.

First consider examples with short vowels (18):

(18)	UR	Tone	two open syllables	at least one closed syllable
	L	L	kòná 'name' (W 36)	mèdìl 'valley, farmland' (W)
	H	H	pítí 'bed' (M, W 36)	-----
	LH	LH LH.H L.LH	dùlé 'sun' (W 36) wǎná 'firefly' (W 43) -----	bòrrá 'hill' (W) kǎwóló 'dried cow-dung' (W 44) -----
	HL	HL HL.L H.HL	bàrà 'brother' (W 43) ----- -----	----- âmpà 'big stick' (W 28) híllâ ~ íllâ 'steam' (W 26)
	LHL	L.HL LH.L	----- dǒmò 'container, sp' (W)	kàràb 'animal, thing' (W 43) àppà 'big, large' (W 53) bǒrǒ 'fox' (M, W 342) gùrbèt 'wild cat, sp.' (W 49) òrnàn 'chief' (W 63)
	HLH	H.LH HL.H	----- -----	----- -----

In these examples, there is a clear preference for two open syllables to have L, H, LH, HL, and LH.L tone patterns, while for words with at least one closed syllable, there are more patterns available: L, LH, LH.H, HL.L, L.HL or LH.L. The distribution and licensing of contour tones is discussed in section 4.2 of this chapter, but to preview this discussion, there is a strong tendency for rising contour tones to occur in the initial syllable of a word and for falling contours to occur in the initial or final syllable—in fact, rising contours do not occur in the final syllable in any examples of the data. Further, I show that syllable weight plays a role in attracting contour tones—heavier syllables tend to attract contour tones. As with previous examples, there are no examples with HLH.

Concerning the succession of two long vowels in a monomorphemic word, Chapter 3 showed that these forms are rare. Only two examples occur, and both examples have the same melody:

- (19) úúniè 'wild dog, sp.' (W)
 túúmiè 'anvil' (W 38)

Both examples have the tone sequence HL. Further, as noted in Chapter 3, the first syllable has a long vowel and the second has a diphthong.

There are also no examples of monomorphemic words with the structure CVV.CVVC or of CVVC.CVV in Fur—these two long vowel sequences are very rare, as mentioned above, and the only type allowed are two open syllables with long vowels.

Now consider (20) that has a long vowel or diphthong and short vowel:

(20)	UR	Tone	syllable 1 short, syll 2 long	syllable 1 long, syllable 2 short
	L	L	libiè 'Libya' (W 24; very rare)	bùürù 'mahogany tree' (W 36) dààgùl 'termite hill' or 'hedgehog' (W 27, W 39)
	H	H	----	óórá 'drought' (W 36)
	LH	LH LH.H L.LH	---- ---- ----	dàálú 'mud' (W) wèéél 'market' (W 44) ~ wèlè 'market' (W 43)
	HL	HL HL.L H.HL	---- ---- ----	káárù 'nail (finger, toe), hoof' (W 36) sáàgà 'loom' (W 43) mèèrà̀m 'princess, queen' (W 43) loanword
	LHL	L.HL LH.L	jàmáà 'disease caused by demon possession' (W 38) mè̀ndú̀l 'bad wound' (W 38)	rààrè 'transparent, light, thin' adj. (D) tààjũn 'small pot, sp' (W 43) kèé̀bù 'sickle' (W 33)
	HLH	H.LH HL.H	---- ----	---- ----

In these examples, we see that there are many more examples with the initial syllable as a long vowel than with the final syllable as a long vowel or diphthong. Concerning the lexical tone of these words, all possible patterns of tone are allowed except for HLH.

Now consider words with three syllables:

(21)	UR	Tone	
	L	L	tùrùṅà charcoal (W 36) dòmbòrè 'book' (D) àndàràb 'wild tree' (D) kùṅírtí tree, sp. (W 36) gùràṅgàl 'plant, sp. not edible' (D)
	H	H	étíné 'to step on (something), to press (something) down' (W 31) bápára 'cassava' (W) kùṅírtá plant, sp. (W 36)
	LH	LH.H L.LH	kèbùró locust, sp. (W 36) dògólá 'children' (W 44) kàbùró 'locust, sp.' (D) gùndírí 'pebble, round stone' (D) gùràṅgú 'crane, bird' (D) tùùnàrí 'gardening tool, sp.' (D) gùmbààtú 'ground nut' (D)
	HL	HL.L H.HL	tógòrùm termite, sp. (W 36) ríṅílè 'lizard, sp.' (D)

The examples in (21) show that trisyllabic words have all possible patterns of L, H, LH, and HL. These examples suggest a different direction of tone association.

In (22) are examples of trisyllabic words with LHL or HLH sequences:

(22)	UR	Tone	
	LHL	L.HL	rùsúgò pumpkin (W 36) àṅáálù 'cassava plant' (D)
		LH.L	pùtùrên 'Zo-Alkaida' <Arabic (Islamic month) (D) tìrìmbîl 'vehicle' (W 78) ìrìmbítì 'grass, sp.' (D)
	HLH	H.L.H H.LH H.L.H	bóròkó 'salamander, sp.' (D) ----- -----
	2 LHs	L.HL.H	gùdùrné 'plant, sp., edible' (D)
	2 LHs	HL.H.L	máàkóyòm 'wild cat, sp.' (D) <i>maybe a compound</i>

The examples in (22) show that the melody LHL.

Finally, one loanword with 4 syllables should be considered:

(23)	UR	Tone	
		L.HL ~ LH	tìlpìsiyôn ~ tìpìsiyóón 'television' loan word (W 38)

4.2.3 Conclusions Regarding Lexical Tone

This section has shown that there are six possible lexical tone melodies in Fur nouns: L, H, LH, HL, LHL, and rarely, HLH. Further, this section has also presented the surface forms of these tones, showing how these surface forms are realized on the available moras in the word.

In the next section, the distribution and licensing of contour tones is discussed.

4.3 Contour Tone and Complex Contour Tone Distribution and Licensing

In this section I show that contour tones (HL and LH) and complex contour tones (LHL and HLH) are licensed by long vowels, diphthongs, and CVC syllables with sonorant codas (CVRs). It is well known that contour tones usually occur on heavy syllables (Hyman 1985, Duanmu 1994a,b, Gordon 2007). These CVR syllables are

forced to be heavy in these cases of contour tone and complex tone distribution. Further, I show that each type of contour (rising or falling) are distributed in different ways.

4.3.1 *Monosyllabic, Monomorphemic Words and Contour Tones*

4.3.1.1 Long vowels, diphthongs and contour tones

In this section I show that contour tones are attracted to long vowels and diphthongs. Long vowels and diphthongs are both heavy, and thus carry two moras.

Section 4.1 of this chapter established that long vowels and diphthongs can bear H or L tone:

- (24) ròò 'well, river, stream, lake, sea'
lòó 'place'
díá 'wound' (D, W 58 as d- íá so maybe polymorphemic)
dìò 'stomach' (W 24)

Long vowels and diphthongs can also bear contour tones and complex contour tones, as shown in (25 and 26):

- (25) a. hòò ~ hòò 'free of charge, easy, nonsensical, idle, useless' W 26
yáà 'woman' W 36
b. dīī ~ dīī 'some (specific)' W 68
- (26) a. yíè 'dream.noun' W 33
piè ~ fiè 'rabbit' A, W 43
sùè 'bellows' W 33
b. pié 'lie' W 43
dùó 'person' W 50, 37
dió 'stomach.LOC' W 59
c. dǔâ 'cap' W 43
wùô 'flour' W 43, 75

In (25), both long vowels and diphthongs may bear contour tones in monosyllabic words with the syllable shape of (C)VV, and some may even bear complex contour tones (25b) and (26c). Complex contour tones are discussed in section 4.3 of this chapter. The only restriction is with the type of contour occurring on long vowels vs. the type of contour occurring on diphthongs. Those examples in (25) with long vowels have falling tones

(HL), but those examples in (26) can have rising (LH) or falling (HL) tones. Further, there is only one example of a complex contour that occurs on a long vowel in (25b), and this complex contour occurs in variation with a contour tone, while in (26c), there are two clear examples of diphthongs with complex contour tones.

Now consider examples of monosyllabic words with the shape (C)VVC; once again, H or L can occur in these words:

- (27) lùùl 'night' (W 50)
 núúm 'snake' (W 36)
 wùòŋ 'herder' (W 24)

Contours and complex contours may also occur on these heavy syllables.

- (28) a. búùn 'fist' (W 30)
 páàl 'leading bull' (W 43)
- b. wíít ~ g^wít 'thread' (W 37)
 bǐís 'cat' (W 50)
 sǒón 'millet' (W 43)
 bùú'l 'hippopotamus' (W 38)
 àál 'where?' interrogative particle (W 294)
- c. ɲèè't 'incisor' (W 20)
 gàâr 'sheet of paper' (W 43)
 jǐír 'sorghum flour' (W 48)
- (29) a. dǘàl 'moon' (W 38)
 b. pèùs 'to move' (monosyll.verb) (W 39)

In (28) and (29), there are examples for each type of coda consonant, except for a glide. Glides are the most sonorous consonants, and in some cases can function as consonants or as vowels. The data from Chapter 2 concerning coda consonants, and the data from Chapter 3 concerning syllable weight show that there is a gap in the data: there are no CV_iV_i G syllables—either with a long vowel (CVVG) or with a diphthong (CV_iV_{ii} G). The above examples show that both monosyllabic words with long vowels and monosyllabic words with diphthongs can bear contour tones. These findings indicate that, as with those in the previous examples, syllable weight does play a role in these

forms, with enough moras able to bear these contour tones. As noted previously, the complex contour tones in the above examples will be discussed below.

The findings in this section can be summarized in Table 4.1, where a + sign indicates that the tone melody occurs in that type of word, a – sign indicates that that tone melody does not occur, and where a plus sign in parentheses (+) means that the occurrence is rare (see Tables 4.2 and following). For example, with monomorphemic words that have the shape CV₁ V₂, both HL and LH contour tones occur, along with LHL tones, but HLH does not occur.

Table 4.1 Contour Tone Distribution of Words with a Long Vowel

	HL	LH	LHL	HLH
CV _i V _i	+	-	-	-
CV _i V _{ii}	+	+	+	-
CV _i V _i O	-	+	+	-
CV _i V _{ii} O	-	-	+	-
CV _i V _i R	+	+	+	-
CV _i V _{ii} R	+	+	-	-

Table 4.1 shows that contour tones occur on monomorphemic words with long vowels and diphthongs. Among open syllables, those with diphthongs allow more types of contours than those with long vowels. This fact shows that diphthongs have a special status with respect to contour tones. Further, this observation shows that the complex contour tone LHL occurs with open syllables with diphthongs, closed syllables with long vowels and diphthongs with codas that are obstruents, but LHL only occurs with words that have a sonorant coda and a long vowel, not a diphthong.

4.3.1.2 Short, closed syllables and contour tones

I have argued in Chapter 3 that monomorphemic words with a single CVC syllable are heavy in Fur for purposes of minimal word but light otherwise. In this section, I show that the attested contour tones support the conclusion that these CVC

syllables are bimoraic. One important aspect of these syllables to consider is the sonority of the coda consonant. Gordon (2007) has shown that in some languages CVC syllables with a sonorant coda (CVRs, where R = sonorant) may be heavy in some phenomena, like the licensing of contour tone, while CVC syllables with non-sonorant codas (CVOs, where O= obstruent) are considered light. In this section, I show how contour tones are attracted to sonorant codas (CVRs) rather than non-sonorant codas (CVOs); thus, pattern as heavy in Fur in the distribution of contour tones, while CVOs are considered light.

In section 4.1 I established that H and L tones can occur on short, closed syllables (CVCs). As a brief summary, I repeat some of the data below. I have broken these examples down by the sonority of the coda, where vo = obstruent coda, vf= fricative coda, vn = nasal coda, vl and vr = liquid codas, and vg= glide coda.

(30)	Coda	Tone	Example
	vo	H	sát ~ sót 'red cap of student' (W 43)
		L	sòg 'day' (W 38)
	vf	H	-----
		L	rùs 'belt' (W 53)
			kòj 'very old thing' (W 53)
	vn	H	bún 'coffee' (W 36)
		L	tòŋ 'house' (M)
	vl	H	-----
		L	dìl 'stagnant water' (W 30)
	vr		-----
	vg	H	-----
		L	pày 'room' (W 36)
			bàw 'pond'(W 36)

Recall that sonorant codas include nasals, liquids, and glides in obstruent position, while obstruent codas would include codas with fricatives and stops. H and L tones can occur with both non-sonorant codas (CVO) and sonorant codas (CVR). There therefore seem

to be no restrictions on the distribution of H or L in these monosyllabic words. There are a few gaps in the data, however. I would suggest that these gaps occur because first, there are not as many CVC monomorphemic words in Fur (as shown in Chapter 2), and second, there just may be an absence of data to fill those positions.

The data reveal a different story, however, for contour tones. Consider (31), where the examples are separated based on the sonority of the coda consonants, with obstruents being the least sonorous and glides being the most sonorous:

(31)	Coda	Tone	Example
	vo	LH HL	g ^w it ~ wiit 'thread' (W 37) -----
	vf	LH HL	----- -----
	vn	LH HL	----- -----
	vl	LH HL	ǎl REL—'which' (W 77) âl REP—used as a connector W(72) êl 'to come' monosyllabic verb—give person, etc. (W 39) pûl 'peanut' (W 43)
	vr	LH HL	ǔr 'giraffe' (KLW 3) -----
	vg	LH HL	dǎy 'ant, sp' (W 43) hâw 'encouragement for a donkey to speed up' (W 26) dây 'Lalob tree' (W 43) dǎy 'grass' (W 43)

(31) shows a clear favoritism for CVRs, with examples for liquids [l, r] and glides [w, y].

The more sonorous a coda consonant, the more likely that segment will be moraic, which shows that syllable weight is playing a role in the licensing of contour tones in these examples: CVR syllables should therefore be considered heavy in these examples.

Further, the single example in (31) with an obstruent coda g^wit 'thread' (W 37) should be considered rare as this example is the only occurrence in the language. One could argue that here, the vowel is long, offering another mora. The evidence that there

is a variant of ‘thread’ with a long vowel *wiit* ‘thread’, further suggests that this syllable is heavy⁸². In this rare occurrence, the coda consonant does not contribute weight to the syllable. Voiceless obstruents are the least likely to contribute weight in that they are less sonorous than voiced obstruents (see Gordon (2007), Zhang (2004), Yip (2002)); it is therefore the vowel or glide that is contributing weight.

The examples in (32) show that complex contour tones also occur on short, open syllables in Fur:

- (32) a. mǔf ‘revision’ (W 48)
 b. k-ùrn ‘to catch.1p. sjv’ (W 48)

These examples are rare.⁸³ Each of the examples has a sonorant coda consonant [r] or [m]. The sonorant coda reinforces the argument that these codas contribute to weight in Fur and therefore that CVR should be considered heavy in the licensing of contour and complex contour tones in Fur.

The findings in this section can be summarized as follows in Table 4.2:

Table 4.2 Tone Distribution in Monomorphemic, Monosyllabic Short Words

	HL	LH	LHL	HLH
CVO	-	(+)	-	-
CVR	+	+	+	-

This table summarizes the argument presented in this section: CVR syllables carry contour tones and complex contour tones, while CVO syllables are rare occurrences with

⁸² KLW (14) ‘thread’ is actually transcribed as gwíit ~ wíit. Still a contour tone, but a falling tone of HL instead of LH. Here the long vowel occurs in both examples, though.

⁸³ Waag (2010: 44) also recognizes this restriction on complex contour tones on short vowels: “the LHL sequence on one short vowel is restricted to the closed syllable of a monosyllabic word. Such nouns with an LHL sequence on a short vowel are extremely rare (fewer than one in a thousand). There are a few more verbs with this pattern (also restricted to the closed syllable of a monosyllabic word). In all other monomorphemic words one mora can carry up to two tones, with not more than three tones on one vowel.”

LH contour tones. CVR syllables are thus heavy with regard to the distribution of contour tones, like CVV(C) syllables, while CVO syllables are considered light, like CV syllables.

4.3.1.3 Summary of monosyllabic, monomorphemic words

The tonal distribution for monosyllabic words in Fur can therefore be summed up as follows (parentheses indicate a rare occurrence and blank means not found):

Table 4.3 Tonal Distribution of Monosyllabic, Monomorphemic Words

	HL	LH	LHL	HLH
CVO	-	(+)	-	-
CVR	+	+	+	-
CV _i V _i	+	-	-	-
CV _i V _{ii}	+	+	+	-
CV _i V _i O	-	+	+	-
CV _i V _{ii} O	-	-	+	-
CV _i V _i R	+	+	+	-
CV _i V _{ii} R	+	+	-	-

Table 4.3 shows that heavy syllables attract contour tones. The findings show that the type of vowel sequence—whether diphthong or not—and the type of coda consonant—sonorant/obstruent—does affect where contour tones are licensed and what types of contour tones occur. For words with a short vowel, the sonority of the coda consonant contributes to the weight of the syllable, therefore allowing contour tones on these monosyllabic words. For words with a long vowel or diphthong, 1) contour tones occur on both open and closed syllables 2) the types of contour tones allowed are affected by the types of vowels (i.e., either a long vowel or diphthong) allowed in the syllable.

