Root Reduction In Fur Verbs

Robert Glen & Shingjen Jiang

Department Of Applied Foreign Languages
Chung Shan Medical University

Abstract

This is a descriptive account of verbal allomorphic alternations in Fur, a Nilo-Saharan language mainly in the west-central part of Sudan. These basic phenomena can be divided into two general types: (1) allomorphic alternation general principles; and (2) allomorphic alternation specific phenomena, with the allomorphic alternation phenomena consisting of two general subtypes - (a) vowel harmony phenomena (not covered here for reasons of scope), and (b) verb-root reduction phenomena. Five root reduction phenomena are proposed.

1. Root Word-Internal First Vowel Omission
2. Root-Initial Word-Internal Singleton-Consonant Omission
3. Root Word-Initial Non-Approximate Second Consonant Omission
4. Root Non-Low Vowel Omission Before Nonfinal-Dorsal-Nasal
5. Root Adjacent Consonant-Vowel Assimilation

One general principle is proposed as governing the 5 root reduction phenomena:

1. Conservative Allomorphic Form Change Principle

Key Words: Fur, Nilo-Saharan language, verbal allomorphic alternations, root reduction phenomena

Root Reduction In Fur Verbs

Section 1. Introduction And The Data

This paper presents a descriptive analysis of allomorphic alternations in Fur verbs. Fur is a Nilo-Saharan language spoken in the west-central part of Sudan, also variously called For, Forien, Fouraoui, Furawi, Kondjara, Kongara, and Konjara (Beaton 1968, Crystal 1992, Jakobi 1990). The data used is from data and descriptions reported in Beaton (1968), Jakobi (1990), Kutsch Lojenga & Waag (2004), and Noel (2008). The basic phenomena involved in these alternations can be divided into two general types: (1) allomorphic alternation principles and (2) allomorphic alternation phenomena, with the allomorphic alternation phenomena consisting of two general subtypes – (a) vowel harmony phenomena and (b) verb-root reduction phenomena. For reasons of scope, this paper deals only with the root reduction phenomena. The vowel harmony phenomena are factored out as much as possible, but where necessary, hypotheses concerning them are assumed without discussion. Also for reasons of scope, this paper focuses on a description of the basic facts, rather than on a theoretical treatment of them.

Following Jakobi (1990: 43-49), and Noel (2008: 6-7), this study assumes that Fur has a five phonemic vowel system: roughly, (1) a front high unrounded vowel phoneme /i/, (2) a back high rounded vowel phoneme /u/, (3) a front mid unrounded vowel phoneme /e/, (4) a back mid rounded vowel phoneme /o/, and (5) a low unrounded vowel phoneme /a/ [although, Beaton (1968: 1-2) and Kutsch Lojenga & Waag (2004: 11-13) analyzed Fur as having 8 phonemic vowels, with high-high, high-low, mid-high, and mid-low phonemes for the non-low phonemes].

Following Beaton (1968: 1-2), Jakobi (1990: 43-49), this study assumes that Fur has 18 phonemic consonants, -- /b/, /t/, /d/, /ɟ/, /k/, /g/, /f/, /s/, /z/, /h/, /m/, /n/, /nj/, /ŋ/, /l/, /r/, /j/, and /w/, with voicing contrastive for the oral cavity obstruents (stops, afficates, and fricatives). The vowel and consonant symbols have roughly the IPA specified values, except that /f/ is used here to represent an either posterior or anterior labial fricative or stop, /ŋ/ a velar nasal, and /r/ an apical tap. In Beaton and Jakobi /nj/ is treated as a single consonant phoneme, in this paper it is treated as a sequence of two phonemes, a palatal nasal followed by a palatal approximate. Not all of these phonemes of Fur occur in the data analyzed in this study.

Each syllable in Fur is said to carry a tone. The tones have been differently analysed. Some studies have analyzed them to be (1) high, (2) low, and (3) mid (Jernudd 1983, Noel 2008). Some studies have analyzed them to be (1) high and (2) low (Jakobi 1990, Kutsch , Lojenga & Waag 2004). It seems possible to also analyzing Fur tones as being (1) high, (2) low, (3) mid, (4) rising [low-high], and (5) falling [high-low].

Tone is used to distinguish lexical items, to signal person and number in verb forms, and to mark a large number of adjectives as being adjectives (Jakobi: 102, 119). Jakobi and Beaton do not mention tone as affecting the vowels in any verb forms in Fur, and the vowels in the verb forms under investigation in this paper appear to show no influence from tone. Accordingly, for simplicity, tone markings have been omitted from this study's verb-form transcriptions.

