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LEXICAL EXTRAPROSODICITY IN CHILUNGU*

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Nouns in Chilungu, a Bantu language spoken in Zambia, exhibit more tonal distinctions synchronically than exist in many modern Bantu languages. There exists a five-way distinction in nouns with CVCV stems and a four-way distinction in nouns with monosyllabic stems. We show that any synchronic analysis which assumes a two-way tonal distinction for each Tone Bearing Unit (e.g., H vs. L, or H vs. ø) cannot predict the attested number of surface tonal patterns. We avoid this dilemma by proposing that the final mora of certain noun roots is extraprosodic. This assumption not only correctly predicts the attested surface patterns, but results in rules which are well-motivated both theoretically and typologically (in Bantu). We argue that lexical conditioning of extraprosodicity is a natural outgrowth of prosodic theory, parallel to the use of lexical stress and lexical accent.

0. INTRODUCTION

In this paper we provide an autosegmental analysis which accounts for the complex array of surface tone classes found in the isolation forms of nouns in Chilungu, a Bantu language spoken in parts of the Northern province of Zambia.[1] Typologically, Chilungu nouns are interesting in that there appear to be more tone classes synchronically than exist in most modern Bantu languages which retain (at least) some of the Proto-Bantu tone patterns (many, of course, having

* We wish to thank our consultant, Alfred Sikazwe, for his time and patience during the elicitation of these forms. Additionally, we benefitted from comments and suggestions from Bruce Hayes, Larry Hyman, Sharon Inkelas, and Robert Botne. Of course, we remain responsible for any errors or omissions.

[1] According to Ohannessian and Kashoki [1978] there were 69,000 speakers of the language in 1969. Chilungu (M.14) is closely related to neighboring Zambian languages Fipa, Mambwe, Inamwanga, and Iwa. The data presented in this paper were elicited from Alfred Sikazwe, a native speaker of Chilungu. To the best of our knowledge, the only other study of the language is found in Kagaya [1987] which is non-generative and mainly descriptive.

even fewer tonal distinctions). For instance, there is a five-way tonal distinction in CV-CVCV nouns in Chilungu (formed by attaching a noun class prefix to a noun stem) whereas the Proto-language had four: the tone of the class prefix remaining constant and the tone pattern of the root being one of HH, HL, LH, or LL. There is a four-way tonal distinction in Chilungu nouns with monosyllabic stems (whereas the Proto-language had two: the tone pattern of the root being either H or L).[2]

(1) a. H-H L: *mú-lómò* 'mouth'
b. H-!H L: *lú-!límì* 'tongue'
c. H-L H: *má-sàká* 'sorghum'
d. H-L L: *mú-sànà* 'waist'
e. L-L L: *chì-zùlè* 'tobacco garden'

(2) a. H-L: *má-vì* 'excreta'
b. F-L: *kû-twì* 'ear'
c. L-L: *mù-nwè* 'finger'
d. H-!H: *chí-!pá* 'eyelid'

It will be shown below that the tonal distinctions, sometimes manifested in part on the noun class prefix (see examples (1d-e), (2a-c)), are completely due to the tonal specification of the root, as the class prefixes in (1) and (2) do not contrast, phonogically, in tone. It should be evident that a simple two-way underlying tonal contrast, e.g., H vs. L or H vs. ø, on Tone Bearing Units (TBU's) within the stem cannot account for all of the tone classes, as that type of system generates only 2^n tone patterns (where n = the number of stem TBU's). The challenge then becomes one of how to account for the forms above without adopting assumptions which vastly overgenerate (e.g., allowing underlying contours, or freely assigning H vs. L vs. ø, both of which will be addressed below in §3).[3]

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[2] It should be noted that the 'extra' tonal class is not due to the merging of Proto Bantu *CVV and *CV syllables, as Chilungu maintains the phonemic vowel length distinction postulated for Proto Bantu.

[3] In the discussion which follows, we discuss and account for the tone patterns of Chilungu nouns as they occur in isolation. While we will not attempt to provide a complete description and analysis of the various nouns in phrasal contexts, we provide here an example of the nouns in (1) in a phrasal context: *mú-lómò ú-sùmà* 'good mouth', *lú-!límì lù-sùmà* 'good tongue', *má-sàká yá-sùmà* 'good sorghum', *mú-sànà ú-sùmà* 'good waist', *chì-zùlé chì-sùmà* 'good tobacco garden'. We note that the tone patterns of nouns (1a-d) remain the same in this phrasal context. The final mora of (1e) is raised to a High. This could be accounted for by a rule which inserts a High tone on the final mora of the first of two toneless words in a phonological phrase. The insertion of a High tone in this location within a phrase (sometimes subject to additional conditions) is attested elsewhere

In order to account for the tonal contrasts illustrated above, we propose that in addition to an underlying H vs. ø contrast on TBU's, the final TBU of a noun may be lexically extraprosodic. Crossing these two parameters provides the 'extra' tonal distinctions not found in Proto-Bantu, as illustrated schematically below for CVCV nouns.

