Studies in African Linguistics

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UNDERLYING LOW TONES IN RUWUND

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In this paper the author examines data from Ruwund, a language with surface tone patterns often the reverse of those reconstructed for Proto–Bantu, and proposes that, whereas most contemporary Bantu languages are believed to have tonal systems based on an underlying high/toneless contrast, Ruwund is based on a low/toneless contrast. Rules of tone spread and deletion apply to low tones rather than high tones, and the "default low insertion" rule of other languages is replaced in Ruwund by a rule adding default high tones. This finding is theoretically significant in that it contradicts Pulleyblank's [1986] proposal that "low" is always the default value in a two–tone language.

0. Introduction*

Since the mid 1980's various tonal data have been elegantly explained through analyses which combine an autosegmental approach to phonology with under-specification theory. In underlying representations, the various tone-bearing elements of a morpheme are viewed as either bringing tones to the tonal tier (i.e., as being tonally specified) or as making no tonal contributions (i.e., as remaining tonally unspecified). The underlying tones may be linked by association lines to the

elements of the segmental tier to which they belong or they may come in a "floating" (i.e., unlinked) form. The tones may spread, move, or interact with each other according to ordered, language–specific tone rules. At some point in derivations, a general rule applies which assigns a default tonal specification to all tone bearing units which as yet remain unlinked to any tones.

The autosegmental/underspecification synthesis has proven particularly useful in characterizing the spreading and shifting of tones in a number of languages of the Bantu family.[1] One characteristic shared by virtually all recent autosegmental studies of Bantu languages is that high (H) tones are viewed as being underlying, and low (L) tones as being inserted by a default rule.[2] The H–based approach seems justified in that high tones rather than low tones are affected by basic tone rules and figure in the conditioning environments of these rules. It is also consistent with Pulleyblank's [1986] claim that in two–tone languages, L must be the default value.

In her analysis of Igbo, Clark [1989] challenges the view that in languages with two–way underlying contrasts, H is always the underlying tone and L the default value, by showing that an approach in which L is viewed as underlying more satisfactorily accounts for the data of that language. In the present paper, I will argue that at least one member of the Bantu family—the Ruwund language of Zaire and Angola[3]—is also L–based and, counter to Pulleyblank's proposal, makes use of a default-H rule. Low tones, rather than high tones, will be seen to participate in such common Bantu tonal phenomena as tone spread and adjacent tone deletion, and high tones, rather than low tones, will be found in non–definable "elsewhere" locations. The Ruwund data, therefore, support Clark's conclusion that underspecification theory must allow for L–based systems, though perhaps regarding them as "marked".

That an occasional Bantu language would be found where L is the underlying value and H the default value should not be surprising. The family is famous for complex tonal systems in which underlying tones move to new locations during the

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[1] See Pulleyblank's [1986] analysis of Tonga for an example of tone shift, and Goldsmith, Peterson and Drogo [1989] for an example of tone spread.

[2] Botne's [1991] analysis of Ciruri is exceptional in that it proposes underlying low tones in verbs. It should be noted, however, that as Botne's account simultaneously makes use also of underlying high tones and underlying "accents", it represents a much more significant departure from a standard autosegmental/underspecification approach than that offered here for Ruwund.

[3] Ruwund, which is spoken in two major pockets along the Zaire–Angola border, appears in scholarly literature under a variety of names, including "Lunda", "Luwunda", "Luunda", "Ruund", "Uruund", "Northern Lunda", and "Lunda of Mwant Yav". It is language L53 (Luwunda) in Guthrie's [1948] classification system, and K23 (Ruund) in Bastin's [1978]. Speakers of Ruwund, who call themselves *Aruwund*, refer to the language as *Uruwund* (of which the initial syllable is a nominal prefix). It should be noted that Ruwund is distinct from "Lunda–Ndembo" (Guthrie's L52 "Lunda" and Bastin's K22 "Ndembo"), a language spoken in southern Zaire and northern Zambia which is only a moderately close cousin to Ruwund and not at all mutually intelligible with it.

derivation of surface forms or are deleted through interactions with other tones. It is, thus, not uncommon for segments which bear high tones at the underlying level to surface with low tones. Clearly, languages such as these where there are significant tonal changes during surface form derivation are ripe grounds for an eventual reinterpretation regarding which tone is "basic" and which is default–inserted. In Ruwund, the potential for reinterpretation was especially great, since Ruwund belongs to a small group of Bantu languages manifesting historical tonal "reversal"—that is, which have surface tone patterns that are, in most cases, the inverse of what Proto–Bantu is believed to have had. Although tracing the evolution of "reversal" and Ruwund's L–based tone system is not the primary goal of this investigation, one possible historical scenario will be offered at the conclusion of the discussion.

1. Nominal Tone

To make the case for underlying lows in Ruwund, I will first examine basic tone patterns for nouns in the language and show that an L–based analysis is more economical than various possible H–based ones. This discussion will provide the foundation for an examination of a few critical verb forms where *only* an underlying low approach adequately generates the data.[4]

Nouns are a good place to start an investigation of Ruwund tone since they are morphologically simple, consisting usually of just a nominal prefix and a root. More importantly, Ruwund nouns, unlike verbs in this language, bear lexical tone, and thus permit some revealing comparisons to Proto–Bantu reconstructions and to nouns of other contemporary Bantu languages. Unfortunately, however, a comparison of Ruwund nouns to those of other languages is complicated by the fact that Ruwund is not only a "reversing" language, but one of a belt of Bantu languages where word–final vowels have been dropped, at least in surface forms.

Like most contemporary languages of the family, Proto–Bantu is believed to have used only open syllables. However, all Ruwund nouns, as well as most verb forms,[5] end either in consonants or in an *u* vowel which is phonetically voiceless and which carries no tone.[6] For this reason, it is useful to examine first some data

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[4] Space considerations limit the data discussed to what is essential for the argument, though some additional data is provided at the conclusion of the paper. For a full description of the Ruwund tonal facts—including complete verbal paradigms for all tenses with various configurations of affixes—the reader is referred to Nash [1992].

[5] The verbal exceptions include imperatives employing object prefixes, relative forms, and Distant Past tense forms, all of which end in a short, voiced *a* vowel. For the most part, these are not dealt with here, but an explanation can be found in Nash [1992].

[6] Nouns that end in voiceless *u* have the same tone patterns (*u* ignored) as those with no final *u*. Examples include *mûtu* "head" (like *ût* "bow"), *muntu* "person" (like *muj* "root"), *cisaku* "disease from sorcery" (like *nzal* "hunger"), *rupwàmbu* "bell" (like *mukìl* "tail"), and *kapwâpu*

from Ciluba, a neighboring language which also manifests "reversal", but in which final vowels have been retained.

The five Ciluba noun roots in (1) show clear evidence of "reversal" when compared to their Proto–Bantu reflexes; syllable for syllable, tonal specifications are the opposite in Ciluba from what Guthrie [1971] reconstructed for the proto–language.

(1)　(low–toned vowels have grave accents; high–toned vowels are unmarked)[7]

	'root'	'bow'	'hunger'	'tail'	'hair'
Proto-Bantu	-dì	-ta	-jàdà	-kilà	-cùki
Tone melody	L	H	L L	H L	L H
Ciluba	-ji	-tà	-zala	-kìla	-sukì
Tone melody	H	L	H H	L H	H L

Furthermore, whereas nominal prefixes are reconstructed as low–toned in Proto–Bantu, they are high–toned in Ciluba (e.g., *mukìla* 'tail', *butà* 'bow', *mujì* 'root').

As can be seen in (2), it is a short step from the Ciluba forms to the Ruwund cognates. (Prefixes have been separated from the roots to facilitate comparison with the forms in (1) above.)

(2)

	'root'	'bow'	'hunger'	'tail'	'hair'
Ciluba:	*mu-ji*	*bu-tà*	*n-zala*	*mu-kìla*	*n-sukì*
Ruwund:	*mu-j*	*û-t*	*n-zal*	*mu-kìl*	*n-sûc*

Tonal melodies for the Ruwund nouns closely resemble those for their Ciluba counterparts. Forms for 'root' and 'hunger' are all high in both languages. The two–syllable H-L sequence of Ciluba *butà* and *nsukì* appears instead as a single–syllable falling tone in Ruwund *ût* and *nsûc*. In one case, *mukìl* 'tail', a contrasting tonal element in the melody appears to have been lost: the final H of the Ciluba L-H root melody is missing in the Ruwund noun, which ends only in L.

The nouns examined here are not isolated examples, but rather typify correlations between Ruwund, Ciluba and Proto–Bantu. A very large number of reflexes can be found where Proto–Bantu bisyllabic roots with first–syllable highs and

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"insect" (like *nsûc* "hair"). It should be noted as well that a final *u* vowel, like non–final voiced *u,* causes a preceding *t* or *d* to be realized as a retroflex affricate.

[7] It is customary in Ciluba grammars and vocabularies to mark low–toned syllables (and contour–tone syllables), while leaving high–toned syllables unmarked (as opposed to the usual practice in Bantu of marking *high–toned* syllables). "Tail" is thus *mukìla* rather than *múkilá*. As marking lows represents by far the more economical use of diacritics in Ruwund as well, this practice will also be followed in Ruwund spellings.

second–syllable lows (by far the most common type in Guthrie's reconstructions) have come to have first–syllable lows in both Ruwund and Ciluba, and, in the latter language, second–syllable highs (e.g., R: *mashìk* C: *mashìka* PB: *-tíkà* 'cold'; R: *diitàm* C: *ditàma* PB: *-támà* 'cheek'; R: *mucìm* C: *mucìma* PB:*-témà* 'heart'; and R: *diikùm* C: *dikùmi* PB: *-kómì* 'ten'). Also, there are numerous reflexes where bisyllabic roots that were entirely low–toned in Proto–Bantu have become all high–toned in Ruwund and Ciluba (e.g., R: *nnam* C: *nyama* PB: *-yàmà* 'animal'; R: *diikond* C: *dikonde* PB:*-kɔ̀ndè* 'banana'; R: *ngomb* C: *ngomba* PB: *-gòmbè* 'cow'; and R: *ngam* C: *ngoma* PB: *-gòmà* 'drum'). Though examples are not numerous, Proto–Bantu low–high melodies for which reflexes can be found typically become high–low in Ruwund and Ciluba (e.g., R: *mwôj* C: *mwonjì* PB: *-gòdi* 'rope'). Tonal opposition is also usually found in monosyllabic roots (e.g., R: *muntu* [with voiceless final *u*] C: *muntu* PB: *-ntù* 'person' and R: *mûtu* [with voiceless final *u*] C: *mutù* PB: *-to* 'head').[8]

1.1 Preliminaries: End Vowel Rules (EVR) and pre–EVR representations. The Ruwund nouns *muj* 'root' and *ût* 'bow' reveal an interesting problem in Ruwund phonology that must be dealt with before much more can be said about reversal or about the nature of underlying tonal contrasts: what is to be the underlying representation of roots for short, monosyllabic nouns such as these? Consider the following: -*mu*- of *muj* and *u*- of *ût* are merely nominal prefixes, presumably having an identical tonal specification at the underlying level.[9] Since these nouns have different surface tones, the roots -*j* and -*t* are necessarily viewed as tonally contrasting. An analysis employing only tone vs. toneless contrasts at the under-lying level will thus want, in most circumstances, to consider one of these to be underlyingly tone bearing and the other to be toneless.

Since *ût* has a surface contour tone (i.e., is a syllable linked to both an H and an L on the tonal tier) yet also has a short vowel, it is highly likely that the noun's root is in some way moraic. This follows from the fact that without at least two moras in the noun at a pre–surface level in the phonology, it is difficult—in any approach using only a tone/toneless underlying contrast—to generate a two–tone contour,

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[8] Guthrie also reconstructed a few H–H nouns and roots for Proto–Bantu. Unfortunately, only a handful of these survive in Ruwund and the rare reflexes that can be found often manifest different tone patterns. Proto–Bantu *yitu* 'us,' for example, is *êtu* (with HL melody) in Ruwund, while reconstructed root *-jada* 'claw' appears in Ruwund as -*zàl* (with a low tone on the surface but potentially a LL or LH melody prior to deletion of the final vowel, as explained in section 1.1).

[9] Although class 14 prefix *u*- is realized with a falling tone in *ût* 'bow, gun,' it is, like *mu*-, simply high–toned in all polysyllabic nouns (e.g., *ujim* 'anger,' *usând* 'adolescence,' *ulààl* 'bed'). Furthermore, the same tonal contrast can be found in short, monosyllabic nouns employing *identical* prefixes (e.g., *mât* 'bows' and *maj* 'dances,' both of which use class 6 prefix *ma*-).

regardless of which tone, H or L, is taken as being the underlying one. If *ût* were to be viewed as having only one mora (that of prefix *u*) from the outset, it would be expected that an underlying tone (T), whether brought to the tonal tier by prefix *u* (as in (a) and (b) below) or by root *t* (as in (c)), and whether floating (as in (b) and (c)) or linked (as in (a)), would link (or remain linked) to that single mora (as in (d) below) prior to the application of a default tone rule.

(a)	(b)	(c)		(d)
T	T	T		T
|	|		would all be	|
u-t	*u-t*	*u-t*		*u-t*	just prior to default.
|	|	|		|
m	*m*	*m*		*m*

(T = underlying H or L)

There would, thus, be no tonally–unspecified mora remaining at the time of default tone insertion to allow or require the assignment of a contrasting default tone, thereby supplying the second component of an eventual surface H-L contour.[10]

If the root *-t* of *ût* must be moraic, and either *-t* or *-j* (of *muj*) must be tone–bearing, there would seem to be two options: to view Ruwund final consonants as being moraic (at least potentially), or to view Ruwund words as having vowels at the underlying level which (with the exception of *u*) fail to surface due to the operation of a deletion rule. In other words, *ût*, from a segmental standpoint, must have an underlying representation as in (3).

(3)	*u -t*	(with a moraic		*u-tV*	(with a non-surfacing final
	| |	final consonant)	or	| |	vowel of indeterminable
	m m			*m m*	quality)

With two moras present, clearly one or the other can be the bearer of the under-lying tone and the remaining mora the recipient of a contrasting default–inserted tone, making an eventual H-L melody possible.

It is beyond the scope of the present discussion to compare the merits of the "moraic consonant" and "non–surfacing final vowel" approaches. Furthermore, this choice does not appear ultimately to affect in any critical way the eventual argument and conclusion concerning underlying low tones. Adopting, then, what is

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[10] Though another conceivable source for a second tone would be a contrasting floating tone, added by rule, this is not a viable hypothesis, since a general tone–adding rule would incorrectly cause the appearance of contour tones on a great many other words in the language.

undoubtedly the least controversial path, I will assume for the purposes of this investigation that words in Ruwund end in vowels at the underlying level, but that short final vowels are devoiced and then (with the exception of *u*) deleted at some point by phonological rules. The rules accomplishing all this can, for present purposes, be lumped together and called simply the End Vowel Rules (EVR). As a word such as *ût* must still have two moras at the time of default tone insertion (so that a contrasting tone is inserted and a two–tone melody created), the End Vowel Rules are necessarily viewed as applying only *after* default tone insertion.

Strong clues as to the nature of the tonal components of the End Vowel Rules are provided by the Ruwund surface forms above in (2). The falling tones of *ût* 'bow' and *nsûc* 'hair' lead to the conclusion that when a low–toned final vowel which follows a high–toned syllable is devoiced/deleted, its low tone reassociates back to the previous syllable.

(4)

	H L	H H L
	| |	| | |
pre-EVR: (post-default)	*u-tV*	*n-sucV* [11]
	H L	H H L
	↙	| ↙
post-EVR:	*u-t*	*n-suc*

If the above represent the correct post–default, pre–EVR representations for *ût* and *nsûc*, it follows that the representations for *muj* 'root' and *nzal* 'hunger' have final vowels linked to high tones just prior to the application of EVR, since it is a different tonal specification on the final vowel which must be causing these to surface with different tone, and since, if the final vowel is not L-linked, it must be H-linked.

(5)   *mú-jV́* and *ń-zálV́*   *as opposed to*   *ú-tV̀* and *ń-súcV̀*

It can also be concluded that if a final vowel is linked to an H and the preceding syllable linked to a different H (as in the possible structures (6a) and (6c) below), the H of the final vowel simply disappears during EVR. There are two reasons for drawing this conclusion: first, there is no counter evidence in the language to indicate that floating H tones are left trailing after certain nouns, and second, representations in which a floating H is retained on the tonal tier after another H would be suspect in most contemporary autosegmental frameworks.[12] (If, of

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[11] All word–initial nasal prefixes are syllabic and tone–bearing in Ruwund.

[12] Even frameworks which readily permit representations with adjacent same–value tones on the tonal tier (i.e., those which don't accept the restriction on such imposed by the Obligatory

course, it turns out that the final vowel is linked to the *same* H as the preceding syllable [as in (6b), (6d) and (6e) below], nothing at all need be said, since the branch would be assumed to disappear with the vowel.)

(6)   (a)   (b)   (c)   (d)   (e)

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              H H           H         H H H       H  H           H
              | |           /\        | | |       |  /\          /|\
pre-EVR:     mu-jV   or    mu-jV      n-zalV  or  n-zalV  or   n-zalV 13
(post-default)
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              (a) and (b)   (c) and (d)   (e)

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                  H                          H H              H
                  |                          | |              /\
post-EVR:        mu-j                        n-zal           n-zal
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Though nothing has yet been determined concerning which tone, H or L, is underlying and which is default–inserted (EVR, coming as it does, after default tone insertion), the pre–EVR tonal specifications of four of the five Ruwund nouns in (2) have now been deduced (as shown in (5) above). Unsurprisingly, considering the close similarity of these nouns in Ciluba and Ruwund, they match Ciluba surface forms *muji* 'root', *butà* 'bow', *nzala* 'hunger', and *nsukì* 'hair' from the tonal standpoint. The case which is difficult to decide is that of *mukìl* 'tail'. The easiest course would be to assume that the tone of the devoiced/deleted final vowel is L, like the syllable before it. An L after an L would be expected to disappear, just as an H after an H, as a natural consequence of the autosegmental model. There is, however, good evidence that in Ruwund the H of a high–toned final vowel would also be dropped after L. No polysyllabic words in the language end in rising tones (which, if found, would suggest reassociation backward of a final stranded floating H), despite the fact that one would expect that in at least some words a high–toned final vowel would follow a low tone. Furthermore, there exist some verb forms in the language which strongly indicate that floating H after L is

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Contour Principle) would probably not want to support representations that maintain adjacent *floating* same–value tones.

[13] The representation in (6c) is unacceptable in standard current autosegmental theory in that it violates the Obligatory Contour Principle, which disallows separate adjacent same-value tones within a single morpheme in underlying representations, if H is, in fact, the underlying tone. It is listed as one possibility here, however, both since there has been no determination as yet that H is an underlying tone and since the validity of the Obligatory Contour Principle is still contested by some theorists.

deleted.[14] Note also that the Ciluba cognate *mukìla* (like a number of other Ciluba cognates of this tone pattern) has a final high tone.

With these considerations in mind, and so as not to limit unnecessarily the possibilities for nominal tone before the various approaches can be examined, I will assume that the End Vowel Rules provide for the loss of an H associated to a final vowel regardless of the tone of the preceding syllable, and leave it that the pre–EVR tone of the last syllable of *mukìl* is unknowably *either* high (V́) *or* low (V̀) (since either an H or an L after low–toned -*kìl* would be lost during EVR as EVRs have just been construed).

The following summarizes what has been either determined or assumed in these preliminaries to the discussion of Ruwund nouns:

- Ruwund words end underlyingly in vowels which, as a result of the End Vowel Rules, do not surface (with the exception of *u*, which surfaces in devoiced, non–tone–bearing form).
- The End Vowel Rules provide that when a word–final vowel is devoiced,
  - the tone of that vowel is deleted in cases where it is of the same type as the tone linked to the previous syllable (H after H, L after L)[15] or when it is H following an L;
  - the tone of that vowel associates back to the previous syllable if it is an L following an H.

These decisions have led to the hypothesis that surface tonal specifications, such as those in (7), are derived from pre-EVR tonal specifications, such as those in (8).

(7)   *mú-j*   *û-t*   *ń-zál*   *mú-kìl*   *ń-sûc*

(8)   *mú-jV́*   *ú-tV̀*   *ń-zálV́*   *mú-kìlV́/V̀*   *ń-súcV̀*

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[14] The best evidence comes from Present Continuous tense forms, in which the final vowel (which in verbs would appear to be *a*) can be deduced to be high–toned, since the verb-stem final syllable (usually tense–marking suffix -*in* or -*iin*) is in most cases simply high–toned (i.e., no falling tone, which would indicate a pre–EVR low on the final vowel, ever appears there).

The form *noshòdin* 'I am burning a lot', since it is not *noshòdîn must come from pre–EVR *nóshòdíná* (with a *high–toned* final vowel *a*), and the form *nimutèkìdiin* 'I am placing for him,' since it is not *nimutèkìdîin, must similarly come from pre–EVR *nímutèkìdííná*. In some short Present Continuous tense forms, however, the syllable preceding the final vowel is low–toned, meaning that a floating H (from final vowel *a*) follows a *low* after EVR has applied. Since no rising tone is produced, which, if present, would indicate that the floating H associates back to the preceding low–toned syllable, it would seem that the floating H is simply deleted.

  noshìn   'I am burning,' coming from pre–EVR *nóshìná* is not *noshĭn
  ninìin   'I am drinking,' coming from pre–EVR *nínìíná* is not *ninĭin*

[15] It will be left as understood that a special rule deleting floating same–value tones (H after H, L after L) is unnecessary in many autosegmental frameworks, and that in most frameworks nothing at all needs to be stipulated if the devoiced final vowel was associated to the same tone as the preceding syllable in a branching representation (the branch simply disappearing when the vowel is devoiced).

Note that no autosegmental structure is proposed as yet for the pre–EVR and post–EVR versions of these nouns as they are represented in (7) and (8). Structure, the nature of the associations of tone–bearing units to tones on the tonal tier, is in some cases dependent upon what analysis of Ruwund tone is ultimately chosen. The pre–EVR representation of "hunger", for example, might conceivably be one of the representations in (9) depending upon what is ultimately taken to be the underlying form of this noun and what rules apply to the form prior to this stage.[16]

(9)   H   H   H H   H   H H H
         | /\   /\ | /\\ | | |
        n-zalV   or   *n-zalV*   or   *n-zalV*   or even   *n-zalV*
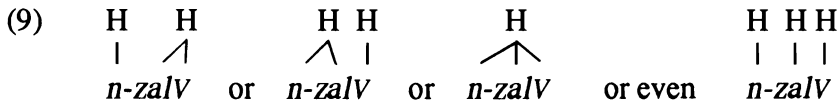
So that various different approaches (with some slightly different structural results) can be considered, the question of what structure generates the tonal specifications of (7) and (8) has intentionally been left open.

1.2 Possible analyses. As the five Ruwund nouns already cited represent the basic tone patterns of the language,[17] the pre–EVR tonal specifications of these nouns in (8) can be taken as the "goals" of any analysis. The tonal effects of EVR having already been described, the effort can now turn to deriving the pre–EVR stage under various hypotheses regarding the nature and distribution of underlying tones.

Since the view of Ruwund tone ultimately proposed in this paper—where L is underlying and H the default value—is unorthodox both in that it differs from the usual approach to Bantu languages and that it requires lifting Pulleyblank's proposed theoretical restriction that L be the default value, it is important to show that more conventional H–based analyses are inadequate. The underlying lows analysis (in (1.2.2) below) will thus be considered in conjunction with two analyses which attempt to deal with the Ruwund data employing underlying H's and a default-L tone rule:

(i) a "non–shifting underlying H" analysis in which surface forms are viewed as directly reflecting underlying tone (§1.2.1 below).

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[16] Again, some of these representations would be unacceptable to standard theory if H is an underlying tone, since separate, adjacent, same–value underlying tones within a morpheme would violate the Obligatory Contour Principle. H has not, however, yet been determined to be the underlying tone.

[17] The overwhelming majority of Ruwund nouns are one or two syllables in length, with these five tone patterns representing the full range of tonal possibilities. The language does have some three–syllable and four–syllable nouns (with bisyllabic and trisyllabic roots), but a study of these does not contribute a great deal to the present discussion, since 1) these are generally not nouns for which Ciluba cognates or Proto–Bantu reconstructions can be found, and 2) tonal variation is here extremely common (e.g., *uswèràl, uswèrâl* or *uswèral* for 'laziness'). The tonal patterns are, nevertheless, provided at the end of the paper.

(ii) a "shifting underlying H" analysis in which surface forms are seen as manifesting a shift of an underlying H one mora to the left (§1.2.3 below).

As no previous autosegmental analyses of Ruwund tone have ever been proposed, these H–based alternative analyses are also new. They are not, however, mere straw–man constructs, conceived with built–in defects to insure their ultimate failure, but rather true attempts to pursue the most promising alternative H–based hypotheses as far as they go.

1.2.1 The non–shifting underlying H analysis. In this hypothesis, noun prefixes are all underlyingly high–toned, and root syllables are underlyingly high or toneless. Low tones are inserted by a default rule.

(10)

		H H	H	H H	H H	H	H H
Underlying:		*mu-jV*	*u-tV*	*n-zalV*	*mu-kilV* or	*mu-kilV*	*n-sucV*

			H L		H L H	H L L	H H L
Default-L:		——	*u-tV*	——	*mu-kilV* or	*mu-kilV*	*n-sucV*

The resulting representations clearly do account for the "goal" tonal specifications of (8), repeated below.

(8)   *mú-jV̀   ú-tV̀   ń-zálV̀   mú-kìlV́ or mú-kìlV̀   ń-súcV̀*

After EVRs apply, representations are as follows.

(11)

	H	H L	H H	H L	H H L
post-EVR:	*mu-j*	*u-t*	*n-zal*	*mu-kil*	*n-suc*
	muj	*ût*	*nzal*	*mukìl*	*nsûc*
	'root'	'bow'	'hunger'	'tail'	'hair'

Note that while this approach maintains a similarity with Proto–Bantu in that it employs underlying H's and default L's, it also views Ruwund as being radically different: Ruwund words are here seen as bearing underlying tone in exactly the opposite locations that Proto–Bantu did (resulting in a situation, visible in (10) above, in which moras tonally specified at the underlying level now far outnumber those remaining unspecified). If, for example, Proto–Bantu had a straightforward tonal system, underlying representations for these words in that language would presumably have been as in (12) (with *px* standing for nominal prefix), to which the low default rule applied, producing the forms in (13).

(12)   H   H   H
     Proto-Bantu | | |
          Underlying: px-*di*   px-*ta*   px-*jada* px-*kila*   px-*cuki*

(13)   L L   L H   L LL   L HL   L LH
                        | | | | | | | | | | | | |
          Default-L: px-*di*   px-*ta*   px-*jada* px-*kila*   px-*cuki*

1.2.2 The underlying L analysis. In this view, noun prefixes are all underlyingly toneless, and root syllables underlyingly low or toneless. High tones are inserted by a default rule.

(14)   L   L   L   L
                              | | ∧ |
     Underlying: mu-*jV*   u-*tV*   n-*zalV*   mu-*kilV* or mu-*kilV*   n-*sucV*

                    H H   H L   H H H   H LH   H L   H HL
                    | | | | | | | | | | | ∧ | | |
     Default-H: mu-*jV*   u-*tV*   n-*zalV*   mu-*kilV* or mu-*kilV*   n-*sucV*

   These representations also account satisfactorily for the "goal" tonal specifications of (8), repeated below.[18]

---

[18] A note on rule ordering: while it is perhaps tempting to view the Default H assignment as *following* the End Vowel Rules, thus eliminating the necessity for the components of EVR which delete floating high tones, this would mean that at one point in the derivations of *ût* and *nsûc* (after the deletion of the final vowel but before H default) a representation would have to be preserved in which words end in a floating L though there exist toneless segments to which L might link. This is probably unacceptable from a theoretical standpoint.

(8)   *mú-jV̌   ú-tV̀   ń-zálV̌   mú-kìlV̌ or mú-kìlV̀   ń-súcV̀*

This analysis is more economical than the first in that many fewer underlying segments are tonally specified at the underlying level, most moras only receiving tonal specification via the default rule. Though the value of the underlying tone is changed, Ruwund appears in this view much more similar to Proto–Bantu from a structural standpoint, noun prefixes remaining underlyingly toneless and underlying tonal associations for noun roots being for the most part as in (12) above.

1.2.3 The shifting underlying H analysis. By supposing that Ruwund employs underlying high tones, but that these highs are realized in surface forms one mora to the left of their original locations, the third analysis permits a conventional H–based, L–default approach to be combined with an underlying tone distribution which is a very close match to the Proto–Bantu one in (12) above.

(15)   H   H   H
                                        | | |
     Underlying: mu-jV [19]   u-tV   n-zalV   mu-kilV   n-sucV

The realization of the underlying H tones one mora to the left in surface forms would presumably, in an autosegmental analysis, be the result of a two–component shift rule, the first part of which (16, Shift A) spreads a tone leftward to the adja-

		L		L	L
		|		|	|
Underlying:	*mu-jV*	*u-tV*	*n-zalV*	*mu-kilV*	*n-sucV*
		L		L	L
				|	
?EVR:	*mu-j*	*u-t*	*n-zal*	*mu-kil*	*n-suc*
	H	H L	H H	H L	H H L
	|	|	| |	| |	| |
?Default-H:	*mu-j*	*u-t*	*n- zal*	*mu-kil*	*n-suc*
		H L			H HL
		∨			| ∨
Floating L Linkage:		*u-t*			*n-suc*
	muj	*ût*	*nzal*	*mukìl*	*nsûc*

[19] Note that the roots *-jV* 'root' and *-zalV* 'hunger', though high in the "goal" representations of (8), must remain underlyingly toneless under this analysis in order to be tonally differentiated from the other roots.

cent mora, and the second part of which (16, Shift B) deletes the rightmost branch of a branching tone.