There is no grammatical gender in Fur, but nouns are either "human" or "nonhuman", and signalled as such in the third-person plural verb-forms for all moods and tenses (Beaton: 5). Person and number are signalled through verbal prefixes, and tense/aspect through verbal suffixes (Jakobi: 101, 114).

The verb-forms under analysis involve 16 sets of four verb-form conjugations – one set each for 16 morphemic verb-roots, which are grouped together and presented in Jakobi (79-80) as all

showing a related vowel-alternation that depends on whether the verb-roots are combined with the past-perfect tense/aspect suffix /a/ or the present tense/aspect suffix /el/. In addition to having one of those two suffixes, the non third-person singular forms also have a prefix that appears to be C/a/ (where "C" represents a consonant) and whose vowel appears to vary according to whether the tense/aspect is present or past-perfect. Jakobi considers third-person singular verb-forms as irregular, and non third-person singular verb-forms to be regular, predictable, and the same except for their varying prefixal consonant (Jakobi: 64-65), and for that reason uses these two verb-forms in the sets of verb-form conjugations. The conjugated verb-forms vary according to person/number (third-person singular versus non third-person singular) and tense/aspect (present versus past-perfect), resulting in four conjugated verb-forms for most of the verb-root.

In this paper, the prefixes are depicted as consisting of an obstruent consonant and a vowel. In both Jakobi and Beaton, the prefixes are said to consist of just a consonant (predictable according to person and number) with the vowel immediately following a prefix consonant considered part of the verb root. Based on the data adduced in Jakobi and Beaton, however, the prefix vowels are predictable, since unless there is some other interacting factor, they match the vowels in the suffix in being either /a/ or /e/, as depicted in the following table, which gives the data sets under analysis in this paper. In this table, and elsewhere in this paper, "+3S" stands for third-person singular, "-3S" for non-third-person singular, "+P" for present tense/aspect, "+PP" for past-perfect, and as mentioned earlier "C" for consonant. The "default" forms given for the verbs' roots, prefixes, and suffixes are hypothesized unconditioned forms, which in some theoretical frameworks are taken to be "Underlying Representations".

Table 1: Data

Verb-Form Sets	English Glosses (Infinitives)	Tense-Aspect	Attested Forms +3S	Attested Forms -3S
1	to measure	+P +PP	arr-a err-el	Ca-rr-a Ce-rr-el
2	to serve food	+P +PP	jan-a jen-el	Ca-n-a Ce-n-el
3	to climb	+P +PP	jaab-a jeeb-el	Ca-ab-a Ce-eb-el
4	to boil (transitive)	+P +PP	jaas-a jeel-el	Ca-as-a Ce-es-el
5	to put the evil eye on	+P +PP	njaal-a njeel-el	Ca-njal-a Ce-njel-el
6	to laugh	+P +PP	la-a le-el	Ca-ll-a Ce-ll-el

7	to share	+P +PP	ŋaar-a ŋeer-el	Ca-ŋgar-a Ce-ŋger-el
8	to melt (intransitive)	+P +PP	salal-a selel-el	(Not given) (Not given)
9	to sprout	+P +PP	tan-a ten-el	(Not given) (Not given)
10	to be (locative)	+P +PP	keŋ-a kee	Ca-ŋ-a Ca-iŋ
11	to taste	+P +PP	iwi-a iwi-el	Ca-wi-a Ce-wi-el
12	to load; to saddle	+P +PP	itab-a itib-el	Ca-tab-a Ce-teb-el
13	to spread	+P +PP	iwir-a iwir-el	Ca-war-a Ce-wer-el
14	to seize	+P +PP	tii-o tii-el	Ce-e-a Ce-e-el
15	to stop (intransitive)	+P +PP	keer-a kiir-el	Ca-ar-a Ce-er-el
16	to tear	+P +PP	njer-a njir-el	Ce- njer-a Ce- njer-el

Section 2: Hypothesized Allomorphic Alternation Phenomena And Principles In The Data

Upon examining the Fur data somewhat, it appears that there may be some systematicity to the allomorphic alternations in the verb forms. In this section, hypothesizes are presented and discussed on the root reduction phenomena that appear to operate in the alternations and on the Default Forms of the prefix, suffix, and root morphemes. The general order of treatment of the phenomena is from relatively simple and easy to isolate to relatively complex and difficult to isolate.