(3) a. CVC<V>

b. CVC<V>
   |
   H

c. CVCV

d. CVCV
   |
   H

e. CVCV
      |
      H

While the positing of lexical extraprosodicity in noun roots runs counter to Inkelas's [1989:154] claim that "only those phonological elements belonging to affixes and clitics can be lexically invisible", we hope to demonstrate below that assuming lexical extraprosodicity of this kind provides a more explanatorily adequate analysis than alternative analyses which make no such assumption. We will return to Inkelas's claim in §4 below.

The structure of the rest of the paper is as follows. First, we will briefly discuss the syllabic and morphological structure of the forms to be analyzed (§1). We will then provide an analysis of all the tone classes found in Chilungu, formalizing all the tonological processes necessary to derive the surface forms (§2). Finally, we discuss the advantages of our analysis over other possible analyses (§3), and present the theoretical implications of our proposal (§4).

1. Preliminaries

The diacritics and autosegmental representations of the tones found in the language are given in (4) below, which presents an inventory of the possible tone/syllable types.

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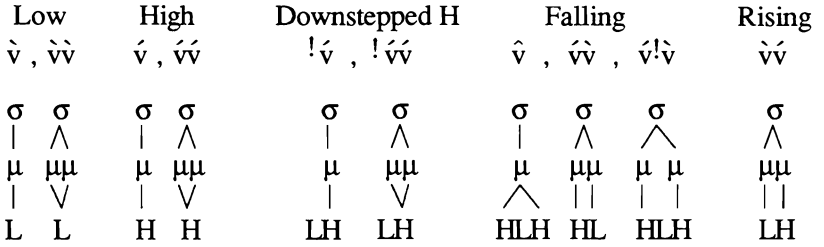
within Bantu, occuring in Kinyambo [Bickmore 1989], Runyankore [Johnson 1976], and Haya [Hyman and Byarushengo 1984].

(4) Tone/syllable types and their representations



Chilungu exhibits downdrift whereby a High tone which follows a Low tone is pronounced on a lower pitch than a previous High. When the Low tone is floating, the downstepping of the following H is indicated formally by a raised ! as shown in (4). We assume that the tone bearing unit (TBU) in Chilungu is the mora. As can be seen, a mora may bear either one or two tones, as there is a contrast in the language between a short and long Falling tone.[4] Furthermore, the fall on a bimoraic syllable can be one from High to Low or from High to downstepped High. A Falling tone on a short syllable always originates phonologically as a High followed by a downstepped High. (Instances of all of these types of Falling tones will be illustrated below.)

The essentials of Chilungu nominal morphology are as follows. All noun roots in the language fall into one of several morphological classes, usually consisting of a singular and plural pair, called a gender. Surface nouns consist minimally of a class prefix plus the root, e.g., *mú-lómò* 'mouth', where *mu* is the (singular) class prefix and *-lomo* is the root. Chilungu is one of those Bantu languages in which nouns may surface with a preprefix (in addition to the class prefix), as in *ú-mú-lómò* 'mouth'. The semantic and/or pragmatic factors which condition the appearance or absence of the preprefix in a particular context will not concern us here.[5] We provide a formal analysis capable of generating both forms.

2. Tonal analysis

First, as is commonly assumed in the analyses of most Bantu languages, we propose that Low tones are completely underspecified underlyingly (cf. Pulleyblank [1986], papers in Clements and Goldsmith [1984]). A late rule in the phonology (to be formalized below) will supply any toneless syllable with a default Low tone. As regards any 'automatic' linking of tones to tone bearing units, we follow

[4] An example of another Bantu language with a phonetic contrast between High and Falling tones on short vowels is Haya, a Tanzanian Bantu language described by Hyman and Byarushengo [1984].

[5] For an insightful treatment on the presence of the Preprefix in Haya, another Bantu language in which the Preprefix is used similarly, see Chagas [1977].

Pulleyblank [1986] in assuming a universal Tonal Association Convention (TAC) by which free tones link in a one-to-one fashion with free TBU's.[6] All other tonal associations are produced by tone rules to be formalized below.

(5) Association Convention (from Pulleyblank [1986:11])

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

We assume that class prefixes are High-toned underlyingly. The only exceptions are the prefixes of classes 1a and 2a—/ø/ (null) and /ya-/, respectively—which bear no tone underlyingly.[7] We assume that preprefixes are all underlyingly toneless. Both of these assumptions will be justified below.

As noted above, noun roots vary lexically on two parameters. First, the root can be either toneless or contain a maximum of one High tone prelinked to a single TBU (unless there is no TBU, in which case the High must be floating). It would also be possible to analyze the High tones which are linked to the root-initial mora as floating Highs which would then be associated to the leftmost TBU by the Association Convention (5). As nothing in our analysis seems to hinge on this point, we assume the prelinked forms for expository convenience. Second, the final TBU of the noun root may be extraprosodic.[8] We will show below that this extraprosodicity is in fact a lexical property of the root, being neither a general property of nouns nor predictable by some phonological or morphological property of the root.

The crossing of these two binary parameters generates four tone classes (where H=High tone and E=final mora extraprosodicity): [-H,+E], [+H,+E], [+H,-E], [-H,-E]. For expository purposes, we assign a roman numeral to these four possible 'Tone Classes' and provide examples of abstract monomoraic, bimoraic, and trimoraic forms in Table 1 below. It should be noted that different

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[6] Even this, however, may not be universal. See Odden [1987] and Hyman and Ngunga [1994].