The hierarchy for weight concerning the licensing of contour tones and complex contour tones can be formalized as such for monosyllabic, monomorphemic words:

$$(34) \text{CVV(C), CVR} > \text{CVO, CV}$$

(34) shows that CVV(C) and CVR are heavier than CVO and CV syllables.

But now we turn to polysyllabic monomorphemic words in order to see what type of syllable attracts contour tones (heavy or light) , where in the word the contour tone may occur (initial, final/ultimate), and what type of contour tone (rising or falling) may occur in what position of the word. All of these points help establish syllable weight in the licensing of contour tones in Fur and show how the sonority of the coda consonant can be a contributing factor to syllable weight in this language.

4.3.2 Disyllabic/Trisyllabic, Monomorphemic Words and Contour Tones

In this section, disyllabic words and trisyllabic words are discussed with respect to contour tones. Reduplicative forms are analyzed in Chapter 5.

Section 4.1 established that H and L tones can occur on polysyllabic words through the spreading of those tones to the available moras in the word. Further, this section showed that there are six lexical tone melodies in Fur: L, H, LH, HL, LHL, and very rarely HLH. In the discussions that follow in this section, the focus is on the distribution of contour tones and complex contour tones in polysyllabic, monomorphemic words. In these examples, I focus on contour tones that are tautosyllabic—I do not focus on contour tones that are heterosyllabic. For example, while *dùlé* ‘sun’ (W 36) would be considered a contour tone in some literature, it does not help establish the distribution of contour (or complex) contour tones within this language in relation to syllable weight. Examples like *bəmbûs* ‘pawpaw tree’ (W 60) that have a tautosyllabic falling contour tone provide a better example of what syllables (heavy or light) attract contour tones and where in the word (initial or final syllable) attract the contour tone.

4.3.2.1 The distribution of rising (LH), tautosyllabic contour tones

Consider the examples in (35), which have two open syllables:

- (35) a. *dĩŋà* ‘some’ (W 63) b. *tòsà* ‘game’ (W 43)
 ŋǎlà ‘Nyala.loc’ place (W 73) *kèébù* ‘sickle’ (W 33)
 ŋĩrè ~ *ŋĩrè* ‘cotton’ (W 33)

(35) shows examples with short and long vowels bearing the LH tone in the initial syllable of the word. The tonal melody for these words is LHL. There is also one example of a word with a LH lexical tone that carries the contour tone on the initial syllable: *wǎná* ‘firefly’ (W 43).

How can the contour tone in the initial syllable be accounted for on both a short and long vowel? Can both light and heavy syllables bear contour tones? (36) provides a possible explanation of how these syllables should be treated:

- (36) a. *wě̀lè* ‘market’ (W 43)
b. *wè̀é̀lè* ‘market’ (W 44)

In (36), these words occur in free variation (Waag 2010), suggesting that the initial syllable in the words in (36a) should be treated as heavy. Recall that contour tones are generally attracted to heavy syllables (Gordon 2007, Duanmo 1992, Zhang 2001, 2004). Further, Zhang (2001, 2004) argues that rising tones need a longer duration, which also helps support the idea that these initial syllables are long rather than short vowels.

Another important observation about the examples in both (35) and (36) is that the onset consonant of the second syllable is sonorant for all examples with the short vowels in (35a) and (36b). While onsets do not bear weight, in some languages, the onset in a following syllable can influence the preceding syllable (cite). The examples with long vowels in (35b) and (36b) both have obstruent codas, so perhaps the vowels were lengthened in order to accommodate the contour tone.

Now consider examples of a rising tone in (37), with a lexical tone of LHL:

- (37) a. *gǔmbòŋ* ‘dove, sp’ (W) b. *bǒŋnò* ‘fox’ (M, W 342)
 ǒrnàŋ ‘chief’ (W 63) *kǔrtù* ‘to dig a hole’ verb (W 39)

These examples show that the optimal position for a rising tone is the initial syllable, and that rising tones are attracted to heavy syllables. In (37a), there are two possible heavy

syllables within each word; however, the initial syllable that receives the tone rather than the final syllable. In section 4.2.2.3 below, I show that this is a limitation in Fur: rising tones never occur on the final syllable of a word—only falling tones occur in this position. Further, (37b) shows that given a heavy and a light syllable in a word, the rising contour tone is found on the heavy syllable.

The codas of all of the syllables in (37) are also sonorants—they are either nasals or liquids; thus, these codas could be moraic and thus able to bear tone underlyingly, while the vowel bears the tone on the surface.

In (38) below are also examples of a rising tone on the initial syllable; however, the lexical tone for these words is LH.

- (38) a. kǎwló ‘dried cow-dung’ (W 44)
b. ǎlbá ‘when’ (W 72)

These examples show that again the rising tone is attracted to the initial syllable because the syllable is heavy—both are CVR syllables.

4.3.2.2 The distribution of falling (HL), tautosyllabic contour tones

In this section, I compare the distribution of falling (HL) tautosyllabic contour tones with those of the rising (LH) tautosyllabic contour tones presented in section 4.2.2.1 above. I show that there is a clear preference for contour tones to be attracted to heavy syllables and that rising tones are limited in their distribution to the initial syllable only, while falling tones usually occur in the final syllable, but may also occur on the initial syllable.

Consider (39) and (40), for example, which show a clear preference for both types of contour tones to occur on the heavy syllable.

- (39) a. kèéǎ̀bù ‘sickle’ (W 33) b. sáàǎ̀ǎ̀gà ‘loom’ (W 43)
tǎ̀sà ‘game’ (W 43)

(40) jàmáà ‘disease caused by demon possession’ (W 38)

Both a rising (LH) and falling (HL) tone can occur on the initial syllable of the word, but only a falling can occur on the final CVV syllable, as shown in (40). Now consider examples with two heavy syllables:

(41) a. túúmíè ‘anvil’ (W 38)

b. úúníè ‘wild dog, sp.’ (W)

(41) shows that the falling tone is preferred on the final syllable of the word. Compared with the examples in (42) below, (41) also reinforces this preference for the falling tone to be on the final syllable, when a disyllabic word is comprised of two heavies.

The examples above also show that more than one contour tone cannot occur in a monomorphemic word.⁸⁴

Now we consider examples of disyllabic words with closed vowels, but look at both the consonant coda of closed vowels and the position of these types of consonants within the word to see where contour tones may be licensed in Fur and whether or not short, closed syllables ((C)VCs) pattern more with syllables with long vowels or diphthongs (CVV(C)s) or not and should be considered heavy. Consider the examples in (42), where there is a lexical tone of LHL:

(42) a. gǔmbòŋ ‘dove, sp’
 ǒrnàŋ ‘chief’ (W 63)

b. pàndòg ‘buttock’ (W 33)
 gùrbêt ‘wild cat, sp.’ (W 49)
 bèmbùs ‘pawpaw tree’ (W 60)
 kèrtùm ‘Khartoum, place’ (W 66)
 àmpâr ‘friendship’ (W 50)

In (42), the contour tone can fall on either syllable—the initial (42a) or final (42b).

However, the type of contour that can fall on the initial or final syllable is complementary:

⁸⁴ There are, however, examples of contour tones being copied or repeated in reduplicants, as shown in Chapter 5. These contour tones are not tautosyllabic—they are heterosyllabic, occurring over multiple syllables. There are also no long vowels copied in reduplicants, so there are no instances of contour tones on heavy syllables that are copied.

if the initial syllable carries a contour tone, then the tone is always rising (LH), but if the final syllable carries a contour tone, only a falling tone (HL) occurs. Here where the syllable occurs in the word matters more than the type (i.e., whether the syllable is heavy or light, as both are heavy) that matters. Further, two contour tones cannot occur within one word.

It could be argued, however, that those examples in (42a) that have an initial contour tone have a coda consonant with a greater sonority than the final syllable's coda consonant. In (42), it is clear that the position of the syllable in the word matters rather than the coda consonant of the syllable: in both *ǝrnàŋ* 'chief' and *gùrbét* 'wild cat, sp.', the coda consonant of the initial syllable is also more sonorant than that of the final syllable [r] > [ŋ] and [r] > [t], respectively, but the contour tone falls on the final syllable in *gùrbét* 'wild cat, sp.' rather than the initial syllable **gùrbet* 'wild cat, sp.' or **gùrbet* 'wild cat, sp.'. Here the sonority of the coda consonant does not matter in these examples; rather, it is the position of the contour within the word that licenses where the falling or rising tone will occur.

Further evidence that short, closed syllables (CVCs) should be considered heavy in the distribution of contour tones comes from examples like (43):

- | | |
|---|---|
| <p>(43) a. âmpà 'big stick' (W 28)
 sùndù 'date' (W 44)
 nârmà=̀sì 'fast food, market
 food' (W 79)</p> | <p>b. bǝrŋò 'fox' (W 342)
 kùrtù 'to dig a hole' verb (W 39)
 ǎlbá 'when' (W 72)

 kǎwló 'dried cow-dung' (W 44)</p> |
| <p>c. kàràb 'animal, thing' (W 43)
 sùbîr 'noon' (W 55)</p> | |

In these examples are two important observations. First, both a rising and a falling tone may occur on the initial syllable, as shown in (43a,b). Second, the heavy syllable attracts the contour tone. In (43a,b) the initial syllable of the word has a shape of CVR, while the final syllable has a shape of CV. The contour tone is on the initial syllable. On the other

hand, in (43c), the contour tone is on the final syllable, as that syllable is of the shape CVC (both an obstruent coda and sonorant coda occur), and the initial syllable is a light syllable (CV). These examples also confirm that there is a preference for a falling contour on the final syllable of the word, as evidenced in the lack of examples of rising tones for those examples in (43c).

Examples with geminates are also important to consider, as the consonant coda of the geminate is often considered to bear weight (Hayes 1989), as shown in Chapter 3 of this dissertation. Compare the examples below:

- | | |
|---|---|
| <p>(44) a. èttê , òttò ‘today’ (W 64, 65)
 àppâ ‘big, large’ (W 53)
 ìttî ‘small’ (W53)</p> <p>b. sòŋŋâ ‘many’ (W 63)</p> <p>c. nàbbâl ‘bow’ (W 28)</p> | <p>(45) a. âmpâ ‘big stick’ (W 28)
 sũndũ ‘date’ (W 44)
 nârmà= sí ‘fast food, market food’ (W 79)</p> <p>b. bõŋŋò ‘fox’ (W 342)
 kũrtũ ‘to dig a hole’ verb (W 39)
 ălbá ‘when’ (W 72)
 kěwłó ‘dried cow-dung’ W 44</p> <p>c. pândôg ‘buttock’ (W 33)
 gũmbòŋ ‘dove, sp’ (W)</p> |
|---|---|

(44) shows examples with geminates, while the examples in (45) show C.C sequences that are not geminates. I suggest that this tone pattern is part of the structure of these nouns and modifiers; thus these words always carry this tonal melody.

There are also two clear examples of loanwords with geminates. Both have the lexical tone HL, but the contour tones are found on different syllables: *híllâ* ~ *íllâ* ‘steam’ (W 26) vs. *hêrrâ* ~ *êrrâ* ‘radiation, light’ (W 26).

Finally, consider the few examples below, which will help illustrate some of the findings from this section:

- (46) a. méêrà̀m ‘princess, queen’ (W 43)

- b. tààjûn 'small pot, sp' (W 43)
- c. mèndúùl 'bad wound' W 38
- d. túúmíè 'anvil' (W 38)
- e. sīisi 'saw' (W 43)

These examples show that long vowels attract contour tones (46a, 46c) and that falling contour tones are attracted to the final position in a word. Further, the complex contour tone in (46e) shows that the long vowel can bear more tones than other types of syllables.

Now consider trisyllabic monomorphemic words and monomorphemic words with more than three syllables that have contour tones⁸⁵:

- (47) a. bîrînjâl 'tomato' (W 28)
 tirimbîl 'vehicle' (W 78)
- b. tilpîsiyôn ~ tipîsiyóón 'television' (W 38)

First, all of these examples are loanwords. Each example has the same lexical tone of LHL, with the falling contour tone occurring on the final syllable. These examples coincide with previous observations about contour and complex contour tones: falling tones occur on the final syllable in a word and these syllables are heavy, thus attracting contour tone.

4.3.2.3 Summary of contour tone distribution for polysyllabic words

Table 4.4 below summarizes the findings concerning contour tones in this section.

⁸⁵ There are also reduplicative forms in Fur that have a trisyllabic or greater structure, but those are analyzed in Chapter 5.

Table 4.4 Distribution of HL, LH, LHL and HLH Tones

		HL (falling)	LH (rising)	LHL	HLH
monosyllabic words	heavy syllable (CVO)	-	(+)	-	-
	heavy syllable (CVR)	+	+	+	-
	heavy syllable (long vowel)	+	+	+	-
	heavy syllable (diphthong)	+	+	+	-
polysyllabic words	syllable initial	+	+	-	-
	syllable final	+	-	-	-
	light syllable	-	-	-	-
	heavy syllable (long vowel)	+	+	-	-
	heavy syllable (diphthong)	+	-	-	-
	heavy syllable (CVO)	+	-	-	-
	heavy syllable (CVR)	+	+	-	-

The data in Table 4.4 show that the type of syllable in the word matters in Fur for attracting contour tones. The clear pattern is that a contour tone is always attracted to a heavy syllable. Further, the position of each contour type is different: Falling tones (HL), can occur in any position, but the final position seems to be the better position, while rising tones only occur in the initial syllable of the word. The type of vowel sequence is also important in the type of contour allowed in the word. Falling tones occur on both long vowels and diphthongs, while rising tones only fall on long vowels for polysyllabic words.⁸⁶

Concerning disyllabic words vs. trisyllabic words and greater, this section shows that only falling tones on the final syllable are allowed in words with three syllables or more.

⁸⁶ Section 4.2.2.1 above shows that monosyllabic words have a rising tone on diphthongs. The lack of rising tones on a diphthong could merely be a limitation in the distribution for diphthongs combining with a limitation on the distribution of rising tones, as diphthongs only occur in monosyllabic words or on final syllables of words and rising tones only occur on monosyllabic words or initial syllables of words.

Further, there are no examples where more than one contour tone is allowed within a polysyllabic word. I suggest that this is a limitation on the number of moras available in these words, with three syllables being the max number allowed for disyllabic words (so heavy, light (HL) or light, heavy (LH), and for trisyllabic words, a maximum of four moras are available with a structure of light, light, heavy. Words that have more than three syllables are loanwords in Fur (or reduplicants or compound words), but these words also have a specific structure of only 5 moras allowed, and a structure of light-light-light-heavy.

There are also no complex contour tones on any of the syllables in these examples. This point would suggest that the lexical tones are spread over the available moras of the word; with polysyllabic words, more moras are available throughout the entire word, while with monosyllabic words, these LHL sequences are rare because while moras are available in the word, they are not the best types of moras.

Finally, the HLH sequence of complex contours are not seen on any examples except as a lexical tone that is spread over the available moras in a trisyllabic word (see section 4.2.2.2). Waag (2010: 44) also notes this avoidance of the HLH sequence:

On two successive moras (one to two successive syllables) within a word no high-low-high sequence (HL.H, HLH, or H.LH) is attested in the available data. The low tone in such a sequence is replaced by a downstep instead (footnote: The only exceptions to this rule are case markings with dissimilation on the noun, in which in deliberate speech HL-H is possible across morpheme boundaries).

This avoidance of the HLH sequence is part of the general avoidance of a rising tone at the end of a word. In fact, falling tones are generally seen more at the right-edges of words than at the left edges of words, due to a left-to-right default association (Gordon 2007, Zhang 2002, 2004).

4.3.3 Complex Contour Tones

Complex contour tones are tones of a HLH or LHL sequence. While complex contour tones were discussed separately in the sections above, these types of tones must be looked at as a whole in order to show how they are distributed in this language, as these tones are more limited in distribution and occurrence than contour tones. In Fur, as with most African languages, complex contours are a combination of the level tones H and L (Yip 2002). Complex contours are rarer in African languages, but can be seen in many Asian languages (Yip 2002). Further, these complex contour tones require three moras, as opposed to contour tones which require two moras, which shows that the weight of the syllable is important in their distribution.