Section 2.1: Prefix Default Form

For 15 of the 16 verb-form sets, the Default Form of the prefix vowel could be taken to be either /a/ or /e/, or a vowel that is specified as [-high] is exceptionally not used for the +PP verb forms, provides an instance of the prefix occurring without a suffix.

Table 2.1.1: Data Suggesting Prefix Default Form

Verb-Form Set	English Gloss (Infinitive)	Hypothesized Verb-Root Default Form	Tense-Aspect	Attested Forms +3S	Attested Forms -3S
10	to be (locative)	kaiŋ	+P +PP	keŋ-a kee	Ca-ŋ-a Ca-iŋ

The prefix vowel is /a/ in both of the -3S verb forms. In the case of the -3S+P verb form, the suffix vowel is also /a/ and thus it is unclear if the /a/ in the prefix is the Default Form or the result of a suffix-induced vowel harmony. However, in the case of the -3S+PP verb form, the fact that there is no suffix and the prefix vowel is /a/ suggests that the /a/ in the prefix can be taken as being the Default Form of the prefix vowel, as depicted in the following table.

Table 2.1.2: Prefix Default Form

Verb-Form Sets	English Glosses	Hypothesized Prefix Default Form	Tense-Aspect	Attested Forms +3S	Attested Forms -3S
1-16	Not 3rd Per Sing 3rd Per Sing	Ca- Ø-	+P +PP +PP	Ø- Ø- Ø-	Ca- Ce- Ca-

Section 2.2: Suffixes Default Forms

As seen in Table 1, for the +PP aspect there is an /el/ in every instance of its occurrence, and hence the most conservative and concrete hypothesis is that the /el/ is the form of a single suffix, and that the Default Form of the suffix is also /el/, as depicted in the following table. The +P aspect is signalled by an /a/ in all but one instance and by an /o/ in that other instance (Set 14's +3S+P verb form). The /o/ can be taken to be either a different (and apparently exceptional) +P suffix, or possibly a misprint, since it is the only instance in these data sets in which the form of the +P suffix is not /a/, but nothing is said about it in Jakobi. If the /o/ is a misprint, the Default Form of the +P suffix can be taken to be /a/. If the /o/ is not a misprint, the Default Form of the more common +P suffix can be

taken to be /a, and the Default Form of the less common one can be taken to be /o/.

Table 2.2: Suffixes Default Forms

Verb-Form Sets	English Glosses	Hypothesized Suffix Default Forms	Tense-Aspect	Attested Forms +3S	Attested Forms -3S
1-16	Past Present Perfect	-a (, -o?) -el	 +P +PP +PP	 -a (,-o) -el -Ø	 -a -el -Ø

Section 2.3: Root Default Forms For Sets 1-16

The following table presents the hypothesized root Default Forms for Sets 1-16. The reasoning for Sets 1-9 and Set 11 is fairly straightforward and similar: each Default Form is taken to consist of the maximum consonants and vowels found to occur in the four conjugated verb forms in its set. In Sets 1-9, the decision on whether a vowel is /a/ or /e/ is based on the +3S+P verb forms, since these apparently are not affected by certain types of harmony that affect the other verb forms.

The hypothesized Default Forms of the roots in Sets 10, and 12-16 are based on reasoning that is somewhat more complicated, and that involves various vowel harmony phenomena which are beyond the scope of this paper. Their hypothesized Default Forms are presented here, but merely in an assumed status, but without any supporting evidence and reasoning.

Table 2.3: Root Default Forms For Sets 1-16

Verb-Form Sets	English Glosses (Infinitives)	Hypothesized Verb-Root Default Forms	Tense/ Aspect	Attested Forms +3S	Attested Forms -3S
1	to measure	arr-	 +P +PP	 arr-a err-el	 Ca-rr-a Ce-rr-el
2	to serve food	ɟan-	 +P +PP	 ɟan-a ɟen-el	 Ca-n-a Ce-n-el
3	to climb	ɟaab-	 +P +PP	 ɟaab-a ɟeeb-el	 Ca-ab-a Ce-eb-el