[7] In Guthrie's [1967-71] noun class system proposed for Bantu languages, Classes 1/2 generally consist of animate (usually human) nouns, marked in Chilungu by the class prefixes /mu-/ (sg.) and /a-/ (pl.). There are certain animate nouns in the language which are marked by the class prefixes /ø/ (sg.) and /ya-/ (pl.). Since these nouns take the regular gender 1/2 verbal agreement markers, we treat them as a special subclass of 1/2 and label them 1a/2a.

[8] We note that the extraprosodicity of a root consisting of a single mora does not violate Hayes's [1995] prohibition on total extraprosodicity, as Hayes's prohibition applies to prosodic words, while any Chilungu root must combine with a (nonextraprosodic) class prefix to become a prosodic word.

tone patterns are possible within polysyllabic roots found in Tone Classes II and III because the underlying High can be located in any one of several positions.[9]

Table 1. Chilungu tone classes

	I. [-H, +E]	II. [+H, +E]	III. [+H, -E]	IV. [-H, -E]
1 μ	<μ>	<μ> H	μ H	μ
2 μ	μ <μ>	μ <μ> H	μ μ H μ μ H	μ μ
3 μ	μ μ <μ>	μ μ <μ> H μ μ <μ> H	μ μ μ H μ μ μ H μ μ μ H	μ μ μ

Finally, we will assume that processes which affect vowel length precede the tonal rules to be discussed in detail below. Briefly, while vowel length in Chilungu can be lexically contrastive (e.g., *kú-ǃsúlà* 'to blacksmith', *kú-ǃsúúlà* 'to ignore'), it can also be derived via compensatory lengthening (in all positions except word-finally). As is the case in many Bantu languages, compensatory lengthening occurs a) after gliding (e.g., /mu-ana/ → *mwáànà* 'child'), b) after vowel deletion (e.g., /ma-ino/ → *míìnò* 'teeth'), and c) before NC clusters (e.g., /mu-ntu/ → *múúntù* 'person'). This latter process suggests that a nasal which follows a vowel and immediately precedes another consonant is moraic by Hayes's [1989] "Weight by Position" principle which assigns a mora to a conso-

[9] It turns out that due to a tonal rule to be motivated below (24), there is a neutralization in the surface tonal pattern of [+H, -E] forms where the High is linked to a pre-final TBU. Therefore, Chilungu has a 6-way distinction in trimoraic roots rather than a 7-way one.

nant which is tautosyllabic with a preceding syllable nucleus. A phonological rule then reassociates the nasal into the onset of the following syllable, and the floating mora gets reassociated to the previous vowel. When a nasal-consonant sequence is word-initial, the nasal is not a Tone Bearing Unit; rather, it forms part of the onset and is, hence, not moraic (e.g., *n-zóvù* 'elephant'). Let us now turn to the analysis of nouns falling within each of the four Tone Classes.

2.1 Extraprosodicity: Tone class I [-H, +E]: The first set of nouns which we address are those which phonetically begin with a High tone and stay High until the final mora, which is Low-toned (see (1a)). Some examples of this tone class are given in (6).[10]

(6) Examples of nouns in Tone Class I [-H, +E]

ú-múú-ntù	'person'	*ú-mú-lómò*	'mouth'	*ú-mú-zííngà*	'beehive'
á-má-vì	'excreta'	*í-ví-lézù*	'beard'	*í-cháálò*	'field'
ú-mú-zì	'village'	*íí-m-bázò*	'ribs'	*ú-lú-nyélélè*	'ant'
		í-chí-lézù	'chin'	*íí-m-bálámínwè*	'ring'
		í-chí-fúlà	'well'	*ú-mw-óóngólólò*	'backbone'

These suface forms can be produced by assuming that all of the class prefixes illustrated above have an underlying High tone. We propose that this High tone will spread by rule to the right as far as it can. By also positing that all of these nouns have an extraprosodic final TBU, we correctly predict that the spreading (when it occurs) will persist up to the penultimate syllable in each case. To accomplish the spreading we posit a rule of Iterative Rightward High Spread, formalized in (7), which has the effect of spreading a linked H tone to a following free mora. We assume the rule applies iteratively, and will thus continue to reapply until no further free mora is found. This type of rule has been used in the analysis of other Bantu languages, e.g., Tonga [Pulleyblank 1986], Shona [Myers 1987], and Xhosa [Downing 1994]).

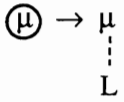
(7) *Iterative Rightward H Spread (RHS)*

A subsequent rule, already alluded to above and formalized in (8) below, assigns a default Low tone to any free mora(e). We assume that this rule of Low

[10] While the forms given in (6) include the preprefix, it should be noted that the tone pattern of the rest of the word remains the same when the preprefix is not present. This is true of all the data which will be presented below.

Default Insertion applies to all TBU's not associated with any tone. Since all TBU's must eventually bear a tone in the phonetic representation, we assume that at some point extraprosodic TBU's must become visible again. This step in the derivation, discussed further below, precedes Low Default Insertion and is labelled 'Visibility' in the derivation.

(8) *Low Default Insertion (LD)*



Two sample derivations are provided in (9) below to illustrate the effects of these two rules.