(16)

$$
\begin{array}{cccc}
 & & \overset{\displaystyle H}{\diagup\!\shortmid} & \overset{\displaystyle H}{\diagup\!\shortmid} \qquad \overset{\displaystyle H}{\diagup\!\shortmid} \\
\textit{Shift A:} & \text{———} & u\text{-}tV & mu\text{-}kilV \qquad n\text{-}sucV \\[2ex]
 & & \overset{\displaystyle H}{\mid} & \overset{\displaystyle H}{\mid} \qquad \overset{\displaystyle H}{\mid} \\
\textit{Shift B:} & \text{———} & u\text{-}tV & mu\text{-}kilV \qquad n\text{-}sucV
\end{array}
$$
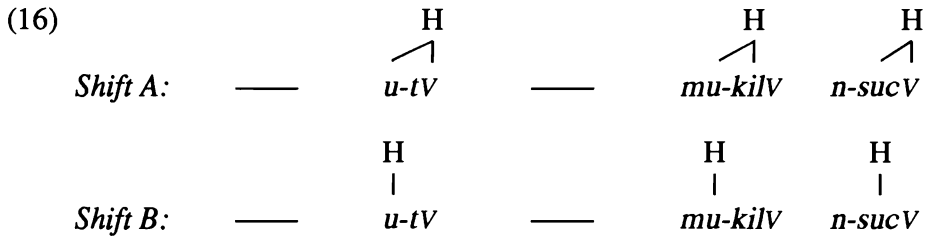
Clearly, additional rules are required under this view if the pre–EVR "goal" specifications of (8) are to be generated. To account for the high tones of *mú-jV̂* and *ń-zálV̂*, which have no underlying H's, an H must first be added to the string via some type of general high insertion rule, then spread, again via a general rule, to several syllables. (If no H is inserted, all syllables in these words would be expected to receive an L specification via the eventual application of the low default rule.)

Leaving aside, for the moment, the question of exactly where the additional H is inserted, it is clear that the mora immediately to the right of any shifted lexical H, i.e., the mora which was the original location of the lexical H, must be protected from receiving an H specification under the new proposed general spread rule, since in the goal specifications of (8) this mora is low–toned. (The low will be introduced by the default-L assignment rule which, of course, necessarily applies *after* the rule spreading H generally. And to be eligible for it, the mora to the right of an H must be toneless at the time the L default rule applies.) The only obvious way in which this mora can be protected from the general H spread rule is to have the rule operate from right to left and stop before it gets to the mora which follows a shifted lexical H. (If, on the contrary, H's were spread left–to–right during the general spread rule, the mora to the right of a shifted lexical H would be reassociated to this H, both undoing the work of "Shift B" and ensuring that this mora become ineligible for a low tone under the default L rule later.)

Turning now to the question of the rule inserting H's, if "general spread" is to be right–to–left, and if all of the moras of an underlyingly toneless word such as *nzalV* 'hunger' are to benefit, the new H is necessarily inserted at the right edge of the word (or potentially, at the right edge of the phrase) and linked to the last vowel. For the purposes of this discussion, I will assume that both the H insertion rule and the general H spread rule operate at the phrasal level and call them "Phrasal H Add" and "Phrasal H Spread", respectively, though this assumption is in no way critical. Phrasal H Add will be viewed as supplying an H to the last mora of any phrase as long as that mora is toneless and not preceded by an H–linked mora. Phrasal H Spread will be viewed as an iterative rule spreading all H's leftward (even across word boundaries) to all toneless moras except those preceded

by H–linked moras. Preventing both Phrasal H Add and Phrasal H Spread from linking H's to moras that are themselves preceded by H-linked moras allows moras which follow H–linked ones to remain toneless and to thus be eligible for low tones via the L default rule. The restriction is far from an unnatural one. It could easily be motivated by the Obligatory Contour Principle.[20]

With Phrasal H Add and Phrasal H Spread in place, the derivations of (16) can be continued as below. (Note: So that all of the sample nouns receive tonal specification in these derivations, all are here considered to be phrase–final.)

---

[20] It might, at first perusal, appear that a simple reordering which puts Phrasal H Add and Phrasal H Spread before the second part of the shift rule (Shift B, which delinks rightmost branches) would eliminate the need for the restrictions on the rules themselves. If, for example, the H of *mukilv* is allowed to remain linked to both its original mora (í) and the mora to which it has spread in Shift A (ú), then an H can be inserted on the last mora without restriction. When Shift B applies, mora *i* will lose its association and be ready to receive an L association by default.

H	H	H H		H H	H L H	H L	
|	⌒	∧ |		| |	| | |	| |	
mu-kilV	mu-kilV	mu-kilV	(NA)	mu-kilV	mu-kilV	mu-kilV	mu-kìl
UR→	Shift A	Phr.H-Add	Phr.H-Sprd.	Shift B	Def. Low	EVR	'tail'

This approach, however, runs into problems with such short, contrasting forms as *muj* 'root' and *ût* 'bow', since when an H is added to *muj* and spread by Phrasal H Spread, a representation is created which is identical to that of *ût* after Shift A.

	H	H	H	H	H L	H L	
		|	⌒	|	| |	∨	
mu-jv	(NA)	mu-jV	mu-jV	mu-jV	mu-jV	mu-j	*mûj
UR→	Shift A	Phr.H-Add	Phr.H-Sprd.	Shift B	Def. Low	EVR	'root'

H	H			H	H L	H L	
|	⌒			|	| |	∨	
u-t V	u-t V	(NA)	(NA)	u-t V	u-t V	mu-t	ût
UR→	Shift A	Phr.H-Add	Phr.H.-Sprd.	Shift B	Def. Low	EVR	'bow'

(17)

		H			H	H
		|			|	|
(from (16)):	*mu-jV*	*u-tV*	*n-zalV*	*mu-kilV*	*n-sucV*

		H		H	H H	
		|	(blocked)	|	| |	(blocked)
Phrasal H Add:	*mu-jV*		*n-zalV*	*mu-kilV*	

	H		H		H
	⟋	—	⟋	(blocked)	⟋
Phrasal H Spread:	*mu-jV*		*n-zalV*		*n-sucV*

		H L		H L H	H L
	—	| |	—	| ||	⋀ |
Default Low:		*u-tV*		*mu-kilV*	*n-sucV*

Representations which account for the "goal" specifications of (8) above, repeated below, have now been derived.

(8)   *mú-jV̌   ú-tV̀   ń-zálV̌   mú-kìlV̌ Ǹ   ń-súcV̀*

Several things should be noted about this analysis. First, "reversal" is here a synchronic phenomenon, the still–active shift rules resulting in surface forms with the appearance of historic reversal. Secondly, though a close similarity to Proto–Bantu is maintained at the underlying level, the commonality comes only at considerable cost, the inclusion of Shift A, Shift B, Phrasal High Add, and Phrasal High Spread making this approach already significantly less elegant than either of the others. Finally, there is the problem that though the derivations are successful from a purely mechanical standpoint, the approach seems to violate the spirit of underspecification theory. A default rule normally applies to "elsewhere" environments, i.e., to any moras not linked to underlying tones or affected by deep–level tonal processes. By this definition, the real default rule in this analysis is thus the combination of Phrasal H Add and Phrasal H Spread (which supply tones to under-lyingly toneless nouns such as *nzal* 'hunger'). In contrast, moras which receive "default" lows under this approach actually represent consistent, highly definable locations: exactly (and only) those moras which bear lexical tone.

2. Verbal Tone

Though an examination of nouns is useful in suggesting the main possible approaches to Ruwund tone, and, thus, for providing a foundation from which to look at other tonal phenomena in the language, it cannot resolve the question of

which type of analysis is ultimately the most satisfactory, nor can it fully reveal the tone system of Ruwund. For additional insight one must look at verb forms, where there exists the opportunity to observe different combinations of a restricted set of morphemes. In sections 2.1, 2.2 and 2.3 below, forms of the verb *-futol* 'pay (for) a lot' (made up of the root *-fut* 'pay' and the intensive extension *-ol/od*) are examined in three tenses—the Recent Past, the Near Past, and the Present Continuous. (As verbs do not bear lexical tone in Ruwund, patterns are the same for all other bisyllabic, consonant–initial stems. Forms for longer and shorter stems (some data for which are provided at the end of the paper) follow the patterns for bisyllabic stems except where noted.)

2.1 The shifting underlying H analysis—second look. The "shifting underlying H" analysis is the one which most quickly runs into serious difficulties when verbs are considered. One generalization that emerges immediately from the analysis as it was developed in section 1.2.3 above, is that in this system, words which contain no low tones at the surface level contain no H's at the underlying level (since it is the site of an underlying H that eventually surfaces as low).[21] Thus, since the first person Recent Past tense form *namamufutodin* 'I paid him a lot for them' contains no surface lows, it can be concluded that all of the morphemes which make up this form—object prefixes *ma-* 'them' and *mu-* 'him', verb root *-fut*, verbal extension *-ol*, tense–marking suffix *-in*, non–surfacing final vowel *-a*, first person singular subject prefix *ni-* and tense–marking prefix *a-* (*ni-* and *a-* together forming an initial syllable *na-* having a short vowel)—are toneless in this tense at the underlying level. The form's surface high tones must all result from "Phrasal H Insertion" and "Phrasal H Spread".

---

[21] It is unlikely that a lack of low tones on the surface could instead be explained as the result of an interaction of underlying H's that results in *all* underlying H's being deleted by rules.

(18)

| | Underlying: | *ni-a-ma-mu-fut-ol-in-a* |

| | Shift A & B: | —— |

Phrasal H Insertion:

$$\overset{\text{H}}{\underset{|}{}}$$

ni-a-ma-mu-fut-ol-in-a

Phrasal H Spread (←):

H

ni-a-ma-mu-fut-ol-in-a

Default Low: ——

EVR:

H

ni-a-ma-mu-fut-ol-in

> *namafutodin*
> 'I paid him a lot for them'

The corresponding third person form, *wàmàmùfutodin* 'she paid him a lot for them', has surface lows on all prefixes. Since the only morpheme which distinguishes this form from the first person one is the third person singular subject prefix (*w*)*u*- /wu-/ (which, replacing the first person prefix *ni*-, combines with tense–marking prefix *a*- to form an initial syllable *wa*- having a short vowel),[22] this must be the cause of the low tones appearing in the surface form. To be the cause of the low tones, however, *wu*- must be underlyingly *high–toned* in this system, since contrasting *ni*- was necessarily toneless, and "toneless" or "high" are the only possible underlying specifications. "Shift" would be expected to cause *wu*- to lose its high and, thus, become eligible for a low specification via the default rule. (That *wu*- would be high–toned underlyingly is, of course, not at all surprising, since third person subject prefixes are high–toned in many Bantu languages.)

---

[22] For reasons that are too lengthy to be explained here, the third person singular subject prefix in Ruwund is best considered to have acquired an initial /w/ at the underlying level, though this consonant is not always articulated and is not used in spellings when /wu/ is word–initial (e.g., the Present Continuous tense form *ùfùtòdin* (*wu-fut-ol-in-a*) 's/he is paying a lot').

(19)   Underlying:

$$
\begin{array}{c}
\text{H} \\
| \\
\textit{wu-a-ma-mu-fut-ol-in-a}
\end{array}
$$

A first problem for this analysis is how, exactly, to construe things so that a default low tone eventually appears on subject prefix *wu-*. The underlying high of this prefix has nowhere to go during Shift, since the prefix is at the beginning of the word (and, potentially, at the beginning of the phrase). Shift A (one–mora leftward spread) cannot apply at all. Shift B (right–branch delinking) could be prevented from applying to *wu-* by a stipulation that the rule applies only to branching tones, but then it becomes unclear how this syllable will eventually become toneless and, thus, the recipient of a low default tone.[23] If, on the other hand, Shift B is viewed as causing the H of *wu-* to delink and become a floating tone, it is not obvious how "Phrasal H Spread" would be prevented from eventually assigning H to this syllable (thereby eliminating the toneless gap that one would want to become low–toned during default tone assignment). It is true that H-Spread cannot spread a high tone to a position immediately adjacent to another high. But the H brought by subject prefix *wu-*, if it has been floated by Shift B, no longer really has a position that a tone rule could identify.

Since it may prove theoretically acceptable to claim that the shifted floating H of subject prefix *wu-* has been moved to a position "just prior to the word" (thus enabling it to inhibit H Spread to the word's first syllable), this problem may be merely awkward rather than catastrophic. Assuming then, that the question of how initial syllable *wa-* eventually comes to be assigned a low default tone can be resolved, there remains the greater problem of explaining how object prefixes *-ma-* and *-mu-* also come to be low–toned on the surface, since neither is low in the first person form. The only possible cause of these low tones is the same one as for the low of *wa*, the underlying H of subject prefix *wu-* (which shifts off *wu-* and protects it from H–Spread), the first person form having made it clear that all other morphemes are underlyingly toneless. There doesn't seem to be any way, however, that the shifted H of *wu-* could also protect *ma-* and *mu-* from H–Spread, since they are not adjacent to it (see 20).

---

[23] The idea that *wu-* retains its H, with *a–* becoming the recipient of the default low, and that the falling tone which results is subsequently simplified to just L might seem to be a possible solution in this particular form, but turns out to be unworkable in other tenses. (Consider, for example, Present Continuous tense form *ùmàmùfùtòdin* 'she is paying him a lot for them,' which lacks an *a-* tense–marking prefix to serve as a recipient of the default low but which still has a low–toned initial syllable.)

(20)   H

    after Shift A & B: *wu-a-ma-mu-fut-ol-in-a*

                  H   H
                                                   |
Phrasal H Insertion: *wu-a-ma-mu-fut-ol-in-a*

                  H   H
Phrasal H Spread (←):   *wu-a-ma-mu-fut-ol-in-a*

                  H   L   H
                      |
      Default Low: *wu-a-ma-mu-fut-ol-in-a*

      (after EVR:)   *wàmamufutodin*

      correct form: *wàmàmùfutodin*
                       'she paid him a lot for them'

    Though it might at first seem desirable to view the L which is eventually assigned to the subject prefix *wu-* by the default rule as subsequently spreading to the object prefixes, there is no straightforward way in which lows could spread in this analysis. Lows are introduced by default at the ends of derivations, by which time the Phrasal H Spread rule has spread a high to most of the prefixes (including object prefixes *ma-* and *mu-*). Ordering Default-L before Phrasal H Spread is, of course, of no help. If the default rule assigned L's to tonally unspecified moras prior to Phrasal H Spread, the latter would never apply, since all the syllables to which it has been viewed as spreading in the derivations above would already have been linked to L's. Long incorrect strings of low tones would be the result, as in *nàmàmùfùtòdin* and *wàmàmùfùtòdin*. A post–default rule spreading L to an adjacent H–toned syllable to the right, along with a falling–tone simplification rule, could conceivably get initial object prefix *ma-* to surface low–toned, but since two–step rule sequences cannot normally be iterative in non–cyclic generative accounts, such an approach has little hope of explaining the surface low of second object prefix *mu-*, and would furthermore make forms with single–syllable lows (not manifesting any such spread)—such as *wàfutin* 'she paid'—difficult to generate.

    The problems for this analysis only worsen when Present Continuous tense forms are considered. In this tense, different in its morphological makeup from the Recent Past tense only in its non–use of tense–marking prefix *-a*, surface lows show up in the verb stem, indicating the presence of a grammatical H (docking,

presumably, to the first verb syllable). Since prefixes have the same surface tone as in the Recent Past tense, a reasonable starting assumption is that, as in the Recent Past tense, first person subject prefixes are toneless at the underlying level while third person prefixes are H–toned. But the rules, all of which appear to be necessary in some form, again produce the wrong results, this time for *both* first person *and* third person forms.

(21)

	H	H H
	|	| |
Underlying:	*ni-ma-mu-fut-ol-in-a*	*wu-ma-mu-fut-ol-in-a*

	H	H H
	|	|
Shift A & B:	*ni-ma-mu-fut-ol-in-a*	*wu-ma-mu-fut-ol-in-a*

	H H H	H H
	| |	| |
Phrasal H Insertion:	*ni-ma-mu-fut-ol-in-a*	*wu-ma-mu-fut-ol-in-a*

	H H H	H H
	⟋ ⟋	⟋ ⟋
Phrasal H Spread (←):	*ni-ma-mu-fut-ol-in-a*	*wu-ma-mu-fut-ol-in-a*

	H L H	H L H L H
	⟋⌃ | ⟋⌃	| ⌃ | ⌃
Default Low:	*ni-ma-mu-fut-ol-in-a*	*wu-ma-mu-fut-ol-in-a*

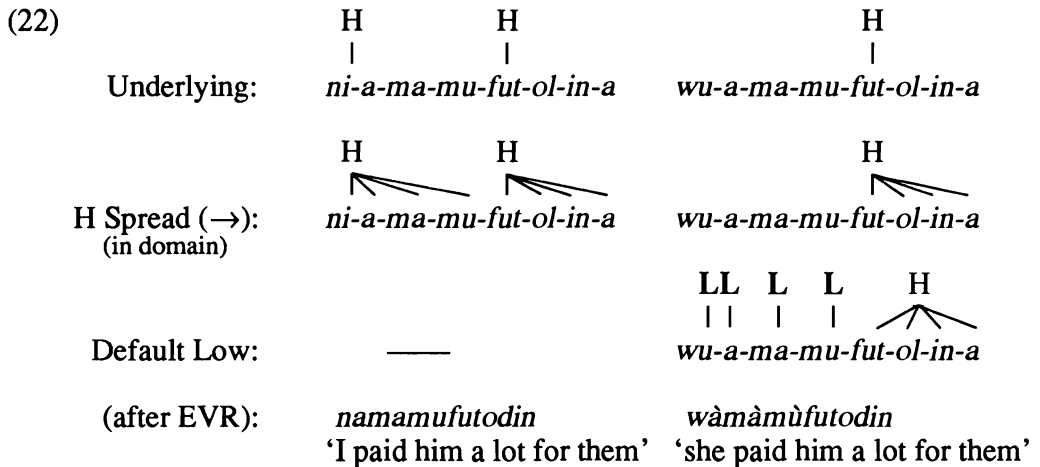|		
(after EVR):	**nimamufùtodin*	**ùmamufùtodin*
correct forms:	*nimamufùtòdin* 'I am paying him a lot for them'	*ùmàmùfùtòdin* 'she is paying him a lot for them'

The serious mechanical problems of the shifting underlying H approach are easily summarized. In this view, low tones are limited to the role of providing default tonal specification to single–mora gaps of tonelessness left by the Phrasal H–Spread rule (which is constrained so as not to spread an H to moras adjacent to any H–linked moras). But Ruwund verb forms contain many long strings of consecutive low–toned syllables in addition to strings of high–toned ones. Gaps of tonelessness are not easily enlarged to account for multi–syllable strings of lows on the surface, since tonelessness can not be spread by rules in the way that tones can. (Low tones *could* spread, but in this analysis they enter the picture too late to cover any long distances, most toneless moras at this point already having received an H

specification as a result of Phrasal H Spread.) Particularly problematic is gene-
rating forms such as *ùmàmùfùtòdin* (21), where the toneless gaps following two
different underlying H's must connect. In the derivation above, for instance, there
would not seem to be any means available to explain the eventual disappearance
(in the correct form) of the H (originally from -*fut* but shifted to *mu*-) separating
the first gap (located at *wu*-) from the second (located at -*fut*).

2.2 The non–shifting underlying H analysis—second look. As developed in
§1.3.1 above for nouns, the non–shifting underlying H analysis had only one rule:
default-L insertion. All surface high tones were derived directly from underlying
high tones. This clearly will not suffice for verb forms, since there exist verbal
morphemes which surface with high tones in some forms but with low tones in
others. Object prefixes in the Recent Past tense, for instance, are high–toned in first
person forms but low–toned in third person forms. However, addition of a rule to
the system—operating only in verbs and spreading an H to all toneless syllables to
the right within the domains of "prefix" and "verb stem"—permits this approach to
handle easily basic forms in both the Recent Past and Present Continuous tenses.
    In the Recent Past, the verb stem would be assumed to have a first syllable
underlying H (i.e., a floating grammatical H which links to the first verb mora).

(22)   H   H   H
                              | | |
     Underlying: *ni-a-ma-mu-fut-ol-in-a*   *wu-a-ma-mu-fut-ol-in-a*

                          H   H   H
                          ⟍⟍   ⟍⟍   ⟍⟍
H Spread (→):   *ni-a-ma-mu-fut-ol-in-a*   *wu-a-ma-mu-fut-ol-in-a*
   (in domain)

                                                    LL   L   L   H
                                                    | | | | ╱↗⟍
Default Low: ——   *wu-a-ma-mu-fut-ol-in-a*

(after EVR):   *namamufutodin*   *wàmàmùfutodin*
                  'I paid him a lot for them' 'she paid him a lot for them'

    In the Present Continuous tense, the verb stem itself is toneless, but tense–
marking suffix -*in* is linked to an underlying H.

(23)
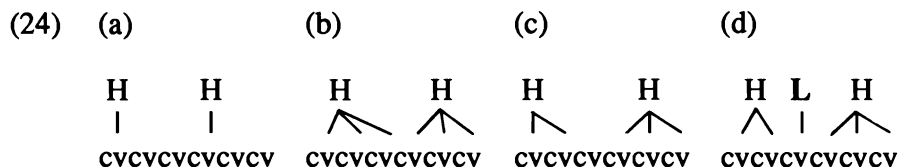
	H	H		H
	|	|		|
Underlying:	*ni-ma-mu-fut-ol-in-a*			*wu-ma-mu-fut-ol-in-a*

	H	H		H
	⌐͞	⌐		⌐
H Spread (→): (in domain)	*ni-ma-mu-fut-ol-in-a*			*wu-ma-mu-fut-ol-in-a*

	H	L L	H	L L L L L	H
	|	| |	∧	| | | | |	∧
Default Low:	*ni-ma-mu-fut-ol-in-a*			*wu-ma-mu-fut-ol-in-a*	

(after EVR):	*nimamufùtòdin*	*ùmàmùfùtòdin*
	'I am paying him a lot	'she is paying him a lot
	for them'	for them'

It is in Near Past tense data, where suffix *-in* of the Recent Past tense is replaced by *-ang*, that the major shortcomings of the non–shifting underlying H analysis are revealed.[24] While all prefixes are high–toned in the Recent Past form *namamufutodin* 'I paid [days or weeks ago] him a lot for them', object prefixes *mà–* and *mù-* are low–toned in Near Past form *namàmùfutolang* 'I paid [yesterday] him a lot for them'. For *ma-* and *mu-* to remain open for default-L assignment in the Near Past form, in this tense something must block the spread of the underlying H of *ni-*, the first person subject prefix. It is not at all obvious, however, what that something could be.

As at the underlying level there is only a toneless/H contrast, and as tonelessness is the environment in which H-Spread occurs, only another underlying H could be blocking H-Spread from prefix *ni-* to *ma-* and *mu-* in *namàmùfutolang*. In other words, *namàmùfutolang* might be viewed as containing three underlying H's rather than the two posited for the Recent Past form *namamufutodin* in (22). Clearly, an additional underlying H would have at least the potential to serve as a blocker of the rightward spread of the H on *ni-*, since the Obligatory Contour Principle (OCP) could be invoked (as in the "Shifting underlying H's" analysis) to cause spread to come to a stop one syllable or one mora away from another H tone. This would leave a toneless gap which would later be assigned an L by the default rule.
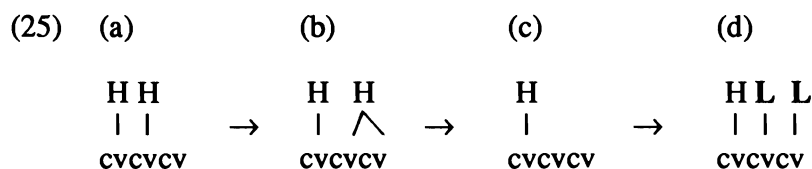
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[24] The Near Past pronunciations used in this study are those of elder speakers of the Musumban dialect (the version of the language spoken in the Ruwund capital city of Musumb), as well as of all–age speakers of the Kalamban dialect. The innovations in pronunciation now standard for younger Musumbans are still under investigation.

With the correct limitations on the H–Spread Rule, a representation like (24a) might go to one like (24c) rather than to one like (24b), allowing an L to be inserted eventually by the default rule (as in (24d)).

(24)   (a)   (b)   (c)   (d)

```
    H     H          H     H     H     H          H  L  H
    |     |          ⟍⟍   ⟋⟍    ⟍    ⟋⟍          ⟋ |  ⟋⟍
 cvcvcvcvcvcv     cvcvcvcvcvcv     cvcvcvcvcvcv     cvcvcvcvcvcv
```

Another way in which an additional H might cause a toneless gap is through a deletion rule, also OCP motivated, which removes the second of two adjacent H's.[25]

With a rule in the grammar deleting H after H, ordered after H–Spread, a representation like (25a) might go to one like (25b) during spread, but then become like (25c) (via deletion) and eventually like (25d) (via default).

(25)   (a)   (b)   (c)   (d)

```
   H H               H  H               H                H  L  L
   | |      →        |  ⟋\     →        |        →       |  |  |
  cvcvcv           cvcvcv             cvcvcv            cvcvcv
```

There are, however, a number of problems with these approaches for Ruwund. One that might already be obvious is that an H was allowed to spread to a position adjacent to another H in the analysis of Recent Past form *namamufutodin* (in (22)). This would seem to rule out both the "limitation of spread" and "adjacent tone deletion" ideas, but perhaps that form can be handled as a special case since the two H's belong to different domains. A more serious difficulty for the hypothesis that additional underlying H's are what cause low tones to appear in *namàmùfutolang* is that no positioning of them seems to work.

Looking first at the possibility that any additional underlying H's responsible for low *mà-* and *mù-* in *namàmùfutolang* are located in the prefix domain, it can quickly be concluded that the tense–marking prefix *a-*, minimally, would have to be viewed as bearing an underlying H. This follows from the fact that a low tone also appears in *nafùtolang* 'I paid a lot', a Near Past form which employs no object prefixes at all—though now the low tone presumed to be caused by an additional prefixal H appears on the first stem syllable rather than on an object prefix. Since in this analysis the first person subject prefix *ni-* is viewed as high–toned and the third person subject prefix *wu-* as toneless, underlying representations for

---

[25] Often referred to as Meeussen's Rule, tone deletion of this type is found in a number of Bantu languages.

nafùtolang and *wàfùtolang* 'she paid a lot' would presumably be as in (26a) below, contrasting with those of the Recent Past in (26b).

(26) (a) *Near Past*   (b) *Recent Past*

```
      HH  H                    H    H
      | |  |                   |    |
      ni-a-fut-ol-ang-a        ni-a-fut-ol-in-a
      nafùtolang               nafutodin              'I paid a lot'


       H  H                         H
       |  |                         |
      wu-a-fut-ol-ang-a        wu-a-fut-ol-in-a
      wàfùtolang               wàfutodin              'she paid a lot'
```

Representations for forms with object prefixes would be as in (27a) or (27b), depending upon whether object prefixes are themselves viewed as underlyingly high or toneless.

(27) (a)
```
      HH  H  H  H                    (b)   HH          H
      | |  |  |  |                          | |          |
      ni-a-ma-mu-fut-ol-ang-a   or         ni-a-ma-mu-fut-ol-ang-a

            namàmùfutolang  'I paid him a lot for them'


       H  H  H  H                            H           H
       |  |  |  |                            |           |
      wu-a-ma-mu-fut-ol-ang-a   or         wu-a-ma-mu-fut-ol-ang-a

            wàmàmùfutolang  'she paid him a lot for them'
```

It is clear that the underlying H of the first person subject prefix *ni-* might be viewed as causing deletion of the H assumed to belong to *a-* (and possibly H's belonging to the object prefixes), thus creating a toneless gap right after the subject prefix that would receive a low tone by the default rule. In one way or another, the first person forms *nafùtolang* and *namàmùfutolang* could probably be generated from such a starting point (though the alternation in the syllable *-fu-* poses something of a challenge). Even without going into the details, however, it is already obvious that such an approach will have a very hard time generating the third person forms *wàfùtolang* and *wàmàmùfutolang*. These surface with no highs in the prefix area, yet, since the third person subject prefix *wu-* is toneless, there are no tones around that could be causing the H of *a-* to undergo deletion. The H of

a- would be expected to show up in some form in the prefix area of the surface forms (perhaps as a rising tone on the syllable containing a-, as in *wǎfùtolang* and *wǎmàmùfutolang*, or as a falling tone on the following syllable, as in *wàfûtolang* and *wàmâmùfutolang*).