4	to boil (transitive)	ɟaas-	+P +PP	ɟaas-a ɟeel-el	Ca-as-a Ce-es-el
5	to put the evil eye on	njaal-	+P +PP	njaal-a njeel-el	Ca-njal-a Ce-njel-el
6	to laugh	lla-	+P +PP	la-a le-el	Ca-ll-a Ce-ll-el
7	to share	ŋgaar-	+P +PP	ŋaar-a ŋeer-el	Ca-ŋgar-a Ce-ŋger-el
8	to melt (intransitive)	salal-	+P +PP	salal-a selel-el	(not given) (not given)
9	to sprout	tan-	+P +PP	tan-a ten-el	(not given) (not given)
10	to be (locative)	kaiŋ -	+P +PP	keŋ-a kee	Ca-ŋ-a Ca-iŋ
11	to taste	iwi-	+P +PP	iwi-a iwi-el	Ca-wi-a Ce-wi-el
12	to load; to saddle	itab-	+P +PP	itab-a itib-el	Ca-tab-a Ce-teb-el
13	to spread	iwer-	+P +PP	iwir-a iwir-el	Ca-war-a Ce-wer-el
14	to seize	tie-	+P +PP	tii-o tii-el	Ce-e-a Ce-e-el
15	to stop (intransitive)	kiar-	+P +PP	keer-a kiir-el	Ca-ar-a Ce-er-el
16	to tear	niar-	+P +PP	njer-a njir-el	Ce- njer-a Ce- njer-el

Section 2.4: Root Word-Internal First-Vowel Omission

One aspect of the allomorphic alternations in this Fur data is that in general the roots have one fewer vowel in the prefixed verb forms (i.e., the -3S verb forms) than in the prefixless verb forms (i.e., the +3S verb forms). The first root vowel (or only root vowel, if there is just one) of the Default Form is omitted from the root of the prefixed verb forms, as long as the omission does result in a syllable with a consonant—non-glide-consonant sequence. As seen in the following table, this type of omission appears to occur in Sets 1-7 and 10-15, but seems to possibly not occur in Set 16, with the relevant data not available for Sets 8 and 9. Set 16's case is discussed in more detail later.

Table 2.4: Data Suggesting Root Word-Internal First-Vowel Omission

Verb-Form Sets	English Glosses (Infinitives)	Hypothesized Verb-Root Default Forms	Tense-Aspect	Attested Forms +3S	Attested Forms -3S
1	to measure	arr-	+P +PP	arr-a err-el	Ca-rr-a Ce-rr-el
2	to serve food	ɟan-	+P +PP	ɟan-a ɟen-el	Ca-n-a Ce-n-el
3	to climb	ɟaab-	+P +PP	ɟaab-a ɟeeb-el	Ca-ab-a Ce-eb-el
4	to boil (transitive)	ɟaas-	+P +PP	ɟaas-a ɟeel-el	Ca-as-a Ce-es-el
5	to put the evil eye on	njaal-	+P +PP	njaal-a njeel-el	Ca-njal-a Ce-njel-el
6	to laugh	lla-	+P +PP	la-a le-el	Ca-ll-a Ce-ll-el
7	to share	ŋgaar-	+P +PP	ŋaar-a ŋeer-el	Ca-ŋgar-a Ce-ŋger-el
8	to melt (intransitive)	salal-	+P +PP	salal-a selel-el	(not given) (not given)

9	to sprout	tan-	+P +PP	tan-a ten-el	(not given) (not given)
10	to be (locative)	kaiŋ-	+P +PP	keŋ-a kee	Ca-ŋ-a Ca-iŋ
11	to taste	iwi-	+P +PP	iwi-a iwi-el	Ca-wi-a Ce-wi-el
12	to load; saddle	itab-	+P +PP	itab-a itib-el	Ca-tab-a Ce-teb-el
13	to spread	iwer-	+P +PP	iwir-a iwir-el	Ca-war-a Ce-wer-el
14	to seize	tie-	+P +PP	tii-o tii-el	Ce-e-a Ce-e-el
15	to stop (intransitive)	kiar-	+P +PP	keer-a kiir-el	Ca-ar-a Ce-er-el
16	to tear	niar-	+P +PP	njer-a njir-el	Ce- njer-a Ce- njer-el

Section 2.5: Root-Initial Word-Internal Singleton-Consonant Omission

Another aspect of the allomorphic alternations in this Fur data is that in a number of sets, such as in Set 2, the roots in the prefixless verb forms (i.e., the +3S verb forms) start with a consonant followed by one or two vowels while those in the prefixless verb forms (i.e., the -3S verb forms) lack the consonant and instead start with one or no vowel (the preceding section discusses vowel omission). This type of omission phenomenon appears to involve a singleton root-initial consonant (if there is one) of the Default Form being omitted from the root of the prefixed and hence word-internal verb forms. As seen in the following table, Root-Initial Word-Internal Singleton-Consonant Omission appears to occur in Sets 2, 3, 4, 10, 14, and 15, with the relevant data not available for Sets 8 and 9.