(9) Derivations of nouns of Tone Class I

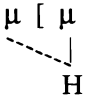
a.	b.	
mu-lom<o>	n-balaminw<e>	Underlying Rep (UR)
H	H	
	n-balaminw<e>	Association Convention (5)
	H	
mu-lom<o>	n-balaminw<e>	Rightward High Spread (7)
H	H	
mu-lomo	n-balaminwe	Visibility & Low Default (8)
H L	H L	
múlómò	mbálámínwè	Phonetic Representation (PR)
'mouth'	'ring'	

Visibility must not occur until after Rightward High Spread applies, insuring the invisibility of the final mora at the time the spreading rule applies. If this were not the case, Rightward High Spread would incorrectly produce a High on the final V in forms such as those in (9), in effect neutralizing the distinction between Tone Class I and Tone Class III (discussed in §2.3 below). The unbounded nature of the Rightward High Spread rule is aptly demonstrated in (9b)

where the High spreads to all visible morae. (A homorganic nasal assimilation rule accounts for the change of the Class 9 prefix /n-/ into a labial.)

As mentioned above, nouns must be generated with and without the preprefix. We will now account for the above forms with the preprefix. We assume a lexical phonological framework which provides Chilungu with two morphological levels (cf. Kiparsky [1982] and Mohanan [1986]). The class prefix is added at the first level, while the preprefix is added at the second level. As the tone of the preprefix is always identical to the (leftmost) tone associated to the class prefix, we propose a Level 2 phonological rule which spreads a linked H leftward across a morpheme boundary to a free mora.[11] This rule is formalized In (10) below.

(10) *Leftward High Spread (LHS)*



In (9) above we provided sample derivations of two nouns at Level 1. In (9') below, we continue the derivation of the nouns illustrated in (9), beginning with the output of the first morphological level.

We suggest that the extraprosodicity of the word-final TBU is lost as the form enters the second level of the lexical phonology. After the addition of the preprefix, Leftward High Spread will insure that any TBU's in the preprefix are associated with the High linked to the class prefix. Finally, Low Default applies and the tonification of the forms is complete. As the tonology of the preprefix is derived in just this way for all forms which exit Level 1 with a High tone on the leftmost TBU, we limit ourselves to the Level 1 morphology for the remainder of the forms to be discussed below.

[11] Reference to the morpheme boundary in the rule anticipates derivations of forms to be presented below. While a linked H must spread leftward to the preprefix in cases like (9'), it must not spread morpheme internally in cases like (15a-b). Additionally, the assumption that the Preprefix is added at a subsequent morphological level, while not crucial for the derivations in (9') will be justified below (see (19)).

(9') Derivation of nouns of Tone Class I: Level 2

a.	b.	
mu-lom<o>	n-balaminw<e>	Output of Level 1
H	H	
mu-lomo	n-balaminwe	Visibility
H	H	
u-mu-lomo	ii-n-balaminwe	Addition of Level 2 preprefix
H	H	
u-mu-lomo	ii-n-balaminwe	Leftward High Spread (10)
H	H	
u-mu-lomo	ii-n-balaminwe	Low Default (8)
H L	H L	
úmúlómò	íímbálámínwè	Phonetic Representation (PR)
'mouth'	'ring'	

2.2 More benefits of extraprosodicity: Tone class II [+H,+E]: We now turn to nouns whose surface tonal pattern differs from those just described only in that the first mora of the root is a downstepped High rather than a High pronounced at the same level as that of the class prefix. Examples of these are give in (11) and (12).

(11) a. *ú-lú-ˡlímì* 'tongue'
b. *á-má-ˡfútà* 'oil'
c. *í-chí-ˡlóótò* 'dream'
d. *ú-mú-ˡkázyáánà* 'girl'

(12) a. *ú-lú-ˡúzì* 'river'
b. *í-lí-ˡínò* 'tooth'
c. *í-lí-ˡínsózì* 'tear'

We suggest that like the nouns in (6), the nouns in (11) exhibit final mora extraprosodicity accounting for the Low tone on that TBU in each case. We propose that these nouns differ from those in (6), however, in that the root has a

High tone linked to the root-initial syllable. To account for the downstep we posit a rule of Low Tone Insertion, which inserts a Low tone between two High tones. This rule makes such forms consistent with the Obligatory Contour Principle and provides a phonological (versus a purely phonetic) account of downstep, as was argued to be the case in other African tone languages in Clements and Ford [1979] and Pulleyblank [1986]. We will present evidence later that the process is truly a phonological one, best handled by an ordered rule.The rule is formalized in (13).

(13) *Low Tone Insertion (LI)*

$$\emptyset \rightarrow L \;/\; H \_\_\_ H$$

The application of this rule is illustrated in the derivations in (14) below.