If an H on a- (and, possibly, on object prefixes) is not causing the difference between the Near Past surface form *namàmùfutolang* and the Recent Past form *namamufutodin*, another hypothesis would be that differences in stem tone are the source. It turns out, however, to be difficult to claim that Near Past forms lack altogether the tense–inserted grammatical H which makes Recent Past stem -*futodin* high–toned in both first and third person forms, since most Near Past stem syllables also surface high–toned. Only the first stem syllable is low–toned in Near Past forms, and then only when no object prefixes are present (e.g., -*fù*- in *nafùtolang* and *wàfùtolang*). If the stem contained no underlying H, all stem syllables could be expected to receive default L tones. (Since H–spread is domain–restricted in this analysis, no prefixal H's would spread into the stem.)

(28)

	H		H
Underlying:	*ni-a-fut-ol-ang-a*	*wu-a-fut-ol-ang-a*	*ni-a-ma-mu-fut-ol-ang-a*

	H		H
H-Spread (→):	*ni-a-fut-ol-ang-a*	——	*ni-a-ma-mu-fut-ol-ang-a*

	H L L L L	L L L L L L	H L L L L
Default Low:	*ni-a-fut-ol-ang-a*	*wu-a-fut-ol-ang-a*	*ni-a-ma-mu-fut-ol-ang-a*

| (after EVR): | *nafùtòlàng* | *wàfùtòlàng* | *namamufùtòlàng* |

| correct forms: | *nafùtolang* | *wàfùtolang* | *namàmùfutolang* |
| | 'I paid a lot' | 'she paid a lot' | 'I paid him a lot for them' |

Also unusable is the idea that the surface tonal difference is attributable to the use in the Near Past of -*ang* (which could be considered to contribute an underlying H) in place of -*in* (believed to be underlyingly toneless) in the Recent Past. Suffix -*ang* is too close to the end of the verb to be blocking H-Spread in the prefixal area. In addition, tonal patterns for forms of the Narrative tense turn out to be identical to those in the Near Past, despite the fact that in this case there is no -*ang* suffix to blame. Compare, for example, forms in the Narrative and Near Past tenses (29).

(29)   *Narrative*   *Near Past*

    nafùtol   *nafùtolang*   'I pay/paid a lot'
    namàmùfutol   *namàmùfutolang*   'I pay/paid him a lot for them'
    wàfùtol   *wàfùtolang*   'she pays/paid a lot'
    wàmàmùfutol   *wàmàmùfutolang*   'she pays/paid him a lot for them'

A final idea would be to consider the grammatical H of the verb stem as linking not to the first stem mora but to the second, and viewing object prefixes as counting as part of the verb stem. This is not an unheard of possibility—a number of Bantu languages have second–mora or second–syllable verb tone linkage, and some count object prefixes as part of the verb stem (though these languages do not usually do this in just one tense). This would seem to generate the forms *nafùtolang* 'I paid a lot' (with no objects) and *namùfutolang* 'I paid him a lot' (with one object), since in each case the string of high–toned syllables in the stem starts right after the initial syllable (object prefixes included). Unfortunately, however, this hypothesis has a great deal of trouble handling the form *namàmùfutolang* 'I paid him a lot for them' with two object prefixes and the form *nakàmàmùfutolang* 'I went and paid him a lot for them' with two object prefixes and an auxiliary prefix.[26] Such a view would seem, necessarily, to predict that in a form with two or three prefixes, the final string of high–toned syllables would start with the second prefix from the left (since it is the recipient of the H of the verb stem), resulting in the incorrect forms **namàmufutolang* and **nakàmamufutolang*.

---

(30) *with floating grammatical H for stem+object domain:*

```
 H  H              H  H                    H  H
 |                 |                        |
ni-a-fut-ol-ang-a  ni-a-mu-fut-ol-ang-a   ni-a-ka-ma-mu-fut-ol-ang-a
```

after tone docking (to second mora of stem+object domain):

```
 H  H              H  H                    H  H
 |   \             |   \                    |   \
ni-a-fut-ol-ang-a  ni-a-mu-fut-ol-ang-a   ni-a-ka-ma-mu-fut-ol-ang-a
```

H-Spread (→):

```
 H    H            H     H                 H      H
 ↖ ↗              ↖   ↗                  ↖    ↗
ni-a-fut-ol-ang-a  ni-a-mu-fut-ol-ang-a   ni-a-ka-ma-mu-fut-ol-ang-a
```

Default Low:

```
 H L    H          H L    H               H L         H
 ⋀ |  ↗           ⋀ |  ↗                ⋀ |     ↗
ni-a-fut-ol-ang-a  ni-a-mu-fut-ol-ang-a   ni-a-ka-ma-mu-fut-ol-ang-a
```

(after EVR):

nafùtolang	*namùfutolang*	**nakàmamufutolang*
'I paid a lot'	'I paid him a lot'	'I went and paid him a lot for them'

　　The Near Past tense data are difficult for any analysis, as will be seen when the "underlying lows" approach is examined below. Under the "non–shifting underlying highs" analysis, however, the problems appear insurmountable. The central awkwardness of this approach is easily identifiable: like the "shifting underlying H analysis", it is forced to explain the appearance of surface lows in such first person forms as *nakàmàmùfutolang* 'I went and paid him a lot for them' and *nafùtolang* 'I paid a lot' as the result of a toneless gap, the syllables of the gap receiving lows by default at the end of the derivation. However, since tonelessness cannot be directly manipulated by tone rules, and since the only underlying tone is H, the gap (which has variable size and is found in different locations depending upon whether the form has object prefixes or not) can only be created by positing additional H's at the underlying level to block H–spread (the H's themselves possibly coming to be deleted as a result of a rule disallowing H's directly adjacent

to other H's). While sometimes successful in generating first person forms, adding H's to underlying representations (so as to have a means to block spread and leave gaps of tonelessness) usually causes problems in third person forms, which, lacking a high–toned subject prefix, have no means of getting rid of them.

2.3 The underlying L analysis—second look. In its simplest formulation, the underlying lows analysis handles the Recent Past tense data with greater economy than even the non–shifting underlying highs analysis, only a single tone being required at the underlying level. Instead of an H-Spread rule, this approach makes use of a rule spreading L within the prefixal domain.

(31)

		L
		|
Underlying:	*ni-a-ma-mu-fut-ol-in-a*	*wu-a-ma-mu-fut-ol-in-a*

L
╲╲
Low Spread: ——   *wu-a-ma-mu-fut-ol-in-a*

HH H H HHH H   L   H H H H
Default High: || | | ||| | ╱╱╲ | | | |
            ni-a-ma-mu-fut-ol-in-a   *wu-a-ma-mu-fut-ol-in-a*

(after EVR):   *namamufutodin*   *wàmàmùfutodin*
              'I paid him a lot for them'   'she paid him a lot for them'

However, for reasons which are apparent only when Present Continuous and Near Past data are considered, a better analysis removes the restriction "within the prefixal domain" on L-spread and adopts a cyclic approach in which both L–spread and H–default apply first to the stem—minus final vowel -a—then to the prefixes. (The final vowel will be considered to belong to a "coda" domain, joining the form on the third cycle, where it is subject to a final application of H–default.[27]) In such an approach, the L of subject prefix *wu-* fails to spread into the verb stem because stem syllables are already H-specified by the time prefix–cycle L-Spread applies.

---

[27] Division of the verb into domains of prefix, stem, and final vowel is not uncommon in Bantu phonology, as is evident in the discussion of "layers" in Goldsmith, Peterson and Drogo [1989].

(32)   *stem cycle*   *fut ol in*   *fut ol in*

    L-Spread: ——   ——

                                          H H H   **H H H**
                                            | | | | | |
    Default-H: *fut ol in*   *fut ol in*

    prefix cycle

                                    H H H   L   H H H
                                     | | | | | | |
                 ni-a-ma-mu-fut-ol-in   *wu-a-ma-mu-fut-ol-in*

                                         L   H H H
                                         ⟍⟍—— | | |
    L-Spread: ——   *wu-a-ma-mu-fut-ol-in*

                       HH H H HHH
    Default-H: | | | | | | |
                       ni-a-ma-mu-fut-ol-in   ——

    coda cycle

                    HH H H HHH H   L   H H HH
    Default H: | | | | | | | | ⟋⟋⟍—— | | | |
                  ni-a-ma-mu-fut-ol-in-a   *wu-a-ma-mu-fut-ol-in-a*

    (after EVR):   *namamufutodin*   *wàmàmùfutodin*
                 'I paid him a lot for them'   'she paid him a lot for them'

In Present Continuous tense forms, the verb stem receives a grammatical low tone which links to the first stem mora. This low, like the low of third person subject prefix *wu-*, is subject to L–Spread, though on the stem cycle. Since the last stem syllable (*-in*) always surfaces high–toned in Present Continuous forms, this syllable would appear, in this tense, to be "extrametrical" (indicated by angle brackets < >), meaning that it is invisible to tone rules until extrametricality is lifted. I will assume here that the lifting of extrametricality occurs at the end of a cycle, during the application of the default tone rule. (Since normally only syllables or moras which are at the edge of a domain can be extrametrical, the necessity of marking *-in* extrametrical is, obviously, one reason for viewing the verb final vowel—which comes after *-in*—as belonging to a different domain and cycle.)

(33) *stem cycle*

$$
\begin{array}{ccc}
\text{L} & \quad & \text{L} \\
| & & | \\
\textit{fut-ol-in} & & \textit{fut-ol-in}
\end{array}
$$

Extrametricality:

$$
\begin{array}{ccc}
\text{L} & \quad & \text{L} \\
| & & | \\
\textit{fut-ol<in>} & & \textit{fut-ol<in>}
\end{array}
$$

L-Spread:

$$
\begin{array}{ccc}
\text{L} & \quad & \text{L} \\
\diagdown & & \diagdown \\
\textit{fut-ol<in>} & & \textit{fut-ol<in>}
\end{array}
$$

Default-H:

$$
\begin{array}{ccc}
\text{L \ H} & \quad & \text{L \ H} \\
\wedge\ | & & \wedge\ | \\
\textit{fut-ol-in} & & \textit{fut-ol-in}
\end{array}
$$

Developments in the prefix and coda cycles are as in the Recent Past tense forms.

(34) *prefix cycle*

$$
\begin{array}{cc}
\text{L \ H} & \text{L} \qquad\quad \text{L \ H} \\
\wedge\ | & | \qquad\qquad \wedge\ | \\
\textit{ni-ma-mu-fut-ol-in} & \textit{wu-ma-mu-fut-ol-in}
\end{array}
$$

L-Spread:

——
$$
\begin{array}{c}
\text{L} \qquad\quad \text{L \ H} \\
\diagdown\!\!\diagdown \quad\ \wedge\ | \\
\textit{wu-ma-mu-fut-ol-in}
\end{array}
$$

Default-H:

$$
\begin{array}{c}
\text{H H \ H \quad L \ H} \\
|\ \ |\ \ |\ \ \wedge\ | \\
\textit{ni-ma-mu-fut-ol-in}
\end{array}
$$

——

coda cycle

Default H:

$$
\begin{array}{cc}
\text{H H \ H \ L H H} & \text{L \qquad L \ H H} \\
|\ \ |\ \ |\ \wedge\ |\ | & \diagup\!\!\diagdown\ \ \diagdown\ |\ | \\
\textit{ni-ma-mu-fut-ol-in-a} & \textit{wu-ma-mu-fut-ol-in-a}
\end{array}
$$

(after EVR): *nimamufùtòdin*   *ùmàmùfùtòdin*
'I am paying him a lot for   'she is paying him a lot for
them'   them'

The derivation of Near Past forms is not nearly so straightforward as for Recent Past and Present Continuous forms. Nevertheless, the possibility of viewing prefix *a-* as toneless in the Recent Past tense, but as bringing an underlying low to the

tonal tier in the Near Past tense, provides an explanation for the extra low tones which appear in Near Past forms but not in Recent Past forms, as well as an explanation for the varying location of these lows in forms with object prefixes and those without. If the L brought by *a*- to the tonal tier is a floating (unlinked) tone, and the first syllable in the prefixal domain is extrametrical, it is not surprising that this L appears on an object prefix if there is one, and on the verb stem if there is not. Unable to link to any mora in the string–initial extrametrical syllable (since extrametrical syllables are invisible to tone rules), the L of *a*- links to the first available mora after that syllable—which in forms with object prefixes belongs to an object prefix and in forms without object prefixes belongs to the initial verb stem syllable.

Linkage of the floating L of *a*- to object prefixes can be seen in the derivations of forms *namàmùfutolang* 'I paid him a lot for them' and *wàmàmùfutolang* 'she paid him a lot for them'. As in the Recent Past tense, L-Spread fails to apply during the stem cycle since the stem is viewed as not having any grammatical tones. All stem syllables consequently receive default H's.

(35)   *stem cycle*   *fut-ol-ang*   *fut-ol-ang*

      L-Spread: ——   ——

                                         H H H   H H H
                                         | | | | | |
      Default-H: *fut-ol-ang*   *fut-ol-ang*

Before the results of the prefix cycle can be shown, an additional rule—*a*-Deletion—must be introduced. As mentioned earlier, the combination of subject prefix and tense–marking prefix *a*- forms an irregular short vowel. Since exactly when and how the combination vowel comes to be short has not been critical in forms and analyses considered up to this point, this process has not yet been explicitly considered. For the third person form *wàmàmùfutolang* 'she paid him a lot for them' to be correctly generated under the present analysis, however, it is necessary to view the reduction from two moras to one as occurring prior to the operation of tone rules, and, specifically, as the result of the deletion of the mora of the *a*- prefix and not that of the subject prefix vowel (36). (The fact that the product vowel has the quality of *a*-, rather than that of the subject prefix vowel, can be attributed to a rule of assimilation occurring prior to *a*-Deletion).

(36)   *ni-a* & *wu-a* become first *na-a* & *wa-a*   then   *na–ø* & *wa–ø*
                     (assimilation)   (a-Del.)

When *a*-Deletion and extrametricality marking are applied to the forms under consideration, the results are as illustrated in (37).[28]

(37)   prefix cycle

L	H H H	L L	H H H
	∣ ∣ ∣	∣	∣ ∣ ∣
ni-a-ma-mu-fut-ol-ang		*wu-a-ma-mu-fut-ol-ang*

L   H HH   LL   H HH
| ∣ ∣ ∣   ∣   ∣ ∣ ∣
a-Deletion: *ni-ø-ma-mu-fut-ol-ang*   *wu-ø-ma-mu-fut-ol-ang*

L   H HH   LL   H HH
| ∣ ∣ ∣   ∣   ∣ ∣ ∣
Extrametricality: <na> *ma-mu-fut-ol-ang*   <wa> *ma-mu-fut-ol-ang*

The floating low tone remaining after *a*-Deletion and Extrametricality can be viewed as docking, by rule, to the first non–extrametrical mora of the string, which in this case is that of object prefix *ma-*. L-Spread ensures that this tone eventually associates as well to the second object prefix *mu-*.

(38)

L   H HH   LL   H HH
 ↘   ∣ ∣ ∣   ∣ ↘   ∣ ∣ ∣
Docking: <na> *ma-mu-fut-ol-ang*   <wa> *ma-mu-fut-ol-ang*

L   H HH   L   L   H HH
 ↗ ↘   ∣ ∣ ∣   ∣   ↗   ∣ ∣ ∣
L-Spread: <na> *ma-mu-fut-ol-ang*   <wa> *ma-mu-fut-ol-ang*

Extrametricality is lifted at the end of the prefix cycle and a default H assigned to *na-*. Default-H reapplies during the coda cycle, assigning an H to the final vowel *-a*.

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[28] It may have occurred to the reader that the floating quality of *a-*'s underlying low tone could be viewed as a consequence of *a*-Deletion. This remains a possibility in Ruwund, though such a view complicates matters somewhat in certain other data sets that cannot, for lack of space, be considered here. The present analysis adopts the floating–from–the–start approach since current theory allows for such, and since though there is some evidence that the tone of *a-* is not linked at the underlying level (the complications just mentioned), there is nothing at all in the language which suggests that it *is* linked.

(39)   H   L   H H H
    Default-H: | ∧ | | | ——
                         na ma-mu-fut-ol-ang

    coda cycle
                         H   L   H H H   H   L   L   H H H   H
    Default-H: | ∧ | | | | | ∧ | | | |
                         na ma-mu-fut-ol-ang-a   wa ma-mu-fut-ol-ang-a

    (after EVR):   namàmùfutolang   wàmàmùfutolang
                         'I paid him a lot for them'   'she paid him a lot for them'

Derivations for *nafùtolang* and *wàfùtolang* begin in a manner identical to those above for *namàmùfutolang* and *wàmàmùfutolang*, since they share the same stems.

(40)   H H H   H H H
                                | | | | | |
    (at end of stem cycle):   fut-ol-ang   fut-ol-ang

When *a*-Deletion and extrametricality are applied, the result is as follows.

(41)   L H H H   L L H H H
    (input to | | | | | | | | |
    prefix cycle):   ni-a-fut-ol-ang   wu-a-fut-ol-ang

                        L H H H   L L H H H
                        | | | | | | | | |
    a-Deletion: na-ø-fut-ol-ang   wa-ø-fut-ol-ang

                        L   H H H   L L H H H
                        | | | | | | | |
    Extrametricality: <na> fut-ol-ang   <wa> fut-ol-ang

It is now time for "Docking" to apply, but in these forms, the "first non–extrametrical mora of the string" belongs to *u* of the stem -*futolang* rather than to any object prefixes. As *u* of -*fut* is already linked to an H, it will be necessary to view the Ruwund docking rule as providing associations for floating tones even when target moras are already linked to other tones. Note, however, that the subsequent failure of the L on *a*- to appear on more than one syllable on the surface (as it does, say, in *nakàmàmùfutolang* 'I went and paid him a lot for them') is now explained: unlike object prefixes, stem syllables are not toneless but rather linked

to H's as a result of stem–cycle Default-H. L-Spread provides for the spread of an L only to additional *toneless* moras; it cannot spread an L through a string of H's.

(42)
                        L H HH   L LH HH

     Docking: \<na\> *fut ol ang*   \<wa\> *fut ol ang*

     L-Spread: ——   ——

Extrametricality is lifted at the end of the prefix cycle and a default H assigned to *na-*. Default-H reapplies during the coda cycle, assigning an H to the final vowel *-a*.

(43)
                        H L H H H

     Default-H: *na fut-ol-ang*   ——

     coda cycle

                        HL H HH H   L LH HH H

     Default-H: *na fut-ol-ang-a*   *wa   fut ol ang a*

To complete these derivations, another rule, which I shall call Rising Tone Simplification (RTS) #1, is required. During RTS#1, a syllable which is linked to both an L and an H on the tonal tier, yet followed by an H–linked syllable, becomes simply L–linked.

(44)
                        L H   L   H

     RTS #1:   ⌄   → | when followed by |

                        CV   CV   CV

Application of RTS#1 produces the correct surface forms for the present derivations. (The rule has, of course, no effect on the other derivations provided under this analysis since they contain no rising tones.)

(45)

	HL H H H	L L H HH
End Vowel Rules:	na fut-ol-ang	wa fut-ol-ang

	H L H H	L L H H
RTS #1:	na fut-ol-ang	wa fut-ol-ang
	nafùtolang	*wàfùtolang*
	'I paid a lot'	'she paid a lot'

This analysis of Near Past verb forms is strongly supported in that there exists excellent evidence that the initial stem syllable *-fu-* really does bear a rising tone just prior to its realization on the surface. In addition to Rising Tone Simplification #1, Ruwund also has Rising Tone Simplification #2, ordered after RTS #1,[29] which simplifies a rising tone following a low tone to high. Rising Tone Simplification #3, also ordered after RTS #1, simplifies a rising tone following a high tone to "high–toned preceded by a downstep".[30] The three RTS rules—all of which are well motivated by other data in the language[31]—explain effortlessly the slightly different surface patterns that are found in Narrative tense forms with monosyllabic stems. As can be seen below, Narrative tense forms for *multi*–syllabled stems are identical to Near Past tense forms except that they lack suffix *-ang*.

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[29] As the Rising Tone Simplification rules all apply to different environments, an alternative to ordering the rules is to add the condition "before L or a word boundary" to rules #2 and #3.

[30] Downstep—the abrupt lowering of the pitch range between two high–toned syllables (caused, it is usually assumed, by a floating low tone)—is a common phenomenon in Bantu.

[31] Note, for example, that the rising tone of the Narrative tense form *wŏsh* (*wù-a-osh-a*) 'she burns' simplifies (by RTS #1) to low in *wòshol* 'she burns a lot' (where high–toned *-ol* is added to the stem), and that the rising tone of relative form *nŏsha* (*nì-a-osh-à:*) 'which I burn' simplifies (by RTS #2) to high in equivalent form *mìnoshà* (which includes optional relative pre–prefix *mì-*).

(46) *Narrative Tense*   *Near Past Tense*

     nafùtol   *nafùtolang*
     'I pay a lot'   'I paid a lot'

     wàfùtol   *wàfùtolang*
     'she pays a lot'   'she paid a lot'

     nakàmàmùfutol   *nakàmàmùfutolang*
     'I go and pay him a lot for them'   'I went and paid him a lot for them'

     wàkàmàmùfutol   *wàkàmàmùfutolang*
     'she goes and pays him a lot for them'   'she went and paid him a lot for them'

When, however, the verb *-futol* 'pay a lot' is shortened to just *-fut* 'pay', RTS#3, rather than RTS#1, applies to 'I pay' and RTS#2 (rather than RTS#1) to 'she pays', with the result that *-fut* surfaces with a high tone in these forms.[32]

(47)

	HLH	LLH	HLH H	LLH H
	I ⟍	I ⟍	I ⟍ I	I ⟍ I
	na fut	*wa fut*	*na fut ol*	*wa fut ol*

		HLH	L H	H L H	L L H
RTS:		I I (#3)	I I (#2)	I I I (#1)	I I I (#1)
		na fut	*wa fut*	*na fut ol*	*wa fut ol*

     na ꜜfut   *wàfut*   (Cf. *nafùtol*   *wàfùtol*
     'I pay'   'she pays'   'I pay a lot'   'she pays a lot')

Otherwise highly problematic, the three–way tonal alternation—low, high and downstepped high—of stem–initial syllable *-fut* in Narrative and Near Past tense forms can be considered a natural, melody–preserving consequence of contour–tone reduction if the initial stem syllable is viewed as at some point bearing a rising tone.[33] Since the rising tone has a logical explanation under an analysis employing

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[32] No stem tone changes are found in the Narrative forms *nakàmàmùfut* 'I go and pay him' and *wàkàmàmùfut* 'she goes and pays him,' since in such forms the underlyingly toneless auxiliary and object prefixes are the recipients of a low tone from *a-* and no rising tones are ever created in the stem.

[33] It is critical that the floating low tone brought by the tense–marking prefix *a-* link to the high–toned verb stem to create a rising tone prior to the lifting of extrametricality of the low–toned initial syllable *wa-* in third person forms. If this tone remained floating, it would be expected to simply merge with the adjacent linked low of *wa-* as soon as that morpheme joined the string. The syllable *-fu-* in *wàfùtolang*—which is high–toned at the end of the stem cycle—would consequently never be affected by it, and would fail to surface with a low–tone. An alternative hypothesis in which the low often appearing on the initial stem syllable is a grammatical one

underlying L's, extrametricality and cyclic rule application, but is very difficult to generate consistently under other hypotheses, the Narrative tense data must be considered strong evidence in favor of this approach.

2.4 Summary

Of the three analyses considered, only the "underlying L's" approach satisfactorily accounts for basic verb forms in all three trial tenses. The possibility—available only in an "underlying L" approach—of viewing tense–marking prefix *a–* as bringing a floating low tone in the Near Past tense explains the otherwise mysterious appearance of low tones in first person forms right after the subject prefix (on object prefixes, or in forms lacking these, on the first verb stem syllable). Furthermore, this analysis naturally derives rising tones on the initial syllables of Near Past and Narrative tense verb stems, and thus allows the divergent surface tone patterns of short–stem Narrative forms to be an automatic consequence of independently–motivated rules in the language simplifying rising tones. Although data from the Future and Distant Past tense groups were not considered in the process of eliminating the H–based approaches, they are entirely consistent with the view that in Ruwund, L rather than H is underlying.[34]

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assigned to the stem by the tense, but allowed to link to it only in cases where the first stem syllable is not also the final stem syllable (in which case it could be viewed as being extrametrical and consequently unavailable for tone docking), is unable to account for the Near Past forms *nafùtolang* 'I paid a lot' and *wàfùtolang* 'she paid a lot'. Under such an approach, a stem–assigned grammatical low would be expected to spread (as a consequence of the L–Spread rule) to -*ol*, producing **nafùtòlang* and **wàfùtòlang* (paralleling the Present Continuous forms *nifùtòdin* 'I am paying a lot' and *ùfùtòdin* 'she is paying a lot').

[34] The Ruwund Distant Past tense is similar to the Present Continuous in that a low tone is assigned to the verb stem and spreads there (if the stem is multimoraic). The two tenses are dissimilar in that in the Distant Past, 1) the tense–marking prefix -*a*- accompanies the subject prefix, 2) all subject prefixes are underlyingly toneless, 3) the last stem syllable is not extrametrical, and 4) the final vowel is underlyingly long and, thus, is not eliminated by EVR but only shortened.

namamufùtòla   'I paid him a lot for them'   *wamamufùtòla*   'she paid him a lot for them'

Ruwund future tenses employ only a subject prefix, tense–marking prefix *ku-*, and the verb stem (followed by a non–surfacing final vowel). A unique and interesting feature of this tense group is that the spread of the low tone of third person subject prefixes is in this case dependent upon metrical structure, a prefixal low tone being able to spread only within its metrical foot. Since binary feet are constructed right to left throughout the prefix domain beginning at the juncture of prefixes and stem, the effect is to permit spread in cases where there is an even number of moras in the prefixal domain (as in (b) and (f) below), and to prohibit it when the total number is odd (the subject prefix ending up alone in its foot), as in (d).

It is not difficult to state in general terms why an L–based analysis succeeds and H–based analyses fail. In Ruwund, it turns out that it is low tones, rather than high tones, that appear in consistent patterns throughout many verb forms and that can readily be tied, by virtue of their position, to specific morphemes in verb strings. In contrast, high tone patterns are difficult to characterize and defy linkage to morphemic components.

H–based analyses struggle hopelessly with these facts. On one hand, they are forced to employ very general H–spread rules to account for the many all-high words in the language. On the other hand, they must also posit multiple underlying H tones in order to generate the often multi–syllabic strings of low tones in Ruwund verb forms, relying on the spread inhibition or deletion–triggering potential of these H's to create or maintain multi–syllabled gaps of tonelessness (that eventually undergo default-L tone assignment). Hence, H–based analyses represent awkward attempts to access the low–toned areas in verbs—which, as just pointed out, are in themselves relatively characterizable—only by the very indirect means of positing multiple underlying H's in not–so–characterizable H–toned areas. The result is invariably too many H's on the surface; the underlying H tones posited to generate toneless gaps in some verb forms inevitably surface where they shouldn't in other, closely related forms.

Unlike an H-based analysis, an L–based approach can access low–toned areas in verb forms directly, since it manipulates low tones from the start. Surface low tones and low tone sequences can be generated by viewing certain pivotal morphemes (e.g., third person subject prefix *wu-* and tense marker *a-*) as bearing underlying L's, and by employing a spread rule affecting only moras within natural verbal domains. Rather than view the "generality" and "non–definability" of the many surface high tones as the product of a very general spread rule, the L–based approach permits this to be a simple reflection of "elsewhereness", as captured in such an analysis by the relegation of H to default status.

(a) *nikufutol* 'I will pay a lot'	(b) *ùkùfutol* *(w/spread)*, 'she will pay a lot'	foot: *(ùku)*
(c) *nikumufutol* 'I will pay him a lot'	(d) *ùkumufutol (no spread)* 'she will pay him a lot'	feet: *(ù) (kumu)*
(e) *nikumamufutol* 'I will pay him a lot for them'	(f) *ùkùmamufutol (w/spread)* 'she will pay him a lot for them'	feet: *(ùku) (mamu)*

An additional interesting feature of the future tenses is that a low tone is assigned to the verb stem just in cases where the stem is monomoraic, as exemplified by the following forms for -*fut* 'pay:'

nikumufùt   'I will pay him'   *ùkumufùt*   'she will pay him'

(cf. the forms for -*futol* 'pay a lot' above, as well as *nikumukwaash* 'I will help him' and *ùkumukwaash* 'she will help him,' where no low tone is assigned since stem -*kwaash* is bimoraic)

3.0 Meeussen's Rule

As Meeussen's Rule (the deletion of a high tone after another high tone) is a feature of a number of Bantu tone systems, an immediate question of interest is whether Ruwund—which employs underlying L's instead of underlying H's—makes use of a rule of this type deleting lows after lows. The answer is that Meeussen's Rule *is* found in Ruwund, though in limited contexts.[35] In verb forms, for instance, it affects only a low–toned final vowel and other low–toned morphemes of the verb's "coda" domain.[36] An example that is not too involved to be presented here can be found in the Habitual Past and Distant Past tense forms of (48) below. Note that the final vowel is low–toned in forms (b), (c) and (d)—where it follows the high–toned morphemes -*aañ* and -*ang*—and high–toned in (a) where it follows the low–toned morpheme -*òl*.

(48)   *Distant Past*   *Habitual Past*   (=Dist. Past + -*ang*)

    (a)   *nafùtòla̱*   (c)   *nafùtòlangà̱*
           'I paid a lot'   'I used to pay a lot'

    (b)   *nakufùtòlaañà̱*   (d)   *nakufùtòlang!aañà̱*
           'I paid you(pl) a lot'   'I used to pay you(pl) a lot'

   (*ku ... aañ* = 2p obj.pfx. *ku-* and plural sfx. -*aañ* ; -*ang* = habitual action sfx.)