In Fur, there are only a few examples of complex contours, as shown in (48) below:

- (48) a. hòô ~ hóò 'free of charge, easy, nonsensical, idle, useless' (W 26)
dîî ~ díî 'some (specific)' (W 68)
dũâ 'cap' (W 43)
wùô 'flour' (W 43)
- b. ɲèêt 'incisor' (W 20)
pèûs 'to move' (monosyll.verb) (W 39)
gàâr 'sheet of paper' (W 43, 48)
jîîr 'sorghum flour' (W 48)
- c. sîisi 'saw' (W 43) (rare)

In (48) above, we see that long vowels and diphthongs can carry complex contour tones. Specifically, in (48c), when there is a long and a short vowel available in a word, the long vowel is the one that has the complex contour. Further, both open syllables with long vowels (CVV) or closed syllables with long vowels (CVVC) may carry complex contour tones—the sonority of the coda consonant does not matter in these examples, as we see obstruents like [t] and [s] and sonorants like [r]. Further, there are only LHL complex contours found in these examples—no HLHs—as noted in section 4.2.2 above.

Now consider these examples where a complex contour is found on a short vowel:

- (49) mǔf 'revision' (W 48)
 jir̄m̄ 'to show' monosyllabic verb (W 39)
 k-ür̄m̄ 'to catch.1p. sjv' (W 48)

These examples are even rarer than those in (48). There are no monomorphemic open, short syllables with complex contour tones in Fur. Each of the examples has the structure of a short, closed syllable, with the sonorant coda consonants [r] and [m] occurring in the coda position. This inclusion of a sonorant coda reinforces the argument that sonorant codas contribute to weight in Fur and therefore that CVR should be considered heavy in the licensing of contour and complex contour tones in Fur. Waag (2010: 44) also recognizes this restriction on complex contour tones on short vowels:

The LHL sequence on one short vowel is restricted to the closed syllable of a monosyllabic word. Such nouns with an LHL sequence on a short vowel are extremely rare (fewer than one in a thousand). There are a few more verbs with this pattern (also restricted to the closed syllable of a monosyllabic word). In all other monomorphemic words one mora can carry up to two tones, with not more than three tones on one vowel.

Instead of moras being allowed to carry up to two tones, as Waag (2010) discusses, I would suggest that the coda consonant is contributing to the weight of these syllables, which I show in the sections above.

Most complex contours are on long vowels or diphthongs, but with the rare occurrence of complex contours on monomoraic, closed syllable words, the coda consonant is a sonorant. Table 4.5 presents a summary of these results:

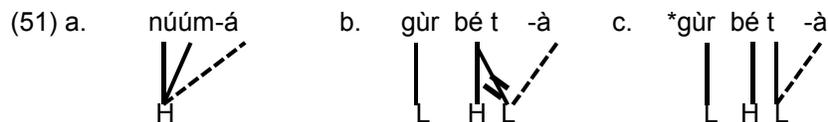
Table 4.5 Complex Contour Tone Distribution

	LHL	HLH
CVO	-	-
CVR	+	-
CVV	+	-
CVVO	+	-
CVVR	+	-

In (50a), the final tone is copied to the plural suffix. In (50b, c) a falling contour tone is split, with the low tone associating with the next available mora, which is in the suffix.

Recall from sections 4.2.1 and 4.2.2 that rising tones do not occur word-finally in Fur.

(51) below shows an example where the tone spreads to the next mora, while (51b) shows the tone delinking from the previous mora and then linking to the next available mora. (51) shows that spreading is not an option **gùrbét-à* ‘wild cat, sp.’ for contour tones.



This tone is delinking from the initial mora, which is a consonant, and then linking to the next available mora, which is a vowel, shows two things. First, these examples show that when possible, contour tones are split rather than preserved on a short, closed syllable. Second, these examples show that the more sonorous mora (a vowel) is chosen over a less sonorous mora (a consonant). So, while consonants may be moraic in regard to contour tone, it is only because they are forced to be so.

Now consider these examples in (52)

- (52) a. âmpà ‘big stick’ âmpà- ñà ‘big stick.pl’ (W 28)
- b. yáà ‘woman’ yáà- ñà ‘woman.pl’ (W 36)
- píè ‘rabbit’ píè -ñà ‘rabbit.pl’
- c. bĩís ‘cat’ bĩís-á ‘cat.pl’ (W 44)

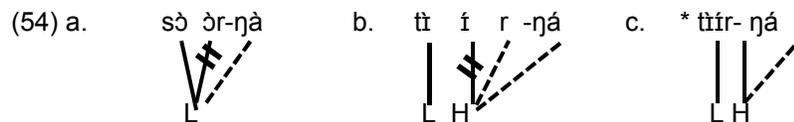
In these examples, the contour tone does not split. In (52a), the tone does not split because it is on the first syllable—the tone on the final syllable spreads to the plural suffix. In (52b, c), tone does not split because there are enough moras that are better (i.e., there is a long vowel) available, compared to the examples in (51) above, where the

contour tone is delinked and then spread to the next available mora that is more harmonic. Therefore, the tone only spreads to the suffix.

There are also a few examples where a long vowel shortens when the plural suffix is added:

- (53) a. kóór kór-ηά 'war.pl' (W 38)
 b. sòòr sòr-ηά 'back (body part)' (W 38)
 c. tíír tír-ηά 'path, opening.Pl' (W 38)

In (53) the tone spreads, as with the other examples above, but the contour tone stays on the root of the word, with the consonant keeping the root heavy, and the last part of the contour tone spreads onto the suffix.



Concerning this type of vowel shortening, Waag (2010: 30) mentions that

Gussenhoven and Jacobs (2005: 146) wrote 'Although it is not uncommon for languages to allow the last syllable of the word to have three moras, languages that generally allow their rhymes to have three moras are rare.' Fur is not an exception to this rule. In the composition of morphemes, vowels may be shortened to reduce the number of moras [...].

I would agree that the number of optimal moras is reduced in these forms but that the number of total moras remains the same: the root is still heavy because of the sonorant coda consonant. Since these words are taking the *-ηa* suffix instead of the *-a* suffix, as would be expected with words that end in a vowel, the [r] could be sonorous in this case, allowing for the *-ηa* suffix. Waag (2010) does make the case for words that end in what could be either a high vowel or a glide to be considered as the consonant:

However, vowel sequences ending in a [+high] vowel, [+ATR] or [-ATR] present a problem. On the one hand, they could be seen as a long CVV syllable, on the other hand, the final [+high] vocoid could function as a consonant, thus forming a short closed syllable CVC, ending in *-y* or *-w*.

the LHL tone remains on the root [...].” Here, I agree again with Waag, but in a different way—as with (55) and (56), the vowels are not only moraic—the coda consonant is moraic, too, which allows for the preservation of the contour tone on the root.

These examples also bring up the question of whether the contour tone can be carried on a short vowel (as in (56a)) or not. This is a similar question posed above, which has a similar response here. I would suggest that either the vowel is lengthened in order to carry the contour tone or that the sonorant, even though it is now an onset, is contributing to the weight of the previous syllable.

4.4 A Preliminary Discussion of OT Constraints and the Distribution of Contour Tones in

Fur

In order to formalize some of the findings in this chapter, I present a short discussion concerning contour tone distribution in Fur and the types of OT constraints important to a more in-depth analysis of tone in this language.

The generalizations concerning the distribution of contour tones and complex contour tones can be summarized as follows. First, regarding the distribution of contour tones: In disyllabic and trisyllabic words, the initial syllable may take a rising (LH) or falling (HL) tone (with clearer preference for rising), but the final syllable only takes a falling tone (HL). The distribution of the rising and falling contours is different. Rising contours are limited to word-initial syllables (so the left-edge), but falling contours can occur on the initial or final syllable (so the right-edge). Still, the falling contour is more commonly seen on the final syllable rather than on the initial syllable. To account for these observations about distribution, constraints regarding contour tones and alignment are important. First, the type of contour tone can be accounted for through constraints such as *Fall:

(1) *Fall: 'one violation for each falling tone' (Yip 2001; Barrie 2006) and *RISE: 'a syllable cannot bear a Rising tone' (Bickmore 2000).

Second, the position of the contour tone can be accounted for through Alignment constraints:

(2) Align(Tone,Edge,Domain,Edge): 'generalized alignment constraint for tones' (Morén & Zsiga 2006)

(3) Align-R(TBU/contour,Pwd)/ Align-L(TBU/contour,Pwd): 'contours are linked to the rightmost (or leftmost) TBU. Formally: for every TBU/contour there exists some Prosodic Word such that the TBU/contour coincides with the rightmost (or leftmost) TBU in the Prosodic Word' (Zoll 1997).

Further, a constraint like Coincide (contour, final vowel) could also account for the distribution of contour tones in the word.

(4) Coincide(contour,final vowel): 'contour tones are licensed only word-finally' (Zoll 2003)

Second, regarding the distribution of contour tones: Contour tones are limited to only one per word—the maximum number of total tones per word is usually three, with some spreading or splitting. The constraint *Contour would work well for this observation:

(5) *Contour: 'one violation for each contour tone' (Yip 2001; Barrie 2006) would work well for this observation.

Third, regarding the distribution of complex contour tones: Complex contour tones occur on long, open or closed syllables (CVV, CVVC) and very rarely on short syllables that are closed with a sonorant (CVR). In the long, closed syllable, the consonant does not contribute weight. The modified constraints below would be

important in this analysis to show vowel length and the importance of coda sonority in bearing complex contour tones:

(6) Coincide (complex contour, long vowel): 'complex contour tones are licensed only on a long vowel' (Zoll 2003)

(7) Coincide(complex contour,VR rime): 'complex contour tones are licensed only on a sonorous rime' (Zoll 2003)⁸⁹

(8) SonCoda: 'codas are [+sonorant]' (Lombardi 2002).

The way contour tones and complex contour tones behave within morphological processes can be summarized as follows. First, regarding contour tones: Contour tones split when a better mora (i.e., a vowel) becomes available. Here, constraints regarding faithfulness and identity to tone are important:

(9) Dep(Tone): 'all output tones have correspondents in the input (no epenthesis of tones)' (Myers 1997)

(10) Ident(Tone): 'if mora x bears tone T in the input, then the output correspondent of x bears T' (de Lacy 2002)

Second, regarding complex contours: With the complex contour of LHL, like that on a short syllable closed by a sonorant (CVR), the contour of LH will stay on the CVR syllable, but the L will delink and associate to the vowel suffix. This observation shows syllabic segments are preferred over coda consonants as tone-bearing units. To account for these observations, constraints like those below would be helpful:

(11) Ident(Tone): 'if mora x bears tone T in the input, then the output correspondent of x bears T' (de Lacy 2002)

(12) *Contour: 'one violation for each contour tone' (Yip 2001; Barrie 2006)

⁸⁹ Gordon (2006) also has several constraints regarding contour tones, complex contour tones, moraicity of codas, and sonority of codas that would be helpful to a more in-depth analysis.

(13) Max(Association): 'a tone association in the input must have a correspondent in the output (no delinking)' (Myers 1997)

Further, a constraint that would account for the preference of a vowel as a TBU over a consonant as a TBU would be important, so something like *MoraicCoda would be helpful:

(14) 'moraic consonants are forbidden'(Kennedy 2005) and Parse(Tone): every tone has a TBU; formally: for all x(if x is a tone then x is linked to a TBU)' (Zoll 1997).

Third, regarding short vs. long vowels: It is preferred to split the contour tone when that tone is on a short vowel—the tone then goes to next better mora: we see the vowel is preferred over a sonorous consonant. But, with a long vowel, the contour tone remains on the long vowel: 2 moras are available, and the better segment is the vowel. Here, constraints like those below would be useful:

(15) *MoraicCoda: 'moraic consonants are forbidden'(Kennedy 2005)

(16)Coincide(complex contour,long vowel): 'complex contour tones are licensed only on a long vowel' (Zoll 2003)

(17) Coincide(complex contour,VR rime): 'complex contour tones are licensed only on a sonorous rime' (Zoll 2003)

(18)SonCoda: 'codas are [+sonorant]' (Lombardi 2002)

The hierarchy of syllable weight in the licensing of contour tones and complex contour tones can be summarized as follows. Clearly, long open and closed syllables are heavier (CVV(C)) than short, closed syllables (CVC), but short closed syllables are heavier than short open syllables (CV). Further, in some cases, short syllables closed by a sonorant (CVR) are heavier than short syllables closed by an obstruent (CVO). This distinction can be formalized as (57):

(19) CVV > CVR >> CVO > CV

Concerning the formalization in (57), sonorous codas are preferred over obstruent codas for bearing contour and complex contour tones (CVR > CVO), showing that monosyllabic words are heavy, but in disyllabic words with two short, closed syllables (CVC.CVC), the position of the syllable within the word rather than the weight of the syllable matters. Here, position of the syllable is ranked over type of coda consonant. The only exception to this observation is with geminates.

In (58) are listed constraints for a more in-depth OT analysis of contour tone distribution in Fur:

(58)	Constraint	Definition
a.	NO-CODA	'Syllables do not have codas' (Prince and Smolensky 1993)
b.	DEP-IO	'every segment of the output has a correspondent in the input" i.e., no epenthesis' (McCarthy and Prince 1999)
c.	*Fall	'one violation for each falling tone' (Yip 2001; Barrie 2006)
d.	*RISE	a syllable cannot bear a Rising tone (Bickmore 2000)
e.	*Float	'a tone must be associated with a syllable (no floating tones)' (Myers 1997)
f.	3 μ	a syllable can contain no more than three moras (Hall 2002)
g.	Coda/ μ	the coda is moraic (Hammond 1997)
h.	SonCoda	'codas are [+sonorant]' (Lombardi 2002)
i.	*H.H	no consecutive heavy syllables (Boersma and Hayes 2001)
j.	*L.L	'No consecutive light syllables' (Boersma and Hayes 2001)
k.	*Mora[cons]	do not associate a mora with a consonant (Morén 2000) Note: a ton more on other features....
l.	*MoraicCoda	moraic consonants are forbidden (Kennedy 2005)
m.	*MoraicOnset	moraic onsets are prohibited (Topintzi 2008)
n.	Coincide(contour, final vowel)	contour tones are licensed only word-finally (Zoll 2003)

o.	Coincide(contour, long vowel)	contour tones are licensed only on a long vowel (Zoll 2003)
p.	Coincide(contour, stressed vowel)	contour tones are licensed only on a stressed vowel (Zoll 2003)
q.	Coincide(contour, syllable in short word)	contour tones are licensed only on a syllable in a short word (Zoll 2003)
r.	Coincide(contour, V R rime)	contour tones are licensed only on a sonorous rime (Zoll 2003)
s.	NoContour- σ	no contour tones (one tone per syllable) (Yip 2002; Pearce 2006)
t.	*Contour	one violation for each contour tone (Yip 2001; Barrie 2006)

4.5 Conclusion

Building on the argumentation I presented in Chapter 3 of this dissertation, I have argued in this chapter that weight plays a role in the attraction of the contour tones rising (LH) and falling (HL) and complex contour tones (LHL). I have shown that long vowels, diphthongs, and syllables with the structure of CVR (syllables that have a sonorant coda) attract contour tones.

In this chapter, there are three major sets of generalizations concerning contour and complex contour tones: those regarding distribution, those regarding behavior, and those regarding the hierarchy of syllable weight. Each of these generalizations were presented above along with a discussion of OT constraints pertinent to a more in-depth analysis. In the next chapter, I show how reduplication in Fur is also driven by considerations of syllable weight.

Chapter 5

Reduplication in Fur

McCarthy & Prince (1986, 1990, 1995a) argue that reduplication can be a weight-sensitive process: the shape of the base often assumes a specific shape that conforms to a weight standard within the language. This study investigates syllable weight in Fur reduplicants. Specifically, I argue that prosodic structure, motivated in part by sonority, is important in the formation of reduplicants in this language.

In Fur nouns there are several patterns of both full and partial reduplication. . These forms are fossilized from a formerly productive process in the language, and all show a specific prosodic shape in the shape of the reduplicant. For these forms, the meaning of the root—if different from the reduplicative form—generally cannot be recovered.⁹⁰ Most of these fossilized cases are words for specific animals and plants

With total reduplication, the shape of the reduplicant is that of the base:

- | | | |
|-----|--|-------------------------------------|
| (1) | a. ùl-ùl ‘mad person, mental problem; mad’ | c. gájà-gájà ‘riddle’ |
| | b. bèl-bèl ‘grass, sp’ | d. birij-birij ‘wild cat, specific’ |

In these examples, all bases follow an iambic template (Hayes 1995) of H (1a,b), LL (1c), or LH (1d) feet.⁹¹ There are no known languages that have an iambic foot requirement in reduplication (cf. footnote 24 in Crowhurst and Olivares 2014), so this chapter shows that languages can have an iambic foot requirement.