(14) Derivations of nouns of Tone Class II: root-initial H

a. lu - lim<i>	b. mu - kazyaan<a>	c. li - insoz<i>	
H H	H H	H H	UR
lu - lim<i>	mu - kazyaan<a>	li - insoz<i>	Low Insertion (13)
HL H	H L H	HLH	
	mu - kazyaan<a>	li - insoz<i>	RHS (7)
	H L H	HLH	
lu - limi	mu - kazyaana	li - insozi	Visibility & LD (8)
HL H L	H L H L	HLH L	
lú!límì	*mú!kázyáánà*	*lí!ínsózì*	PR
'tongue'	'girl'	'tear'	

In (14) we see exactly how a phonetic downstep is accounted for in the phonology. Because of the presence of the two H tones, Low Tone Insertion will apply. The Tonal Association Convention, as stated in (5), only provides for the automatic linking of a tone when there is a free TBU. As the L could not link without the crossing of association lines, it remains floating and is interpreted by the phonetic component as a downstep. The derivation in (14c) illustrates what happens when the root is vowel-initial. Low Insertion applies as it does in the C-

initial cases, creating a falling tone across a long vowel, from High to Downstepped High.[12]

We noted earlier that the High tone in a noun root is not always borne by the initial TBU. Consider, e.g., the forms *í-chí-tòlòókósì* 'jail' and *mùsátò* 'python', the second of which falls into gender 1a/2a which has a null class prefix in the singular and /ya-/ in the plural (see fn. 7). If we assume that the underlying High tone is linked to the leftmost TBU bearing a phonetic High, these tone patterns fall out straightforwardly as shown in (15) below.[13]

(15) Tone Class II with non-root-initial H

a.	b.	
chi-tolookos<i>	Ø-musat<o>	UR
H H	H	
chi-tolookos<i>	----------	Low Insertion (13)
H L H		
chi-tolookos<i>	----------	Tonal Assoc. Convention (5)
H L H		
chi-tolookos<i>	----------	RHS (7)
H L H		
chi-tolookosi	Ø-musato	Visibility & LD (8)[14]
H L H L	L HL	
chítòlòókósì	*mùsátò* (pl. yà-mùsátò)	
'jail'	'python'	

Forms in this tone class prevent an analysis in which nouns such as *ú-mú-lómò* 'mouth' (9b) are derived via a bi-directional H spreading rule (operating on the

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[12] In listening to a slowed digital playback of such forms, it is clear that the phonetic Fall in pitch is indeed from High to downstepped High (i.e., a phonetic level between High and Low). This should be compared to cases presented later where the phonology produces Falls from High to Low (22b, 25).

[13] Words such as *í-chí-tòlòókósì* 'jail' provide further support for the claim that the TBU in Chilungu must be the mora. While usually associated with the syllable-initial mora (e.g., *í-cháálò* 'field'), an underlying H must occasionally be prelinked to the syllable-final mora (e.g., *kòóntwà* 'tick').

[14] We assume Low Default applies in such a way as to comply with the OCP.

High of the class prefix). While such a rule would account for the form, it would make an incorrect prediction in the cases above where the root H must not spread to the left. The plural form *yà-mùsátò* 'pythons' is accounted for in a manner parallel to the singular if we simply assume that /ya/ is underlyingly toneless. (It seems to be the only class prefix which is toneless.)

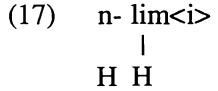
In (15a) we see that Low Insertion (and subsequent TAC) must crucially precede High Spread in order to bleed it. Were Rightward High Spread to apply before Low Insertion, the result would be the ungrammatical **chítóló!ókósì*.

The derivation in (15a) also aptly illustrates the phonological nature of downstep in Chilungu. Up to this point the only manifestation of the Low tone inserted by the rule in (13) was the phonetic downstepping of the second of two morae each linked to a High tone. Were this the only evidence for Low Insertion, one might assume that the downstepping took place in the phonetic component (whose input would be a representation in which the OCP did not apply to derived forms (cf. Odden [1986]). However, examples such as (15a) provide additional evidence that a real Low tone is inserted between two High tones in the phonology, as the Low, in conformity with the Association Convention (5), is phonetically realized on the leftmost free tone bearing unit, and blocks the High to its left from spreading rightward.

A final set of nouns which we will consider here is provided in (16).

(16) a. *íí-m-bîlà* 'announcement'
b. *íí-n-dôbò* 'fish-hook'
c. *íí-n-dîmì* 'tongues'
d. *í-kû-twì* 'ear'

Nouns in (16a-b) are formed with the gender 9/10 prefix /N/, a nasal unspecified for place of articulation. Example (16c) also has the class 10 prefix /N/, but its singular form is in class 11 (see 14a). The Falling tone of the root-initial syllable can be derived in a parallel manner to the one in (14c). As mentioned earlier, word-initial nasals are not moraic and therefore are not TBU's. Therefore, the underlying representation (UR) of (16c) is that in (17).

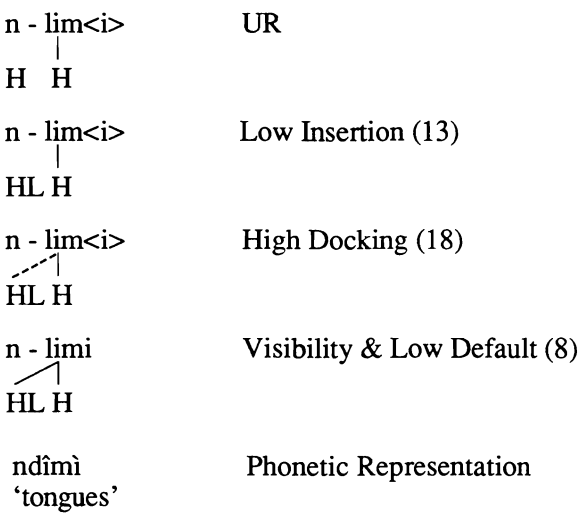
(17)


It appears that a floating High must link to some TBU, such that a Falling tone (from High to downstepped High) is derived in the same way it was in (14c). This rule, called High Docking, is formalized in (18).