The behavior of -*à/a* in these two closely–related tenses suggests that for this tense group, the final vowel is both underlyingly long and underlyingly low–toned. If -*à/a* is long underlyingly, its appearance on the surface is understandable, since the End Vowel Rules can be viewed as shortening rather than eliminating long vowels. If it is underlyingly low—and made subject to Meeussen's Rule—the tonal alternation in the above forms (and many others where an -*à/a* alternation appears) is also explained: the final vowel's underlying L is deleted by Meeussen's Rule when it directly follows morphemes linked to low tones (such as stem morpheme -*òl* 'a lot' in the example above), yet free to surface otherwise.

Supporting the view that final vowel -*à/a* in these tenses is underlyingly low–toned and subject to Meeussen's Rule is the fact that certain adverbs which are

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[35] Note that Meeussen's Rules does not, for instance, delete the L of the verb stem in the Present Continuous tense when this follows directly the L of prefixes in 3rd-person forms (as is clear from *ùmàmùfùtòdin* 'she is paying him a lot for them,' derived earlier).

[36] As mentioned earlier, the underlying L analysis views a verb's final vowel as belonging to a third subdivision in the verb string, here referred to as the "coda" domain. In addition to final vowels, it contains object suffixes, habitual-action suffix -*ang,* and plural suffix -*aañ,* of which only object suffixes are potentially low-toned underlyingly and consequently subject to Meeussen's Rule.

normally preceded by a downstep when they adjoin themselves to words ending in high–toned syllables, lose their downsteps when adjoined to verb forms where this final vowel has also lost its low. The adverb *ꜝkand* 'again' is an example (49).

(49)   no loss of downstep: *nzal-ꜝkand*   'hunger again'
                                nifùtòdin-ꜝkand   'I am paying a lot again'

       loss of downstep: *nafùtòla-kand*   'I paid a lot again'

Since downstep is caused by a floating low tone, the loss of the adverb's downstep in this environment can be seen as the consequence of its coming directly after an underlying low belonging to the verb final vowel *-à/a*. Either the floating low of *ꜝkand* simply merges with the underlying low of *-à/a* prior to this tone's deletion via Meeussen's Rule,[37] or, in an alternative view, Meeussen's Rule applies twice, first deleting the floating low of *ꜝkand* (since it follows *-à*) and then deleting the low of *-à* (since it follows *-òl*).

    An example of Meeussen's Rule outside of verbs can be found in the predicative forms of nouns. Although predicatives are complex and by no means completely understood, it is clear that they minimally involve adding a low tone to a noun's initial mora. The noun *rusûc* 'hair'· thus becomes *rùsûc* 'it is a hair' and *nzal* becomes *ǹzal* 'it is hunger'. However, when this low is added to a noun with a second–syllable low tone, the second–syllable low—and, in certain circumstances, a subsequent low in the phrase—is lost. The low of *-kìl* in *mukìl* 'tail' is lost, for example, in predicative *mùkila* 'it is a tail', as are also the initial lows of *nàmànangà* 'that I saw' in predicative *mùkil namanangà* 'it is a tail that I saw', the low of the associative particle *wà* of *wà kafùr* 'of the turtle' in predicative *mùkil wa kafùr* 'it is the tail of the turtle', and the downstepping floating low of demonstrative *ꜝwa* in predicative *mùkil wa* 'it is that tail'.

4.0 Historical Perspective

Though the choice of a synchronic analysis shouldn't depend on the researcher's ability to trace its historical development, finding a reasonable historical explanation can lend credibility to any claims made concerning the nature of the contemporary phonological system, especially if, as in the case of Ruwund, the language is found to be very different from other members of its family and from its supposed ancestor. If Ruwund has an underlying L/toneless contrast instead of the H/toneless one found in most Bantu languages (and believed to be characteristic of Proto–Bantu)—a development which constitutes "reversal" at a

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[37] Since they are adjacent on the tonal tier, it would not be expected that the floating low tone of the adverb would maintain an existence separate from that of the linked underlying low of *-à/a*.

very deep level—it would certainly be desirable to be able to propose how the former evolved from the latter.

Examining data from Ciluba, Maddieson (1976) proposed that the inverse tone patterns of that language resulted from two historical developments: the introduction—at a time when Ciluba still used nominal pre–prefixes—of an iterative rule spreading any tone, L or H, one mora to the right if that mora was followed by a word boundary or by a mora associated to a non–contrasting tone,[38] and later, the loss of nominal pre–prefixes resulting in a shift of all tone melody elements one mora to the right. These developments are shown in the derivational table in (50) below, an adaptation of one of Maddieson's own. If just the tone of the nominal prefix (cv) and the various nominal roots (CV and CVCV) are considered, clearly the "new" tonal associations are the inverse of the original ones.

(50)　*original tonal associations:*

noun type:	#1	#2	#3	#4	#5	#6
	H L H	H L L	H L H L	H L L H	H L L L	H L H H
	| | |	| | |	| | | |	| | | |	| | | |	| | | |
	vcvCV	vcvCV	vcvCVCV	vcvCVCV	vcvCVCV	vcvCVCV

　　　first historical development:

	#1	#2	#3	#4	#5	#6
spread:	H L L	H H L	H L H H	H H L H	H H L L	H L L H
	| | |	| | |	| | | |	| | | |	| | | |	| | | |
(1st appl.)	vcvCV	vcvCV	vcvCVCV	vcvCVCV	vcvCVCV	vcvCVCV
		H H H		H H L L	H H H L	H L L L
		| | |		| | | |	| | | |	| | | |
(2nd appl.)		vcvCV		vcvCVCV	vcvCVCV	vcvCVCV
					H H H L	
					| | | |	
(3rd appl.)					vcvCVCV	

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second historical development:

SHIFT: H L Ø   H H Ø   H L H Ø   H H L Ø   H H H Ø   H L L Ø
　　　　 ＼＼　　＼＼　　＼＼＼＼　　＼＼＼＼　　＼＼＼＼　　＼＼＼＼
　　　　ØcvCV　ØcvCV　ØcvCVCV　ØcvCVCV　ØcvCVCV　ØcvCVCV

new tonal associations:

H L　　 H H　　 H L H　　 H H L　　 H H H　　 H L L
| |　　 | |　　 | | |　　 | | |　　 | | |　　 | | |
cvCV　 cvCV　 cvCVCV　 cvCVCV　 cvCVCV　 cvCVCV

Though an inspired explanation at the time, Maddieson's account is not easily modified to fit developments in tone theory since the article appeared. Leaving aside the fact that Maddieson uses underlying H's *and* L's, rather than an "H (or L) vs. toneless" underlying contrast, there is a major problem in the spread rule. In an autosegmental analysis, the initial H of an H-L-L-L sequence (as in Maddieson's nominal type #5) could not spread throughout the L's to produce eventually H-H-H-H. When two tones are present (which is the case only after low default tone insertion in an H/toneless approach), spread is necessarily a two–step process. It begins with the association of a tone to a segment linked to another tone, and concludes with the delinking of that segment from its original tone.

(51)　 H L L   H L L   H L L 39
　　　 | | | —*association*→   ＼| | —*delinking*→   ／ |
　　　 CVCVCV   CVCVCV   CVCVCV

Two–step processes, however, cannot be iterative in standard, non–cyclic rule systems.40 In an ordered rule system, there can be no reapplication of an earlier rule (such as "association") after another rule (such as "delinking") has applied. The multi–syllable spreads of tones in some Bantu languages are, thus, usually accounted for in the manner illustrated in the various analyses for Ruwund tested earlier in this paper: an underlying tone spreads iteratively to a number of *toneless* syllables—*before* a default tone rule has applied. Unfortunately, though a spread mechanism of this type would work for Maddieson's #5 type nouns (assuming that

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39 A superscript L is used here to indicate that the floating L left after delinking would not be expected to remain a separate tone on the tier since it is followed by another L, linked to the segmental tier.

40 Though multi–step processes can be iterative in cyclic approaches, a cyclic analysis which added just one syllable per cycle would be difficult to justify for Bantu languages where natural domains (prefixes, roots, etc.) are often polysyllabic.

the moras marked L in (50) above are considered to instead be toneless), it would fail in the case of type #6 nouns, since there it is L—the presumed default value—which would need to spread.[41]

As Maddieson pointed out, reversal would not have been a sudden development. To restate this in terms of the analysis developed here for contemporary Ruwund, speakers could not very well have simply one day changed the underlying tonal specification from high to low and inverted all of their pronunciations. There would, instead, have been a series of gradual phonetic developments that led to a stage at which two different analyses were possible, both producing the same phonetic result. At some point in Ruwund's history, adults must have been employing a system based on underlying highs, while children learning the language were interpreting what they heard as a system based on underlying lows. Certain peculiarities in the way in which tones are actually realized phonetically in Ruwund today suggest an historical scenario quite different from that proposed by Maddieson for Ciluba—one, in fact, making use of *leftward* spread rather than rightward spread.

Pitch differentiation is a subtle matter in contemporary Ruwund. The pitch range employed is very narrow to begin with, and the language makes use of a rule of "High Tone Lowering" which further reduces surface differences by causing all high tones not immediately followed by lows to be realized with mid pitch rather than high pitch. High Tone Lowering can be considered to belong to a non–structure–changing "phonetic implementation" level in the phonology. As is evidenced by the phrases below, it is operative across word boundaries within a breath group.[42]

• Phrases where all–high–toned noun *cindaal* 'scabbard' is not followed directly by a low tone and is thus realized with a *mid/mid* melody (both syllables being subject to High Tone Lowering):

cindaal (isolation)	'scabbard'
cindaal cilêmp	'long scabbard'
cindaal capàɲika	'the scabbard fell'
cindaal nîmpaka	'the scabbard and the knife'

(phonetic tone realization for *cindaal* : *mid/mid*)

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[41] Following application of the default rule, there are, of course, no remaining toneless vowels to be recipients of spread, so the problems are the same as for Maddieson's original account using both highs and lows at the underlying level.

[42] Ciluba also has this rule, as can be seen, for example, in the contrast between the phrases *cilamba [mid/mid/mid] cibì* 'bad bridge' and *cilamba [mid/mid/high] cà kawungeɲì* 'Kawungeji bridge'. Preliminary evidence indicates that it is characteristic of at least two other "reversing" languages—Southern Kete and Kanyok—as well, suggesting a correlation between reversal and High Tone Lowering.

• Phrases where *cindaal* is followed by a low tone and thus realized with a *mid/high* melody (only initial syllable *ci-* being subject to High Tone Lowering):

cindaal cìtôk	'white scabbard'
cindaal cà yâav	'Yaav's scabbard'
cindaal cìpàñkin	'the scabbard is falling'

(phonetic tone realization for *cindaal* : mid/high)

A second important feature of Ruwund phonetic implementation is "Abrupt Fall"—a rule which causes a low–toned syllable which directly follows a high–toned one in the same word to be realized with a special, quick–falling pitch pattern (phonetically distinct from the more gradual high–falling pitch pattern of a genuine falling–tone syllable such as those in *ût* 'bow' and *nsûc* 'hair'). Unlike High Tone Lowering, Abrupt Fall is operative only word–internally.

High Tone Lowering and Abrupt Fall cause the five nouns considered earlier in this paper to have the following isolation pronunciations:

(52)

H	H L	H H	H L	H H L
muj	ut	nzal	mukil	nsuc
muj	ût	nzal	mukìl	nsûc
[mid]	[high-falling]	[mid—mid]	[high—abrupt falling]	[mid—high-falling]
'root'	'bow'	'hunger'	'tail'	'hair'

I will return to these eventually, but would like now to propose that the ancestor to contemporary Ruwund, Proto–Ruwund, had nouns with 1) surfacing final vowels, 2) underlying and surface tone like that of Proto–Bantu, and 3) completely straightforward phonetic realization of tone. In close resemblance to the Proto–Bantu system proposed in (12), the Proto–Ruwund system could have been as in (53).

(53) underlying:

	H		H	H
*muji	*uta	*nzala	*mukila	*nsuci

with low default tones:

L L	L H	L L L	L H L	L L H
*muji	*uta	*nzala	*mukila	*nsuci

phonetic realization:

| *low-low* | *low-high* | *low-low-low* | *low-high-low* | *low-low-high* |

Now, if to this system were eventually added (prior to Default-L) an assimilatory rule of High Anticipation (i.e., high spread leftward), whereby a high tone spreads to the preceding syllable and causes it also to be associated to an H (and thus realized high), the result would be as in (54).

(54) underlying:

$$
\begin{array}{ccccc}
\text{H} & & & \text{H} & \text{H} \\
| & & & | & | \\
muji & uta & nzala & mukila & nsuci
\end{array}
$$

after H leftward spread (High Anticipation):

$$
\begin{array}{ccccc}
\text{H} & & & \text{H} & \text{H} \\
\diagup\!\!\diagdown & & & \diagup\!\!\diagdown & \diagup\!\!\diagdown \\
muji & uta & nzala & mukila & nsuci
\end{array}
$$

with low default tones:

$$
\begin{array}{ccccc}
\text{L L} & \text{H} & \text{L LL} & \text{H L} & \text{L H} \\
| \; | & \wedge & |\;|\;| & \wedge\,| & |\;\wedge \\
muji & uta & nzala & mukila & nsuci
\end{array}
$$

phonetic realizations:

| *low-low* | *high-high* | *low-low-low* | *high-high-low* | *low-high-high* |

Suppose now that, after a time, speakers of this version of Ruwund began to realize the second syllable of a pair of high–toned syllables (the right branch of a branching high tone) with a falling pitch pattern, and, perhaps a little later, developed a tendency to realize purely low–toned syllables at a slightly higher pitch than the low point of a falling pitch pattern.[43] The changes—which represent only the addition of some "phonetic implementation" rules to the grammar and have no effect upon structure—could have occurred quite gradually, with the falling pitch becoming more and more pronounced until it became the most

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[43] The falling pitch pattern itself could have begun as assimilation in words like *mukila* (where the second high is followed by a low) and later been generalized to all cases where there was a branching high tone.

prominent pitch pattern phonetically, and with the low tones slowly coming to have more mid–like realizations.[44] Pronunciations would have been as in (55).

(55)
L L	H	L L L	H L	L H
| |	∧	| | |	∧ |	| ∧
muji	*uta*	*nzala*	*mukila*	*nsuci*
mid-mid	*high-falling*	*mid-mid-mid*	*high-falling-mid*	*mid-high-falling*

This phonetic result, however, could have easily been reanalyzed by the next generation as reflecting a different structure with different realization rules: one which views falling pitch as a realization of L, and mid and high–pitched syllables as two different realizations of H (*high* before L, *mid* elsewhere).

(56)
mid-mid	*high-falling*	*mid-mid-mid*	*high-falling-mid*	*mid-high-falling*
↓ ↓	↓ ↓	↓ ↓ ↓	↓ ↓	↓ ↓ ↓ ↓
H H	H L	H H H	H L	H H H L

(57) reinterpreted structure:
H H	H L	H H H	H L H	H H L
| |	| |	| | |	| | |	| | |
muji	*uta*	*nzala*	*mukila*	*nsuci*

With this interpretation of tonal structure, the leap to the view that L is underlying and H inserted by default is virtually automatic, since such an assumption provides the most economic analysis. The relatively few L's become the locations in underlying representations "marked" for underlying tone, and the numerous H's become the "elsewhere" default tone. The "High Anticipation" rule disappears. Though the "phonetic implementation" component of the grammar is quite different for the children than for their parents, the new realization principles—that an H not preceding an L is realized with mid pitch and an L after an H with falling pitch—are no more numerous, complicated or unnatural than the old ones.

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[44] Even in contemporary Ruwund, syllables bearing abrupt–falling pitch patterns have a certain accent–like prominence, and as observed earlier, the overall pitch range employed is not very wide.

(58) children's new underlying forms:

	L		L		L
	|		|		|
muji	*uta*	*nzala*	*mukila*	*nsuci*

after Default-H insertion (=new structures):

HH	HL	H HH	H L H	H H L
| |	| |	| | |	| | |	| | |
muji	*uta*	*nzala*	*mukila*	*nsuci*

phonetic realization:
  mid-mid   *high-falling* *mid-mid-mid* *high-falling-mid* *mid-high-falling*

As in the H–based analysis of their parents, children employing this system would have underlying tone differences occurring where they should—on the various stem syllables rather than on prefixes—and be exploiting all possible tonal possibilities for stems (except that, as in the original system, no forms have an underlying tone linked to two moras). The site of the underlying tone, in fact, has not changed. However, since that syllable has come to be realized with a falling pitch pattern, what it is—H or L—from the structural standpoint has become open to interpretation. The older speakers know it as the original source of a spreading and slightly corrupted H, while the younger speakers see it rather as a somewhat deformed L. Both analyses could easily coexist for a short while within the same community.

To return now to contemporary Ruwund, it is easy to see that the pronunciations just derived above for an older Ruwund could evolve into the present ones (repeated below) when final vowels began to be devoiced and deleted. Devoicing created a new structural type: the syllable with a "true" falling tone (i.e., one that is linked to both an H and an L on the tonal tier as a result of the backward reassociation of a stranded final L). The new structure was realized, as would be expected, with a falling pitch, but one sufficiently distinct from the type of falling pitch already in use for a low–toned syllable which follows a high tone to ensure that these two types of syllables remained distinguishable. The difference (a high–starting, gradual fall vs. a mid–starting, very abrupt fall) is that which remains discernible today.

(59)

	H	H L	H H	H L	H H L
	|	⟋	| |	| |	| ⟋
	muj	*ut*	*nzal*	*mukil*	*nsuc*

	muj	*ût*	*nzal*	*mukìl*	*nsûc*
	[mid]	[high-falling]	[mid—mid]	[high—abrupt-falling]	[mid—high-falling]

Though it is difficult to apply this scenario directly to verb forms—especially if today's verb form patterns with their long strings of low tones are used as a starting point--this should not be regarded as a catastrophic defect of the hypothesis. Verbal tone is undoubtedly the single most unstable aspect in all of Bantu phonology, as is evidenced by the great variety of contemporary systems found, and the present Ruwund system is neither very old nor likely to survive long into the future.[45] Ruwund nouns could conceivably have changed first, with verbal patterns making changes as necessary to keep up.

5.0 Conclusion

This discussion has argued, through a consideration of basic nominal tone patterns and the tonal characteristics of verb forms in three tenses, that Ruwund makes use of an underlying L/toneless contrast, as opposed to the usual Bantu H/toneless one. Low tones, rather than high tones, are found to occur in morphologically critical and definable locations, and it is L which is subject to such basic and common tone rules as spread and deletion. The relegation of high tones to default status is also found to be natural, given the very general "elsewhere" nature of their distribution in this language. These findings are theoretically significant in that by being most conducive to an analysis where low tones are underlying and high tones inserted only by default, Ruwund constitutes a counterexample to the Pulleyblank proposal that in two–tone languages, L is always the default value. Clark's suggestion that a H–based systems with L default rules be considered as representing merely the "unmarked" case—rather than the sole possibility—is thus strongly supported.

Ruwund's changing of the underlying specification from H to L, while still maintaining in nouns a distribution of underlying tone virtually identical to that in reconstructed Proto–Bantu, establishes that, at least for this language, the term "reversal" is not a misnomer. That such a major change can indeed be explained from the diachronic standpoint is shown through the presentation of a plausible historical account for Ruwund, in which a set of gradually introduced, small phonetic and phonological modifications results eventually in a major structural reanalysis by a new generation of speakers.

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[45] If the descriptions of explorer Carvalho [1890] can be trusted, the verb system has changed dramatically since the end of the last century. Few of the tenses he listed resemble those in use today even in segmental aspects. That change is continuing at a rapid pace is clear from the surprisingly wide disparity between the tone patterns used by Ruwund youths and those of their parents. The innovations are small in terms of the overall sound of the language, but significant for any analysis.

Additional Data[46]

Noun tonal patterns
  • five basic nominal tone patterns (prefixes underlined)

<u>yi</u>r	<u>rû</u>s	<u>ci</u>shipu	<u>m</u>pàk	<u>mi</u>sîñ
'fields'	'end'	'dry season'	'knife'	'grass'
<u>ma</u>j	<u>mî</u>y	<u>mu</u>laj	<u>ma</u>cìku	<u>n</u>m̂ım
'dances'	'thorns'	'sorcerer'	'days'	'back'

  • long surface root vowels for last three columns[47]

<u>ci</u>y	<u>cî</u>su	<u>ci</u>rung	<u>ci</u>rùng	<u>ci</u>rûng
'door'	'time'	'yam'	'basket'	'period'
<u>ka</u>n	âf	<u>ka</u>sok	<u>u</u>làâl	<u>mu</u>lêj
'mouth'	'cadavers'	'ax'	'bed'	'teacher'

  • three-syllable nouns

(a)	(b)	(c)	(d)	(e)
<u>ru</u>tengil	<u>ka</u>pàmbamb	<u>ii</u>sàlâay	<u>ka</u>ɦmìsh	<u>dii</u>bendêl
'shelf'	'scorpion'	'soldier'	'respect'	'flag'

–Most nouns with second syllable low tones are commonly found with *any* of the three possible tonal endings illustrated in (b), (c) and (d):[48]

            uswèral uswèrâl or   uswèràl   'laziness'

–All nouns of pattern (e) appear to be borrowings from Swahili, a language with penultimate stress.

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[46] This section is intended only to provide a context for data included in the body of this paper and should by no means be taken as revealing all important tonal phenomena in the language. The reader is referred to Nash (1992) for a much more thorough presentation, including descriptions of tone in negative and relative verb forms, in forms containing object suffixes, and in predicated nouns.

[47] The Ruwund vowels *e* and *o* are always long, as are vowels before nasal–initial consonant clusters in spellings.

[48] Although dialect differences appear to have been the original source of the variation, contemporary Musumban speakers employ a mix of patterns, the mix usually differing slightly from speaker to speaker.

- four–syllable nouns:

(a)	(b)	(c)
<u>c</u>ijingidij	<u>k</u>asòn̂ikañ	<u>u</u>sùkùr̂iil
'sign'	'nepotism'	'sand'

-Most nouns with second syllable low tones are commonly found with *either* pattern (b) *or* pattern (c):

     yisàwùriil   or   yisàwùr̂iil   'manioc fibers'

In some cases, pattern (a) is also a possibility: <u>yi</u>sawu<u>r</u>iil

Verb tonal patterns

Stems used are *-pwiit* 'pull', *-bacik* 'push', and *-jikitish* 'thank'.

Present Continuous

nipwìitin	*nibàcìkin*	*nijìkìtìshin*
/ni-pwi:t-in-a/		
'I am pulling'	'I am pushing'	'I am thanking'
upwìitin	*ubàcìkin*	*ujìkìtìshin*
/wu-pwi:t-in-a/		
'you[sg] are pulling'	'you[sg] are pushing'	'you[sg] are thanking'
ùpwìitin	*ùbàcìkin*	*ùjìkìtìshin*
/wù-pwi:t-in-a/		
's/he is pulling'	's/he is pushing'	's/he is thanking'
tupwìitin	*tubàcìkin*	*tujìkìtìshin*
/tu-pwi:t-in-a/		
'we are pulling'	'we are pushing'	'we are thanking'
upwìitinaañ	*ubàcìkinaañ*	*ujìkìtìshinaañ*
/wu-pwi:t-in-a-a:ñ-a/[49]		
'you[pl] are pulling'	'you[pl] are pushing'	'you[pl] are thanking'
àpwìitin	*àbàcìkin*	*àjìkìtìshin*
/à-pwi:t-in-a/		
'they are pulling'	'they are pushing'	'they are thanking'

---

[49] Musumban dialect forms containing pluralizing suffix *-aañ* employ two copies of the final vowel, one preceding *-aañ* and one following, as is evidenced by such forms as the Habitual Past *wapwìitang!aañà* /wu-a-pwi:t-ang-à:-a:ñ-à:/ 'you[pl] used to pull.'

Present continuous with the prefixes *mu-* 'him/her' and *ka-* 'go and':

nimupwììtin	*ùmùpwììtin*	'I am/he is pulling her'
nikamupwììtin	*ùkàmùpwììtin*	'I am/he is going and pulling her'

Narrative

na!pwiit
/ni-a-pwi:t-a/
'I pull'

nabàcik
'I push'

najìkitish
'I thank'

wa!pwiit
/wu-a-pwi:t-a/
'you^{sg} pull'

wabàcik
'you^{sg} push'

wajìkitish
'you^{sg} thank'

wàpwiit
/wù-a-pwi:t-a/
's/he pulls'

wàbàcik
's/he pushes'

wàjìkitish
's/he thanks'

twa!pwiit
/tu-a-pwi:t-a/
'we pull'

twabàcik
'we push'

twajìkitish
'we thank'

wapwììtinaañ
/wu-a-pwi:t-a-a:ñ-a/
'you^{pl} pull'

wabàcikinaañ
'you^{pl} push'

wajìkitishaañ
'you^{pl} thank'

àpwiit
/à-a-pwi:t-a/
'they pull'

àbàcik
'they push'

àjìkitish
'they thank'

Narrative with the prefixes *mu-* 'him/her' and *ka-* 'go and':

namùpwiit	*wàmùpwiit*	'I/he pull(s) her'
nakàmùpwiit	*wàkàmùpwiit*	'I/he go(es) and pull(s) her'

Near Past

napwììtang   nabàcikang   najìkitishang
/ni-a-pwi:t-ang-a/
'I pulled'   'I pushed'   'I thanked'

wapwììtangaañ   wabàcikangaañ   wajìkitishangaañ
'youᵖˡ pulled'   'youᵖˡ pushed'   'youᵖˡ thanked'

wàpwììtang   wàbàcikang   wàjìkitishang
's/he pulled'   's/he pushed'   's/he thanked'

Near Past with the prefixes *mu-* 'him/her' and *ka-* 'go and':
    namùpwiitang   wàmùpwiitang   'I/he pulled her'
    nakàmùpwiitang   wàkàmùpwiitang   'I/he went and pulled her'

Recent Past

napwiitin   nabacikin   najikitishin
/ni-a-pwi:t-in-a/
'I pulled'   'I pushed'   'I thanked'

wapwiitinaañ   wabacikinaañ   wajıkitishinaañ
'youᵖˡ pulled'   'youᵖˡ pushed'   'youᵖˡ thanked'

wàpwiitin   wàbacikin   wàjikitishin
's/he pulled'   's/he pushed'   's/he thanked'

Recent Past with the prefixes *mu-* 'him/her' and *ka-* 'go and':
    namupwiitin   wàmùpwiitin   'I/he pulled her'
    nakamupwiitin   wàkàmùpwiitin   'I/he went and pulled her'

Distant Past

napwììta   nabàcìka   najìkìtìsha
/ni-a-pwi:t-à/
'I pulled'   'I pushed'   'I thanked'

wapwììtaañà   wabàcìkaañà   wajìkìtìshaañà
'youᵖˡ pulled'   'youᵖˡ pushed'   'youᵖˡ thanked'

wapwììta   wabàcìka   wajìkìtìsha
's/he pulled'   's/he pushed'   's/he thanked'

Distant Past with the prefixes *mu-* 'him/her' and *ka-* 'go and':

namupwììta	*wamupwììta*	'I/he pulled her'
nakamupwììta	*wakamupwììta*	'I/he went and pulled her'

Habitual Past

napwììtangà	*nabàcìkangà*	*najìkìtìshangà*
/ni-a-pwi:t-ang-à:/		
'I used to pull	'I used to push'	'I used to thank'
wapwììtang!aañà	*wabàcìkang!aañà*	*wajìkìtìshang!aañà*
'you[pl] used topull'	'you[pl] used to push'	'you[pl] used to thank'
wapwììtangà	*wabàcìkangà*	*wajìkìtìshangà*
's/he used to pull'	's/he used to push'	's/he used to thank'

Habitual Past with the prefixes *mu-* 'him/her' and *ci-* 'still':

namupwììtangà	*wamupwììtangà*	'I/he used to pull her'
nacimupwììtangà	*wacimupwììtangà*	"I/he was still pulling her"

Near Future   (also used: *-fut* 'pay' and *-non* /no:n/ 'take')

nikupwiit	*nikubacik*	*nikujikitish*
/ni-ku-pwi:t-a/		
'I will pull'	'I will push'	'I will thank'
ukupwiitaañ	*ukubacikaañ*	*ukujikitishaañ*
'youᵖˡ will pull'	'youᵖˡ will push'	'youᵖˡ will thank'
ùkùpwiit	*ùkùbacik*	*ùkùjikitish*
's/he will pull'	's/he will push'	's/he will thank'
nikufùt 50	*nikunon*	
/ni–ku–fut–a/	/ni-ku-no:n-a/	
'I will pay'	'I will take'	
ukufùtaañ	*ukunonaañ*	
'youᵖˡ will pay'	'youᵖˡ will take'	
*ùkufùt*51	*úkúnon*	
'she will pay'	'she will take'	

Near Future with the prefixes *mu-* 'him' and *ma-* 'them':

nikumunon	*ùkumunon*52	'I/he will take her'
nikumamunon	*ùkùmamunon*	'I/he will take them from her'
nikumufùt	*ùkumufùt*	'I/he will pay her'
nikumamufùt	*ùkùmamufùt*	'I/he will pay her for them'

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50 Monomoraic stems are low–toned in future tenses.