⁹⁰ There is one example *dàydây* ‘storage made of rope’ (dictionary and K LW) that may have come from the noun *dây* ‘grass, general’, but this is only speculation based on the inference that rope is generally made out of grass or some type of natural plant-based substance and not a synthetic substance like nylon.

⁹¹ Recall that coda consonants are moraic in Fur and that the bimoraic foot (CVC, CVV) corresponds to the minimum word in this language.

Using Optimality Theory (see Crowhurst (2004), Gordon (2007), Kennedy (2008), McCarthy and Prince (1986, 1990, 1995), and others), a tangle of constraints concerning the size of the base (and shape of the reduplicant), the faithfulness of the shape of the base (and reduplicant), the direction of the reduplication in regards to the base, and those concerning sonority are discussed in this chapter to account for these patterns of reduplication. Further, lexical tone patterns are also shown to help account for different patterns of reduplication.

This chapter is laid out as follows. In section 5.1, the patterns of reduplication are summarized, along with sections on the four patterns of total reduplication and several examples with partial reduplication—where alliteration occurs (either to the right or left of the base)—like a prefix, or the rhyme occurs (to the right of the base only)—either like a suffix or infix. There are also some examples presented of potential reduplication in Section 5.2. Section 5.3 then shows how lexical tone patterns are also important in accounting for the different patterns of reduplication. Section 5.4 presents a partial analysis of reduplicants, using Optimality Theory, and discusses the types of constraints that are important with a more in-depth analysis of Fur reduplication. Finally, section 5.5 concludes the chapter.

5.1 The Patterns of Reduplication

In this section, the types of reduplication attested in Fur are summarized.⁹² As mentioned in the Introduction to this chapter, there is both total and partial reduplication in this language. Both of these types of reduplication are more thoroughly discussed in separate sections of 5.1 below.

⁹² Most examples come from a Fur dictionary (unpublished m.s.), and some are seen in K LW and W. Those examples without citations are from the dictionary, and those in the dictionary and the other sources are noted as (D, K LW) or (D, W).

5.1.1 The Eight Bases of Reduplication and Their Outputs

While there is a variety of reduplication in Fur nouns, eight total bases may occur. These eight bases produce outputs with total reduplication and partial reduplication; however, in some examples, only partial reduplication is permitted. Table 5.1 presents the seven bases with their possible outputs:

Table 5.1 Seven Bases with Possible Outputs

	Base	Output	Total RED	Partial RED	Number of examples
1.	(C)VC	CVC-CVC	X	-----	16
		<u>CV</u> -CVC OR CV- <u>CV</u> -C (infix)	-----	prefix or infix	1
		CVC- <u>VC</u>	-----	suffix	9
2.	V.CV	<u>VC</u> -V.CV OR VC- <u>VC</u> - V OR V.CV- <u>CV</u>	-----	prefix or infix or suffix	2
3.	CV.CV	CV.CV	X	-----	4
		CV.CV- <u>CV</u>	-----	suffix	5
		<u>CVC</u> -CV.CV OR CV.CVC- <u>CVC</u>	-----	prefix or suffix	
4.	V.CVC	V.CVC- <u>CVC</u>	-----	suffix	1 (verb)
5.	CV.CVC	CV.CVC-CV.CVC	X		4
		CV.CVC- <u>CVC</u>	-----	suffix	1
6.	CVC.CV	CVC.CV- <u>CV</u>	-----	suffix	1
7.	CVV.CV	<u>CVV</u> -CVV.CV	-----	prefix	1
8.	CV.CV.CV	CV.CV.CV- <u>CV</u>	-----	suffix	1

Table 5.1 shows that most examples of reduplication come from the base (C)VC, and that several examples also have a base of CV.CV or CV.CVC. Further, there are more examples with total reduplication than there are with partial reduplication.

5.1.1.1 Total reduplication

There are several examples in Fur nouns where the reduplicant equals the shape of the base. In these examples, the iambic foot is the shape: either a heavy base ((C)VC), a light-light base (CV.CV), or a light-heavy base (CV.CVC) can have total reduplication.

Consider the examples in (3) and (4)⁹³:

- | | |
|---|--|
| <p>(2) a. ùl-ùl 'mad person, mental problem;
mad'</p> <p>b. bèl-bèl 'grass, sp.'
dìr-dìr 'small bird, sp.'
dòl-dòl 'bird, sp.'
gòr-gòr 'fish, sp.'
kàl-kàl 'earring'
kùl-kùl 'tree, sp., not edible'
pìl-pìl 'hot pepper' (D, K LW)
mìr-mìr 'plant, sp. not edible'</p> <p>c. nír-nír 'plant, sp. edible'
wít-wít 'bird, sp.' (D, K LW)</p> | <p>(3) a. múr-mùr 'plant seeds, sp.'

tár-tàr 'kind of animal fat'
yéw-yèw 'filament (Faden)
of rope'</p> <p>b. gòl-gól 'skull; amago fruit'
tùl-túl 'circle made up of
sticks used in
building'</p> |
|---|--|

In these examples, the entire base is the size of the reduplicant, which is bimoraic ((C)VC), and thus a heavy syllable. Most of the examples have a liquid coda (CVR)—there is only one example that has an obstruent, suggesting that these forms are following the minimum word requirements, which were presented in Chapter 3. The examples in (3) and (4) also show the different surface tones that can occur with these forms. Tone is discussed in section 5.2 of this chapter.

There are also examples where a light-light (CV.CV) base becomes the shape of the reduplicant, as in (5):

⁹³ Which form was the base and which was the shape of the base cannot be ascertained from these examples where tone is also copied; the direction (to the right or left of the base) can also not be discerned from these examples. The differences in tone are accounted for in a different section below.

There are no examples where a light syllable ((C)V) is the shape of the reduplicant or the base, but I would suggest that this is because the smallest base allowed to fully reduplicate corresponds to the minimum word, which is bimoraic. As discussed in Chapter 3, the minimal word in Fur is (C)VC, so it follows that the smallest unit that is able to be fully reduplicated would be of the same structure. Most nouns in Fur are disyllabic, providing additional motivation for these structures. Further, only monosyllabic (bimoraic) or disyllabic forms (iambic feet) are reduplicated—there are no cases of trisyllabic or greater reduplicants like *CV.CV.CV in this language.

The length of the vowel is also important in all of (3-6), as there are also no examples with long vowels being fully allowed to fully reduplicate in this language—all are short vowels.

5.1.1.2 Partial reduplication: Alliteration and rhyme shape of the reduplicant

Some examples of reduplication in Fur show that the shape of the reduplicant is only a part of the base. There are several examples where alliteration is employed or where the rhyme is copied.

In forms with reduplication in which alliteration is present, the onset and the nucleus are usually the shape of the reduplicant. This type of alliteration can be seen in Icelandic, for example (Fabb 1997), so it is not unusual. Further, the direction of the reduplicant—either to the right or to the left of the base—in these forms is localized. Alliteration occurs to the right of the base when the final syllable is involved in the alliteration, and alliteration occurs to the left of the base when it is the initial syllable that is involved in the alliteration. These types of partial reduplication are similar to other morphological affixes in Fur, like the plural suffix:

(7) a. gèw gèw-ŋà 'round hat or flap' (D)

(7) shows that the suffix (CV) is joined to the right of the root (CVC).

The first type of partial reduplication discussed in this chapter involves alliteration to the left of the base, with the onset and nucleus being the size of the reduplicant:

(8) gà-gàm 'wild plant, sp.'⁹⁴

(8) is the only example recorded of this type of reduplication.

There are no examples of total reduplication that have a nasal as the coda consonant (see examples 4 and 5 above), suggesting a possible motivation for alliteration to take place rather than total reduplication: **gàm-gàm*. The partial reduplication of a light syllable in (8) is not seen in the fully reduplicated forms in (4), but a light syllable is still plausible as a candidate because there are several function words like personal pronouns and other affixes (see the plural suffix in (7) above and several examples in Chapter 2) that are light. Also, these findings show that a light syllable can be the size of the reduplicant but that a light syllable cannot be both the size of the base and the size of the reduplicant like those examples in (5); these findings further support the fact that the minimal word in Fur is bimoraic rather than monomoraic *((C)V).

In (9) is one example showing the first full syllable as the shape of the reduplicant:

(9) wí-wíinà 'bird, sp.'

The contour tone stays on the long vowel of the reduplicant because the base can carry the contour tone—there are enough moras. This example is also unique in that the syllable being copied has a long vowel, showing that shortening does not take place in these forms: **wí-wíinà* 'bird, sp.'

The examples in (10) show partial reduplication of the final syllable (i.e., alliteration to the right of the base):

(10) a. zàgà-gà 'plant, sp. not edible'

⁹⁴ Parker (personal communication) notes that this example could be an infix.

bùrú-rú 'fly, sp.'

- b. búrù-rú 'waxy berry uice'
- tórò-ró 'rat, sp.'
- túsi-sí 'bird, sp.'
- c. bùrtù-tù 'frog, sp.'

In these examples, there are at least two syllables in the base: either a light-light base is the size of the reduplicant, and occurs to the right of the base (10a,b), or a heavy-light base (10c) is the size of the reduplicant, and occurs to the right of the base.

There is also one example of a trisyllabic word that has partial reduplication:

(11) kòsònó-nó 'place to stick needle on back of sheet'

This example is similar to those in (10); however, it is unique in that it has three syllables in the base. The final syllable copies to the right, because shape of the reduplicant more than that would violate foot structure: *kòsònó-kòsònó or *kòsònó-sònó or * kòsò-kòsònó.

Now consider the examples in (12) below:

- (12) a. ùrùrù 'bird, sp.'
- b. ìrîrî 'dragonfly'

In these examples, the final syllable also is part of the reduplicant, but there is a difference in tone. There are two possibilities for these forms. One possibility is that the onset and nucleus of the final syllable is part of the reduplicant and occurs to the right of the base: ùr-ùr-ù 'bird, sp.'. This type of reduplication would be a type of infixation. Another possibility is that the final syllable is the shape of the reduplicant and occurs to the right of the base: ùrù-rù 'bird, sp.', which would be a type of alliteration.

Now consider these examples of reduplication, where only the rhyme (the nucleus and the coda) is the size of the reduplicant.

- (13) a. mòg-òg 'wild animal, sp. bit bigger than goat'
 bìl-ìl 'grass, sp.'
 pàl-àl 'type of shell from sea'
 sà̀n-à̀n 'vine'
 tá̀l-á̀l 'vine, sp.'
- b. m̀ùn-ùn 'plant, sp. parasite grows on trees, disease; warts, sap of tree used for catching birds.'
 mú̀n-ùn 'insect, sp.'
- c. sà̀n-à̀n 'stone for sharpening utensils like an axe'
 dè̀l-è̀l 'plant, sp. not edible'

In the examples in (13), the base is (C)VC. Only the rhyme is the size of the reduplicant, and it occurs to the right of the base in these examples. The different patterns in tone are discussed in section 5.2 below.

There is also one form in (13) that is not like the others. In (13a), *mòg-òg* 'wild animal, sp. bit bigger than goat' is the only example with a non-sonorant coda. I suggest that the base is heavy, like the others with sonorant codas because of the bimoraic minimum word requirement. The other option might be that the form **mòg-mòg* is avoided because the resulting consonant sequence of g.m does not follow the Syllable Contact Law (Clements 1990), where the coda consonant is usually more sonorant than the following onset consonant. There are other examples, however, where this law is violated (e.g., *wít-wít* 'bird, sp.' (D, K LW)), so the possibility of a form like **mòg-mòg* existing is still plausible. Because of these observations, I suggest that the obstruent coda consonant is also moraic like the sonorant codas, thus making the base heavy.

There is also one example where the right-most heavy syllable (CVC) is the size of the reduplicant, and it occurs to the right of the base:

- (14) kùtíj-tíj 'bird, specific' (D, W)

The base in (14) is an iambic foot of light-heavy (CV.CVC). Even though this structure can be the shape of the reduplicant as in *kiríw-kiríw* 'bird, sp.' above, (14) only shows the final syllable as the shape of the reduplicant. Note that the coda consonant is a sonorant.

- (18) a. *gògògè* ‘bird, sp.’ b. *dóddòré* ‘wild cat, sp.’

The base in (18a) could either be *gòg* or *gògè*. If it is *gòg*, then either alliteration took place to the left of the base, as with *gò-gòg-è*, or rhyme took place to the right of the base, as with *gòg-òg-è*. Further, if the base is *gògè*, then there is either alliteration of the initial syllable to the right of the base, as in *gò-gògè* or to the left of the base: *gò-gò-gè*. But why does the base not fully occur as the reduplicant, which is something seen in (13), if the base for this example is *rùg*: *rùg-rùg-è* ‘bird, sp. (with big eyes)’? If the base is *gòg*, and the reduplicant is the size of the base, (17a) would become **gòg-gòg-è*, and a geminate would form. Perhaps a geminate is avoided in this type of reduplication. But, when looking at (15b) *dóddòré* ‘wild cat, sp.’, a geminate is in the reduplicant, showing that germination (or geminates) do occur in reduplication.

(18b) presents another interesting form when trying to recover the base. I suggest that in this form, lenition took place. As shown in Chapter 2, via metathesis (and other processes) some consonants weaken between vowels. $d \rightarrow r$ is a form of lenition seen with verbs whose roots have undergone metathesis. Thus, I suggest that *dód* is the base, and the base copied fully to the right when the suffix *-e* was added to it. Because the obstruent occurs between two vowels, lenition took place, causing the $/d/ \rightarrow r$: *dód-dòr-é*. If the base was *dòré* or *dòr*, we could assume that a form like **dòr-dòr-é* would be possible, as *sàr-sàr-è* ‘bird, sp.’ exists.

Finally, the examples in (18) could also potentially be reduplication: **gògè-gògè* and **dòré-dòré*, as there are examples of reduplicants where light-light feet are the shape of the reduplicant (as seen in section 5.1): *dùgù-dùgù* ‘eagle, sp. same as *kùlífisà*’.

Even with the ambiguity surrounding the proposed bases and the proposed shape of the base, the surface forms of these reduplicants follow the size of the reduplicants seen so far in Fur: alliteration of the onset and nucleus takes place (CV) or

the rhyme is copied ((C)VC). As mentioned in this section, both (14) and (15) end in the vowel [e], suggesting that this vowel may have been a suffix at some point in the language, the meaning now lost.

5.1.1.3 Vowel and consonant lengthening or shortening during reduplication

Some reduplicative forms in Fur show signs of vowel lengthening or shortening, depending on what the possible base may have been.

First, consider these examples:

- (19) a. yóòyò ‘tree, sp., not edible’
 yúùyù ‘flock of birds’
- b. súsúsú ‘empty head of sorghum plant, after the birds have eaten the seeds’
 sùùsù ‘fish, sp.’

In (19a) if we posit the base was yóò, the onset and initial vowel then alliterated to the right of the base, with the low tone spreading to the reduplicant: yóò-yò. This would be an example of alliteration, the same kind seen in the examples in section 5.1 above. The base would not be equal to the size of the reduplicant in this case because there are no examples with only two long vowels in a reduplicant: * yóò- yóò. In wíí-wíínà or wíí-wíí-nà ‘bird, sp.’, the structure is different, (CVV-CVV.CV).

The examples in (20) and (21) below are similar to those in (16):

- (20) zùùrù ‘bird, sp.’ (D, K LW)
 sùùrù ‘earth, ground’
 túúrú ‘ant, sp.’ (K LW)
 túúrú ‘squirrel, sp.’ (K LW)
 mùùrú ‘lion’ (K LW)
- (21) zèèlè ‘tree, sp. not edible’
 zìdì ‘bird, sp.’

I would suggest that only the vowel reduplicated to the right of these examples because the consonant of the base serves as the onset of the derived syllable. For example, the

base for *zùrù* ‘bird, sp.’ (D, K LW) would be *zùr* with the vowel reduplicating to the right of the base: *zùr-ù*.

Now consider the examples in (22) where geminates occur in reduplicants:

- (22) *táttáágò* ‘grasshopper, sp’ (D, W)
túttùrù ‘insect, sp.’

In these examples, the base may be *tùrù*, in *tút-tùrù* ‘insect, sp.’ One reason for the suggested base is that the word for ‘ant, sp.’ in Fur is *tùrù*. This reduplicant form is a specific insect, and may be a specific kind of ant or something related to *tùrù* ‘ant, sp.’ If the base is *tùrù*, then two forms are possible: either the initial syllable is the size of the reduplicant, and it occurs to the right or left of the base: *tút-tù-rù* or *tút-tùrù*. Again, *wíwíinà* ‘bird, sp.’ should be considered. Because the onset is a glide in this *wíwíinà*, a geminate glide may be what is being avoided: **wíw-wíinà*.