Table 2.5: Data Suggesting Root-Initial Word-Internal Singleton-Consonant Omission

Verb-Form Sets	English Glosses (Infinitives)	Hypothesized Verb-Root Default Forms	Tense-Aspect	Attested Forms +3S	Attested Forms -3S
2	to serve food	ɟan-	+P +PP	ɟan-a ɟen-el	Ca-n-a Ce-n-el
3	to climb	ɟaab-	+P +PP	ɟaab-a ɟeeb-el	Ca-ab-a Ce-eb-el
4	to boil (transitive)	ɟaas-	+P +PP	ɟaas-a ɟeel-el	Ca-as-a Ce-es-el
8	to melt (intransitive)	salal-	+P +PP	salal-a selel-el	(not given) (not given)
9	to sprout	tan-	+P +PP	tan-a ten-el	(not given) (not given)
10	to be (locative)	kaiŋ-	+P +PP	keŋ-a kee	Ca-ŋ-a Ca-iŋ
14	to seize	tie-	+P +PP	tii-o tii-el	Ce-e-a Ce-e-el
15	to stop (intransitive)	kiar-	+P +PP	keer-a kiir-el	Ca-ar-a Ce-er-el

Section 2.6: Root Word-Initial Non-Approximate Second-Consonant Omission

Fur also shows evidence of allomorphic consonant omission, a phenomenon which apparently simplifies root consonant clusters in word-initial position, that is, in +3S verb forms. The second root consonant of the Default Form is omitted from the root of the prefixless verb forms, unless it is an approximate, presumably to avoid word-initial consonant clusters. As seen in the following table, this type of omission seems to occur in Sets 6 and 7, but not in Set 5, apparently because the second consonant is the approximate /j/. Root Word-Initial Non-Approximate Second-Consonant Omission seems to possibly also not occur in Set 16, although as discussed later, there are reasons to conclude that it does not actually apply to Set 16's data.

Table 2.6: Data Suggesting Root Word-Initial Non-Approximate Second-Consonant Omission

Verb-Form Sets	English Glosses (Infinitives)	Hypothesized Verb-Root Defaults Forms	Tense-Aspect	Attested Forms +3S	Attested Forms -3S
5	to put the evil eye on	njaal-	+P +PP	njaal-a njeel-el	Ca-njal-a Ce-njel-el
6	to laugh	lla-	+P +PP	la-a le-el	Ca-ll-a Ce-ll-el
7	to share	ŋgaar-	+P +PP	ŋaar-a ŋeer-el	Ca-ŋgar-a Ce-ŋger-el
16	to tear	niar-	+P +PP	njer-a njir-el	Ce- njer-a Ce- njer-el

Section 2.7: Root Nonlow Vowel Omission Before Nonfinal Dorsal-Nasal

Consider the attested +P verb forms in Set 10, which both have the +P suffix /a/, as shown in the following table.

Table 2.7: Data Suggesting Root Nonlow Vowel Omission Before Nonfinal Dorsal-Nasal

Verb-Form Set	English Gloss (Infinitive)	Hypothesized Verb-Root Default Form	Tense-Aspect	Attested Forms +3S	Attested Forms -3S
10	to be (locative)	kaiŋ-	+P +PP	keŋ-a kee	Ca-ŋ-a Ca-iŋ

Given /kaiŋ/ as the hypothesized verb-root Default Form, then based upon the phenomena analyzed to be operating in Fur thus far, the expected +3S+P verb form would be /keeŋ-a/ (due to a vowel harmony phenomena not treated in this paper), and the expected -3S+P verb form would be /Ca-iŋ-a/ (due to Root-Initial Word-Internal Singleton-Consonant Omission and Root Word-Internal First-Vowel Omission), which both have one non-low vowel more than the actually attested forms. If these P forms are not merely exceptional, it seems possible that Fur has a rule, or phenomenon, whereby a non-low Default-Form vowel is omitted in a verb form when it would come after another vowel and before the nonfinal dorsal nasal /ŋ/ (or perhaps before the dorsal nasal /ŋ/ when it is followed by a vowel). If so, then that would account for why the two verb forms with the +P suffix

omit the root-vowel /i/ while the two verb forms without a suffix, and hence without a vowel to follow the /ŋ/, do not omit that vowel. Note that omitting this vowel in the +P verb forms still leaves the root represented in those words and so does not conflict with Morpheme Form Preservation.