51 As described in footnote #34, the underlying low of subject prefix *ù–* would normally spread to *ku-* in this form, since both syllables belong to the same metric foot. Spread in the future tenses is blocked, however, in cases where an OCP violation would result.

52 See footnote #34 for a brief explanation of prefixal low spread in future tenses.

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CONSONANT MUTATION IN SEEREER-SIIN*

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This study presents a description and analysis of stem-initial consonant mutation within the nominal system of Seereer-Siin, a West Atlantic language closely related to Fula. Two distinct mutation patterns are isolated. The first consists of a voiced stop—voiceless stop—prenasalized stop set of alternations, while the second is a Fula-like pattern consisting of continuant—stop— prenasalized stop alternations. Consonant mutation is shown to be the result of the prefixation of a class marker that contains a floating autosegment which associates to an underspecified stem-initial consonant. Both mutation patterns occur in the same morphological environments, thereby presenting a potential problem for an autosegmental analysis: e.g., How can we account for the occurrence of continuants and voiced stops in the same environment? By positing different underlying forms for each of the mutation patterns we show how consonant mutation in Seereer is quite complex but also more regular than previously thought.

1.0 Introduction

Seereer-Siin[1], a West Atlantic language most closely related to Fula, is character- ized by a complex system of consonant mutation that pervades the nominal and

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[1] There are four main dialects of Seereer, which is spoken by approximately seven hundred thousand people in the west central area of Senegal and parts of coastal Gambia. Seereer-Siin is spoken in the inland area of Senegal that corresponds to the precolonial kingdom of Sine (Siin) and surrounding areas, including the city of Kaolack and the towns of Fatick and Diakhao (Jaxaaw).

(continued...)

verbal morphology of the language. Mutation in verbs is conditioned by number, and is thus limited to a binary set of alternations reflecting singular and plural forms, as illustrated in (1).

(1) a. *a-xon-a*   's/he died'[2]
         a-nɢon-a   'they died'

    b. *a-gaʔ-a*   's/he saw'
        a-ngaʔ-a   'they saw'

Mutation in nouns is conditioned by the class for which a noun is specified, and stems may show up to three alternations, as illustrated in (2).

(2) a. 'village'
         saax   Class 5   singular
         a-caax   Class 4   plural
         o-njaax   Class 12   diminutive singular

    b. 'horn'
         o-jan   Class 10   singular
         xa-can   Class 11   plural
         fo-njan   Class 13   diminutive plural

While consonant mutation in the various dialects of Fula has been well described [e.g., Klingenheben 1963, Arnott 1970, Anderson 1976, Sylla 1982, Lieber 1984, Paradis 1986], these numerous descriptions and analyses seem to

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Seereer has borrowed heavily from Wolof, especially towards the northern extent of the Seereer-Siin speaking area which borders on the Wolof heartland, and in urban areas that are undergoing wolofisation—the adoption of Wolof as the dominant language.

   A subgroup of Northern West Atlantic languages, originally thought of as a series of Seereer dialects, was reclassified by Pichl [1966] as a distinct group, thereby corroborating what native speakers had implicitly reported, namely that those languages are only very distantly if at all related to Seereer. Pichl gave them the name Cangin languages after their common name for the city of Thiès, in and around which they are spoken. They include Safen, Lehar, Non, and Ndut, which, along with their speakers, are still commonly referred to as Seereer, causing some confusion in the literature. In Sapir's [1971] classification the Cangin Languages and the Senegal Languages, along with the Bak Languages, the Eastern Senegal-Guinea Bissau languages, and a fifth, nameless category of languages, go to make up the Northern Branch of West Atlantic. Because the term Seereer is commonly used to refer to the Cangin languages and their speakers, official studies such as the 1988 Senegalese census give figures for ethnicity and language that do not differentiate between the two groups. Consequently, the figure of approximately 700,000 speakers is only an estimate based on the total figure of 929,360 Seereer speakers, or 13.7% of the Senegalese population, reported in the census. [République du Sénégal: 1989]

[2] *a-* is the third person marker, *-a* a perfective marker.

have actually hindered research on consonant mutation in Seereer. Most accounts of the latter [Sapir 1971, Fal 1980] go no further than attempting to extend the familiar Fula pattern of a three-way (continuant-stop-prenasalized stop) mutation system to Seereer, with only limited success. The purpose of this paper is to provide a description and an analysis of consonant mutation in Seereer, showing that there are two distinct mutation patterns operating in the morphophonology of the language. The first pattern involves a three-way alternation between voiced stops, voiceless stops, and prenasalized stops; the second type is similar to mutation in Fula. The challenge of the Seereer data is to account for the occurrence of two distinct mutation patterns within a single set of morphological environments. Based on an analysis of mutation as prefixation to an underspecified consonant, we will show that consonant mutation in Seereer, while quite complex, can be viewed as much more regular and predictable than previously thought. This paper will focus on consonant mutation in the context of the noun classification system, since that is where the fullest range of mutation occurs.

The consonantal inventory of Seereer-Siin is as follows.

(3)

	labial	coronal	palatal	velar	uvular	glottal
OBSTRUENT						
Plosive						
voiceless	p	t	c	k	q	ʔ
voiced	b	d	j	g		
Implosive						
voiceless	ƥ	ƭ	ƈ			
voiced	ɓ	ɗ	ʃ			
Prenasalized						
voiced	mb	nd	nj	ng	ɴɢ	
Fricative						
voiceless	f	s		x		
SONORANT						
Nasal	m	n	ɲ	ŋ		
Flap		r				
Lateral		l				
Glide	w		y	(w)[3]		

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[3] The glide /w/ appears twice in the chart of phonemes, once as a labial, and again as a velar segment. This dual classification reflects the fact that the glide occurs in two gradation sets: w/b/mb and w/k/ng. The labial set is much more common in Seereer than the velar set which, to my knowledge, occurs only once in the language in the allomorphs for the stem meaning person: *o-kiin* (singular), *wiin* (plural), *fo-ngiin* (diminutive plural).

Data upon which this study is based are from the Fatick dialect of Seereer-Siin, which is similar in many respects to the Jaxaaw dialect described by Fal [1980]. Perhaps the most salient aspect of the phonemic inventory of both dialects is the occurrence of voiceless bilabial, alveolar, and palatal implosive stops, /ɓ/, /ƭ/ and /ƈ/. These stops, which are not found in Seereer dialects outside the Siin region, participate in the mutation system.[4]

2.0 Mutation and noun classification

Noun classification in Seereer may best be described as an obligatory agreement system in which each and every noun belongs to a maximum of five of fifteen possible classes. Each of the fifteen classes is associated with a class prefix that triggers stem-initial consonant mutation.

While the majority of noun stems in Seereer undergo the complete set of initial mutations, there are two categories of stems which do not. Non-alternating stems are characterized by initial consonants that never undergo mutation. This subset of consonants includes only the simple nasal (as opposed to prenasalized) stops, m, n, ɲ, ŋ, and also y and l.[5] In addition, there are certain stems which we would normally expect to undergo mutation, but which do so only partially, for idiosyncratic reasons. These stems will be discussed briefly in 4.2. The following discussion, however, will focus on typical, i.e., mutating, stems.

A typical nominal paradigm consists of a singular and plural form, a diminutive singular and diminutive plural form, and an augmentative singular form, as illustrated in (4).

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[4] In Fal's study [1980: 11], she describes these sounds as glottalized aspirates (*aspirés glottalisés*) based on the phonetic findings of S. Sauvageot. The notation she uses reflects this.

Fal:	ʰɓ	ʰɗ	ʰɟ̱
This study:	ɓ	ƭ	ƈ

Of ʰɓ and ʰɗ Fal says that each is *réalisé sonore* by which I assume she means that they are realized as voiced. ʰɟ̱, however, is described as inherently *sonore*. Whether she meant to imply some type of distinction regarding voicing between the former two and the latter, i.e., that the former two are underlyingly voiceless, is unclear. Moreover, although she worked under Sauvageot's assumption that they are voiced, she mentions in a footnote that she has not abandoned her original hypothesis that they are the voiceless counterparts of the voiced implosive stops. Fal's current thinking on the matter is that the segments are, in fact, voiceless implosive stops (personal communication).

[5] According to Crétois (1972), certain dialects, including the Petite Côte and Fadiouth dialects, occasionally exhibit a mutation involving /l/, which alternates with /t/ and /nd/. In the Fatick dialect, however, /l/ does not undergo mutation.

(4) Full paradigm for 'milk bowl'
o-roon	singular	Class 10
xa-toon	plural	Class 11
o-ndoon	diminutive singular	Class 12
fo-ndoon	diminutive plural	Class 13
a-ndoon	augmentative singular	Class 3b

In contrast to Fula, Seereer does not have class suffixes. Class is, however, marked on an enclitic determiner that also encodes definiteness and proximity as the examples in (5) show.

(5) *o-roon-ole*   'the milk bowl' (proximate)
    xa-toon-axe   'the milk bowls' (proximate)

Consonants that undergo mutation may have up to three variants which, following Arnott (1970), will be designated by the term "grades". Allomorphs of the noun stem in (4), for example, exhibit three grades of the initial consonant: a continuant in the case of the singular form, a stop in the case of the plural, and a prenasalized stop in the diminutive and augmentative forms.

Taken together, the three grades of any given consonant will be designated by the term "gradation set". Seereer exhibits thirteen distinct gradation sets which are presented in (6).[6]

---

[6] Consonants that occur within a given mutation set are assumed to be homorganic in that they share the same place features. There are two apparent exceptions to this generalization: the gradation set s/c/nj, where [s] is alveolar, and the two other mutations are palatal; and the gradation set x/q/nɢ, where [x] is velar and the two other mutations are uvular. These apparent anomalies can be explained by defining homorganicity within a model of feature geometry consistent with McCarthy [1988]. Homorganicity would depend only on the major place nodes, [labial], [coronal], and [dorsal], rather than features that are dependents of those nodes. In that case, the first gradation set would be considered a coronal set, and the second a dorsal set.

(6) Seereer gradation sets

|	**LABIAL**				**CORONAL**						**DORSAL**		
a-	b	ɓ	f	w	d	ɗ	r	s⁷	j	ʃ	g	x	w
b-	p	ƥ	p	b	t	ƭ	t	c	c	č	k	q	k
c-	mb	ƥ	mb	mb	nd	ƭ	nd	nj	nj	č	ng	nɢ	ng

   In stems that undergo mutation, a given noun class always conditions the same grade, either a, b, or c in (6), regardless of the gradation set. The chart in (7) summarizes the class prefixes, enclitic determiners, and the grade that each class conditions.[8] Note that Class 3 takes the a-grade (designated as Class 3a), except when it is the augmentative singular, in which case it takes the c-grade (designated as Class 3b).

(7)

Class	Prefix	Clitic determiner	Grade	Class content
1	*o-*	*oxe*	b	human singular
2	*ø-*	*we*	a	human plural
3a	*a-*	*ale*	a	singular
3b	*a-*	*ale*	c	augmentative singular
4	*a-*	*ake*	b	plural
5	*ø-*	*le*	a	singular
6	*ø-*	*ne*	c	singular
7	*ø-*	*fee*	a	singular
8	*fo-*	*ole*	a	plural
9	*ø-*	*ke*	b	plural
10	*o-*	*ole*	a	singular
11	*xa-*	*axe*	b	plural

---

[7] The s/c/nj gradation set is not very productive in Seereer. In the present corpus there are only a few lexical items that exhibit all three grades, and Fal [1980] reports for the Jaxaaw dialect that the gradation set is restricted to the speech of older speakers.

[8] Class numbers are consistent with Fal [1980]. In contrast to most Bantu languages where noun classes tend to occur in corresponding singular and plural pairs, in Seereer there is little systematic correspondence between singular and plural classes. Given the singular class specification for a noun, the plural is rarely predictable, and vice versa. The main exceptions to this are the relatively rare classes 14 and 15 which are singular and plural, respectively.

Singular - plural correspondences

Singular Classes: 1 3 5 6 7   10 12 14

Plural Classes: 2 4   8 9 11 13 15
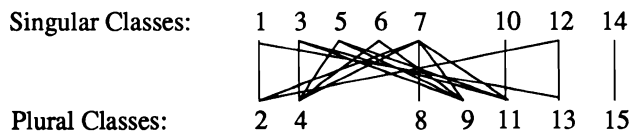
Class	Prefix	Clitic determiner	Grade	Class content
12	*o-*	ONGE	c	diminutive singular
13	*fo-*	*ne*	c	diminutive plural
14	*fa-*	*fee*	c	singular
15	*pa-*	*ke*	b	plural

Representative examples of noun stems that exhibit full mutation sets are given in (8).

(8) a. 'sin'   (b-p-mb)
        ø-bakad   Cl. 7 (s.)
        ø-pakad   Cl. 9 (pl.)
        o-mbakad   Cl. 12 (dim. s.)

    b. 'hand/arm'   (ɓ-β-β)
        o-ɓay   Cl. 10 (s.)
        xa-βay   Cl. 11 (pl.)
        fo-βay   Cl. 13 (dim. pl.)

    c. 'slave'   (f-p-mb)
        ø-faɗ   Cl. 2 (human pl.)
        o-paɗ   Cl. 1 (human s.)
        o-mbaɗ   Cl. 12 (dim. s.)

    d. 'hair'   (w-b-mb)
        ø-wiil   Cl. 5 (s.)
        a-biil   Cl. 4 (pl.)
        a-mbiil   Cl. 3b (aug. s.)

    e. 'mouth'   (d-t-nd)
        o-don   Cl. 10 (s.)
        xa-ton   Cl. 11 (pl.)
        o-ndon   Cl. 12 (dim. s.)

    f. 'stick'   (ɗ-f-f)
        o-ɗon   Cl. 10 (s.)
        xa-fon   Cl. 11
        fo-fon   Cl. 13 (dim. pl.)

    g. 'pig'   (r-t-nd)
        ø-ruul   Cl. 5 (s.)
        a-tuul   Cl. 4 (pl.)
        o-nduul   Cl. 12 (dim. s.)

    h. 'village'   (s-c-nj)
        ø-saax   Cl. 5 (s.)
        a-caax   Cl. 4 (pl.)
        a-njaax   Cl. 3b (aug. s.)

    i. 'illness'   (j-c-nj)
        ø-jir   Cl. 5 (s.)
        a-cir   Cl. 4 (pl.)
        a-njir   Cl. 3b (aug. s.)

    j. 'bracelet'   (ʃ-c̆-c̆)
        o-ʃang   Cl. 10 (s.)
        xa-c̆ang   Cl. 11 (pl.)
        fo-c̆ang   Cl. 13 (dim. pl.)

    k. 'stone'   (g-k-ng)
        o-gac   Cl. 10 (s.)
        a-kac   Cl. 4 (pl.)
        fo-ngac   Cl. 13 (dim. pl.)

    l. 'manioc'   (x-q-nG)
        ø-xaβ   Cl. 5 (s.)
        a-qaβ   Cl. 4 (pl.)
        a-nGaβ   Cl. 3b (aug. s.)

m. 'person'   (w-k-ng)
  ø-wiin Cl. 2 (human pl.)
  o-kiin Cl. 1 (human s.)
  o-ngiin Cl. 12 (dim. s.)

3.0 Mutation patterns

Besides the basic observation that all gradation sets except for those involving the glottalized consonants have a prenasalized grade, there is no readily apparent regularity to the system as a whole, a fact that has led to the conclusion that it is basically idiosyncratic in nature [Fal 1980]. Nevertheless, certain regular patterns appear in subsets of the system, a fact that suggests that more than one distinctive pattern of mutation occurs in Seereer.

 Superficially, three mutation patterns are apparent in the gradation sets in (6). The first involves the pattern of the implosive consonants which alternate between only two forms, distinguished by voicing.

(9) a. ɓ ɗ ʃ (voiced)
  b. ƥ ƭ č (voiceless)
  c. ƥ ƭ č (voiceless)

These mutations are distinct from the others in that they lack a prenasalized form.

 The second pattern involves alternations between an a-grade voiced stop, a b-grade voiceless stop, and a c-grade prenasalized stop. There are four such gradation sets.

(10) a. b d j g (voiced)
  b. p t c k (voiceless)
  c. mb nd nj ng (prenasalized)

 Lastly, a Fula-like pattern involving alternations between a continuant, a stop, and a prenasalized stop, characterizes the remainder of the gradation sets.

(11) a. w f r s x w (continuant)
  b. b p t c q k (stop)
  c. mb mb nd nj ɴɢ ng (prenasalized)

 The similarities between the behavior of the implosive gradation sets in (9) and the gradations involving plosive stops in (10) are quite striking: both involve voicing, and are distinguished only by the fact that the implosive consonants do not have a prenasalized grade. Since prenasalized implosives are not found under-lyingly in Seereer, we may assume that their derivation in mutation contexts is

prohibited by the structure preserving rule [Kiparsky 1985] in (12); in other words, implosive consonants do not undergo prenasalization.

(12)   Root

[Laryngeal]   [+nasal]
   |
[+constricted glottis]
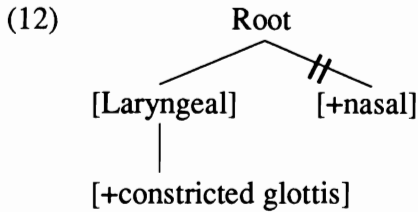
The three distinct mutation patterns may now be reduced to two: a voiced stop-voiceless stop-prenasalized stop type, and a continuant-stop-prenasalized stop type. These two mutation patterns, which I refer to as voicing and continuancy mutations, respectively, are represented in (13).

(13) Mutation types in Seereer

Voicing
a. voiced	b	d	j	g	ɓ	ɗ	ʃ
b. voiceless	p	t	c	k	ƥ	ƒ	č
c. prenasalized	mb	nd	nj	ng	ƥ	ƒ	č

Continuancy
d. continuant	w	f	r	s	x	w	
e. stop	b	p	t	c	q	k	
f. prenasalized	mb	mb	nd	·nj	ɴɢ	ng	

4.0 Underlying forms

In determining the underlying form of Seereer noun stems we must take into consideration the considerable overlap apparent in the mutation system. The segments /p/, /t/, /c/, and /k/ appear in the b-grades of both the voicing mutations and the continuancy mutations. This distribution provides strong evidence against choosing the b-grades as the underlying forms, since we would then be forced to account for identical segments behaving differently in identical morphological environments, as illustrated in (14).

(14) The non-predictability of a-grades from underlying b-grades

b-grades   p   t   c   k

a-grades   f   b   r   d   s   j   w   g
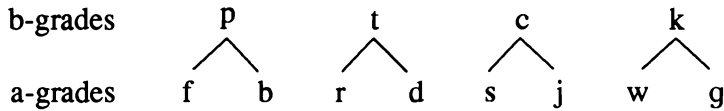
If we were to posit the b-grades as the underlying forms for both the voicing mutations and the continuancy mutations, the only way to account for /p/ sometimes becoming [f] and sometimes becoming [b] in a-environments would be to have each /p/-initial stem be lexically specified for the type of mutation (voicing or continuancy) it undergoes, a highly unsatisfactory solution that would fail to exploit the morphophonological regularities inherent in the mutation system.

Likewise, positing the prenasalized forms as the underlying grades seems implausible. The overlap both within and between the two mutation sets is too high to warrant such a claim. For example, the segment [mb] occurs three times, and the segments [nd], [nj], and [ng] occur twice each, making almost the entire mutation system unpredictable.

Positing the a-grades as the underlying form of the mutations eliminates the necessity of lexical specification for mutation type, since (with the exception of /w/[9]) there is no overlap between a-grade and b-grade segments. This analysis, however, is problematic for mutations involving the glottalized consonants. If we are to maintain the claim made earlier that the implosive mutations are identical to the voicing mutations, and that prenasalized implosives are simply not derivable in the language, we cannot maintain that the a-grades, which are voiced, are the underlying grades. Note that the c-grades for the implosive consonants are voiceless. If we were to posit the voiced forms as underlying, we would have to account in some way for the devoicing of those forms in the nasal grade. Given these problems, and in light of the fact that there is already somewhat of a dichotomy in the mutation system of Seereer between voicing mutations and continuancy mutations, we will posit a split mutation system in which each of those two types has a distinct underlying form. For the voicing mutations, we posit the voiceless or b-grade forms as underlying, and for the continuancy mutations we posit the continuant or a-grade forms as underlying. There is no compelling reason to require both mutation types to have the same grade as their underlying form, and in fact the above discussions show that such a premise presents a multiplicity of problems.

A recapitulation of this approach to underlying mutation forms is given in chart form in (15). Underlying forms are in italics.

---

[9] Recall that two variants of /w/ are posited. One is essentially labial in nature, while the other is velar.

(15)   Voicing mutations   Continuancy mutations

a-	b	d	j	g	ɓ	ɗ	ʃ		*w*	*f*	*r*	*s*	*x*	*w*
b-	*p*	*t*	*c*	*k*	*ɓ*	*ƭ*	*c̓*		b	p	t	c	q	k
c-	mb	nd	nj	ng	ɓ	ƭ	c̓		mb	mb	nd	nj	nɢ	ng

4.1 Voicing mutations. There is much evidence in favor of this analysis when we consider the mutation types individually. With regard to the voicing mutations, if we establish the voiceless forms as underlying it is possible to derive both the a-grades and the c-grades by the addition of a single feature: [voiced] in the case of the former, and [+nasal] in the case of the latter, since, as we shall see, there is evidence to suggest that presence of the feature [voiced] in c-grade segments is a consequence of prenasalization by way of a redundancy rule, given in (16), that voices all nasal segments.

(16)   [+nasal] → [voiced]

Most importantly, however, positing the voiceless stops as the UR's allows us to derive the c-grade implosive stops, which are voiceless, in a natural way by simply invoking the redundancy rule in (12). This may be construed as further evidence for the existence of rule (16): implosive stops, which are underlyingly voiceless, do not undergo prenasalization, thus they do not become voiced. Consider the alternative. If the a-grades or voiced stops were underlying we would need a rule that devoiced c-grade forms. While this would work for the implosive gradation sets, the analysis for the other voicing mutations would be far-fetched; they would first have to undergo the same devoicing rule as the implosives, then prenasalization, and finally re-voicing via rule (16). In these cases the devoicing rule seems to complicate the grammar quite unnecessarily. Based on these facts we will definitively adopt the position that the b-grades are the underlying forms for the voicing mutations.

4.2 Continuancy mutations. Turning now to the continuancy mutations, recall that we have posited the a-grade or continuants as underlying for these mutations. While setting up the b-grades as underlying for the voicing mutations effectively prescribes setting up the a-grades as underlying for the continuancy mutations, if we are to have a mutation system that is in any way predictable, there is much independent evidence to suggest that our position is, in fact, the correct one. Let us examine these criteria independently of the voicing mutations. First, the distribution of stem types favors an underlying continuant on the grounds of predictability. There are certain stems in Seereer, like those shown in (17a), that exhibit a stop in the a-grade, where we would normally expect to find a continuant, but undergo prenasalization in the regular fashion in the c-grade. The opposite, however, is not true. Consider the following examples.

(17)   a. Partially mutating stems

Grade	'pigeon'		'field'		
a	a-qodoxoɲ	(Cl. 3a)	o-qol	(Cl. 10)	singular
b	a-qodoxoɲ	(Cl. 4)	xa-qol	(Cl. 11)	plural
c	a-ɲɢodoxoɲ	(Cl. 3b)	a-ɲɢol	(Cl. 3b)	aug. sg.

b. Fully mutating stems

Grade	'ring'		'heart'		
a	o-xad	(Cl. 10)	∅-xeeɲ	(Cl. 5)	singular
b	xa-qad	(Cl. 11)	a-qeeɲ	(Cl. 4)	plural
c	a-ɲɢad	(Cl. 3)	a-ɲɢeeɲ	(Cl. 3)	aug. sg.

The examples in (17a) and (17b) illustrate the two possible types of stems. There are no stems that exhibit a continuant in the b-grade where we would expect to find a stop. The variation, and hence unpredictability, is taking place in the a-grade forms, while the b- and c-grades are completely predictable. This fact clearly supports the establishment of the a-grades as underlying. A similar distribution of stem types in Fula has been used as evidence to support the generally accepted position [Lieber 1984] that the continuant grade is also underlying for mutations in that language. The relevance of the Fula facts for Seereer will become clear in section 6.0, after we have fully analyzed mutation in Seereer.

In establishing the a-grade as underlying for the continuancy mutations we can now derive the other grades through the addition of a single feature, as we did for the voicing mutations. To derive the b-grades we add the feature [-continuant], and for the c-grades, [+nasal]. The association of these features is not sufficient to derive the surface forms, but with the help of a minimal number of well motivated rules we will be able to account for the derivation of b- and c-grades in a satisfactory manner, as will be shown in section 5.0.

4.3 Prefixes. In deriving forms from the underlying representations in both voicing and continuancy mutations, we have posited the association of a single feature: [voiced] for the a-grades, [-continuant] for the b-grades, and [+nasal] for the c-grades. We will consider these features to be part of the representation of the class prefix, so that each prefix, in addition to possibly consisting of an overt (C)V sequence, also contains one of those features. Those prefixes without an overt (C)V consist of a sole feature. Prefixes conditioning the a-grade contain the feature [voiced]; those conditioning the b-grade contain the feature [-continuant]; and those conditioning the c-grade contain the feature [+nasal]. Mutation, then, is regarded as a type of prefixation.

5.0 Analysis of consonant mutation

In our analysis of consonant mutation we will adopt the framework of contrastive underspecification [Steriade 1987; Clements 1988; Mester and Itô 1989] in which only redundant features are absent from the underlying representation; however, following McCarthy (1988), we will assume that root node features [+/-consonantal] and [+/-sonorant] are always present in the underlying representation. The major place features [labial], [coronal], or [dorsal] are also present.[10]

Based on the consonantal inventory of Seereer given in section 1.0, we will assume that the underlying default in the consonantal inventory is [-continuant] and [-nasal], with absence of the feature [voiced]. Unless otherwise specified (as in, for example, the case of simple nasals which are assumed to be underlyingly [+nasal], or the obstruents /f/, /s/, and /x/, which are assumed to be underlyingly [+continuant]) these features are eventually filled in by the following default rules.

(18)   [ ] → [-continuant]

(19)   [ ] → [-nasal]

Based on the recognition that a two way mutation system calls for different underlying grades, the analysis of Seereer consonant mutation presented below accounts in a constrained and fairly straightforward manner for all the mutations by positing a single floating feature for each of the a-, b-, and c-grade prefixes.

5.1 A-grade derivations. Recall that a-grades are conditioned by class prefixes that contain the floating autosegment [voiced].

5.1.1 Voicing mutations. With regard to the voicing mutations, in which the b-grades or voiceless stops are the underlying forms, a-grade mutation involves the association of the feature [voiced] to the Laryngeal node. The mutations involved are as follows.

(20) Underlying forms	p	t	c	k	ɓ	f	ƈ
a-grades	b	d	j	g	ɓ	ɗ	ʃ

The mutation process is illustrated in the representative derivations in (21) and (22).

---

[10] Nothing crucial in the analysis of consonant mutation hinges on the choice of underspecification theory.

(21)   *kend* → *gend*   'agemate'
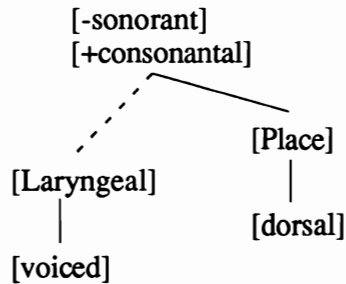   Class 2 prefix: Ø[voiced]

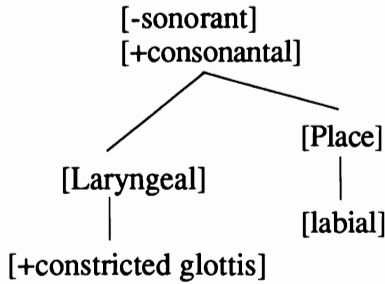   a. Feature geometric representation of stem-initial consonant

$$
\begin{array}{c}
\text{[-sonorant]} \\
\text{[+consonantal]} \\
| \\
\text{[Place]} \\
| \\
\text{[dorsal]}
\end{array}
$$

   b. Prefixation

$$
\begin{array}{c}
\text{[-sonorant]} \\
\text{[+consonantal]}
\end{array}
$$

[voiced]   [Place]
                               |
                           [dorsal]

   c. Association of floating feature

$$
\begin{array}{c}
\text{[-sonorant]} \\
\text{[+consonantal]}
\end{array}
$$

              [Laryngeal]   [Place]
                  | |
              [voiced]   [dorsal]

(22)   ɓaak → ɓaak   'baobab fruit'
        Class 5 prefix: Ø[voiced]

    a.   Feature geometric representation of stem-initial consonant

$$
\begin{array}{c}
\text{[-sonorant]} \\
\text{[+consonantal]}
\end{array}
$$

                    [Place]

    [Laryngeal]

                    [labial]

  [+constricted glottis]

    b.   Prefixation

$$
\begin{array}{c}
\text{[-sonorant]} \\
\text{[+consonantal]}
\end{array}
$$

                    [Place]

    [Laryngeal]

                    [labial]

[voiced] [+constr. glottis]

    c.   Association of floating feature

$$
\begin{array}{c}
\text{[-sonorant]} \\
\text{[+consonantal]}
\end{array}
$$

                    [Place]

    [Laryngeal]

                    [labial]

[voiced] [+constr. glottis]

5.1.2 Continuancy mutations. A-grade continuancy mutations are the under-lying form for continuancy mutations. Of the six segments, three are voiced and three are voiceless, as shown in (23).