Now consider this example:

- (23) *kúlíkùlísà* ‘eagle, sp. Same as dugudugu’ (D, K LW)

With (23), either *kúlí* or *kùlî* is copied. Both light-light feet and light-heavy feet have been shown in Fur to shape of the base with reduplicants in section 5.1; however, the heavy syllable in the light-heavy foot was a short, closed vowel, not a long, open vowel as in (23). This fact suggests that the base is *kúlí*, and the vowel is lengthened.

Now consider (24):

- (24) *túúbìtú* ‘bird, sp.’

In (24), alliteration takes place to the right of the base *túúbì-tú*, or the final syllable is the shape of the reduplicant and it occurs to the left of the base and is lengthened *túú-bìtú*.

A better solution is that alliteration took place with *túúbì-tú*, because this type of reduplication has been seen in the other examples of section 5.1.

And finally, consider the examples in (25):

- (25) a. kětětǵè 'bird, sp.' (W 44)
 gòmôrgò 'type of basket' (D, W)
- b. kótòrgó 'snake, spl.'
 gùràṅgú 'crane (bird), same as gùrág'

In *kětětǵè* 'bird, sp.' could be *ketet-ge*, with the the /k/ becoming voiced. In *gòmôr-gò* 'type of basket', the onset is already voiced, so no change takes place. In *kótòrgó* 'snake, spl.' the underlying form could be *ko-torgo*, with the /g/ devoicing.

5.1.3 Summary of the Types of Reduplication: Full and Partial

In section 5.1 I have presented the possible types of reduplication within nouns. I have shown that there is both total reduplication and partial reduplication. In the forms with total reduplication, the iambic foot ((LL), (H), or (LH)) is the shape of the reduplicant. In forms with partial reduplication, the onset and nucleus of either the initial or final syllable in the word alliterates. There is also rhyme in these partially reduplicated forms. Further, I have shown that sonority of the coda consonant and of C.C sequences is important in these forms.

The next section shows how tone behaves with reduplicants and how tone in reduplicants mirrors that of other morphological processes in Fur.

5.2 Tone in Reduplication: Reflecting Word-Formation

In this section, I draw on principles from Chapter 4 to show how the forms of reduplication presented in this chapter mirror the tone melodies in Fur. There are six melodies as presented in Chapter 4: L, H, HL, LH, LHL, and rarely HLH. Further, in this section, I show that tone in reduplicated forms mirrors that of other morphological processes in Fur: tone is often spread to the reduplicant much like when a suffix or prefix is joined to the root of a word in Fur, or tone is delinked from the base and then associated to the reduplicant.

5.2.1 Lexical Tones L, H, LH, and HL

In this section, we consider forms with reduplication that have the lexical tones L, H, LH, or HL. Consider (25) below:

- (25) a. m̀̀r-m̀̀r ‘plant, sp. not edible’
 b. múr-m̀̀r ‘plant seeds, sp.’
 c. t̀̀l-t̀̀l ‘circle made up of sticks used in building’

In (25a), the tone spreads to reduplicant, just as it would with a suffix (like the plural morpheme in Chapter 4) when joined to a root in Fur:



And in (26b and c), the contour tone splits (see 27 below), with the final tone delinking and then associating to the reduplicant, again, just as it would with a suffix:



The splitting of contour and complex contour tones is common in Fur, as seen in the creation of plurals from singulars when the plural morpheme joined to the root (see Chapter 3), so the contour tones could split here too.

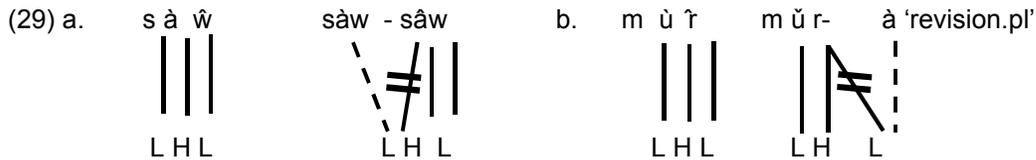
Now consider the examples in (28)⁹⁶:

- (28) d̀̀y-d̀̀y ‘storage made of rope’ (D, K LW)
 s̀̀w-s̀̀w ‘wild cat, sp.’
 j̀̀l-j̀̀l ‘person who travels around (not stable)’

⁹⁶ There is one example: *ẁ̀ẁ̀* ‘girl’s name (also boy?)’.

tòr-tôr 'round tool (net, eg. for catching birds or playing) made of a round stick
and a net of rope'
wâr-wâr 'stirring stick for stirring stew'

In (28), the tonal melody of the output is L.HL. Underlyingly, there may have been a complex contour tone of LHL, as in examples similar to the noun *mûr* 'revision'. When reduplication took place, tone copied to the left of the base with the final syllable taking the falling contour tone, as opposed to a suffix like that for 'revision', which was added to the right of the root, causing the tone to split to the right. These examples also preserve a coda consonant (CVC → CVC.CVC) while 'revision' and the other examples of complex contour tones on short vowels do not (CVC → CV.CV), so perhaps it is the coda consonant in 'wild cat, sp.' and the other examples making the syllable heavy, and then default right for the falling tone, as falling tones are more common than rising:



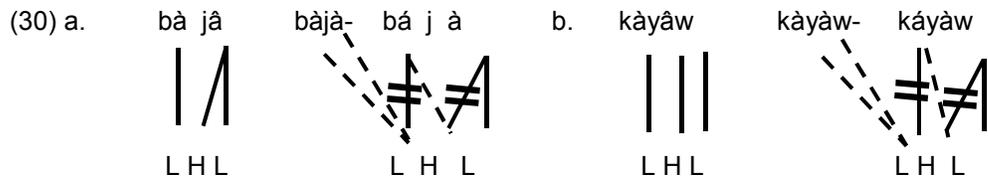
(29a) shows that the reduplicant takes place to the left of the base, with the L tone delinking and associating to the right. This kind of association (as in 27b with the plural morphemes) is plausible to see occurring to the left, with the reduplicant acting like a prefix.

5.2.2 Lexical tones LHL and HLH

Now consider (29), where the shape of the reduplicant is the same as that of the base, but the tone melody is not:

- (29) a. bàjà-bájà 'bird,sp'
 zàgà-zágà 'ant, sp.'
- b. kàyàw-káyàw 'wild plant, sp. like onion, edible' (D, K LW)

With the examples in (29), I suggest that the melody of the base is LHL, and that the initial L tone again delinks, associating to the reduplicant and spreading through the entire reduplicant. The HL contour is then split, with the H delinking and associating to the next available mora:



(30) shows that contour tones on short, open syllables are only there when forced to be there—when given the opportunity, the contour splits and goes to the next, optimal mora.

There are also examples where the entire tonal melody copies:

- (32) a. *dùgù-dùgù* ‘eagle, sp. same as *kúlíísà*’
 gájà-gájà ‘riddle’
- b. *bìrìṅ-bìrìṅ* ‘wild cat, specific’ (D, W)

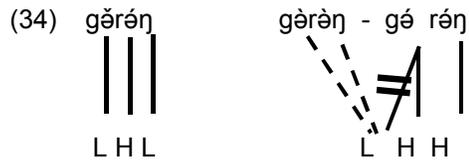
Concerning tone, the tonal melody in its entirety is copied in both mono and disyllabic words. There are no contour tones in these examples. Where nasal assimilation might be expected to occur, as in (30b) *bìrìṅ-bìrìṅ* ‘wild cat, specific’ this is not found: The [ŋ] does not assimilate in place (so [m] to the [b]) as this segment would in other morphological processes.⁹⁷

Now consider (33):

- (33) *gèrèṅ-gérérṅ* ‘Adam’s apple’ (D, KLW, W)

I posit that the underlying tone for ‘Adam’s apple’ is LH.H, and that to maintain contrast, the L tone from the initial syllable spread (as with the other examples), but the H tone spread onto the reduplicative form.

⁹⁷ Parker (p.c.): Underapplication or over-feeding opacity.

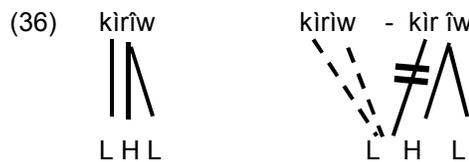


Tonal spreading is not uncommon in Fur, as seen in several morphological processes in this language; thus, these examples support tonal spreading these forms.

Now consider this example of reduplication:

(35) kiriw-kirîw 'bird, sp.'

Here the entire base (LH) foot, is the size of the reduplicant, while only the L tone spreads to the reduplicant:



Again, in this example, the consonant coda of the final short, closed syllable (CVC) is a sonorant, which explains why the contour tone is attracted to this syllable.

Now consider examples like (37):

- (37) a. bîl-îl 'grass, sp'
 b. zàgà-gà 'plant, sp. not edible'

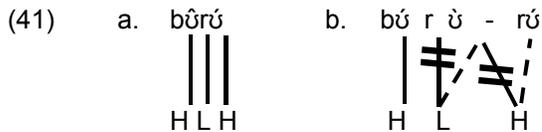
The tone in these examples can be accounted for through the same analysis presented for in the section on full reduplication. In (24a) and (24a), the tone spreads:



Now consider (39), which shows an example of a tone spreading and (39) a tone delinking and associating in partially reduplicated forms:



Now consider (41), where the lexical tone is HLH—a rare melody (see Chapter 4 concerning lexical tone):

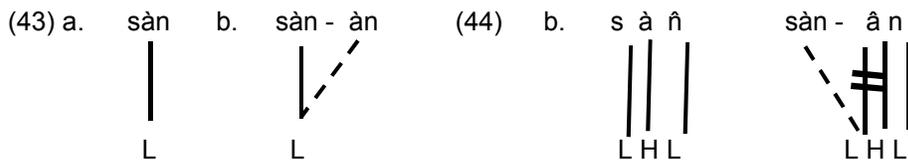


The analysis that the underlying tone for the word ‘waxy berry juice’ was a H.LH, with the word ending in a rising (LH) tone, presents a challenge as this melody is rarely seen in the licensing of contour tones of Fur. As shown in Chapter 3, no rises occur word-finally in this language. Rises only occur on short, open syllables (CV)⁹⁸ in the initial position of a word. The sequence HLH on a word is generally not seen, with the L becoming a downstep, but in some cases as Waag (2010) mentions, the sequence HLH can be pronounced in careful speech across morpheme boundaries by some speakers.⁹⁹ In (40) the tone must have been carefully pronounced.

Finally, an underlying complex contour could be argued for in the partial reduplication of (42).

(42) s̀àn-ân “

Compare (43) to (44):



⁹⁸ But I argued that these are long vowels in open syllables word initially in Chapter 3.

⁹⁹ Parker (p.c.): Or the L floats and the second H downsteps.

In (43) the tone spreads with the shape of the base, but in (44), the tone split with HL on the right-most syllable of the base. Again, in this example the coda consonant is a sonorant and would aid in carrying a contour tone. (44) may be a case of the base shape of the baseing to the left (as shown in the representation in (44), thus allowing for only the spreading of the L tone and allowing for the contour tone to remain word-finally.

Finally, consider the examples in (44) of partial reduplication:

- (45) a. sùùsù 'fish, sp.'
 b. yóòyò 'tree, sp., not edible'

Here the tone merely spreads to the reduplicant:

- (46) a. sùù b. sùùsù (47) b. yóò yóò- yò
-

5.2.3 Summary of the Behavior of Tone in Reduplicants

This section has shown that tone in reduplicants usually spreads from the base to the reduplicant or that it may delink and spread. Both phenomena have been observed in other morphological processes, as seen in Chapter 4. Further, in some examples, the tone is completely copied along with the shape of the base.

5.3 Preliminary OT Analysis and Discussion of important Constraints

In this section, some clear cases of reduplication are analyzed through OT in order to show what types of constraints are important in Fur reduplication.

Because both total and partial reduplication occur in Fur, *Max-BR is an important constraint—if this constraint is ranked above other constraints, total reduplication will occur; if this constraint is ranked lower than other constraints, only partial reduplication will occur.

(1) Max-BR: ('every segment of the base has a correspondent in the reduplicant (reduplication is total) (McCarthy and Prince 1995)

First, we examine instances of total reduplication in Fur. Only three sizes of bases may occur as reduplicants, and these three bases correspond to the iambic foot: CVC, CV.CV, and CV.CVC. Because of this constraint on the size of the base, the constraint Red=iambic foot (modified from Red=Ft because no languages have yet been described as having iambic feet reduplicate) is needed. This constraint means that the reduplicant is the size of an iambic foot, and helps eliminate candidates like CVV.CVV-CVV.CVV and CVC.CVC-CVC.CVC. The prefixing or suffixing nature of total reduplication is not known, so an alignment constraint is not needed at this time. A ranking of Max-BR > Red=iamb >> Max-IO > NoCoda may be important for this type of discussion.

There are several sizes of reduplicants that do not occur in total reduplication: *CV, *CVV, *CVVC, *CVC.CVC, *CVC.CV, and *CVV.CV. Only an iambic foot can totally reduplicate. One exception is the structure with a base of CVV—why is this structure not allowed to fully reduplicate when CVC fully reduplicants? Most of the structures can occur in partial reduplication, showing that Max-BR is ranked below other constraints. There are six bases that allow partial reduplication: CVC, CV.CV, CV.CVC, CVV.CV, V.CV, and CV.CV.CV. Here the constraint Align-Red-R is important in aligning the reduplicant in the proper place. Here, the shape of the base must follow the stem.

(2) Align-Red-R: 'Align the right edge of the reduplicant with the right edge of the prosodic word' (Kager 1999)

In (3) a list of potential constraints important for a more in-depth analysis of all of the data in this chapter is presented¹⁰⁰:

(3)	Constraint	Definition
a.	NO-CODA	'Syllables do not have codas' (Prince and Smolensky 1993)
b.	*COMPLEX	'no more than one C or V may associate to any syllable position node' (Prince and Smolensky 1993) 'tautosyllabic consonant clusters are prohibited, i.e., "avoid consonant clusters"' (Hume 1997, 2004)
c.	ONSET	'Syllables must have onsets' (Prince and Smolensky 1993)
d.	DEP-IO	'every segment of the output has a correspondent in the input' i.e., no epenthesis' (McCarthy and Prince 1999)
e.	3 μ	'a syllable can contain no more than three moras' (Hall 2002)
f.	Coda/ μ	'the coda is moraic' (Hammond 1997)
g.	SonCoda	'codas are [+sonorant]' (Lombardi 2002)
h.	*H.H	'no consecutive heavy syllables' (Boersma and Hayes 2001)
i.	*L.L	'No consecutive light syllables' (Boersma and Hayes 2001)
j.	*Mora[cons]	'do not associate a mora with a consonant' (Morén 2000)
k.	*MoraicCoda	'moraic consonants are forbidden' (Kennedy 2005)
l.	*MoraicOnset	'moraic onsets are prohibited' (Topintzi 2008)
m.	Align(#,Foot)	'stem-internal morphological boundaries occur at foot boundaries' (Kennedy 2008)
n.	Align(Red-R,Stem-L)	'the reduplicant subcategorises for a following Stem' (Downing 2000)
o.	Align-L-Red-Wd	'the left edge of the reduplicant must occur as close as possible to the left edge of the word' (Riggle 2006)
p.	Align-Right- μ (Affix(Red), $\sigma\mu\mu$)	'the rightmost mora in any Red is the rightmost mora in a heavy syllable' (Crowhurst 2004)
q.	Align-Seg-Left(Affix(Red),PrWd)	'the leftmost segment in every Red is the leftmost segment in some PrWd' (Crowhurst 2004)
r.	Align-Seg-Left(Affix(Red), $\sigma\mu\mu$)	'the leftmost segmental root node in any Red is the leftmost segment of a heavy syllable' (Crowhurst 2004)
s.	Align-Seg-Right(Affix(Red),Pr)	'the rightmost segment in every Red is the rightmost segment in some PrWd' (Crowhurst 2004)

¹⁰⁰ Note that this is not an exhaustive list of possible constraints.