Section 2.8: Root Adjacent Consonant-Vowel Assimilation

Set 16's verb forms appear to involve a general principle governing allomorphic alternations in Fur, and an additional type of assimilation, between a consonant and a following vowel in a root, as depicted in the following table. The assimilation phenomenon is discussed in this section, and the general principle is discussed in the next section.

Table 2.8: Data Suggesting Root Adjacent Consonant-Vowel Assimilation

Verb-Form Set	English Gloss (Infinitive)	Hypothesized Verb-Root Default Form	Tense-Aspect	Attested Forms +3S	Attested Forms -3S
16	to tear	niar-	+P +PP	njer-a njir-el	Ce- njer-a Ce- njer-el

Assuming that /nj/ is actually two phonemes rather than one, then each of the four attested verb forms has four phonemes and the Default Form can be hypothesized as having four phonemes too. Each of the attested conjugated verb-form roots starts with an /n/ and ends with an /r/, neither of which seems predicable, so there is some reason to conclude that the Default Form of the root also does. All of the attested verb forms have the approximate /j/ following their root-initial consonant /n/, so it might seem that the Default Form of the root would as well. However, it does not seem possible to account for the particular root-vowel alternations in the conjugated verb forms unless the second phoneme in the verb-root's Default Form is taken to be /i/ and not /j/. Three of the attested verb forms have /e/ as their pre-/r/ phoneme and one has /i/, so it might be thought that the corresponding Default Form phoneme would be /e/ or possibly /i/, but the vowel /a/ seems to better account for the occurrence and distributions of the /e/s and the /i/ in the attested verb-form roots and thus seems a better hypothesis. The reasons for hypothesizing that /i/ is the second phoneme in the verb-root's Default Form and /a/ is the third are as follow.

Given /niar-/ as the verb-root Default Form, the +3S+P verb form of /njer-a/ can be analyzed as involving one vowel harmony phenomena, (Root Adjacent High-Low Vowel Merging, which as noted earlier is not discussed in this paper), and a consonant-vowel assimilation phenomenon. Root Adjacent High-Low Vowel Merging requires the Default-Form vowels /ia/ to be replaced by two vowels midway between them (i.e., /ee/) in the +3S+P verb form, which does not have an /el/ +PP suffix. If just this phenomenon was involved, the expected +3S+P verb form would be /neer-a/, rather than the attested form /njer-a/. Based on the four conjugated verb forms in this set, however, it appears there is also a root reduction phenomenon operating in Fur, Root Adjacent Consonant-

Vowel Assimilation, whereby a non-low front unrounded vowel (/i/ or /e/) that follows a palatal nasal (/n/) and precedes another vowel in a root Default Form is replaced by an unrounded palatal approximate (/j/) in these four conjugated verb forms. This phenomenon, added to the effects of the other two, results in the attested verb form of /njer-a/.

Given /niar-/ as the verb-root Default Form, the +3S+PP verb form of /njir-el/ can be seen as involving three phenomena, Affix-Induced Non-High Vowel Harmony, Root Higher Vowel Harmony, and Root Adjacent Consonant-Vowel Assimilation (recall that Root Adjacent High-Low Vowel Merging does not occur in verb forms that have the /el/ +PP suffix). The first of these phenomena requires that any low vowel in the root Base Form /niar-/ be replaced by a non-low vowel (preferably /e/, but possibly /i/) in order to be harmonious with the /e/ in the suffix. The second of these requires that a non-low vowel be replaced by an /i/, in order to be harmonious with an /i/ as the second phoneme of the verb-root Base Form. If just these two phenomena were involved, the expected +3S+PP verb form would be /niir-el/, rather than the attested form of /njir-el/. The third phenomenon, Root Adjacent Consonant-Vowel Assimilation, requires the /i/ that follows the /n/ and precedes the second /i/ to be replaced by /j/, resulting in the attested verb form /njir-el/.

The –3S verb forms appear to involve an additional factor, a general principle governing allomorphic alternations in Fur. The hypothesized Default Forms of these verb forms and the general principle are discussed in the next section.

Section 2.9: Conservative Allomorphic Form Change Principle

First consider the –3S+PP verb form, repeated in the following table. Given /niar-/ as the verb-root Default Form, three root reduction phenomena could potentially occur, although not necessarily all together: Root-Initial Word-Internal Singleton Consonant Omission; Root Word-Internal First Vowel Omission; and Root Adjacent Consonant-Vowel Assimilation. The first two could both occur, but the occurrence of either of them would seem to preclude the occurrence of the third one. If the first two occurred, the verb root would then have only two phonemes, a vowel followed by /r/, which could not result in the attested verb form. If the third one (Root Adjacent Consonant-Vowel Assimilation) occurred, the verb root would then still have four phonemes, the two just mentioned and an /n/ and /j/ preceding them.