(23) A-grade (underlying) continuancy mutations

      Voiced   Voiceless
      w   r   w   f   s   x

Association of the feature [voiced] from the a-grade class prefix has no effect on the surface forms of continuancy mutations. In the case of the three voiced segments, /w/, /r/, and /w/, the feature associates to the Laryngeal node, but is subsequently eliminated by the Twin Sisters Convention [Clements and Keyser 1983:95] which converts two identical specifications associated to the same element into a single specification. This process is illustrated for a stem containing the bilabial glide /w/ in (24).

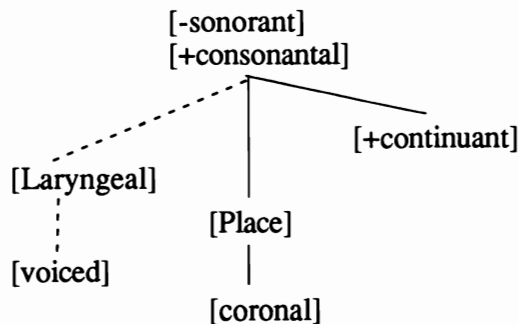(24)   *wiil* → *wiil*   'hair'
          Class 5 prefix: Ø[voiced]

    a.   Feature geometric representation of stem-initial consonant
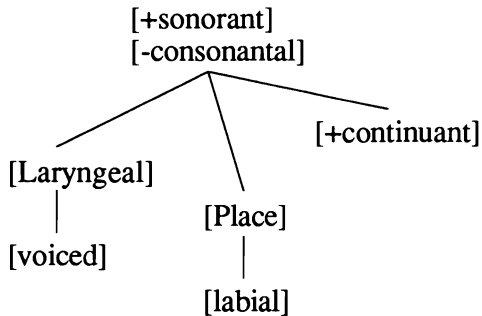
    b.   Prefixation

c. Association of floating feature

[+sonorant]
[-consonantal]

[+continuant]

[Laryngeal]

[voiced] [voiced]

[Place]

[labial]
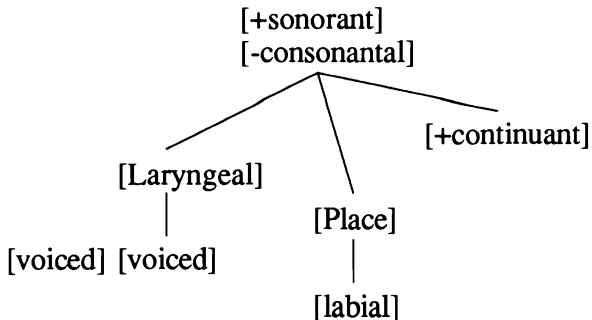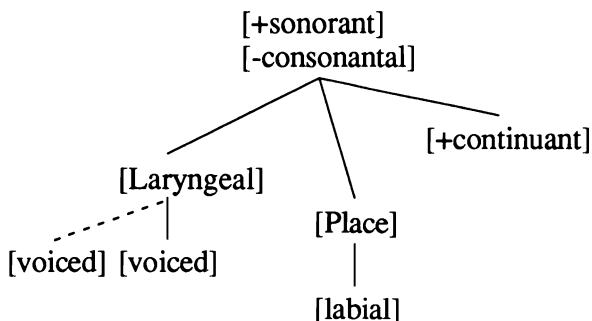
d. Delinking of identical feature by Twin Sisters Convention

[+sonorant]
[-consonantal]

[+continuant]

[Laryngeal]

[voiced] [voiced]

[Place]

[labial]
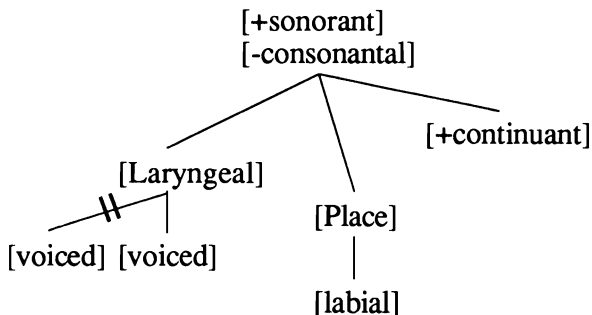
Turning now to the three voiceless segments, /f/, /s/, and /x/, we see that their surface representation does not include the feature [voiced]. In this case, we will assume that the feature [voiced] associates to the Laryngeal node, but that it is delinked by a rule that prohibits expansion of the phonemic inventory of Seereer to include voiced counterparts of those segments, namely *[v], *[z], and *[ʔ]. We will posit the following structure preserving rule which will eliminate the Laryngeal specification of any segment that is [+continuant] and [-sonorant].

(25)   [-sonorant]

[+continuant]

[Laryngeal]
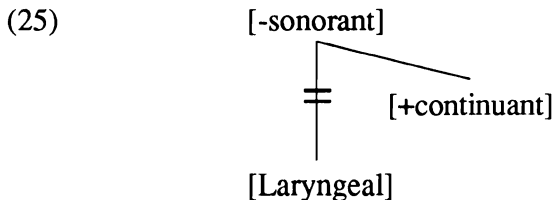
A sample derivation involving the coronal segment /s/ is given in (26).

(26)   *saax* → *saax*   'village'
            Class 5 prefix: Ø[voiced]

    a.   Feature geometric representation of stem-initial consonant

[-sonorant]
[+consonantal]

[Place]   [+continuant]

[coronal]

    b.   Prefixation

[-sonorant]
[+consonantal]

[+continuant]

[voiced]   [Place]

[coronal]

    c.   Association of floating feature

[-sonorant]
[+consonantal]

[Laryngeal]   [+continuant]

[voiced]   [Place]

[coronal]

d.   Delinking of Laryngeal node by rule (25)

```
                [-sonorant]
                [+consonantal]

           ╱──╫──┐────────┐
          ╱            │          [+continuant]
      [Laryngeal]      │
          │         [Place]
       [voiced]        │
                    [coronal]
```
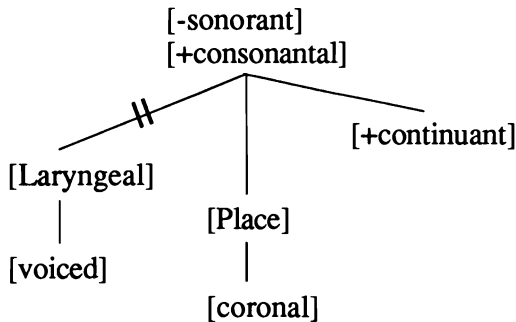
5.2 B-grade derivations. B-grades are conditioned by a class prefix that contains the floating feature [-continuant].

5.2.1 Voicing mutations. B-grade voicing mutations are the underlying forms for the voicing mutations. They consist of the voiceless stops /p/, /t/, /c/, /k/, /ɓ/, /ƒ/, and /c̓/, which remain unaffected by the prefixation of [-continuant] since the value for this feature is identical to the default value, as supplied by the rule in (18). We will assume that the feature is associated by class prefixation, which would in any case apply before the default rule. A sample derivation is given in (27).

(27)   *kac* → *a-kac*   'stone'
         Class 4 prefix: ₐ[-continuant]

a.   Feature geometric representation of stem-initial consonant

```
              [-sonorant]
              [+consonantal]

                   │
                   │
                   │
                [Place]
                   │
                [dorsal]
```

b.   Prefixation

[-sonorant]
[+consonantal]
|
| [-continuant]
|
[Place]
|
[dorsal]

c.   Association of floating feature

[-sonorant]
[+consonantal]
|
| [-continuant]
|
[Place]
|
[dorsal]
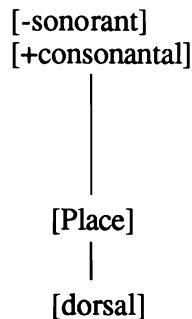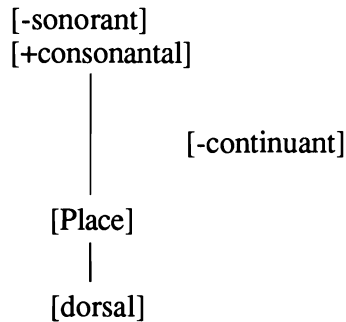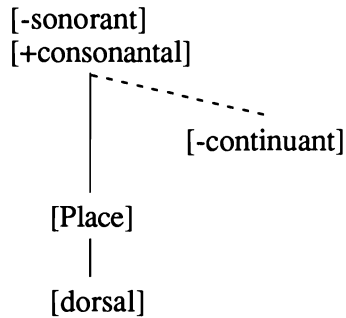
5.2.2   Continuancy mutations. By far the most challenging mutations to account for, b-grade continuancy mutations are derived from underlying continuants by the association of the feature [-continuant]. Subsequently, a persistent rule, given in (28), that blocks the formation of affricates in Seereer, is invoked to delink the [+continuant] specification from the root node.

(28)   Root
| #
| [+continuant]
|
[-continuant]
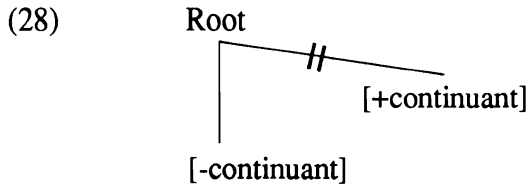
A second rule, given in (29), that changes [+sonorant] to [-sonorant] is invoked in the case of the mutations w/b, r/t, and w/k.

(29)   [+sonorant] → [-sonorant]

        [-continuant] [-nasal]
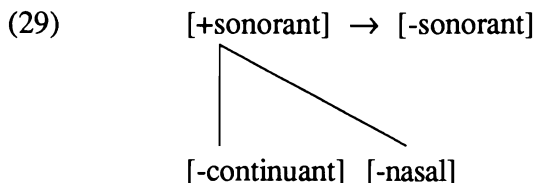
The most problematic aspect of b-grade continuancy mutations, however, lies in the voicing specification. As we saw in (23), three of the underlying representations, labial /w/, /r/, and velar /w/ are voiced; the fricatives /f/, /s/, and /x/ are voiceless. Let us examine what happens to the voicing specification of the b-grades.

(30)   Underlying forms   w   f   r   s   x   w
        b-grades   b   p   t   c   q   k

If voicing did not play a role in these mutations, we would expect [r] to alternate with [d], and [w] to alternate with [g]. In order to account for these forms we will posit that the b-grade, in addition to prefixing the [-continuant] feature, also involves a neutralization rule that delinks the feature [voiced] from the Laryngeal node. The only major problem associated with this solution is that devoicing does not occur in the w/b alternation. A second, minor problem is that there is only one substantiated instance of the w/k alternation in the language (*wiin*/o-*kiin* 'person') so the alternation may very well be lexicalized rather than productive.[11] On the other hand, within the broader context of Northern West Atlantic, Seereer is the only language that exhibits the r/t alternation rather than r/d as in Fula and Wolof, so a devoicing rule would appear to be a logical choice. A solution to these problems must be sought elsewhere, within the comparative and historical context of Northern West Atlantic. In the meantime we will adopt the solution posited above, namely that the b-grade involves a devoicing rule, and that the w/b
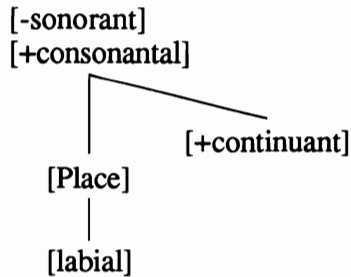
---

[11] Given that there is only one instance of this mutation in Seereer, it is very difficult to establish its correlate in the related languages. It is possible, however, that the stem *wiin*/*kiin* is cognate with the suppletive stem for 'person' in Fula. The stem occurs in Class 2, human plural in Fula as *yim-ɓe*, showing a stem initial glide, [y]. The suppletive form of this stem in the singular is *nedd-o*, cognate with Wolof *nit*. In Fula, [y] may alternate with [g], providing a possible analog for the w/k mutation in Seereer. In alternations involving the segment [g] in Fula, in the a-grade it alternates with either [y] before [i] and [e], [w] before [u] and [o], and [ʔ] before [a], hence we get phonological condition for [yim-ɓe] as opposed to *[wim-ɓe] or *[ʔim-ɓe].
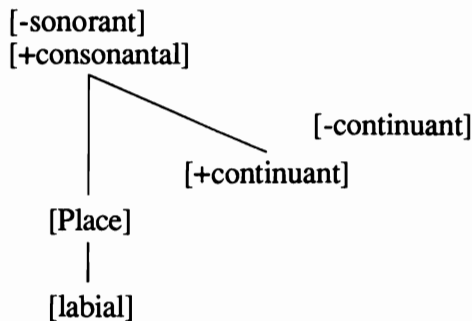
alternation is an anomalous exception.[12] The following sample derivations
illustrate the mutations f/p and r/t.

(31)   *faaɗ* → *xa-paaɗ*   'heel'
         Class 11 prefix: xa[-continuant]

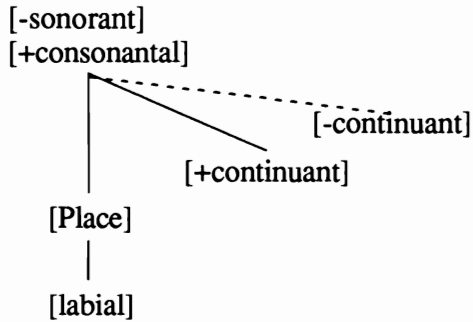   a.   Feature geometric representation of stem-initial consonant
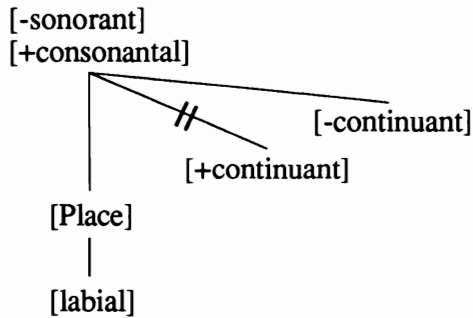
              [-sonorant]
              [+consonantal]

                      [+continuant]

              [Place]

              [labial]

    b.   Prefixation

              [-sonorant]
              [+consonantal]

                      [-continuant]
                [+continuant]

              [Place]

              [labial]

---

[12] The w/b/b mutation occurs in Fula, so although it is anomalous for the Seereer mutations, in
which voicing takes a part, it is not anomalous within the West Atlantic family. See section 6 for a
discussion of the Seereer mutations within the West Atlantic context.

c. Association of floating feature

[-sonorant]
[+consonantal]
                                    [-continuant]
            [+continuant]

[Place]
  |
[labial]

d. Application of affricate blocking rule (28)

[-sonorant]
[+consonantal]
                                    [-continuant]
            [+continuant]

[Place]
  |
[labial]

(32)   *rew → o-tew*   'woman'
        Class 1 prefix: o[-continuant]

a. Feature geometric representation of stem-initial consonant

[+sonorant]
[+consonantal]
                              [+continuant]

[Laryngeal]
   | [Place]
[voiced] |
                    [coronal]

b.   Prefixation

```
                      [+sonorant]
                      [+consonantal]
                                                    [-continuant]
         [Laryngeal]              [+continuant]
             |           [Place]
         [voiced]           |
                        [coronal]
```

c.   Association of floating feature

```
                      [+sonorant]
                      [+consonantal]
                          - - - - - - - -
                                         [-continuant]
         [Laryngeal]              [+continuant]
             |           [Place]
         [voiced]           |
                        [coronal]
```
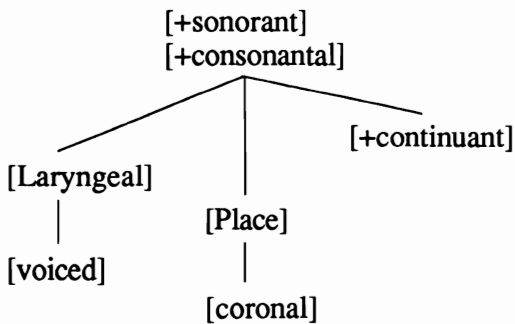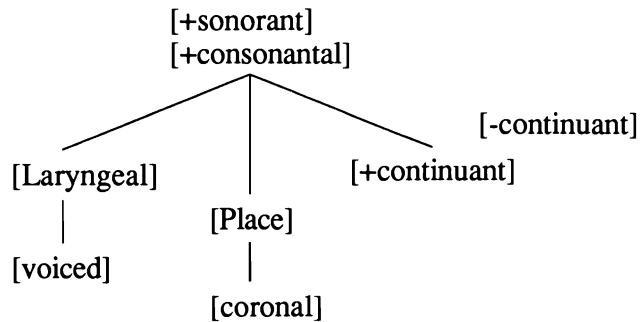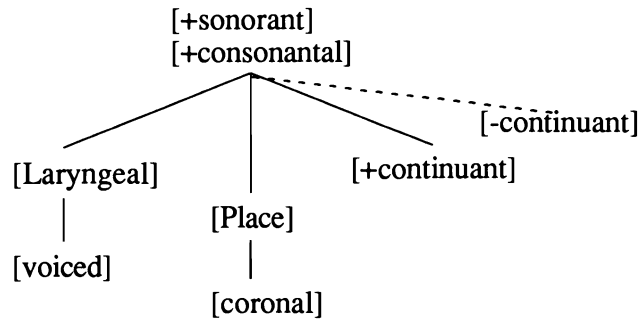
d.   Application of neutralization (devoicing) rule

```
                      [+sonorant]
                      [+consonantal]
               ╫                            [-continuant]
         [Laryngeal]              [+continuant]
             |           [Place]
         [voiced]           |
                        [coronal]
```

e. Application of affricate blocking rule (28)

[+sonorant]
[+consonantal]

                 //   [-continuant]

                [+continuant]

[Place]

[coronal]

f. Application of rule (29)

[+sonorant] → [-sonorant]
[+consonantal]

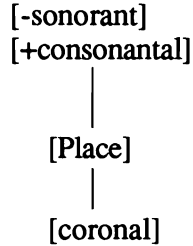   [-continuant]

[Place]

[coronal]
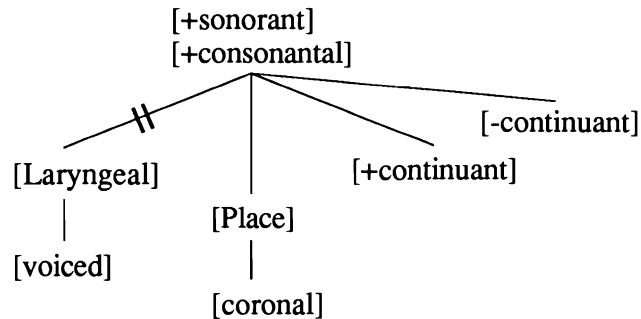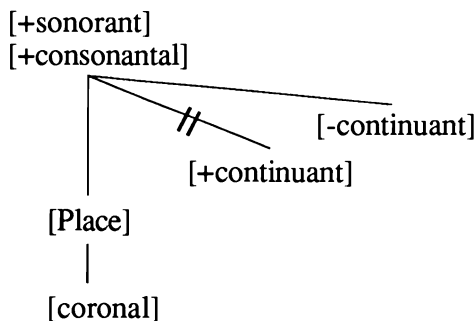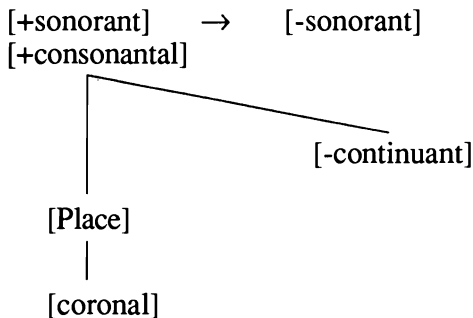
5.3 C-grades. The c-grades, or prenasalized grades, are conditioned by class prefixes that contain the floating feature [+nasal]. Two additional rules are required to derive the correct surface forms. First, a structure preserving rule, given in (32), blocks the formation of prenasalized continuants; second, the rule that we saw in (18) ensures voicing of all [+nasal] segments.

(33)   Root

[+nasal] [+continuant] → [+continuant]
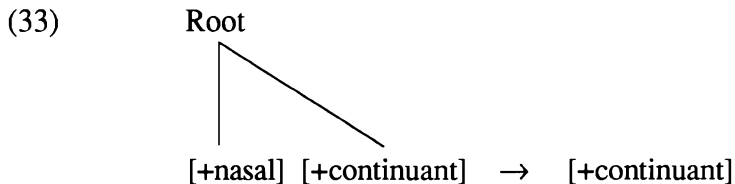
5.3.1 Voicing mutations. The c-grades of voicing mutations, other than the glottalized series, are derived from the underlying voiceless stops by association of the feature [+nasal] and application of rule (16), as illustrated in (34).

(34)   *caf → fo-njaf*   'leg'
          Class 13 prefix: *fo*[+nasal]
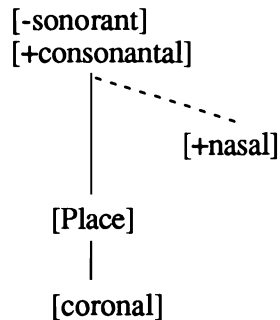
    a. Feature geometric representation of stem-initial consonant
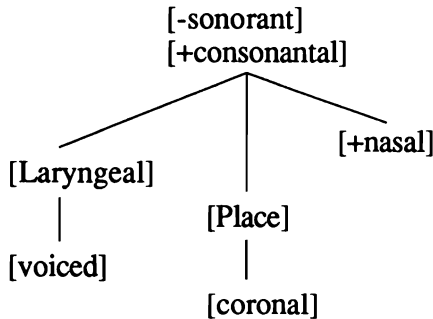
[-sonorant]
[+consonantal]

|

[Place]

|

[coronal]

    b. Prefixation

[-sonorant]
[+consonantal]

| [+nasal]

[Place]

|

[coronal]

    c. Association of floating feature

[-sonorant]
[+consonantal]

| - - - - - -
| [+nasal]

[Place]

|

[coronal]

d. Application of rule (16)

[-sonorant]
[+consonantal]

[Laryngeal]

[+nasal]

[voiced]

[Place]

[coronal]
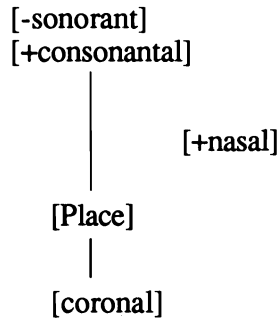
Note that a plain nasal segment, [ɲ], cannot result from the association of [+nasal] to the underlying form because it is already underlyingly [-sonorant]. The basic structural description of a prenasalized stop, however, is met in the combination of features [-sonorant] and [+nasal].[13]

C-grade voicing mutations involving the implosive stops do not undergo prenasalization, which is blocked by rule (12). Consequently, they do not undergo voicing, so the c-grade forms are identical to the underlying voiceless forms, as the following example shows.

(35)   ɓaŋ → fo-ɓaŋ   'spoon'
         Class 13 prefix: fo[+nasal]

a. Feature geometric representation of stem-initial consonant

[-sonorant]
[+consonantal]

[Laryngeal]

[Place]

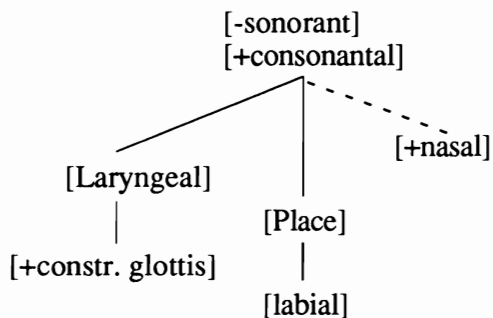[+constr. glottis]

[labial]

---
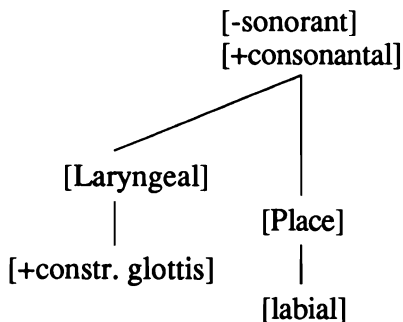
[13] Given the facts of Seereer, this structural description of prenasalized stops is to be preferred to one that consists of the cooccurrence of the features [+nasal] and [-nasal] associated with a single root node.
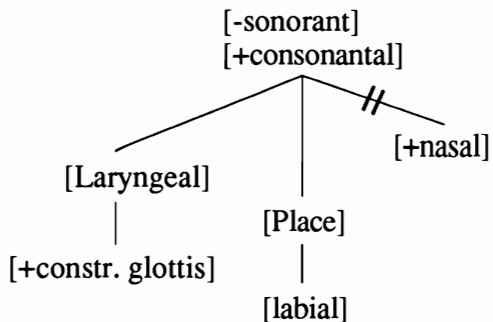
b.   Prefixation

[-sonorant]
[+consonantal]

[+nasal]

[Laryngeal]

[+constr. glottis]   [Place]

[labial]

c.   Association of floating feature

[-sonorant]
[+consonantal]

[+nasal]

[Laryngeal]

[+constr. glottis]   [Place]

[labial]

d.   Application of rule (12)

[-sonorant]
[+consonantal]

[+nasal]

[Laryngeal]

[+constr. glottis]   [Place]

[labial]
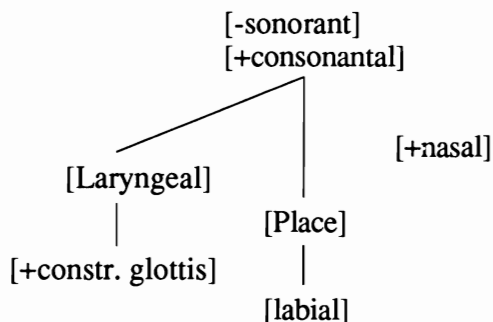
5.3.2 Continuancy mutations. The c-grades of continuancy mutations are derived from the underlying continuant forms by the prefixation of the feature
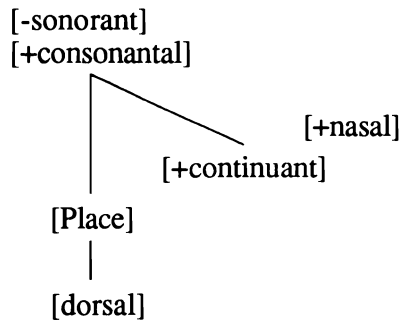
[+nasal] and subsequent application of two rules, rule (16) which voices [+nasal] segments, and rule (33) which changes the feature value of [+nasal] segments to [-continuant]. Sample derivations are given in (36) for the mutation x/nɢ and (36) for s/nj.

(36)   *xiic* → *fo-nɢiic*   'bone'
         Class 13 prefix: *fo*[+nasal]

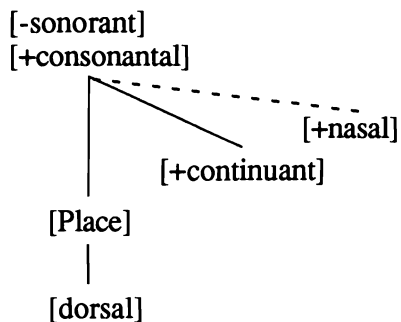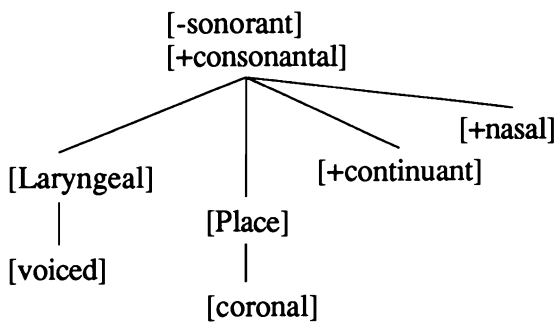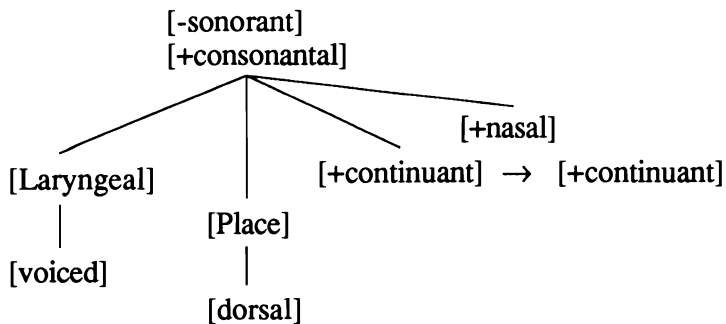   a.   Feature geometric representation of stem-initial consonant

[-sonorant]
[+consonantal]

                    [+continuant]

         [Place]

         [dorsal]

   b.   Prefixation

[-sonorant]
[+consonantal]

                              [+nasal]
                    [+continuant]

         [Place]

         [dorsal]

c.   Association of floating feature

[-sonorant]
[+consonantal]

[+nasal]

[+continuant]

[Place]

[dorsal]

d.   Application of rule (16)

[-sonorant]
[+consonantal]

[+nasal]

[Laryngeal]   [+continuant]

[voiced]   [Place]

[coronal]

e.   Application of rule (33)

[-sonorant]
[+consonantal]

[+nasal]

[Laryngeal]   [+continuant] → [+continuant]

[voiced]   [Place]

[dorsal]

(37)   *saxaal* → *fo-njaxaal*   'calabash'
         Class 13 prefix: *fo*[+nasal]

    a.   Feature geometric representation of stem-initial consonant

          [-sonorant]
          [+consonantal]

                         [+continuant]

           [Place]

           [coronal]

    b.   Prefixation

          [-sonorant]
          [+consonantal]

                         [+nasal]
                 [+continuant]

           [Place]

           [coronal]

    c.   Association of floating feature

          [-sonorant]
          [+consonantal]

                         [+nasal]
                 [+continuant]

           [Place]

           [dorsal]

d.   Application of rule (16)

```
                    [-sonorant]
                    [+consonantal]
                   /      |      \
                  /       |       _____ [+nasal]
                 /        |
      [Laryngeal]        |      [+continuant]
          |          [Place]
       [voiced]          |
                     [coronal]
```

e.   Application of rule (33)

```
                    [-sonorant]
                    [+consonantal]
                   /      |      \
                  /       |       _____ [+nasal]
                 /        |
      [Laryngeal]        |      [+continuant]  →  [+continuant]
          |          [Place]
       [voiced]          |
                      [dorsal]
```

6.0 Summary and conclusion

As we have seen in the preceding sections, the challenging nature of Seereer consonant mutations reflects a complex morphophonological system that is characterized by a basic dichotomy in mutation type. Any analysis of the facts of Seereer must account for both voicing and continuancy mutations within the same morphological environments. The analysis presented above accounts for consonant gradation in Seereer in a satisfactory manner by positing both a partially underspecified stem-initial consonant in mutating stems, and a floating autosegment, [voiced], [-continuant], or [+nasal], as part of the morphological representation of the class prefixes that condition a-grades, b-grades, and c-grades, respectively.