	Wd)	
t.	Align-Seg-Right(Affix(Red), $\sigma\mu$ μ)	'the rightmost segmental root node in any Red is the rightmost segment of a heavy syllable' (Crowhurst 2004)
u.	Align- μ -Left(Red,PrWd)	'the leftmost mora of Red is aligned with the leftmost mora of some PrWd' (Crowhurst 2004)
v.	Align- μ -Left(Root,PrWd)	'the leftmost mora of the root is aligned with the leftmost mora of some PrWd' (Crowhurst 2004)
w.	Align- μ -Right(Red,PrWd)	'the rightmost mora of Red is aligned with the rightmost mora of some PrWd' (Crowhurst 2004)
x.	Align- μ -Right(Root,PrWd)	'the rightmost mora of the root is aligned with the rightmost mora of some PrWd' (Crowhurst 2004)
y.	RED=Ft	'the Reduplicant is a (binary) foot' (McCarthy and Prince 1993)
z.	RED= $\sigma\mu$	'the edges of the Reduplicant must coincide with the edges of a light syllable' (McCarthy and Prince 1993)
aa.	StrongAnchor	'there is correspondence between the segment at edge _i of the base and the segment at edge _i of the output, and "every" output segment corresponding to the base segment at edge _i must be located at edge _i of the output' (Bat-El 2006)
bb.	StrongAnchorEdge	'there is correspondence between the segments at the left and right edges of the base and the segments at the left and right edges of the output, and "every" output segment corresponding to the base segments at left and right edges must be located at the left and right edges of the output' (Bat-El 2006)
cc.	StrongAnchorLeft	'there is correspondence between the segment at the left edge of the base and the segment at the left edge of the output, and "every" output segment corresponding to the base segment at left edge must be located at the left edge of the output' (Bat-El 2006)
dd.	Contiguity _{IB}	'the portion of the base standing in correspondence to the input forms a contiguous string' (Fitzgerald 2000)
ee.	Contiguity _{IR}	'the portion of the reduplicant standing in correspondence to the input forms a contiguous string' (Fitzgerald 2000)

5.3 Conclusion

In Fur, there are several patterns of reduplication. Most forms are fossilized within the noun-class of words in Fur. In this chapter, the types of reduplication of Fur

have been analyzed, showing that there is both full and partial reduplication. Further, it has been shown that reduplication is constrained by syllable weight and by foot structure. The types of structures reduplicated have also mirrored those of the attested syllable types in Fur, as described in Chapter 3. The final section shows how tone placement within reduplicants mirrors that of general word-formation in many cases.

Before concluding this chapter, I should note that there is one, current productive process of reduplication within the modifiers¹⁰¹ whereby the entire root, including the tonal melody becomes the reduplicant. When this reduplicative form is used, the intensity of the modifier is diminished:

(46) *tùllé- tùllé* 'somewhat good/well' (from *tùllé* 'well') (W 95)

Here in (46) the reduplicant equals that of the base: CVC.CV. This type of reduplication is also seen with the reduplicative forms of the nouns, but this syllable structure of heavy-light (CVC.CV) is not currently found in the fully reduplicated forms of nouns (i.e., only iambic feet are found with them). As discussed in Chapters 3 and 4, this syllable structure of heavy-light and the gemination is specific to the word-class of modifiers. Even though this is the only example of reduplication as a productive process within this language, it supports the argument that the fossilized forms of reduplication studied in this chapter were at one time productive.

In the next chapter, I show how alliteration, rhyme, and syllable weight are important organizing factors in the formation of Dance Songs in Fur.

¹⁰¹ Waag (2010: 95) notes that there are several degrees of modifiers with several different forms, one of which is a reduplicative form.

Chapter 6

Fur Dance Songs

6.1 Introduction

In this chapter, I analyze several Fur dance songs that Beaton (1940) recorded in his ethnographic work “Fur Dance Songs.”¹⁰² The purpose of this chapter is to summarize the phonological properties around which dance songs are organized. Alliteration and rhyme, heavies vs. lights, and the near absence of syllables with the shape of CVO are all significant to this genre, and thus covered in this chapter. What is shown is that each of these areas is connected through sonority, reinforcing the conclusions presented in Chapter 2 on sonority.

The outline for the rest of the chapter is as follows. In the remainder of section 6.1, I first describe the corpus of songs that I analyze. Section 6.2 shows how alliteration, rhyme, and sonority are important organizing factors in these songs. In section 6.3 I show how weight is also an important organizing principle in these songs, with focus on the sonority of codas in short, closed syllables (CVCs). Finally, in section 6.4 I conclude the chapter and summarize the findings.

6.1.1 Corpus of Dance Songs

In this section, information about the dance songs is presented. There are a total of 46 songs and 181 lines, which is not a large corpus, but these examples still provide enough data to present some of the general tendencies of phonological organizational principles in these dance songs.

¹⁰² With respect to Beaton’s transcription, see his book *A Fur Grammar*, and his article “Fur Dance Songs.”

6.1.1.1 The ethnographic division of dance songs

While the division of dance songs into nine genres provided by Beaton is not used to organize the analysis in this chapter, I provide a brief description below in order to show how these songs have been organized in previous literature and to discuss the total number of songs and total number of lines consulted in this study.

Beaton has organized each genre of song into one of four ways: age, person, item, action, and/or event.¹⁰³

In his ethnography, he has organized the Tεsa, Kɔsɔk¹⁰⁴, and Diktis songs based on the age of the singers: children sing and participate in the Tεsa dances, youth sing and participate in Kɔsɔk dances, and the elderly sing and participate in Diktis dances. Beaton notes that these dances are the most frequently performed genres and that the Tesa and Kosok can be almost interchangeable. Within these genres, there are several themes.

The Jɔmbole genre is categorized by Beaton by the specific type of “special persons,” who sings it. With this dance song type, the *muhajra* ‘Fiki’s pupil’ is only allowed to sing it, so only males may perform the song.

Beaton categorized the Jurε and Duko dance songs according to an item or specific body movement that is used during the dance (sticks and stomping, respectively). Beaton categorizes these songs with the Jombole, even though there does not seem to be an item or action specifically associated with the Jombole, and even though there does not seem to be a special person who sings the Jurε and Duko songs.

¹⁰³ Appendix A goes into more detail on these themes and definitions/categories of the Dance Songs. Because the focus of my analysis is the phonological structure of these songs, the background information on these songs is in the Appendix to allow for that focus but still be accessible to readers.

¹⁰⁴ There are several examples dance songs labeled as “kosok” that have more recently been uploaded to YouTube by Darfurians that would be useful in an expanded analysis.

Finally, the Kona Koriŋ, Josiŋ Kona, and Firaŋa Biε are sung for special occasions and are categorized by the ceremony they are used for. The Kona Koriŋ is sung for war and only by men, the Josiŋ Kona is sung for marriage, and the Firaŋa Biε is sung during circumcision.

Beaton's ethnographic descriptions and organization provide one way to organize the texts showing the importance of the culture of these songs. The analysis in this chapter considers the form of these songs, focusing on phonological organizational properties of these songs as a whole.

6.1.1.2 Totals: Songs and lines

There are a total of 46 dance songs that Beaton has transcribed. Most songs included in the corpus come from two genres that Beaton has labeled as the *Jɔmbolε* and the *Tεsa*. There are eleven total songs that come from the *Jɔmbolε* genre and eight total songs from the *Tεsa* genre. The other seven genres left from Beaton's categories have 3-5 total songs each.

There are 181 total lines for analysis in this corpus. The number of songs and lines examined is comparable to those of Schuh's analyses of Ngizim, Bole, and Hausa (cf Schuh 1994, 1995, 2001, 2010, and 2011), and that of Fitzgerald's analysis of Tohono O'odham (1998), so while this is not a large corpus of data like that of Nanti (Micheal 2004), Somali (Fitzgerald 2006) or of English folk songs (Hayes and McEachern 1998), there is still enough data to make generalizations about the phonological organizing properties of these songs. Further, because no analyses have been completed to date for these types of texts, this analysis provides a starting point for this type of analysis in this language.

Table 6.1 presents a breakdown of the number of songs and lines in this corpus.

Table 6.1 Total Number of Songs and Lines Used in this Analysis

Song Genre	Definition/Category	Total # of Songs	Total # of Lines	Percentage of Corpus
Tesa	Age: young children; boys start and girls take over	8	41	23%
Kosok	Age: youth; girls	5	29	16%
Diktis	Age: elderly	4	18	10%
Jombolε	Person: pupils of the Fiki (they are called <i>muhagarin</i> in Arabic and <i>muhajira</i> in Fur); males begin and females join	11	22	12%
Jure	Item: sticks; young men and girls	3	9	5%
Duko	Action: stomp; young men and girls	4	18	10%
Kona Koriŋ	Event: War; men only	3	15	8%
Josiŋ Kona	Event: marriage	3	15	8%
Firaŋa Biε	Event: circumcision; relatives of boy to be circumcised	5	14	8%
		<i>Total: 46</i>	<i>Total: 181</i>	

Table 6.1 shows that the *Tesa* and *Kosok* genres have the most number of lines in the corpus (39% of the corpus), while the *Jure* genre, for example, only comprises 5% of the corpus.

Songs include line groupings in sizes of two (couplets), and range up to as large as 7 lines per song.¹⁰⁵ Of the 46 total songs, most (15 out of 46 songs) have a range of 2 lines per song, which is 33% of the total songs. Most of these couplets (11 of the 15 songs) are within the *Jombolε* genre, which suggests that the *Jombolε* dance songs are organized by couplets, and therefore is the only genre that corresponds to Beaton's *genrem* which is based on ethnographic work (see section 6.1.1.1 above).

¹⁰⁵ 5 of the songs are triplets, 8 songs are quatrains, 6 of the songs are 5 lines long, 10 of the songs are 6 lines long, and 2 of the songs are 7 lines long.

6.1.2 *Tone in Songs*

Before proceeding with the analysis of the songs, I must first discuss why tone is not considered in this analysis. In some languages, like Dinka (Ladd 2013) tone was found to correlate to the melody in some cases (i.e., constrained by the melody so that when the melody would get higher, so would the tone, and vice versa) but in many other cases, tone was found to not be constrained to the melody—here the functional load of tone was considerably lower than in languages like Cantonese, in which tone is constrained by the melody. Chan (1987 cited in Ladd 2013) found that the tone is the same for several sequences in which the melody is also the same (even though the words were different).

As shown in the previous chapters in this dissertation, tone is important in Fur. I do not focus on tone in my analysis of these songs, however, because Beaton (1940) does not include tone in his transcriptions of the songs. However, I show that even without analyzing the tone of these songs in this corpus, I still am able to establish important organizational properties of these songs. Exploring tone in songs would be an area for future research in order to ascertain if tone has a higher functional load (like Cantonese) or if tone has a lower functional load (like in Dinka).

6.2 Alliteration and Rhyme

In Chapter 5, I showed that in cases of partial reduplication, alliteration can take place where the onset and nucleus of the base become the shape of the reduplicant. I also showed that in cases of rhyme, the nucleus and coda (sometimes with the onset) of the base become the shape of the reduplicant. I also showed in Chapter 2 and Chapter 5 how the sonority of the segments is important when C.C segments are derived—in most cases the Syllable Contact Law (Clements 1990) is followed with reduplication, but in

other cases this law is violated. In forms without reduplication, the law is never violated; in fact illicit C.Cs are repaired through several strategies (see Chapter 2).

In this section, I show how alliteration, rhyme, and sonority are also important organizing factors within Fur Dance Songs. Here, sonority of onsets (and in some cases both the onset and the nucleus) is important in showing what segments alliterate, and the sonority of the segments in the nucleus and coda position is important in showing what segments may be involved with rhyming.

According to Fabb (1997: 120):

Alliteration is a kind of sound-patterning which includes the onset (it may also include the nucleus as well as the onset, as in the Finnish *Kalevala*). 'Rhyme' is a general cover term for kinds of sound-patterning which include the rime. More specifically, rhyme proper includes both nucleus and coda, while assonance includes just the nucleus and consonance includes just the coda. Rhyme is much more common as a kind of systematic sound-patterning than alliteration is. Alliteration most commonly appears unsystematically. We might expect this distinction because rhyme involves those parts of the syllable which are also controlled by a meter: the nucleus and the coda. Alliteration, on the other hand, involves a part of the syllable—the onset—which has very little significance for meter.

In Fur, alliteration involves the nucleus and the onset, while rhyme involves the nucleus and the coda—sometimes both and sometimes one or the other.

Both alliteration and rhyme are considered to be systematic, where only part of the syllable is repeated (not the whole syllable), and where the repeated part is consistent—codas repeat codas but not onsets and onsets do not repeat codas (and vice versa) (Fabb 1997:117). Further, sound patterning may be found in syllables that are prosodically prominent (as with Old Icelandic) or it may be found with syllables that are at a word boundary (as with Somali) (Faab 1997: 17-8). Fabb (1997: 123) also notes that systematic sound-patterning like alliteration or rhyme has two components: the scope and the position. The scope has to do with what parts of the material are repeated (e.g., the onset and nucleus, etc.) and the position has to do with where the repeated material

occurs (e.g., at the ends of lines, within lines, etc.). Both alliteration and rhyme are thus sensitive to the internal structure of the syllable (having to do with the scope) and to the metrical constituent structure (having to do with the position (Fabb 1997: 118, 125). Concerning the internal structure of the syllable, the rhyme is clearly the rime of the syllable—sometimes two moras. Alliteration is different because in Fur the onset and nucleus often are involved. Alliteration that involves the onset and nucleus is not a well-formed constituent of a syllable (Faab 1997: 126-7). None-the-less, this type of alliteration exists. Concerning the metrical constituent structure, or position, rhyme often falls at the ends of metrical constituents—lines in many cases—and alliteration must often hold between adjacent constituents (Faab 1997: 118). Both points entail that the text must have an internal structure—lines, stanzas, etc. These points about scope and position hold true for Fur, as will be shown in the sections below.

In section 6.2.1 I focus on alliteration in the songs, and in section 6.2.2 I focus on rhyme as an organizational property of the songs.

6.2.1 Alliteration Only in Songs

In most of the songs with alliteration, an obstruent rather than a sonorant is repeated. Rhyme is the opposite—most rhymes that are copied have a sonorant coda. Both of these findings are not very surprising in that coda consonants in Fur tend to be more sonorant (see Chapter 2 and Chapter 3). However, the quantity of obstruents in onset position suggests obstruents are used for organizing purposes in these songs. For example, in some songs, there is a prominent obstruent consonant like [k] or [j] that is part of alliteration throughout the entire song or within one line.

In the Dance Songs, there is alliteration with the onset (sometimes extending to the nucleus). This alliteration of the onset and nucleus is also seen in forms with partial

reduplication (see Chapter 5). The position of the alliteration can be within a line, at the first word of each line, or throughout the entire song.

First consider (1):

(1) Firaja Biε Dance Song 2

- 1 Daldum k^we ajomba
- 2 Koy ki k^we kaayagin
O Daldum, my son, do not weep, we will give you a woman
slave and her son.

In this example, there are obstruents in all onset positions for each of the syllables in both lines, as underlined in the song above. The obstruents include [d], [k], [j], [b], and [g].

There are only two words that do not have an obstruent onset: the [a] in *a-jomb-a* ‘cry, neg.’ and the [ya] from *kaayagin* in the second line. Further, the final line has all velar obstruents [k] and [g], showing alliteration within the line of this particular equivalence set.

According to Fabb (1997), sounds can be grouped together into classes of sounds that act the same way and therefore can become equivalence sets:

The interest for this for sound-patterning is that the groups of sounds which count as equivalent for sound-patterning often form a group on phonological grounds: that is, they share some phonological features (while differing in others). Where this is the case, the sound-patterning rule can be expressed not in terms of whole sounds but in terms of phonological features. For example, it is very common to find that labial sounds such as [l] and rhotic sounds such as [r] are counted as equivalent in sound-patterning rules [...]. These sounds are also phonologically alike by virtue of sharing many phonological features. [...] They differ basically in that [l] has the feature [+lateral]. Thus the sound-patterning rule can refer to the rhyme as involving the cluster of features shared by these two sounds; this is the identity which is required for the rhyme, and the presence or absence of the feature [+lateral] is ignored. (Fabb 1997:128).

The obstruents found throughout the song in (1) may also be considered part of an equivalency set in that the onsets all share that feature [-son]—the others of place and voice are ignored. Obstruents are universally preferred (unmarked) in onset position, which follows The Emergence of the Unmarked (TETU) (McCarthy and Prince 1994).

There are also many obstruents in onset position for this song in (2) as well:

(2) Tɛsa Dance Song 6

- 1 Faal Dikɔ
O Faal Dikɔ
- 2 Ki diinj bara
And your brother
- 3 Diɛŋ tobuŋ tui du ba
Bow your head in shame
- 4 Adam Bainiŋ k^we
Adam, son of Bain
- 5 Dutuŋ k^we kulɔ
Stole his mouse,
- 6 Al ba swiet-swiet kom
That squeaks 'swiet-swiet'

The obstruents seen in this song are [f], [d], [k], [d], [b], [t]. [k] alliteration also occurs throughout the song, with [kɔ], [ki], [k^we], [ku] and [kom] from lines 1, 2, 4, 5, and 6 respectively.

We also see equivalency sets with the first line in this song (3):

(3) Jɔmbolɛ Dance Song 2

- 1 Yaŋa ki ka siŋ ko
- 2 Na hakuuma keŋ riala bawa?
What bridewealth is there left to you and me, when for our taxes
we are held in fee?