(18) High Docking

We will see below that the High Docking rule can be as general as that stated in (18) because there always turns out to be only one TBU to which a floating H could dock without violating the prohibition on line crossing. The application of (18) in the derivation of (16c) is given in (19).

(19)



Comparing (19) and (14a), we see that the tonal allomorphy of High-toned gender 11/10 nouns (in this case /limi/ 'tongue') is accounted for straightforwardly. We note that High Docking applies to the prefixal floating High, associating it to the only available TBU. In the case of the preprefixed form: *íí-n-dîmì*, we note that adding the preprefix *i-* at the same morphological level as the root and class prefix would incorrectly predict that the High of the class 10 prefix /n-/ would link to the prefix instead of the root-initial mora which is necessary to create the Falling tone.[15] As mentioned earlier, nasals are not moraic when word-initial. It is at Level 2 when the preprefix is added that the nasal becomes a

[15] Since the Falling tone in the words in (16) is on a short syllable, it turns out to be quite difficult to tell whether it is phonetically from High to downstepped High, as the output of the phonology suggests, or from High to Low. If the latter turns out to be the case, an additional rule (perhaps in the phonetics) would be needed to make the adjustment.

coda consonant and would be assigned a mora by the Weight-by-Position principle.[16]

Finally, let us consider the example in (16d), in which a noun contains a monosyllabic root: *í-kû-twì* 'ear'. Assuming both final extraprosodicity and a lexical H, we posit the following underlying form and derivation.

(20)

ku - tw<i> | H H	Underlying Representation
ku - tw<i> | HL H	Low Insertion (13)
ku - tw<i> |`·····` HL H	High Docking (8)
ku - twi |`\` : HL HL	Visibility & Low Default (8)
kûtwì 'ear'	Phonetic Representation

In the derivation above we note that High Docking is again operative, this time associating a Root High to the only available TBU.

2.3 Tone class III. We now turn to the analysis of nouns which do not exhibit lexical extraprosodicity. We begin by considering nouns which have a High tone on their final mora.

(21) a. *á-má-sàká* 'sorghum'
í-chí-nùùngí 'porcupine'
ú-lú-tàándá 'star'
íí-n-táándá 'stars'
í-lí-ìndí 'grove'
ú-lw-áálá 'flat rock'

b. *í-chí-ǃpá* 'eyelid'
ú-mú-ǃsé 'basket'

---

[16] As an alternative to positing two morphological levels, it might be possible to analyze the preprefix as extraprosodic, ordering Leftward Spread (10) after Visibility but before Low Default (8). Though we will not pursue this analysis in detail here, it seems to make the same predictions as the one adopted.

If we assume that these nouns have an underlying High tone on their final mora, their derivations follow straightforwardly from the rules proposed so far, as illustrated by the derivations in (22) below.

(22) Derivations of nouns of Tone Class III (non-root-initial H)

a. lu-taanda	b. n-taanda	c. chi-pa	
H H	H H	H H	UR
-------	n-taanda H H	-------	Assoc. Conv. (5)
lu-taanda H L H	n-taanda HL H	chi-pa HLH	Low Insertion (13) & Assoc. Conv. (5)
lu-taanda H L H	-------	-------	Low Default (8)
lútàándá 'star'	*ntáándá* 'stars'	*chíǃpá* 'eyelid'	Phonetic Rep.

The nouns in (22a,b) are the singular and plural forms of the root *-taanda* 'star'. Since the plural class 10 prefix /n-/ is not moraic, the H of that prefix links to the initial mora of the root. This accounts for the Fall in the root-initial syllable of the plural, correctly accounting for the tonal allomorphy of this stem. For expository purposes we will refer to these roots which bear a High on their root-final TBU as Tone Class IIIa. Next, let us consider the nouns in (23).

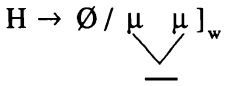
(23) a. *ú-mú-sànà* 'waist'
á-ká-lùùmbà 'lightning'
í-chí-pùtùlwà 'piece'
ú-lú-pèèmbè 'horn'
á-má-lìíndì 'graves'

b. *íí-m-péèmbè* 'horns'
íí-n-síîngò 'neck'
í-lí-índì 'grave'

In these forms, an underlying High on the class prefix does not spread to the right. For this reason, we posit an underlying High tone, associated with the initial TBU of the root, which prevents the prefixal High from spreading. These

nouns constitute what we refer to as Tone Class IIIb. We propose a rule of Final High Deletion which subsequently removes the root High.[17] To insure that such a rule does not delete the word-final High tones in the forms in (21), we stipulate that the High to be deleted must be multiply linked. This H-deletion rule is formalized in (24).