Table 2.9: Data Suggesting The Conservative Allomorphic Form Change Principle

Verb-Form Set	English Gloss (Infinitive)	Hypothesized Verb-Root Default Form	Tense-Aspect	Attested Forms +3S	Attested Forms -3S
16	to tear	niar-	+P +PP	njer-a njir-el	Ce- njer-a Ce- njer-el

A plausible explanation for why the third of those root reduction phenomena occurs in Set 16's –3S+PP verb form, and not the first two, is that Fur has a general Conservative Allomorphic Form Change Principle such that a small or conservative allomorphic form change takes precedence over a conflicting larger or less conservative one. In this case, of three somewhat overlapping and thus conflicting root reduction phenomena, Root Adjacent Consonant-Vowel Assimilation results in a smaller or less radical change in form (the vowel is replaced by an approximate rather than being completely omitted, and the initial consonant is then kept), and so takes precedence over Root Word-Internal First Vowel Omission and Root-Initial Word-Internal Singleton Consonant Omission, which might otherwise be expected to occur and preclude the occurrence of Root Adjacent Consonant-Vowel Assimilation.

The occurrence of Affix-Induced Non-High Vowel Harmony (for the attested /e/s in the root and prefix) would add together with the occurrence of the phenomena discussed in the preceding paragraph and account for the attested form of /Ce-njer-el/. Recall that Root Adjacent High-Low Vowel Merging is hypothesized to occur only in verb forms that do not have the /el/ +PP suffix, and so does not seem to be responsible for the /e/ in this –3S+PP verb root. It should also be noted that Root High Vowel Harmony is hypothesized as only occurring in those verb forms that can contain more than one root, which does not seem to be the case for –3S verb forms, and that hence Root Adjacent High-Low Vowel Merging would not occur here to require the /e/ root vowel to harmonize with the /i/ vowel in the verb-root Base Form.

Now consider the –3S+P verb form. As with the –3S+PP verb form, it seems reasonable to hypothesize that Root Adjacent Consonant-Vowel Assimilation occurs, taking precedence over and precluding the occurrence of Root Word-Internal First Vowel Omission and Root-Initial Word-Internal Singleton Consonant Omission, in accord with the Conservative Allomorphic Form Change Principle. The –3S+P verb form does not have an /el/ +PP suffix, and so Root Adjacent High-Low Vowel Merging should be able to occur in it; it has a /Ca/ prefix and an /a/ +P suffix, and so Affix-Induced Non-High Vowel Harmony should be able to occur in it too. However, in this verb form, if Affix-Induced Non-High Vowel Harmony occurs, the results conflict with Root Adjacent High-Low Vowel Merging, since the latter requires the Default Form vowels /i/ and /a/ to be replaced by two /e/s or by an /e/-based /j/ and an /e/, while the former requires any mid vowels be replaced by an /a/.

The fact that Affix-Induced Non-High Vowel Harmony apparently does not occur is in accordance with the Immediate Phenomena Precedence Principle, whereby an immediate (i.e., local or direct) phenomenon takes precedence over a removed (i.e., remote or indirect) one if either but

not both could occur. In this particular case, the phenomenon involving immediately adjacent phonemes (Root Adjacent High-Low Vowel Merging) takes precedence over the phenomenon involving non-immediately adjacent phonemes (Affix-Induced Non-High Vowel Harmony).

Given the Immediate Phenomena Precedence Principle, the Default Form of /Ca-niar-a/, and the phenomena of Root Adjacent High-Low Vowel Merging, Root Adjacent Consonant-Vowel Assimilation, and Root-Induced Non-Suffix Non-High Vowel Harmony, the –3S+P verb form is required to be /Ce-njer-a/, which is the attested form.

Section 3: Conclusion

The Fur data examined in this paper is analyzable as being consistent with the presence of a few simple vowel-harmony and root-reduction allomorphic alternation phenomena and general allomorphic alternation principles that interact to produce a complex verb-form pattern. The following tables repeat the hypothesized prefix, suffix, and root Default Forms, and the basic data.