In this example, [k] and [ŋ] are part of alliteration. Both are velars, and only differ in manner and voicing. Further, in line 2 there are also instances of [k], tying the alliteration through the entire song.

Not only does alliteration take place throughout an entire song in Fur, alliteration can also occur across the first syllable of each line. Consider (4):

(4) Jure Dance Song 1

- 1 Ki kuiŋ yaŋaŋ hiraam wa
- 2 Kerneŋaŋ kiiso niimitol
- 3 Kowiŋaŋ lɛma ami
By my wives' divorce I swear it, Nyimitol, the chief of
Kerne, eats food made from forest grasses.

[ki], [kɛ], and [ko] pattern together. Further, the first syllable of each of the first two words in lines 1 and 2 also have a [k] alliteration: Ki kuiŋ and Kerneŋaŋ kiiso. And the first two words of lines 2 and 3 have rhyme: Kerneŋaŋ and Kowiŋaŋ.

(5) is another example of a pattern of alliteration in the first syllable of each line, but in this song, two different segments are part of the alliteration:

(5) Duko Dance Song 3

- 1 Kieŋ ɔŋjɔŋsi
- 2 Ati bawi,
- 3 Kal Bawi,
- 4 Asaŋ deŋ jala ka iye
- 5 Al ba deŋ keɔla
“A waddling pup, if you would take it away, take it away but
what good is it with its yapping?”

In this example, there is a [k], [a], [k], [a], [a] alliteration pattern at the beginning of each line and at the end of lines 1-3 rhyme with [si], [wi], and [wi]. [k] is a perfect consonant and [a] the perfect vowel in some sense (Maddieson, via Parker, p.c.).

There are also songs that seem to focus on one sound in alliteration. Consider (6):

(6) Josiŋ Kona Dance Song 1

- 1 Jiz juwa
- 2 Ajaala, jiz juwa,
- 3 Marga jurgo ajomba
You told him (to marry you), you, O harlot, told him; do not
weep at the grinding on the grindstone.

In this song, [j] is prominent in each line, occurring as the onset in several words. In fact, the last two words of each line all have [j]. Further, the first and second words in line number 3 have a CVR.OV structure, *jiz juwa* is paralleled in lines 1 and 2, and *Ajaala* from line one could pattern with *ajomba* from line 3.

(7) is also an example of a song that has [j] in each line.

(7) Firaja Biε Dance Song 4

- 1 Daadasi jεbbia,
- 2 Kasigi jεmi
- 3 Nas jaarε asaiŋba
'Cast aside my elder sister and have intercourse with
me who have no husband.'

In (7), the final word of lines 1 and 2, the second-to last word of line 3 alliterate.

Now consider (8):

(8) Kεsεk Dance Song 3

- 1 Aisa waariŋ wa?
How did I sing of old?
- 2 Aisaŋ kotiila tawra bawi
That murderers should be driven out.
- 3 Dawraŋa ki diεŋ eli
- 4 Kul kaaluŋa
- 5 Na iyez Kujugi bεtεreŋ saaba koŋi.
The men of Daura with their village are all cowards, that they slew
Kujigi to the east of the dance floor.

Here alliteration takes place at the end of these lines instead of the beginnings of each line, with lines 1 and 2 having [w], [w], and lines 4 and 5 having [ŋ], [ŋ]. These examples could also be showing rhyme, with [i] and [i] in lines 1, 2, and 3 rhyming.

Now consider (9), which is an example of a nonsense song (as termed by Beaton (1940)):

(9) Tɛsa Dance Song 7

- 1 Waali walli
- 2 Al waaliyɛ salaama.
- 3 Youths: Dɛn gurrɛ
- 4 Hirriŋ do
- 5 Din do hir.
- 6 Girls: Kɛbɛ kɛbɛ kɛb.

This song presents interesting alliteration and rhyme. For example, Lines 1 and 2 have [waa], [wa], and [waa]. There have been examples from reduplication where only the onset and part of the nucleus were copied, similar to that in lines 1 and 2. Lines 3, 4, and 5 are also interesting in that lines 3-4 and 5 almost parallel each other: lines 3-4 are *Dɛn gurrɛ // Hirriŋ do* and line 5 is *Din do hir*. Here the order of words is adjusted, perhaps to have a heavy syllable at the end of line 5. Finally, line 6 shows alliteration of [k] and [b] along with shortening of [kɛbɛ] to [kɛb]. By shortening the word, the syllable becomes CVO instead of CV.CV.

6.2.1.1 Summary of alliteration

This section has shown that the scope of alliteration usually only includes the onset, but that it sometimes may include the nucleus. Alliteration patterns in songs is a bit different from the reduplication patterns seen in Chapter 5, where the onset and nucleus are always copied. Further, alliteration in these songs has been shown to mostly

involve obstruents rather than sonorants. The position of alliteration within these songs has been limited to occurring within one line, at the beginning of each line, or throughout the entire song.

6.2.2 Rhyme Only in Songs

Rhyme is also an important phonological organizational device in Fur.

Consider the last vowel of each line in (10):

(10) Kəsək Dance Song 5

- | | | |
|---|--|---|
| 1 | Aisa waariŋ <u>wə</u> ? | |
| | “How sang I of old?” | A |
| 2 | Jaal ɛliŋdiɔ dwiinj kil <u>mə</u> , | |
| | | B |
| 3 | Al gi diinj wandɛ foyi bul <u>ɔ</u> | |
| | “O my beloved, if my husband find you with me, be strong of heart.” | C |
| 4 | Kilmasi al dirrɔ <u>ja</u> | |
| | | A |
| 5 | Agiŋ kawib <u>a</u> | |
| | | B |
| 6 | Basiŋ maal el dunya bɛt <u>ɔ</u> | |
| | “Nothing will be done to you except that you will be mulcted of a fine.” | C |

Here, the rhyme (or assonance) patterns at the end of each line with [a] [a] [ɔ] [a] [a] [ɔ].

(11) provides an example of the rhyme (both the nucleus and coda) being

copied:

(11) Duko Dance Song 1

- 1 Dirbat sugin lo
- 2 Na gi Jafaŋa weilin kawi
- 3 Alaŋ o
- 4 Na kərəŋaŋ tɔn ogil
- 5 Ai yilon
At Dirbat the market-mongers have ruined me; I will go
and pay the home of the apes a visit.

(11) shows the second to last word that has rhyme in lines 1 and 2: sugin and weilin, and the penultimate word of line 4 and the final word in line 5 have rhyme: ton and yilon.

(12) also shows an example of assonance, consonance, and rhyme:

(12) Kəsək Dance Song 4

- 1 lyə duin ama
- 2 Jaarə na ka urəl
“Oh my mother, I dislike my chosen husband.”
- 3 Kaarə gi banj?
“Why do you give me to him?”
- 4 ka alan o na baaba owina
“Let me go and find another father.”
- 5 Dunyaŋ maalan erən
- 6 Na gi baurel.
“For the sake of the wealth of my marriage brings, you refuse to hear me”
- 7 Geziira na gi baar ami
“I will go to the Gezira even though the Nile engulf me”

This song has rhyme in each line (except line 6). In lines 1, 2, 4, and 7 [a] is repeated, while in line 3 [i] is repeated, and in line 5 the nucleus and coda are repeated for two examples, and the coda for one: [aŋ] and [ŋ].

6.2.2.1 Summary of rhyme

This section has shown that rhyme may take place within the line or at the ends of lines. Further, it has shown that only the nucleus may shape of the base or the nucleus and coda both shape of the base in Fur. The coda segments have also been sonorants, with all of them being the nasal [ŋ].

6.2.3 Alliteration and Rhyme

In some songs, there is both alliteration and rhyme. These songs are covered in this section.

Consider (13):

(13) Tɛsa Dance Song 3

- | | | |
|---|--|---|
| 1 | Kirɔ, Kirɔ
"O copper coloured one, O copper coloured one," | A |
| 2 | Kirɔ baariŋ diɔ
"O copper coloured one," | A |
| 3 | Ji na sabari si jaula
"Playing in the river," | B |
| 4 | Koni dɔŋa sa jɔɔ?
"If you journey to the east, greet us maidens first." | B |

There is rhyme in these examples that occurs in the last syllable of each line. Here, *Kirɔ*, *diɔ* from lines 1 and 2 rhyme, while *jaula*, and *jɔɔ* of lines 3 and 4 show alliteration. Looking at the gloss of each of the lines in (7a) and (7b), the words also reflect a pattern of two sections of two lines each. The rhyme patterns also follow the number of syllables allowed per line, as this song has a quatrain structure with a pattern of AABB, with two groups of lines with the same number of syllables: 5577. The first line has 4 syllables, but this line still fits the pattern of AABB for these songs, as this would be considered catalexis, with a dropped syllable.

Now consider (14):

(14) Kona Kɔriŋ Dance Song 3

- | | | |
|---|--|---|
| 1 | Al duli foya
the tree has fallen | A |
| 2 | Huu! Maskiina, | A |
| 3 | Al baaba bowiŋa | B |
| 4 | Turga al boru keyɛ
'Alas! Ye people, search for another
father, now that the foreigners have
seized the country. (Side note: And that
is the epitaph of Ali Dinar.)' | B |

In this example, the vowel of the last syllable in each of the final words of each line rhymes: *fɔyḁ*, *Maskiinaḁ*, *bowiḁ*, *keyḁ*. Here, the [a], [a], [a], and [ɛ] show similarity. This example could have alliteration with [y] from line 1 *fɔyḁ* and [y] from line 4 *keyḁ*, and [n] from line 2 *Maskiinaḁ* and [ŋ] *bowiḁ* t from line 3 pattern together. Further, the initial word for both lines 1 and 3 also pattern together *Al* and *Al* as rhyme and 2 and 4 patterns together as alliteration with *Huu* and *Turga* corresponding.

The pattern of syllables per line also parallels the structure AABB: 5466. The last two lines of this song have the same number of syllables, the same types of syllables, and the same number of feet, reflecting again a couplet or quatrain pattern, and there is catalexis in line 2. Further, the gloss of the lines also suggests a pattern of two sections of two lines each. The example in (14) is also similar with the number of syllables per line and with the gloss of this song: 4465 again suggests the quatrain structure of AABB.

Now consider (15):

(15) Diktis Dance Song 1

- | | | |
|---|---|---|
| 1 | <i>Solaḁaḁ kɔr ɛla</i>
The war of the Arabs has come. | A |
| 2 | <i>Sagala burɔ na ko</i>
O Rulers, go forth and let us go to battle. | A |
| 3 | <i>Solaḁa killa dua na gɛ</i>
Are these Arabs men or birds? | B |
| 4 | <i>Walla kiyḁa</i>
Are these Arabs men or birds? | C |

Here, rhyme of *Solaḁaḁ* and *Solaḁa* in lines 1 and 3 and of *Sagala* and *Walla* in lines 2 and for pattern together. Rhyme is also seen in the final syllable of each of these lines, with lines 1 and 4 patterning together (*ɛla* and *kiyḁa*), along with alliteration: lines 2 and 3 together, with *ko* and *gɛ*--both consonants are obstruents (and these

consonants have the same place and manner, but differ in voicing). The examples could also be showing a rhyme with *kɔr* and *ko* of lines 1 and 2, and *na* and *ɲa* (from *kiyaɲa*) in lines 3 and 4, patterning with the syllables per line and an AABB structure, with an extra syllable in line 3 and catalexis in line 4. (The final syllable in lines 1 and 4 and the second to last syllable in lines 2 and 3 could also be involved in this process.) Alliteration with all of the *Sɔlaɲaɲ Sagala Sɔlaɲa* and *Walla* all pattern together: [sɔ], [sa], [sɔ], [wa].

This example is similar to that of the one above, where the second to last word and the final word have alliteration and rhyme. Here, *kuri* and *kori* pattern together.

(16) Jɔmbolɛ Dance Song 3

- 1 Uwɔɲa kuri bɔɲa
- 2 Hakuuma al borɪɲ diɔ kori
“Kneel with respect, ye elders, do not stand, the government has come into our land.”

Now consider this example:

(17) Tɛsa Dance Song 2

- 1 Asi jaula
“If you are leaving,”
- 2 Diiɲ mataagi
“Put your leper on a donkey. (twice)”
- 3 Leliɲ iri ja (twice)
- 4 Asi jaula
“If you are leaving,”
- 5 Diiɲ mataagi
“Will your leper be able to drink the water of Gɛndɛ?”
- 6 Kɔrɔ Gɛndɛ laɲ ba?

Here, the final syllable in lines 1, 3, 4, and 6 all have the same rhyme: [a], [a], [a], and [a]. Further, the initial words in lines 1 and 4 and lines 2 and 5 are the same, creating alliteration with lines 1 and 4 [a] and lines 2 and 5 [d].

Now consider this example:

(18) Tɛsa Dance Song 5

- 1 Saaba ke, saaba ke
“He is in the east, he is in the east,”
- 2 Bugul al saabe ke
“My wooer is in the east.”
- 3 Ami duiŋ iya
“O my mother,”
- 4 Agi ajoldiba
“Do not beat me,”
- 5 Alaŋ ko rigɛ
“Let us go to my hut”
- 6 Na daiŋ keima kirgo
“And tie up our tent.”

In this example, lines 3, 4, and 5 all have the same alliteration to begin the line: [a] (no onset and same nucleus). With the rhyme of these songs, lines 1 and 2 both have [e], lines 3 and 4 have [a], and lines 5 and 6 have alliteration with [g].

Now consider this example:

(19) Jɔmbolɛ Dance Song 5

- 1 Amilla amurɔ
“To Amilla I speed and take my rest,”
- 2 Tirimbiila ba kuiŋ lela gɛ
“Lorries have but a donkey’s speed at best.”

Here, *Amilla* and *amurɔ* from line one pattern together. Further, *Amilla* from line 1 and *Tirimbiila* from line 2 also pattern together.

Now consider (20):

(20) Kona Kɔriŋ Dance Song 1

- 1 Kɔleŋa baam,
- 2 Keita baam,
- 3 Ati kɔr ɛla
- 4 Kaaluŋa

5 Ki biŋa aŋkoba,

6 Huu! Farsa wai kɛɛ baw

“You eat rams, You eat goats and if war comes we will not go out with you cowards. Huu! Ye are brave men whom death has frightened.”

Here [k] is again prominent with several types of alliteration. Further, the rhyme at the end of each line patterns as [am] [am] [a] [a] [aw] so VR, VR, V, V, VG. These examples have sonorant codas or no codas.

And consider (21):

(21) Kona Kɔriŋ Dance Song 2

1 Al biidi kom

2 Na ganŋaŋ kom

3 na mɔrɛ Kom

4 Huu! Baaba, jurɔ

5 Na kɔriŋ ko

“Let the tenor drum sounds, and the ruler’s drum sounds, and the whistle pipe. Huu! O father, go out and we will go to war.’

In (21) there is rhyme in the last syllable of each line: [om], [om], [om], [o], [o], or what could be alliteration with [k], [k], [k], and [k] for lines 1, 2, 3, and 5. There is also rhyme at the beginning of each line for lines 1, 2, 3, and 5: [a], [a], [a], and [a].

6.2.4 Summary of Alliteration and Rhyme in Dance Songs

In this section, both alliteration and rhyme have been shown to be phonological organizing principles in Fur Dance Songs. With alliteration, in some cases only the onset repeats; in other cases, both the onset and the nucleus repeat. In either case, the onset has been found to usually be a non-sonorant like [k], [j], [d], etc. In rhyme, this section has shown that assonance takes place, with only the nucleus repeating, consonance takes place, with only the coda repeating, or rhyme, with both the nucleus and coda

repeating. When a coda consonant is copied, it is usually a sonorant—a nasal like [ŋ] or [m].

Concerning the position of both rhyme and alliteration, there are some differences. This section has also shown that alliteration can take place within the line, from line to line, or within the entire song. With rhyme, this section has shown it to occur only within the line or from line to line—there was no type of rhyme that tied the entire song together.

6.3 The Near Absence of CVO as an Organizing Feature of Dance Songs

In partial cases of reduplication, I showed in chapter 5 that the onset and nucleus are usually the shape of the reduplicant (which is light) in alliteration, but in cases of rhyme, the nucleus and coda (sometimes with the onset optionally copied) become the shape of the reduplicant, which would be heavy structures.

Further, I showed how the sonority of the consonants were important in the weight of the foot structures of full-reduplicants. Most have sonorant codas, with a few non-sonorants; because the minimum word requirement in Fur is bimoraic, I was able to show how this is the smallest unit to be the shape of the reduplicant—light syllables are only the shape of the reduplicant through partial reduplication in alliteration. Further, with fully reduplicated forms I was able to show how the iambic foot is the shape of the reduplicant: either a (H), (LL), or (LH) foot—no (L)s are become the shape of the reduplicant or (HH)s, although in partial reduplication these forms are both allowed to become the shape of the reduplicant.