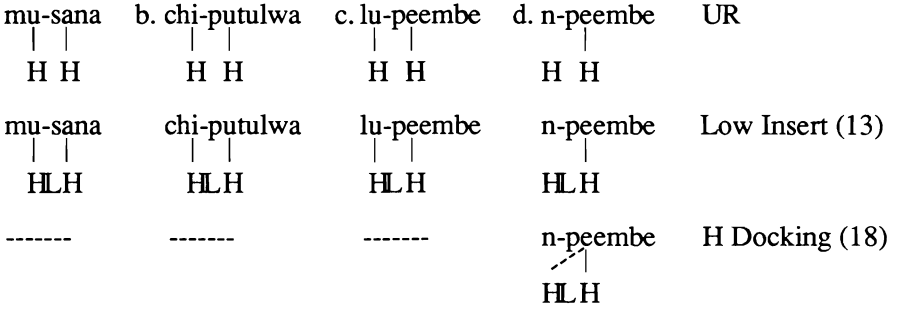
(24) *Final H Deletion (FHD)*



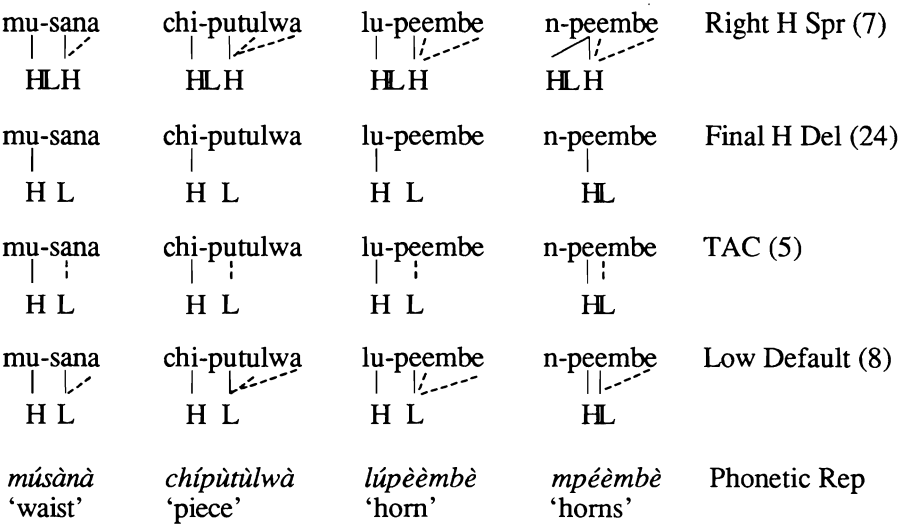
The application of this rule to several nouns is illustrated in (25) below.

In (25a-c) the root surfaces as all Low because the lexical High associated with the root becomes multiply linked and then subsequently deletes in virtue of the Fial H Deletion rule. The forms in (25c,d) are the singular and plural forms of the same root *-peembe* 'horn'. Since the class prefix is not moraic in the plural form, Association Convention (5) forces the H to link to the only available mora, the root-initial syllable. After Final H Deletion, the second mora of the initial syllable will be linked to an L, producing a long Fall.

(25) Derivations of sample nouns from Tone Class IIIb (root-initial H)



[17] Alternatively, the rule could simply change the High into a Low. The rule as given is quite similar to one proposed for Sukuma by Roberts [1992]. The differences are that in her rule: a) the domain of application is the phrase instead of the word, b) the H becomes (extra) L instead of deleting, and c) the H may be linked to *one* or more morae (see §2.4 for more discussion on this point.) Interestingly, the speaker on which Kagaya [1987] based his Chilungu study (who is younger than our consultant) appears to delete (or lower) H in the more general environment of linkage to one or more morae. (We infer this as Kagaya does not provide an autosegmental account of Chilungu tone.)



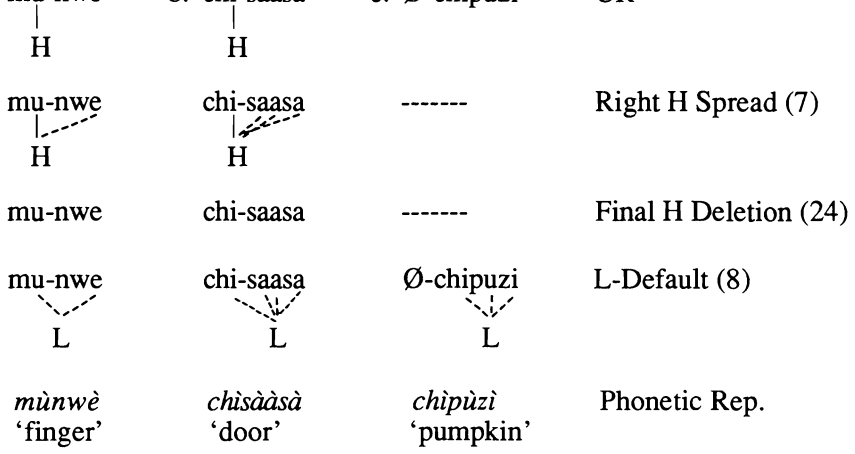
2.4 Analysis of tone class IV [-H, -E]: The final type of noun we will consider is that which is phonetically all Low-toned, as in (26). The nouns in (26b) are from class 1a, which has a null class prefix. (They form their plural with *yà-*.)