   We have seen how the Seereer mutations are unique to Northern West Atlantic in their behavior regarding voicing. The anomalous forms are the b-grades of the continuancy mutations where we get [t] derived from a-grade /r/ as opposed to [d]

in Fula and Wolof. What the analysis presented above shows is that the feature [voiced] has the status of an autosegment in Seereer, which is not true of Fula. In Seereer, the behavior of [voiced] plays a crucial role in the mutations. First, it appears as a floating autosegment attached to prefixes that condition the a-grade; second, it is independently delinked by the neutralization rule associated with the b-grade; and finally, it surfaces in the rule which voices all nasal segments, thereby affecting all three grades of the mutations.

If we briefly examine the stem-initial gradation sets in the Pulaar (Senegalese) dialect of Fula, as illustrated in (38), we see that voicing or devoicing plays no such role. Gradation sets are uniformly either voiced or voiceless; moreover, notice that stops that are underlyingly voiceless do not become voiced through prenasalization. There is no equivalent in Pulaar of the rule in (16) which automatically voices all nasal segments in Seereer.

(38) Gradation sets in the Pulaar dialect of Fula

	LABIAL		CORONAL			DORSAL			
a. continuant	w	f	r	s	y	h	y	w	?
b. stop	b	p	d	c	j	k	g	g	g
c. prenasalized	mb	p	nd	c	nj	k	ng	ng	ng

Although a thorough comparative study of the mutations in Seereer and Fula is well beyond the scope of this paper, these initial observations show that the crucial difference between the two languages hinges on the behavior of the feature [voiced]. Not only does it account for the fact that the implosive consonants in Seereer participate in the mutation system by exhibiting voiced and voiceless alternants, it also accounts for the devoicing of the continuancy mutations in the b-grade,[14] perhaps the most puzzling aspect of Seereer consonant mutation.

---

[14] Within the historical context, it would appear that the dichotomous system of Seereer is the innovative one, triggered by the autonomous behavior of the feature [voiced], thereby differentiating itself from a proto-system that looked more like modern Fula. Although such a hypothesis obviously awaits more comparative and historical research into Northern West Atlantic, I would like to suggest that the devoicing that occurs in the b-grade of the continuancy mutations is a result of the influence of the voicing mutations. The devoicing of the b-grade continuancy mutations is, then, a later innovation than the split in mutation type. I have discussed these issues in more depth elsewhere [Mc Laughlin 1993].

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DOGON PRONOMINAL SYSTEMS:
THEIR NATURE AND EVOLUTION

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The Dogon language family has received little attention in the linguistics
literature to date. In this paper we examine the binding properties of the
pronominal systems of three Dogon languages, Donno Sɔ, Tɔrɔ Sɔ, and
Togo Kã. We also posit the pronominal system of their common ancestor,
and the changes from the common ancestor to the contemporary languages. In
doing so, we find two ways in which languages can lose logophoricity:
(1) the logophoric pronoun becomes a subject oriented reflexive, and (2) the
logophoric pronoun is lost without any reflex. The Dogon languages thus
give us insight into the nature of pronominal systems and how they evolve.

1. Introduction*

The Dogon language family shows an immense amount of formal variation, in
phonology, morphology, and syntax. In this paper we will examine the binding
properties of the pronominal systems of three Dogon languages, Donno Sɔ (DS),
Tɔrɔ Sɔ (TS), and Togo Kã (TK). We will see a variety of properties, many of
which are interesting in their own right. However, perhaps the most interesting
aspect is that TK seems to be in the process of changing from one type of system

to another. This change provides evidence for the logophoric hierarchy of Culy [1991].

The last part of the paper will discuss the relationship among these pronominal systems. In particular, we will argue for certain properties that can be ascribed to their common ancestor. In doing so, we show two ways in which logophoric pronouns can change, a subject which has received little attention to date.[1]

2. Background

2.1 Dogon. While there are many Dogon languages,[2] with variation so extreme that some are not even mutually intelligible, the three languages that we will be looking at—DS, TS, and TK[3]—seem to be fairly closely related. DS and TS are geographically proximate, while TK is separated from the other two by the Bandiagara Escarpment. TK is the least conservative variety morphologically, while DS is the most conservative variety morphologically. However, DS and TS have been more influenced by Fula than has TK, as evidenced by a number of lexical borrowings.

DS has two major sub-varieties, one spoken in and around the town of Bandiagara, and the other spoken in the smaller villages in the surrounding area. The town variety shows more influence, both lexically and phonologically, from Fula than does the outlying variety. Both of these varieties are almost completely mutually intelligible.

2.2. Binding properties. Dalrymple [1990] argues that the binding properties of any pronoun can be described in terms of combinations of five primitive properties, as shown in (1).[4]

(1) Primitive binding properties
   a. Subject Binding/Disjointness ([±sb])
      The pronoun must be bound to (respectively, disjoint from) a subject.

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[1] Though there has been some work on how logophoric pronouns arise, e.g. by Hyman [1979], [1981] Voorhoeve [1980], Frajzyngier [1985].

[2] See Bertho [1953] and Calame-Griaule [1956] for some discussion of the different varieties.

[3] Data on DS are from fieldwork conducted by the first author in 1987-88, unless otherwise noted. Data on TS are from the second author, and data on TK are from the third author, both of whom are native speakers. Descriptions of other aspects of these languages can found in Kervran and Prost [1969, 1986], Calame-Griaule [1968], and Prost [1969], respectively.

[4] Dalrymple does not use features to refer to the properties. We do so for typographical convenience. Dalrymple also provides a formalization of the binding properties, which we will not do here, for the sake of brevity. Finally, the Root S Binding property is not relevant for Dogon, so we will say nothing more about it.

b. Coargument Binding/Disjointness ([±co])
  The pronoun must be bound to (respectively, disjoint from) an argument of the same predicate the pronoun is an argument of.
c. Minimal Complete Nucleus Binding
  The pronoun must be bound by an argument in the smallest predicate-argument structure containing it and a subject of a tensed clause or possessor distinct from it (i.e., it must be bound in its minimal complete nucleus).
  i. Non-subjective ([+mcn])
    The pronoun must not itself be a subject or possessor.
  ii. Subjective ([+mcnS])
    The pronoun may itself be a subject or possessor.
d. Minimal Finite Domain Binding ([+mfd])
  The pronoun must be bound in the smallest finite clause it is contained in.
e. Root S Binding ([+rt])
  The pronoun must be bound somewhere in the sentence.

English provides a simple illustration of these properties. English reflexive pronouns are generally [+mcn], since they must be bound in the smallest predicate-argument structure containing it and a subject or possessor distinct from it, and they cannot occur as subjects of tensed clauses or possessors.[5] Some examples are given in (2). Notice in (2c) that even though 'herself' is an argument of 'picture', there is no possessor, so 'herself' is free to be bound by the subject.

(2) English reflexives
   a. Pat$_i$ talked to Lee$_j$ about herself$_{i/j}$
   b. Pat$_i$ said that Lee$_j$ talked about herself$_{j/*i}$
   c. Pat$_i$ liked the picture of herself$_i$
   d. Pat$_i$ didn't like Lee$_j$'s picture of herself$_{j/*i}$

On the other hand, English personal pronouns are [-co], since they can't be bound by an argument of the same predicate. Some examples are given in (3). Note that when there is no subject or possessor of the predicate, then either the reflexive pronoun or the personal pronoun is allowed ((2c) vs (3c)).

(3) English personal pronouns
   a. Pat$_i$ talked to Lee$_j$ about her$_{k/*i/*j}$
   b. Pat$_i$ said that Lee$_j$ talked about her$_{i/k/*j}$
   c. Pat$_i$ liked the picture of her$_{i/j}$
   d. Pat$_i$ didn't like Lee$_j$'s picture of her$_{i/k/*j}$

---

[5] But see Pollard and Sag [1994] for detailed discussion of some exceptional cases.

One final comment is in order before we move on to Dogon, and that is that Dalrymple deliberately did not discuss logophoric pronouns, which are an important part of Dogon. Logophoric pronouns are pronouns which must have as their antecedents the person whose thoughts, words, or state of mind are being reported. We will not give a detailed analysis of logophoricity,[6] but will use [+log] to refer to logophoric pronouns and [-log] to refer to pronouns that cannot have a logophoric antecedent.

3. Donno Sɔ (DS)

3.1 Personal Pronouns. The personal pronouns are the easiest to describe. DS has first, second, and third person pronouns, distinct in singular and plural. The binding properties of the personal pronouns are also relatively easy to describe. Non-third person pronouns must be disjoint from coarguments (4a-b), but they can corefer with non-coarguments (4c). Note that in (4b) the *m'* is syntactically the possessor of *sɔ* 'word', but semantically the argument of 'talk' in just the same way that English *myself* is the object of the preposition *about* but semantically the argument of 'talk'. In both cases, they are coarguments of the subject.

(4) Non-third person pronouns
    a. As direct object (disjoint from subject)[7]

        **mi miñ   tɛbɛlaa bem*
         1S 1S-OBJ hit   PST-1S
        'I hit myself'

    b. As oblique (disjoint from indirect object)

        **Omar mi le   sɔ   m' mɔ̃   sɔyyaa be*
         Omar 1S with word 1S POSS talked PST
        'Omar talked to me about myself'

    c. As possessor (coreferential with subject)

        mi yaana m' mɔ̃   waa bem
         1S wife 1S POSS saw PST-1S
        'I saw my wife'

---

[6] See Sells [1987] for one such treatment.

[7] Numbers used in the gloss of examples correspond to first, second or third person, hence, 1S indicates first person singular, 3P third person plural. The following abbreviations are also used:

AG	Agentive	OBJ	Object	PST	Past
AUX	Auxiliary verb	Pl	Plural	REFL	Reflexive
DF	Definite (determiner)	POSS	Possessive	SUBJ	Subject
LOC	Locative	PRP	Present participle		
LOG	Logophoric pronoun	PSP	Past participle		

Third person pronouns are similar to non-third person pronouns, as the examples in (5) show.

(5) Non-third person pronouns
   a. As direct object (disjoint from subject)

   wo woñ   tɛbɛlaa be
   3S 3S-OBJ hit   PST
   'She[i] hit her[j]/*herself[i]'

   b. As oblique (disjoint from indirect object)

   Anta wo le   sɔ   wo mɔ̃ sɔyyaa be
   Anta 3S with word 3S POSS talked PST
   'Anta[i] talked to him[j] about him[i/k]/*himself[j]'

   c. As possessor (coreferential with subject)

   Omar yaana wo mɔ̃   waa be
   3S   wife 1S POSS saw PST
   'Omar[i] saw his[i/j] wife'

The one difference between third person and non-third person pronouns is their properties in logophoric contexts. Third person personal pronouns cannot have as their antecedents the person whose thoughts, words, or state of mind are being reported (6a); non-third person pronouns can (6b).

(6) Personal pronouns in a logophoric environment
   a. Third person (disjoint from logophoric subject)

   Anta Omar woñ   wɛ gi
   Anta Omar 3S-OBJ saw said
   'Anta[i] said that Omar saw her[j]/*[i]'

   b. Non-third person

   mi Omar miñ   wɛ gim
   Mi Omar 1S-OBJ saw said-1S
   'I said that Omar saw me'

We can summarize the properties of personal pronouns in DS as in (7).
(7) Binding properties of personal pronouns in DS

   | Non-third person | [-co] |
   | Third person | [-co, -log] |

3.2 Reflexives

3.2.1 The description. DS has two reflexive elements, an invariant reflexive pronoun *sama*, and a periphrastic reflexive, formed from the word for 'head' with a pronominal possessor which agrees in person and number with its antecedent.[8] Some examples are given in (8).

(8) Reflexives in Donno Sɔ
 a. Simple third person

       Anta sama tɛbɛlaa be
       Anta REFL hit   PST
       'Anta hit herself'

 b. Simple first person

       mi sama tɛbɛlaa bem
       1S REFL hit   PST-1S
       'I hit myself'

 c. Periphrastic third person

       Anta ku wo mɔ tɛbɛlaa be
       Anta head 3S POSS hit   PST
       'Anta hit herself'

 d. Periphrastic first person

       mi ku m' mɔ tɛbɛlaa bem
       1S head 1S POSS hit   PST-S
       'I hit myself'

Of these two strategies, it seems that the reflexive pronoun is the older one. There are three reasons for thinking this. The first reason is that the pronoun occurs only in the more conservative outlying variety of DS. The periphrastic strategy is found in both the town variety of DS, and in TS.
    The second reason for thinking that the pronoun is older is that Fula has the same compound strategy, as the example in (9) shows.

(9) Fula reflexive

       Anta fi'ii hoore mum
       Anta hit head 3S
       'Anta hit herself'

---

[8] See Culy [1993] for detailed discussion of periphrastic reflexives.

Recall that TS and DS have had more contact with Fula than TK has, and furthermore that the town variety of DS has had more contact with Fula than the outlying variety, especially with Bandiagara acting as the capital of part of the Fula-speaking Toucouleur empire in the 19th century. Finally, speakers of the town variety are much more likely to speak Fula as a second language than speakers of the outlying variety.[9]

The third reason for thinking that the reflexive strategy is older is that the pronoun, but not the periphrastic reflexive, has a cognate in TK, as we will see. Thus, it seems plausible that DS has borrowed the compound strategy from Fula, with the borrowing having completely replaced the indigenous reflexive pronoun in the town variety and coexisting with the pronoun in the outlying variety.

3.2.2 The binding properties. The binding properties of the periphrastic reflexive are a little easier to determine than those of the reflexive pronoun. In (10) we see that the periphrastic reflexive cannot be bound outside of its minimal complete nucleus, while (11) shows that it can have a non-subject antecedent. Recall from the discussion of (4b) that the periphrastic reflexive is the syntactic possessor of *sɔ* 'word' but the semantic argument of 'talk,' and hence in the same minimal complete nucleus as *Anta*, which is also an argument of the verb.

(10) Periphrastic reflexive bound in its minimal complete nucleus
    Omar Anta ku   wo mɔ̃   waa be   igi   wɔ
    Omar Anta head 3S POSS saw PST know AUX
    'Omarᵢ knows that Antaⱼ saw herselfⱼ/*himselfᵢ'

(11) Periphrastic reflexive with non-subject antecedent
    Anta le   ku   wo mɔ̃   sɔ   sɔyyaa bem
    Anta with head 3S POSS word talked PST-1S
    'I talked with Anta about herself'

To rule out [+mfd], we just need to note the ungrammaticality of (12), which contains only one finite verb.

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[9] Who in turn are more likely to speak Bambara as a second language than speakers of the town variety.

(12) Periphrastic reflexive is not [+mfd]
      Omar [ku   be   mɔ̃   le   sɔ   sɔyyɛzɛn' giaa]
      Omar head 3P POSS with word talk-PRP   say-PSP

      beñ   bondaa be
      3S-obj call-PSP PST

      ('Omar called them in order to talk with them')

Although this evidence is all consistent with the periphrastic reflexive being [+co], the example in (13) shows that the [+co] account is untenable. The post-position *ne* 'at' has its own predicate, yet the periphrastic reflexive can be bound by the subject, which is not a coargument. Thus, the periphrastic reflexive is [+mcn]: it must have an antecedent in the minimal complete nucleus containing it, and it cannot itself be a subject or possessor.

(13) Periphrastic reflexive not bound by coargument [Kervran 1982:489]
      Golu   sɔ-gɔ   sɔyyɛw dyaa yɛlaa
      Golou event-DF talking   take   come

      ku   wo mɔ̃   ne wo dɔaa,   yandalan kanaa yaga sɔyyi
      head 3S POSS at 3S arrived go over   did   other talked

      'In relating the event, when he arrived at [the part about] himself,
      Golou passed over it and talked about something else'

The binding properties of the simple reflexive are a little harder to determine. First of all, *sama* must be bound in its clause, as seen in (14).

(14) Simple reflexive bound in its clause
  a. Monoclausal
      Anta sama   tɛbɛlaa be
      Anta REFL hit   PST
      'Anta hit herself'

  b. Biclausal
      Omar Anta sama   waa   be   igi   wɔ
      Omar Anta REFL saw   PST   know   AUX
      'Omar$_i$ knows that Anta$_j$ saw herself$_j$/*himself$_i$'

That this restriction is not the [+mfd] restriction can be seen by the clause-boundedness of the reflexive in (15), which contains only one finite verb, and in which 'Omar' is the understood subject of 'talk'.

(15) Simple reflexive is not [+mfd] (cf. (12))

       Omar   sama   le   sɔ   sɔyyɛzen' giaa   beñ   bondaa   be
       Omar   REFL with word talk-PRP   say-PSP 3S-OBJ   call-PSP PST
       'Omar$_i$ called them$_j$ in order to talk with him$_i$/*them$_j$'

What makes it difficult to determine the binding properties of *sama* is that we have no examples of it occuring as the object of a simple postposition,[10] and it does not occur in the 'talk to X about Y' construction that we used earlier. The reasons *sama* does not occur in this construction are slightly involved.

First of all, in (16) we see that *sama* cannot occur as a possessor. However, this does not seem to be a consequence of the binding properties of *sama*. Rather, *sama* seems not to be able to occur with any overt case marking, which the possessor is, as shown by Embree [1993]. In particular, other pronouns must occur with Object case marking (e.g., *beñ* in (15)), even though it is optional for certain other NPs. However, *sama* does not occur with Object case marking, as seen in (14b). Since *sama* cannot occur with case marking, it cannot occur as a postnominal possessor of *sɔ* in (16).

(16) Simple reflexive as possessor
    a. With semantically non-empty common noun

        wo   yaana   sama   mɔ̃   waa   be
        3S   woman REFL POSS saw   PST
        'He$_i$ saw his$_i$ wife'

    b. With semantically empty *sɔ*

        mi Anta le   sɔ   sama   mɔ̃   sɔyyaa bem
        1S   Anta with word REFL POSS talked PST-1S
        'I talked with Anta about herself'

Furthermore, pronouns cannot occur in the prenominal position with *sɔ* as seen in (17a) (cf. (11)). This rules out *sama* from occuring in this position, as in (17b).

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[10] Most postpositions are complex, consisting of the simple postposition *ne* (cf. (13)), combined with a common noun, the "object" being realized as the possessor of the common noun.

(17) Pronouns in the prenominal position with *sɔ*
   a. Personal//Non-reflexives

       mi Omar le   u sɔ   sɔyyaa bem
       1S Omar with 2S word talked   PST-1S
       'I talked with Omar about you'

   b. Simple Reflexive

       mi Omar le   sama sɔ   sɔyyaa bem
       1S Omar with REFL word talked   PST-1S
       'I talked with Omar about himself'

Given the the lack of the appropriate structures, we cannot tell if [+sb] is relevant for *sama*. Given that [+sb] does not play a role in any of the other pronouns or reflexives, we will assume that is not in fact relevant for *sama*. However, we still do not know whether *sama* is [+co] or [+mcn].

Finally, third person reflexives are not used in logophoric environments to refer to the logophoric antecedent, as seen in (18a).[11] Of course, they can refer to a non-logophoric antecedent in the same clause (18b), and non-third person periphrastic reflexives can have logophoric antecedents in the same clause (18c).

(18) Reflexives in logophoric environments
   a. Ungrammatical third person periphrastic reflexive

       Omar inyemɛ ku   wo mɔ̃   samaa   bem   gi
       Omar LOG   head 3S POSS congratulated AUX-1S said
       'Omar$_i$ said that he$_i$ congratulated himself$_i$'

   b. Grammatical third person periphrastic reflexive

       Omar Anta ku   wo mɔ̃   samaa   be   gi
       Omar Anta head 3S POSS congratulated AUX said
       'Omar$_i$ said that Anta$_j$ congratulated herself$_j$'

   c. Grammatical non-third person periphrastic reflexive

       mi ma   ku   m' mɔ̃   samaa   be   gim
       1S 1S-SUBJ head 1S POSS congratulated AUX said-1S
       'I said that I congratulated myself'

We can summarize the properties of the reflexives in DS as in (19).

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[11] This isn't quite true, as we'll see in the next section.

(19) Binding properties of reflexives in DS
      Simple   [+co]/[+mcn], [-log]
      Periphrastic
          non-third person   [+mcn]
          third person   [+mcn], [-log]

3.3 Logophoric elements. There are two types of logophoric elements: the simple logophoric pronouns and a periphrastic logophoric element, formed just like periphrastic reflexives, but with a logophoric pronoun instead of a personal pronoun. The logophoric pronouns are third person only, both singular and plural. Illustrative examples are in (20).

(20) Basic logophoric facts
  a. Singular
      Anta inyemeñ i   gɛnɔ   agiya   gi
      Anta LOG-OBJ child robbed-AG-DF took-3P said
      'Anta$_i$ said that they took the child who robbed her$_i$'

  b. Plural
      Anta inyemɛmbe yogo   bojen gi
      Anta LOG-Pl   tomorrow go-1P said
      'Anta$_i$ said that they$_{i+j}$ are going tomorrow'

  c. Periphrastic (cf. (18a))
      Omar (inyemɛ) ku   inyemɛ mɔ̃ samaa   bem   gi
      Omar LOG   head LOG   POSS congratulated AUX-1S said
      'Omar$_i$ said that he$_i$ congratulated himself$_i$'

    Simple logophoric pronouns must have antecedents outside of their clause, as the examples in (21) suggest. However, this is a general, cross-linguistic property of logophoric pronouns,[12] so we will ascribe it to the feature [+log] rather than one of the other binding features.

(21) Logophoric pronouns with same clause antecedents
  a. As Direct Object
      **Anta inyemɛ wa mi bolaa be   ma tube*
      Anta LOG   to I   left AUX Q said
      'Anta asked herself if I had left'

---

[12] See Culy [1991] for discussion.

b. As Possessor

    Anta i   inyeme mɔ̃   wa mi bolaa be   ma gi
    Anta child LOG   POSS to I   left   AUX Q said
    'Anta asked her child if I had left'

The only relevant feature left is [sb], which the logophoric pronouns are not specified for. As we have seen, they can have subject antecedents. They can also have non-subject antecedents, as seen in (22).

(22) Logophoric pronoun with non-subject antecedent
    mi inyeme yogo   bojo Mariam ibura   εgεm   tube
    1S LOG   tomorrow go   Mariam mouth-LOC heard-1S said
    'I heard from Mariam that she's going tomorrow'

The periphrastic logophoric elements are [+mcn] by virtue of being periphrastic reflexives. Obviously, they are also [+log]. This means that the periphrastic logophoric elements can occur only when their clausemate antecedent itself is logophoric.[13] A grammatical example is in (20c), while an ungrammatical example is in (23).

(23) Periphrastic logophoric element with non-logophoric antecedent
    Omar Anta ku   inyeme mɔ̃   samaa   bem   gi
    Omar Anta head LOG   POSS congratulated AUX-1S said
    'Omar$_i$ said that Anta$_j$ congratulated himself$_i$'

We can summarize the properties of the pronominal system of DS as in (24).

(24) Binding properties of the pronominal system of DS

	Exemplar	Binding properties
Personal		
Non-third person	*mi* (1S)	[-co]
Third person	*wo* (3S)	[-co], [-log]
Reflexive		
Simple	*sama*	[+co]/[+mcn], [-log]
Periphrastic		
Non-third person	*ku m' mɔ̃* (1S)	[+mcn]
Third person	*ku wo mɔ̃* (3S)	[+mcn], [-log]

---

[13] DS is a subject pro drop language, so the logophoric subject could be null. See Culy [ms] for more details.

	Exemplar	*Binding properties*
Logophoric		
Simple	*inyemɛ*(S)	[+log]
Periphrastic	*ku inyeme mɔ*(S)	[+log], [+mcn]

By gathering the properties together, we can see that the system forms a coherent whole. The logophoric pronoun has its niche, and other obligatory coreference cases are taken care of by the reflexives. The periphrastic reflexive as a construction has the property of [+mcn], and the rest of the properties of the particular types follow from the internal possessor. Finally, the personal pronouns fill in where obligatory coreference is not possible.

4. Tɔrɔ Sɔ (TS)

4.1 Personal Pronouns. As with DS, the personal pronouns are the easiest to describe. TS has first, second, and third person pronouns, distinct in singular and plural, just as DS does. The binding properties of these pronouns are also easy to describe.

Starting with non-third person pronouns, it is not difficult to see that they have no binding properties whatsoever. They don't need antecedents, and neither do they need to be disjoint from other NPs. These properties hold within and across clause boundaries. Examples illustrating these facts are in (25).

(25) Non-third person pronouns
a. No antecedent

   Anta mũ nɛ sɔaa be
   Anta 1S OBJ talked PST
   'Anta talked to me'

b. No disjointness within a clause

   mũ mũ nɛ sɔaa be
   1S 1S OBJ talked PST
   'I talked to myself'

c. No disjointness across clauses

   mũ Omar wa mũ sa kejaa be gim
   1S Omar SUBJ 1S sister met PST said-1S
   'I said that Omar met my sister'

Third person personal pronouns do have one property: they cannot have subject antecedents, either in the clause or not. This is illustrated in (26).

(26) Third person personal pronouns
a. Disjoint from clausemate subject

    Omar   wo   nɛ   lagaa be
    Omar   3S   OBJ   nit   PST
    'Omar$_i$ hit him$_j$/*himself$_i$'

b. Disjoint from other subject

    Omar Anta peju   wo ebaa   be   igi   wɔ
    Omar Anta sheep 3S bought PST know AUX
    'Omar$_i$ knows that Anda$_j$ has bought her$_k$/*his$_{i/j}$ sheep'

They can also have non-subject antecedents, as shown in (27). Thus, third person personal pronouns are simply [-sb].

(27) Third person personal pronoun with non-subject antecedent

    Madu Anta wa Omar wo sa   iyaa be   gi
    Madu Anta to   Omar 3S sister seen PST said
    'Madu$_i$ said to Anta$_j$ that Omar$_k$ saw her$_{j/m}$/*his$_{i/k}$ sister'

4.2 Reflexives. Like DS, TS has two types of reflexives: simple reflexives *unɔ* '*be*', and the same periphrastic reflexive construction as DS. However, TS has no logophoric pronouns.[14] While the periphrastic reflexives in these two languages are similar, the simple reflexives are not.

First, the simple reflexive in DS is invariant and occurs with any person antecedent, while the simple reflexives in TS are third person only, and the two forms are singular and plural. Second, the simple reflexive in DS is clause bound, but the simple reflexive in TS is not. Rather, it can have any appropriate subject as its antecedent.[15] In other words, it is [+sb]. Examples illustrating these properties are in (28).

(28) Simple reflexive as [+sb]
a. Third person only

    mũ unɔ   nɛ   sɔaa   be
    1S   REFL OBJ talked PST
    'I talked to myself'

---

[14] It seems likely that *unɔ* is cognate with the logophoric pronoun in DS, *inyemɛ* and indeed Calame-Griaule [1968] says that in another dialect of TS, the corresponding form is indeed logophoric. See section 6 for further discussion.
[15] Provided, of course, that the subject c-commands the reflexive.

b. Only subject as antecedent

Anta	*Omar*	*nɛ*	*sɔ*	*unɔ*	*mɔ*	*sɔaa*	*be*
Anta	Omar	OBJ	word	REFL	POSS	talked	PST

'Anta_i talked to Omar_j about herself_i/*himself_j'

c. Not clause bound (ambiguous)

Mariam	*Anda*	*wa*	*unɔ*	*nɛ*	*lagaa*	*be*	*gi*
Mariam	Anda	SUBJ	REFL	OBJ	hit	PST	said

'Mariam_i said that Anda_j hit her_i/himself_j'

Note that the latter two examples are sufficient to fix the binding properties of *unɔ*. (28c) shows that it is not [+co], [+mcn], or [+mfd], while (28b) shows that it is not logophoric, and not simply [+rt], and must be [+sb].