Table 3.1: Prefix Default Form

Verb-Form Sets	English Glosses	Hypothesized Prefix Default Form	Tense-Aspect	Attested Forms +3S	Attested Forms -3S
1-16	Not 3rd Per Sing 3rd Per Sing	Ca- Ø-	 +P +PP +PP	 Ø- Ø- Ø-	 Ca- Ce- Ca-

Table 3.2: Suffixes Default Forms

Verb-Form Sets	English Glosses	Hypothesized Suffix Default Forms	Tense-Aspect	Attested Forms +3S	Attested Forms -3S
1-16	Past Present Perfect	-a (, -o?) -el	 +P +PP +PP	 -a (,-o) -el -Ø	 -a -el -Ø

Table 3.3: Summary Of The Data And The Hypothesized Root Default Forms

Verb-Form Sets	English Glosses (Infinitives)	Hypothesized Verb-Root Default Forms	Tense/ Aspect	Attested Forms +3S	Attested Forms -3S
1	to measure	arr-	+P +PP	arr-a err-el	Ca-rr-a Ce-rr-el
2	to serve food	ɟan-	+P +PP	ɟan-a ɟen-el	Ca-n-a Ce-n-el
3	to climb	ɟaab-	+P +PP	ɟaab-a ɟeeb-el	Ca-ab-a Ce-eb-el
4	to boil (transitive)	ɟaas-	+P +PP	ɟaas-a ɟeel-el	Ca-as-a Ce-es-el
5	to put the evil eye on	njaal-	+P +PP	njaal-a njeel-el	Ca-njal-a Ce-njel-el
6	to laugh	lla-	+P +PP	la-a le-el	Ca-ll-a Ce-ll-el
7	to share	ŋgaar-	+P +PP	ŋaar-a ŋeer-el	Ca-ŋgar-a Ce-ŋger-el
8	to melt (intransitive)	salal-	+P +PP	salal-a selel-el	(not given) (not given)
9	to sprout	tan-	+P +PP	tan-a ten-el	(not given) (not given)
10	to be (locative)	kaiŋ -	+P +PP	keŋ-a kee	Ca-ŋ-a Ca-iŋ
11	to taste	iwi-	+P +PP	iwi-a iwi-el	Ca-wi-a Ce-wi-el

12	to load; saddle	itab-	+P +PP	itab-a itib-el	Ca-tab-a Ce-teb-el
13	to spread	iwer-	+P +PP	iwir-a iwir-el	Ca-war-a Ce-wer-el
14	to seize	tie-	+P +PP	tii-o tii-el	Ce-e-a Ce-e-el
15	to stop (intransitive)	kiar-	+P +PP	keer-a kiir-el	Ca-ar-a Ce-er-el
16	to tear	niar-	+P +PP	njer-a njir-el	Ce- njer-a Ce- njer-el

Five root reduction phenomena have been proposed as acting in Fur verbs:

1. Root Word-Internal First Vowel Omission (Section 2.4)
2. Root-Initial Word-Internal Singleton-Consonant Omission (Section 2.5)
3. Root Word-Initial Non-Approximate Second Consonant Omission (Section 2.6)
4. Root Non-Low Vowel Omission Before Nonfinal-Dorsal-Nasal (Section 2.7)
5. Root Adjacent Consonant-Vowel Assimilation (Section 2.8)

In addition, one general principle has been proposed as governing the root reduction phenomenon in Fur:

Conservative Allomorphic Form Change Principle (Section 2.9)

References

Beaton, A. C. (1968). A Grammar Of The Fur Language. Linguistic Monograph Series I. Khartoum, Sudan: University Of Khartoum

Crystal, David (1992). An Encyclopedic Dictionary Of Language And Languages. Oxford, U.K.: Blackwell Publishers.

Jakobi, Angelika (1990). A Fur Grammar: Phonology, Morphophonology, And Morphology. Hamburg, Germany: Helmut Buske Verlag.

Jernudd, Bjoärn H (1983). "Phonetic Notes on Tone and Quantity in the For Language" Nilo-Saharan Language Studies, ed. by M. Lionel Bender. East Lansing, Michigan: African Studies Center, University of Michigan. pp. 80-86.

Kutsch Lojenga, Constance & Waag, Christine (2004) : "The Sounds And Tones Of Fur". Occasional Papers in the Study of Sudanese Languages, 9. Leoma G. Gilley (ed.). Nairobi : SIL-Sudan. pp 1-25.

Noel, Georgianna (2008). "An Examination Of The Tone System Of Fur And Its Function In Grammar". MA thesis, University Of Texas - Arlington.