In Fur songs, weight is an important organizing tool. In this section, I first discuss the sonority the coda consonants of short, closed syllables (CVCs) in songs, showing how there is a general avoidance of CVOs, and more CVRs in songs.

This section is organized as follows. Section 6.3.1 shows the distribution of CVCs in songs and section 6.3.2 summarizes the section.

6.3.1 Short Closed Syllables (CVCs) in Fur Songs

This section shows that there is a near absence of CVOs in these songs and that CVC syllables are rarer than other syllables in general. This general lack of CVOs can be tied to the sonority of the coda consonant in that CVRs have been shown to carry weight in both contour tone distribution (see Chapter 4) and in reduplication (see Chapter 5); however, Chapter 2 showed that the minimum word is bimoraic; thus even CVOs are heavy but only when through minimal word requirements they are forced to be.

As mentioned in section 6.1 above, there are 46 songs with 181 lines total. Within these lines, there are a total of 1,022 syllables. Of these 1,022 syllables, there are 203 CVC syllables, which is 20% percent of the total number of syllables for all 46 songs. This number is fairly low.

Of these 203 CVC syllables, 23 are CVOs (11%), 66 are CVRs (32%), 107 are CVNs (53%), and 7 are CVGs (3%). This shows that there is a clear preference for sonorous codas in these songs, with 90% of these codas being liquids, nasals, or glides.

Concerning the CVOs, there seems to be a near absence of them in these songs. Further, all of these CVOs are either part of a function word, part of a loan word, or part of a name.

Further, concerning CVCs in general, Chapter 3, section 3.3.1 showed that monomorphemic words with short, closed syllables are rarer—most monomorphemic words are disyllabic or greater; therefore the assumption was made that these short open syllables were bimoraic.

Further, when comparing these song texts to the text entitled “The Cunning of the Fox” (Jakobi 1990: 125-9)¹⁰⁶, there is a similarity in that CVCs are rarer than other syllable types and that CVOs are rarer than CVRs (sonorant codas).

Out of the 312 total syllables in this text, there are only 42 CVC syllables, which is 13.46% of the total number of syllables. Of the 42 CVC syllables, 21 are CVN (including one CVNN) and 12 are CVL, which means that a total of 78.57% of the CVC syllables have a sonorant coda.

There are only 9 CVO syllables, which is 21.42% of the total CVC syllables. Of those 9 CVO syllables, one of these syllables is part of geminate àppá ‘big, modifier’ (VO.OV), one syllable is RVO (and is part of a loanword *sèrík*) and seven syllables are of the shape NVO and are either the function word *nà-s* ‘and, conjunction=tr’ or part of the function word *nàmá-s* ‘and then, conjunction=tr’. Because of the use of *nà-s* ‘and, conjunction=tr’ and *nàmá-s* ‘and then, conjunction=tr’ in this text, I would suggest that these examples are part of the organizational tools of this narrative; therefore, these CVOs may actually be a higher number in this type of text because of the mere fact that these function words are needed in order to mark the discourse.

These numbers show that there are not as many CVC syllables in general throughout this text as there are 177 (C)V syllables (56.73%), 69 (C)VV syllables (22.11%), and 24 (C)VVC syllables (7.69%).¹⁰⁷

Concerning alliteration (concerning the onsets) within the prose text, there were some examples of alliteration, but they were very few. Further, there was not a

¹⁰⁶ The text with my analysis can be found in Appendix 2.

¹⁰⁷ I also completed a quick scan of the 2-3 texts found at the end of Waag’s book, and there are very few CVC syllables, and of those, there are very few CVO syllables. There are some that are parts of geminates. Further, as noted from the text above, many are function words or modifiers (or parts of these word classes).

preference for obstruents in this position as there is for the songs, as shown in section 6.2 above.

6.3.2 Summary of this Section

This section has shown that syllable weight and the iambic foot are important organizing principles in these dance songs. First, I showed how there are very few short, closed syllables in the dance songs (and in a text), and that there are more short, closed syllables with sonorants in the Dance Songs than with the prose text. Second, I showed how syllable weight, and in particular, that the iambic foot is an important organizing unit in these songs. Just as with reduplication (chapter 5), the iamb is important, and degenerate feet (Ls) are left at the right edge of the foot (with reduplicants), and at the right edge of the line (with song lines).

6.4 Conclusions about Dance Songs

There are several important points concerning the phonological organizing principles in Fur Dance Songs that have been presented in this chapter.

First, alliteration and rhyme are both important to the organization within lines and within the songs as a whole. In some cases, the patterning of alliteration or rhyme that helps reinforce the length of each line. Second, the sonority of the consonants involved with alliteration and rhyme show that with alliteration, the segments in the onset position are usually obstruents, while with rhyme, the segments are usually sonorants. Third, concerning alliteration and rhyme, this chapter has shown similar patterns those that occur in reduplicative forms from Chapter 5.

Further, concerning the organization of syllables and moras in Fur dance songs, this chapter has shown that the CVC syllables occur less frequently than other syllable types, with CVO being in a near absence. This was shown to be a factor in syllable weight and how those syllables were parsed.

Chapter 7 Conclusion

7.1 Summary of the Main Points in this Dissertation

In this dissertation, the importance of sonority and of syllable weight have been shown to be organizing factors in this language.

In Chapter 2 the phonotactics of the language were presented. This chapter also showed that sonority is important to organizing the syllable and words, with the Syllable Contact Law (Clements 1990) being adhered to in all forms except in reduplicants.

Chapter 3 showed how syllable weight is important in Fur. First, I was able to establish that the minimum word in Fur is bimoraic. I was also able to establish that short, closed syllables are heavy in minimum word environments because they are forced to be, but that in other environments (i.e., disyllabic and trisyllabic words), these syllables are light. Further, long, closed syllables are superheavy in Fur based on their limited distribution in the language—either as a monosyllabic word or as the final syllable in a polysyllabic word. Long syllables closed by a glide are also avoided in this language.

Chapter 4 presented the lexical tone in Fur. There are 6 melodies: L, H, LH, HL, LHL, and rarely HLH. This chapter also showed how syllable weight and the sonority of the coda consonant is important in the distribution and licensing of contour tones. Contour tones and complex contour tones are attracted to heavy syllables: both syllables with long vowels and short syllables closed by a sonorant (CVR). Further, I showed in this chapter that rising (LH) and falling tones (HL) are distributed in specific ways: rising tones may only occur in the initial syllable of the word, while falling tones may occur on the initial or final syllable, with the final syllable more preferred.

In Chapter 5, I discussed the formation of reduplicants in Fur. In this chapter, syllable weight was shown to be an organizing factor, with the iambic foot being the only foot allowed to be both the shape of the base and the shape of the reduplicant in total

reduplication. In partial reduplication, Ls are also allowed be the shape of the reduplicant. Further, this chapter showed how reduplication is similar to other word-formation processes in regard to tone. There is spreading of tone, and also delinking and spreading, all similar to affixation in Fur.

Finally, in Chapter 6, I showed how alliteration and rhyme were also organizing factors in Dance Songs, much like they are organizing principles in reduplication (Chapter 5). This chapter showed that obstruents were involved in alliteration, while more sonorants were involved with rhyme. Further, this chapter showed how sonority is an important organizing factor in the songs, as very few short, closed syllables are included in the songs, and the syllables that are included, usually have a sonorant coda.

This dissertation has contributed to the knowledge about the Fur language, as sonority and syllable weight have not been studied in-depth in this language to date. Further, this work has also explored phenomena like contour tone distribution, reduplication, and meter—all never before studied in this language. All of these factors have expanded the knowledge about this language and provided analysis that can be used in the study of Nilo-Saharan language and in the study of languages in general.

There are further areas of research that this study does suggest. For example, it is important to study how tone behaves in metrical texts in order to see if tone bears a heavy load in these contexts. Future exploration will also study the precise nature of the quantitative distinctions and whether metrical structure is playing a larger role in Fur phonology.

Appendix A

Themes and Line Relations in Fur Dance Songs

The Table A.1 below gives an outline of the Theme and Line Relations of this song type.

Table A.1 Tesa Dance Songs Theme and Line Relations

Song	Type/theme	Line Relations
1	rape/virginity theme and war/Arab theme; girl lamenting loss of her virginity; calls it a crime; Arabs are perpetrators	mentions event; repercussions; who caused event
2	making fun theme; sickness and marriage; making fun of a women who has married a leper; urging her to take him with her—he won't be able to get water, and no one will bring him water	statement; question
3	marriage theme; asking boys to greet the girls if they go to the East (where many would go to pick cotton to help pay the bride price); mentions Kirro—means “green” but meaning is different when referring to skin color.	description of where boys are; question
4	religious/government/political theme; Discussing the Sheik and how he's tired from going to village to village to monitor them for dancing, etc.; Fur are asking to be left alone and that they'll move somewhere else during autumn	telling about someone; pleading/asking that someone
5	virgin/marriage/brideprice theme; answering implied accusation; singer is saying she's still a virgin—she's true to her lover; asking mother to tie cloth to hut to signify this fact. If the betrothed came back from the east and found that she was untrue, the brideprice would have to be payed back by the mother	description of where lover is; pleading/asking someone else to not do something but to do something else
6	retelling an event; Animal theme and scolding theme; specific names mentioned; spontaneous to event that happened right before song/dance; girl is reproving the boy who stole the mouse from her brother in this song; tells a story of what happened, too	scolding; description of event
7	Meaningless; Beaton says this song is meaningless. Could go with Schuh's points about these songs being passed down and the meaning unknown in some cases. Beaton does note that the dance steps are different for this song.	maybe a call/answer format; seems like section where both boys and girls sing together; boys sing; girls sing
8	Animal theme and role-playing; The girls are the pigeons; the boys are the rats	maybe a call/answer format; girls sing; boys sing

Appendix B

Prose Passage: The Cunning of the Fox

The Cunning of the Fox

(reproduced from Jakobi 1990: 125-9); scansions completed by McKeever

Line

- 1 tòòrò nà fiè ná-s úú sèrík kèíη
(CVV)(CV) (CV) (CVV)(CV)(CVV)(CV)(**CVC**)(CVVC) = 9 Ss
RVO loanword
- 2 díéη úú nàmá nùηí kíri
(CVV)(CVV)(CV)(CV)(CV)(CV)(CV)(CV)=8 Ss
- 3 à-s –ábá àppá éηà nàmá kàηgàrè
(V)(CV)(CV)(**VC**)(CV)(V)(CV)(CV)(CV)(**CVC**)(CV)(CV)=12 Ss
VO OV geminate modifier CVN
- 4 tòòrò nàmá nùòη bàà nà fiè úú bàà
(CVV)(CV)(CV)(CV)(CVVC)(CVV)(CV)(CVV)(VV)(CVV)=10 S
- 5 nàmá-s dùòη káwè
(CV)(**CVC**)(CVVC)(CV)(CV)=5 S
NVO function word
- 6 tòòròη dùòηíη fiéη úú nàmá kùé kíri
(CVV)(**CVC**)(CVV)(**CVC**)(CVV)(CVV)(CV)(CV)(CVV)(CV)(CV)=11 S
CVN, CVN
- 7 tòòrò nàmá-s úòη kèwà nùòη-sí lúí
(CVV)(CV)(CV)(CV)(CVVC)(CV)(CV)(CVVC)(CV)(CVV)=10 S
- 8 nàmá-s nùηí-sí nùòη-lé dúidi álá-η bòrà
(CV)(**CVC**)(CV)(CV)(CV)(CVVC)(CV)(CVV)(CV)(V)(**CVC**)(CV)(CV)=13 S
NVO function word CVN
- 9 nàmá úú-lé wéíηítí álá-η bòrà bàà
(CV)(CV)(VV)(CV)(CVV)(CV)(CV)(V)(**CVC**)(CV)(CV)(CVV)=12 S
CVN
- 10 fiè nàmá élà
(CVV)(CV)(CV)(V)(CV)=5 S
- 11 nàmá bùlò nà dééη úú kíri nà tòòrò nà-s
(CV)(CV)(CV)(CV)(CV)(CVVC)(VV)(CV)(CV)(CV)(CVV)(CV)(**CVC**)=13 S
NVO function
- 12 dééη nùηí bàà nà-s dééη nùòη-sí íní nàη- sí kèwà lúí
(CVVC)(CV)(CV)(CVV)(**CVC**)(CVVC)(CVVC)(CV)(V)(CV)(**CVC**)(CV)(CV)(CV)(CVV)=15 S
NVO function word CVN

- 13 nàmá-s fiè-sí in kùá
(CV)(**CVC**)(CVV)(CV)(**VC**)(CVV)=6 S
NVO function word VN
- 14 dúíṅ nùṅ kùé kíri
(CVVC)(CVVC)(CVV)(CV)(CV)=5 S
- 15 fiè nàmá in kùá ál dúíṅ úú ìi ná kíri
(CVV)(CV)(CV)(**VC**)(CVV)(**VC**)(CVV)(CVV)(VV)(CV)(CV)(CV)=12 S
VN, VL
- 16 nàmá gúldá káwè
(CV)(CV)(**CVC**)(CV)(CV)(CV)=6 S
CVL
- 17 nàmá in kùé àlá-ṅ mùúrú-lé kíò ãl ábù ìi ná-i-s fáári
(CV)(CV)(**VC**)(CVV)(V)(**CVC**)(CVV)(CV)(CV)(CVV)(**VC**)(V)(CV)(VV)(CVVC)(CVV)(CV)=17 S
VN, CVN, VL
- 18 mùúrú nàmá kàràbà jùtán kúl tèrù
(CVV)(CV)(CV)(CV)(CV)(CV)(CV)(CV)(**CVC**)(**CVC**)(CV)(CVV)=12 S
CVN, CVL
- 19 bá bóṅò ìi ná áélàbà
(CV)(**CVC**)(CV)(VV)(CV)(VV)(CV)(CV)=8 S
CVL
- 20 làà nàmá élà ná kásàṅà bòú ná ròò dúfti
(CVV)(CV)(CV)(V)(CV)(CV)(CV)(CV)(CV)(CVV)(CV)(CVV)(CVV)(CV)=14 S
- 21 tòòrò nàmá-s in kùá àál jànní ná-i kí kààn
(CVV)(CV)(CV)(CV)(**CVC**)(CVV)(VVC)(**CVC**)(CV)(CVV)(CV)(CVVC)=12 S
CVN, CVN (Gem)
- 22 nàmá in kùá ròò ànni
(CV)(CV)(**VC**)(CVV)(CVV)(**VC**)(CV)=7 S
VN, VN
- 23 àlá-ṅ kàà jáà
(V)(**CVC**)(CVV)(CVV)=4 S
CVN
- 24 á-s-á-ṅ kòrò élà
(V)(**CVC**)(CV)(CV)(V)(CV)=6 S
CVN
- 25 kàánṅ
(CVV)(**CVC**)=2 S
CVN

- 26 nà má ìn kùá
(CV)(CV)(**VC**)(CVV)=4 S
VN
- 27 ál dúńj báà kíri
(**VC**)(CVVC)(CVV)(CV)(CV)=5 S
VL
- 28 tòrò nà má-s ìn kùá
(CVV)(CV)(CV)(CV)(**CVC**)(CVV)=6 S
CVN
- 29 fiè dúńj tórik àál jàgìlò nà dùó dèè kírel
(CVV)(CV)(CV)(CV)(CV)(CVVC)(CV)(CV)(CV)(CV)(CVV)(CVV)(CV)(**CVC**)=14 S
CVL
- 30 bórnò nà má-s ìn kùá
(**CVC**)(CV)(CV)(CV)(**CVC**)(CVV)=6 S
CVL, CVN
- 31 nà jí tórik àál jàgìlò nà nùńj kírel
(CV)(CV)(CV)(CV)(CVVC)(CV)(CV)(CV)(CV)(CVVC)(CV)(**CVC**)=12 S
CVL
- 32 nà má-s díen gùdà beta
(CV)(**CVC**)(CVVC)(**CVC**)(CV)(CV)(CV)=7 S
NVO function word CVL
- 33 fiè nà má déen nùńj úú nà déen nùńj bàà ná tòrò ná déen nùńj bàà
(CVV)(CV)(CV)(CVVC)(CVV)(CVV)(CV)(CVVC)(CV)(CV)(CVV)(CV)(CVV)(CV)(CV)(CVVC)(C
VVC)(CVV)=18 S
- 34 nà má-s kèrgèl kìnj
(CV)(**CVC**)(**CVC**)(**CVC**)(CV)(CV)=6 S
NVO function word CVL, CVL

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