The binding properties of the periphrastic reflexive are also fairly straight-forward. It is clause bound, with its antecedent being determined by its internal possessor. Thus, if the posssessor is non-third person, then any c-commanding NP in the same clause with the same person and number can be the antecedent, as seen in (29a). If the possessor is a third person personal pronoun, then the antecedent must not be the subject of the clause (29b), since third person personal pronouns are [-sb]. Finally, if the possessor is a simple reflexive, the antecedent must be the subject of the same clause (29c).

(29) Binding properties of the periphrastic reflexive

a. Non-third person pronoun as possessor

u	*ku*	*u*	*mɔ*	*nɛ*	*lagaa*	*be*
2S	head	2S	POSS	OBJ	hit	PST

'You hit yourself'

b. Third person personal pronoun as possessor

Mariam	*Omar*	*nɛ*	*ku*	*wo*	*mɔ*	*sɔ*	*sɔaa*	*be*
Mariam	Omar	to	head	3S	POSS	word	talked	PST

'Mariam_i talked to Omar_j about himself_j/*herself_i'

c. Simple reflexive as possessor

Mariam	*Omar*	*nɛ*	*ku*	*unɔ*	*mɔ*	*sɔ*	*sɔaa*	*be*
Mariam	Omar	to	head	REFL	POSS	word	talked	PST

'Mariam_i talked to Omar_j about herself_i/*himself_j'

We can summarize the binding properties of the pronominal system of TS as in (30).

(30) Summary of TS pronominal system

	Exemplar	*Binding properties*
Personal		
Non-third person	*mu* (1S)	None
Third person	*wo* (3S)	[-sb]
Reflexive		
Simple	*unɔ*	[+sb]
Periphrastic		
Non-third person	*ku u mɔ* (2S)	[+mcn]
Third person personal	*ku wo mɔ*(3S)	[+mcn], [-sb]
Simple reflexive	*ku unɔ mɔ*	[+mcn], [-sb]

As in DS, the system makes a coherent whole. Non-third person pronouns can occur anywhere, while third person personal pronouns are in complementary distribution with the simple reflexive. The periphrastic reflexive overlaps with all of them, with its particular properties being determined by the properties of its internal possessor.

5. Togo Kã(TK)

TK has the most complex pronominal system, even though it has the fewest elements. In addition to personal pronouns, TK has a simple reflexive pronoun and a logophoric pronoun, but no periphrastic reflexives.

We have seen how the pronominal systems of DS and TS make sense when seen as a whole, with the different forms filling different "niches." In order to understand the TK system, it will be easiest to start with the logophoric pronouns, move to the reflexive pronouns, and treat the personal pronouns last.

5.1 Logophoric pronouns. The logophoric pronoun in TK is *ɛnɛ (be)*, probably cognate with the DS logophoric pronoun *inyeme*. As in DS, it is third person only, and varies in number. That *ɛnɛ* is logophoric is suggested by the examples in (31).[16]

31) Logophoric pronoun
    a. Simple clause (ungrammatical)

         *Mariam ɛnɛ   ni tiŋɛ   tiŋɛ
          Mariam LOG   to word talked
         'Mariam_i talked to herself_i'

---

[16] In all cases considered in this paper, the subordinate clause is tensed.

b. Logophoric context (grammatical)

Anta Omar wa   yogo   ene geju gi
Anta Omar SUBJ tomorrow LOG sees said
'Anta$_i$ said that Omar will see her$_i$ tomorrow'

c. Non-logophoric context (ungrammatical)

Omar Anta ene   ɔɛ   ĩ   wɔ
Omar Anta LOG saw know AUX
'Omar$_i$ knows that Anta saw him$_i$'

However, things are not quite as simple as saying that *ene* is [+log]. There are logophoric contexts in which *ene* is used in some positions but not others. One such context is illustrated in (32), and another in (33).

32) Non-uniform distribution of *ene* (with 'think')
   a. Subject (grammatical)

Anta ene   Mariam ɔɛ ge   sa
Anta [LOG Mariam saw said] has
'Anta$_i$ thinks she$_i$ saw Mariam'

   b. Possessor of Subject (ungrammatical)

*Omar ene   nyɛ yei ge   sa
Omar [LOG wife left said] has
'Omar$_i$ thinks that his$_i$ wife left'

33) Non-uniform distribution of *ene* (with 'hear')
   a. Subject (grammatical)

Anta ene   farãsi yaju ɛgɛ
Anta [LOG France go]   heard
'Anta$_i$ heard that she$_i$ will go to France'

   b. Object (ungrammatical)

*Omar Anda ene   ɔɛ   ɛgɛ

Omar Anda LOG saw heard
'Omar$_i$ heard that Anda saw him$_i$'

When we test a variety of verbs, we find the results given in (34).

(34) Patterns of the logophoric pronoun in subordinate clauses

	Subject	Object/ Possessor of Object	Possessor of Subject
'say'	✓	✓	✓
'think'	✓	✓	*
'hear'	✓	*	*
'know', 'see'	*	*	*

While there might be many ways to think about these facts, the following way seems to be the most illuminating. The verbs with which the logophoric pronoun can occur form a hierarchy, much like that proposed on the basis of cross-linguistic evidence in Culy [To appear]. Thus, we can say that ɛnɛ is [+log], and that it is the logophoric domain which varies according to the verb and the position. The domain for 'say' is everywhere, while the domain for 'think' includes the subject and non-subjects, but not the possessor of subjects. Similarly, the domain for 'hear' only includes subjects. The verbs 'know' and 'see' do not have any logo-phoric domains.

5.2 Reflexives. The simple reflexive is *sã(be)*, clearly cognate with the simple reflexive *sama* in DS. While it can have any person antecedents, it only varies in number. The fundamental property of the simple reflexive is that it must have a subject antecedent, as seen in (35a). In addition to being [+sb], the simple reflex-ive seems to be clause bound, but not necessarily bound to a coargument (35b). There also seem to be no logophoric effects (35c).

(35) Simple reflexive

a. Subject orientation

> *Mariam   Omar   ni   sã   tiɲɛ   tiɲɛ*
> Mariam   Omar   to   REFL   word   talked
> 'Mariam$_i$ talked to Omar$_j$ about herself$_i$/*himself$_j$'

b. Clause boundedness, non-coargument antecedent

> *Omar   Anda   sã   peju   ɛwɛ   ĩ   wɔ*
> Omar   Anda   REFL   sheep   bought   know   AUX
> 'Omar$_i$ knows that Anda$_j$ bought his$_{j/*i}$ sheep'

c. No logophoric effects

> *Omar   [sã   peju]   dɔnyu   manuga   tɔŋɔ*
> Omar   REFL   sheep   sell   think   AUX
> 'Omar$_i$ thinks that he$_i$'ll sell his$_i$ sheep'

However, the situation is a little different when we look at subordinate subjects and their possessors, just as it was with the logophoric pronoun. With certain verbs, the simple reflexive can be the subordinate subject with a matrix argument as its antecedent, while with others it cannot. Similarly, with a different set of verbs, the simple reflexive can be the possessor of the subordinate subject with a matrix argument as its antecedent. Some illustrative examples are given in (36-38), while a chart of some of the verbs and the behavior of the simple reflexive is given in (39).

(36). Simple reflexive in subordinate subjects (both grammatical)
    a. Subordinate subject of 'see' (grammatical)

> *Omar sã   bãdi   lagaju ɔɛ*
> Omar [REFL bandit hit]   saw
> 'Omarᵢ saw himselfᵢ hit the bandit'

    b. Possessor of subordinate subject of 'see' (grammatical)

> *Omar sã   nyɛ̃   ĩ   wo lagaju ɔɛ*
> Omar [REFL wife child 3S   hit]   saw
> 'Omar saw his wife hit the child'

(37) Simple reflexive in subordinate subjects (one grammatical)
    a. Subordinate subject of 'hear' (ungrammatical)

> **Anta sã   farãsi yaju ɛgɛ   lagaju ɔɛ*
> Anta [REFL France go]   heard hit]   saw
> 'Antaᵢ heard that sheᵢ will go to France'

    b. Possessor of subordinate subject of 'hear' (grammatical)

> *Omar sã   nyɛ̃   Anta ni tiŋɛ   ɛgɛ*
> Omar [REFL wife Anta to   talked] heard
> 'Omarᵢ heard that hisᵢ wife talked to Anta'

38) Simple reflexive in subordinate subjects (both ungrammatical)
    a. Subordinate subject of 'say' (ungrammatical)

> **Anta sã   yogo   yaju   gi*
> Anta [REFL tomorrow leave] said
> 'Anta said that she will leave tomorrow'

    b. Possessor of subordinate subject of 'say' (ungrammatical)

> **Omar sã   nyɛ yei gi*
> Omar [REFL wife left] said
> 'Omar said that his wife left'

(39) Patterns of the simple reflexive as and in subordinate subjects

	Subject	Possessor of Subject
'say'	*	*
'think'	*	✓
'hear'	*	✓
'know', 'see'	✓	✓

As with the logophoric pronoun there might be many ways to think about these facts. However, in keeping with our view of the logophoric pronoun, we can see that the verbs which disallow the simple reflexive form a hierarchy, similar to that for logophoric pronouns. For example, 'say' disallows the simple reflexive where it allows the logophoric pronoun, and 'hear' allows the simple reflexive where it disallows the the logophoric pronoun. Thus, following the example of the logophoric pronoun, we can say that the subjective (i.e., subject and possessor of subject) form of *sã* is [+sb] and [-log], with the logophoric domain varying according to the verb and position.

Things are not that simple, of course. When we look at sentences with two levels of embedding, we see that the subjective reflexive pronouns are actually also [+mcnS], as in (40). We couldn't see this in the earlier examples, since for a subject, the minimal complete nucleus containing it and a distinct subject will be its matrix clause.[17]

40) Subjective reflexive pronouns in two levels of embedding[18]

> Omar [Anta [sã sugɔ   ĩ   wo lagaju] ɔɛ] ɛgɛ
> Omar   Anta   3S brother child 3S   hit   saw heard
> 'Omar$_i$ heard that Anta$_j$ saw her$_j$/*his$_{i/k}$ brother hit the child'

Since the feature [+mcnS] is relevant for the subjective reflexive, we will assume that it is the feature responsible for the clause-boundedness of the non-subjective reflexive as well. We can summarize the properties of the logophoric pronoun as in (41).

(41) Properties of TK simple reflexive pronoun

Subjective	*Non-subjective*
(Subject and Possessor of Subject)	
[+sb], [+mcnS], [-log]	[+sb], [+mcnS]
Logophoric domain varies	

---

[17] We have to assume here that for the purposes of [+mcnS], if the possessor is contained in a subject, then that subject does not qualify as the subject distinct from the possessor.

[18] The third person pronoun before the verb *lagaju* 'hit' is a clitic doubling the real subject *sã sugɔ* 'her brother'.

5.3 Personal Pronouns. Starting with non-third person personal pronouns, it is easy to see that they differ from both their DS and TS counterparts. Unlike TS pronouns, they do have binding properties, but they are not [-co] as in DS. Rather, they seem to be disjoint from subjects in their own clause, but not necessarily from other subjects. Some examples are in (42). To indicate that non-third person personal pronouns are disjoint from a same clause subject, not all subjects, we will combine the features into a complex: [-sb | +mcnS].[19, 20]

(42) Non-third person personal pronouns
    a. Same clause subject antecedent (ungrammatical)

        *ɛmɛ   ɛmɛ   peju   dɔnye
         1P   1P   sheep sell-Pl
        'We're selling our sheep'

    b. Same clause non-subject antecedent (grammatical)

        Omar   ĩ   larã   tiɲe   ma   ni   tiɲe
        Omar   1S   sister word 1S-OBJ   to   spoke
        'Omar spoke to me about my sister'

    c. Different clause subject antecedent (grammatical)

        ĩ   Omar   wa   wo   wa   ĩ   larã   kije   gi
        1S   Omar   to   [3S SUBJ 1S   sister met]   said
        'I said to Omar that he met my sister'

One exception is the postnominal first person singular possessive *ma*, the only postnominal possessor. It seems to be simply [-co], since it can corefer with a subject in its clause, as seen in (43).

43) Postnominal first person singular possessive

        ĩ   nyɛ   ma   ɔɛ
        1S   wife   1S-POSS   saw
        'I saw my wife'

Of course, third person personal pronouns are slightly more complicated. Their fundamental property is that they are [-sb], as seen in (44).

---

[19] We will justify the use of [+mcnS] below.

[20] The distinction between two features and a complex corresponds to the distinction between two separate binding equations and a single complex binding condition in Dalrymple [1990:139-141]. (Of course, both of these abbreviate sets of equations (p. 164 ff.)).

(44) Third person personal pronouns

 Mariam Omar ni wo tiɲɛ tiɲɛ
 Mariam Omar to 3S word spoke
 'Mariam$_i$ spoke to Omar$_j$ about himself$_j$/him$_k$/*her$_i$'

  However, like the non-third person pronouns, if the pronoun is not a Subject or Possessor of Subject, then this restriction is limited to the clause containing the pronoun and a subject. Outside of this clause, the pronoun can have a subject antecedent (45). Since the object pronoun can have an antecedent outside of the minimal finite clause containing it, and it can be a possessor we can tell that its restriction is [+mcnS].

45) Third person non-subjective personal pronouns

 Omar [Anta wo ɔɛ] ĩ wɔ
 Omar Anta 3S saw know AUX
 'Omar$_i$ knows that Anta$_j$ saw him$_{i/k}$'

  As with the subjective reflexive pronoun, we need to look at more than one level of embedding to determine whether there is a restriction. The example in (46) demonstrates that the subjective pronouns have the same restriction as the non-subjective ones, namely [+mcnS].

(46) Third person non-subjective personal pronouns in two levels of embedding

 Omar [Anta [wo sugɔ ĩ wo lagaju] ɔɛ] ɛgɛ
 Omar Anta 3S brother child 3S hit saw heard
 'Omar$_i$ heard that Anta$_j$ saw his$_{i/k}$/*her$_j$ brother hit the child'

  As we might expect by now, there is an added wrinkle, namely that of logophoricity. When a third person pronoun is outside the minimal nucleus containing it and a subject, it still cannot have the matrix subject as its antecedent, as we would expect. Examples are in (47), while the patterns are given in (48).

(47) Ungrammatical matrix subject antecedent
 a. With a non-subjective pronoun

  Omar [Anta wo ni tiɲɛ gi
  Omar Anta LOG to talk said
  'Anta$_i$ said that Omar$_j$ talked to her$_{k/*i/*j}$'

 b. With a subjective pronoun

  Anta Mariam wa wo Bamako ye ĩ wɔ gi
  Anta Mariam SUBJ 3S Bamako went know AUX said
  'Anta$_i$ said that Mariam$_j$ knows that she$_{k/*i/*j}$ went to Bamako'

(48) Patterns of the third person personal pronouns outside of minimal complete nucleus containing them and a subject

	Subordinate non-Subjective			Subjective
'say'	$\neq Su_{matrix}$	and	$\neq Su$	$\neq Su_{matrix}$
'think'	$\neq Su_{matrix}$	and	$\neq Su$	✓
'hear'	$\neq Su_{matrix}$			✓
'know', 'see'	$\neq Su_{matrix}$			✓

As before, we see a split, so we should analyze the third person personal pronouns as being [-log], with the domain varying by verb and position. Thus, full specification of third person personal pronouns is given in (49).

(49) Binding properties of third person personal pronouns
   [-sb l +mcnS], [-log]
   Logophoric domain varies

5.4 Summary of TK. A recurring theme that we have seen in the pronominal system of TK is the hierarchy of logophoric verbs. Let's represent the segments of the hierarchy as in (50), where "D" stands for "Domain".

(50) Segments of the logophoric hierarchy
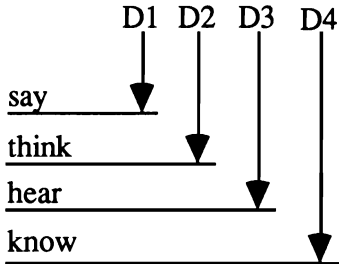
We can now summarize the properties of the pronominal system of TK as in (51). We will use the abbreviations D1-D4 as reminders of which logophoric domain the values [+log] and [-log] hold in.

(51) Binding properties of the pronominal system of TK
       S=Subject   PS=Possessor of subject NS=Non-subject

	Exemplar	*Binding Properties*		*Domain*
Personal				
Non-third person	ĩ (1sg)	[-sb ǀ +mcnS]		
First person PSR	*ma*	[-co]		
Third person	*wo* (sg)	S=PS	[-sb ǀ +mcnS], [-log]	D1
		NS	[-sb ǀ +mcnS], [-log]	D2
Reflexive	*sã* (sg)	S	[+sb], [+mcnS], [-log]	D3
		PS	[+sb], [+mcnS], [-log]	D1
		NS	[+sb], [+mcnS]	
Logophoric	*ɛnɛ* (sg)	S	[+log]	D3
		PS	[+log]	D1
		NS	[+log]	D2

The pronominal system of TK presents a serious challenge for linguistic theory. That challenge is how to account for the fact that the logophoric domain seems to vary according to the target position. Usually, a verb either gives rise to a logophoric domain, or it does not. What we have seen in TK is that a logophoric pronoun can be licensed in one position, e.g., as a subject, by a verb, but not in another position, e.g., as the possessor of the subordinate subject. This difference cannot be attributed to the lack of a possessor logophoric pronoun, since other verbs do allow the logophoric pronoun as the possessor of the subordinate subject.

To make matters worse, the logophoric domain varies according to depth of embedding. For example, when the licensing verb is in the immediately higher clause, the domain for non-subjective logophoric pronouns is D2, as we have seen. However, if the licensing verb is two clauses higher, then the domain is D3, as seen in (52). On the other hand, the domain for all subjective logophoric pronouns is D1 in two levels of embedding, as opposed to D3 for subjects and D1 for possessors of subjects in one level of embedding. A comparison of the one level and two level domains is given in (53).

(52) Domain for non-subjective logophoric pronouns, 2 levels of embedding
   a. With 'say' (grammatical)

   Madu [Omar wa Ali ɛnɛ laran ɔɛ] ĩ wɔ] gi
   Madu Omar SUBJ Ali LOG sister saw know AUX said
   'Madu$_i$ said that Omar$_j$ knows that Ali$_k$ saw his$_{i/*j/*k}$ sister'

   b. With 'think' (grammatical)

   Anta [Mariam wa [Hawa ɛnɛ ĩ wo lagaju] ɔɛ] manugi
   Anta Mariam SUBJ Hawa LOG child 3S hit saw thinks
   'Anta$_i$ thinks that Mariam$_j$ saw Hawa$_k$ hit her$_{i/*j/*k}$ child'

   c. With 'hear' (grammatical)

   Anta [Mariam wa [Hawa ɛnɛ ĩ wo lagaju] ɔɛ] ɛgɛ
   Anta Mariam SUBJ Hawa LOG child 3S hit saw heard
   'Anta$_i$ heard that Mariam$_j$ saw Hawa$_k$ hit her$_{i/*j/*k}$ child'

   d. With 'know' (ungrammatical)

   Madu [Omar wa [Ali ɛnɛ laran ɔɛ] gi] ĩ wɔ
   Madu Omar SUBJ Ali LOG sister saw said know AUX
   'Madu$_i$ knows that Omar$_j$ said that Ali$_k$ saw his$_{j/*i/*k}$ sister'

(53) One level and two level domains for logophoric pronouns

	S	PS	NS
1 level	D3	D1	D2
2 level	D1	D1	D3

No other binding properties change, and indeed they need not. The properties of the simple reflexive are completely circumscribed with one level of embedding. On the other hand, we already had to look at two levels of embedding to determine the properties of the personal pronouns.

6. Reconstruction

Given that DS, TS, and TK are relatively closely related, and that their pronouns seem to be cognates, the question arises as to how this situation came about. The natural assumption is that the three languages have a common ancestor, and that the three pronominal systems have evolved from the system of the common ancestor. This account will show two ways in which logophoric systems can lose their logophoricity. While some attention has been paid to how languages acquire

logophoric pronouns, our study is the first that we are aware of that examines the loss of logophoricity.[21]

DS is clearly the most conservative of the languages with respect to morphology, and it seems likely that it is the most conservative with respect to the pronominal systems. While we cannot justify this position absolutely, we will use this assumption to provide a scenario which we think accounts plausibly for the properties of the three contemporary systems.

The easiest property to account for is the periphrastic reflexive. We have already suggested (section 2) that the periphrastic reflexive found in DS and TS is a borrowing from Fula. Since TK lacks a periphrastic reflexive, the common ancestor (henceforth DCA) also lacked a periphrastic reflexive.

The next property to account for is the existence of just two pronominal types in TS (personal and reflexive), as opposed to three in DS and TK (personal, reflexive, and logophoric). First, we see that the simple reflexives in DS and TK are cognate (*sama* and *să* respectively). Second, the simple reflexive in TS seems to be cognate with the logophoric pronouns in DS and TK.[22] As noted above, the corresponding form *unu* in another dialect of TS is logophoric, according to Calame-Griaule [1968,xxii-xxiii,xxix]. Furthermore, it is significant that the simple reflexive in TS is third person only, just like the logophoric pronouns in DS and TK, and unlike the simple reflexives in those languages, which may be any person.

To sum up what we have so far, DCA had three types of pronoun: personal, simple reflexive, and logophoric. In other words, it was like the country variety of DS, without the periphrastic reflexive. This is illustrated in (54).

54) Pronominal system of Dogon Common Ancestor

	Exemplar	*Binding properties*
Personal		
Non-third person	*mi* (1sg)	[-co]
Third person	*wo* (3sg)	[-co], [-log]
Reflexive		
Simple	*sama*	[+co], [-log]
Logophoric		
Simple	*inyeme* (sg)	[+log]

If this reconstruction is correct, then we can see how the three languages evolved. DS added the periphrastic reflexive, and is in the process of losing the simple reflexive (recall that it no longer exists in the town dialect).

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[21] Aside from speculation in Voorhoeve [1980].

[22] Though admittedly the relationship is not as clear as with the simple reflexives.

TS also added the periphrastic reflexive, and lost the simple reflexive. However, the logophoric pronoun has become a subject oriented reflexive. This change can be seen as a generalization of the general tendency for the logophoric pronoun to have subject antecedents. Recall that there are very few environments in which the logophoric pronoun in DS could have a non-subject antecedent (cf. (22)). Becoming a subject oriented reflexive is the first way in which logophoric pronouns can lose their logophoricity.

One further note on TS concerns the dialect of TS in which the change from logophoric pronoun to subject oriented pronoun has not occurred. This dialect also has a periphrastic reflexive, but no simple reflexive. Thus, it seems that the periphrastic reflexive probably was added before the loss of logophoricity.

TK is the most complex case, in that it is in the process of changing. Based on the variation in the domains for logophoric pronouns, it seems that TK is losing the logophoric pronoun, and the simple reflexive is becoming a subject oriented reflexive. If the simple reflexive in DCA was in fact clause bounded, as we have posited, then the change of the simple reflexive is an example of a common type of change in binding properties [Faltz 1985:145]. We might even see the loss of the logophoric pronoun as a consequence of the expansion of the range of possible antecedents of the simple reflexive. Thus, losing the logophoric pronoun with no reflex is the second way in which a language can lose its logophoricity.
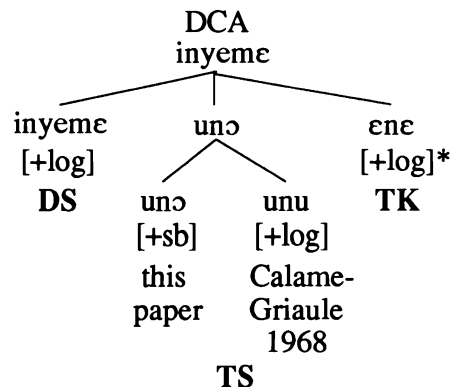
We can summarize the changes in the pronominal systems of Dogon from DCA to the contemporary languages as in (55).

55) Changes in Dogon pronouns from DCA to DS, TS, and TK
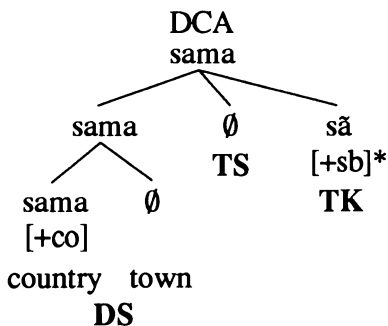
a. Simple reflexive   b. Logophoric

7. Conclusion

The study of Dogon conducted in this paper has had several benefits. First, it is the first detailed study of the pronominal system of any of the Dogon languages, which have received little attention in the literature. We have presented in fairly fine detail the systems of three of the Dogon languages, and compared their properties. It is striking how each system forms a coherent whole, with little overlap in the usage of each form (the notable exception being the simple and periphrastic reflexives in DS). Since languages need not have such non-overlapping systems—English is a prime example (cf. 2-3)—it is an interesting question as to what types of pronouns lend themselves to non-overlapping systems and why. These are questions that we cannot answer here.

It is also fairly unusual to find a pronominal system in flux. While there has been evidence of change in pronominal systems of other languages, the study of TK here is one of the few in which the change has been documented in progress. It is particularly interesting in that TK seems to be losing its logophoric pronoun, another phenomenon that has not been well attested. The complexity of the change provides a challenge for both synchronic and diachronic theories of language.

Finally, this study is unusual in reconstructing the binding properties of the pronominal system of a common ancestor. While the reconstruction of the pronominal system of DCA cannot be proven in an absolute sense, it does seem to provide a plausible explanation for the properties of the three contemporary Dogon languages.

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PUBLICATIONS RECEIVED

Daniel A. Wagner. *Literacy, Culture, and Development: Becoming Literate in Morocco*. Cambridge and New York: Cambridge University Press. 1993. Pp. xiv, 367. $59.95 [hardcover], $24.95 [paper].

This book is the culmination of a multiyear study begun in 1981—six years in the field, three years of analysis—that examines schooling, cognitive development, and the acquisition of literacy in Morocco. The book comprises 13 chapters and 4 appendices. Chapter 1 is a general introduction to the issues addressed. Chapters 2 and 3 present an ethnographic approach to describing the context and culture of literacy in Morocco. Chapter 4 outlines the methodologies and experimental designs used in the project, as well as the samples chosen for study. Chapters 5-7 explore the question of literacy acquisition in Moroccan children from preschool through primary school. Chapters 8-10 examine issues such as first versus second language literacy acquisition, functional literacy, and retention of literacy. Chapter 11 considers the relationship between literacy and poverty in Morocco, while Chapter 12 examines the connection between research and policy, suggesting some directions for policy and planning. Chapter 13 provides a summary of key results presented in the book. The appendices include the interview schedules for parents and students, and details of test construction.

Omar Ka. *Wolof Phonology and Morphology*. Lanham, Maryland: University Press of America. 1994. Pp. 151 . $28.50 [paper].

[From the Preface]: "The object of this study is Wolof, an African language belonging to the Northern West Atlantic branch of the Niger-Congo family. Wolof is spoken primarily in Senegambia, where it has become a lingua franca. The purpose of the study is to provide an analysis of the phonology and morphology of the language using the nonlinear framework. In Wolof, such notions as vowel length, complex segments, permissible syllable, and phonological phrase play a significant role in the description of many aspects of the phonology of the language: syllable structure, gemination and degemination, prenasalization, vowel coalescence, vowel insertion, glide insertion, vowel harmony, and reduplication processes. Nonlinear representations of phonological structure provide a way to account in a satisfactory fashion for these processes.

The book is divided into five chapters. The introductory sets the stage by giving an overall review of the literature on Wolof phonology and morphology, and by sketching the main characteristics of the nonlinear framework that will be used in the book. Chapter one gives an exhaustive account of vowel harmony in Wolof, emphasizing the existence of neutral and opaque vowels, and describing vowel harmony as an external sandhi rule. Chapter two is devoted to syllable structure, in particular the syllabification principles of the language, the levels of assignment, and the treatment of complex segments such as long vowels, geminates, and prenasalized consonants.

Chapter three analyzes syllable-sensitive phonological rules such as gemination, degemination, vowel coalescence, vowel and glide insertions, and their relationship with syllable structure. The final chapter accounts for reduplication in nonlinear terms, positing the existence of a morpheme template and describing the relations between reduplication and other word formation processes such as suffixation and nasal prefixation."

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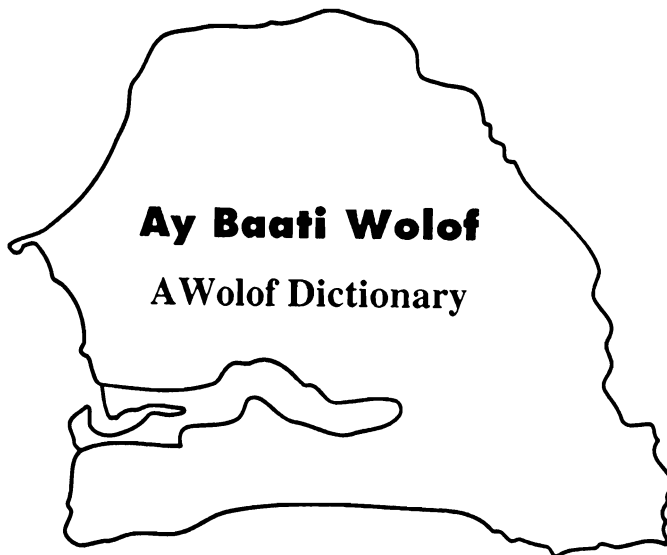
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