(26) Nouns of Tone Class IV

a.	*ìì-n-dà*	'stomach'	b.	*chìsàkà*	'maize'
	ù-mù-nwè	'finger'		*chìpùzì*	'pumpkin'
	ì-chì-zùlè	'tobacco garden'		*mùùmbùlwè*	'monitor lizard'
	ù-mù-yèèmbà	'green bean'		*chùùlà*	'frog'
	ì-chì-sààsà	'door'		*mùtùùmpè*	'peas'

In forms such as those in (26a), the underlying High tone of the class prefix has disappeared. This occurs straightforwardly, and without any additional rules, in virtue of Final High Deletion, if we assume that the roots in (26) are toneless, as illustrated in the sample derivations in (27).

(27) Derivations of nouns of Tone Class IV



Derivations such as those given in (27) can be contrasted with those given in (9a-b) previously in which the final mora was extraprosodic. We insure that the rule of Final H Deletion does not apply to the Tone Class I and Tone Class II forms by ordering it after Visibility. We also note that the rule of Final High Deletion is not one which is idiosyncratic and restricted to a single tonal class, but instead is applicable in two separate tonal classes (i.e., IIIb and IV).

One point of theoretical interest here is the Linking Constraint proposed in Hayes [1986:331] which states that "Association lines in structural descriptions are interpreted as exhaustive." Final High Deletion (24) appears to be a counter-example to the Linking Constraint in that it applies both when there are exactly two association lines present (27a) and when there are more than two association lines present (27b). We note here that Hayes [1986] based this constraint mainly upon examples involving single and multiple linkages between the timing tier (either in its CV, X, or moraic instantiation) and the segmental tier. No examples involving the tonal tier were presented.

Goldsmith [1990] makes a proposal similar to Hayes's, dubbed the "Conjunctivity Condition", which states (and we paraphrase here) that the association lines in a rule must be interpreted as exhaustive if the rule modifies or deletes a segment (as opposed to a rule which adds or modifies association lines—these latter rules not being subject to the Conjunctivity Condition). Goldsmith presents an analysis of Kihunde which involves a rule which affects a singly linked tone, but not a doubly-linked one.

While Final High Lowering violates the Linking Constraint and Conjunctivity Condition, it turns out that there are other precedents in the literature for interpreting tonal associations in rules not as exclusive associations, but as the

minimal associations. Roberts [1992] presents a convincing analysis of Sukuma which includes a rule (quite similar to ours) which lowers an utterance-final High tone (see fn. 18). Crucially, that High tone may be singly or multiply linked. Pulleyblank [1986] motivates a rule in Tonga which delinks the rightmost association line from a High tone, but only if that High tone is multiply linked. In light of these rules and ours, we suggest that the Linking Constraint and Conjunctivity Condition cannot be held to be universal constraints on tonal associations.

In summing up this section, Table 2 below provides both underlying and phonetic representations of nouns from each tone class whose stem contains one, two, or three morae.

Table 2. Sample nouns from each tone class

	I. [-H, +E]	II. [+H, +E]	III. [+H, -E]	IV. [-H, -E]
1 μ	ma-v<i> H [mávì]	ku-tw<i> H H [kûtwì]	chi-pa H [chí!pá]	mu-nwe H [mùnwè]
2 μ	mu-lom<o> H [múlómò]	lu- lim<i> H [lú!límì]	ma-saka H H [másàká] mu-sana H H [músànà]	chi-zule H [chìzùlè]
3 μ	lu-nyelel<e> H [lúnyélélè]	chi-loot<o> H H [chí!lóótò] musat<o> H [mùsátò]	lu-taanda H H [lútàándá] chi-putulwe H H [chípùtùlwè]	chi-saasa H [chìsààsà]

2.5 Evidence from verbs: This section concludes with a brief discussion of verbal infinitives (which are class 15 nouns), deverbal nominals, imperatives, and finite verbs. Verbal infinitives have the morphological structure: (Preprefix) +

Class prefix /ku-/ + Verb root + Final vowel /-a/. How then is extraprosodicity manifested? It cannot be a property of verbal roots, as the final mora in a root is never word-peripheral. What of the Final Vowel then? First, we recall that while some nouns have final extraprosodicity and some do not, for any given root, this extraprosodicity is found consistently in both the singular and plural (compare examples in (14a),(19); (22a,b); (25c,d)). Thus, while we permit a given morpheme to exhibit extraprosodicity, this property is never variable with respect to a single morpheme. Therefore, since the Final Vowel /-a/ is a separate morpheme from the root, it should consistently be either extraprosodic or not. This principle reduces the potential number of tone classes from four to two. It turns out that all verbal infinitives fall into Tone Classes I and II, and never into III or IV, a fact we can straightforwardly account for by assuming that the FV is always extraprosodic.

(28) a. Tone Class I

ú-kú-sh-à	'to leave'
ú-kú-vúl-à	'to be enough'
ú-kú-víímb-à	'to thatch'
ú-kw-íímb-à	'to dig'
ú-kú-fúlúmy-à	'to boil over'

b. Tone Class II

ú-kú-ˡsh-á	'to grind'
ú-kú-ˡvúl-à	'to inquire'
ú-kú-ˡvíímb-à	'to swell'
ú-kw-íìmb-à	'to sing'
ú-kú-ˡfísám-à	'to hide'

c. Tone Class III

*ú-kú-CvCv

*ú-kú-Cvˡ Cv

d. Tone Class IV

*ù-kù-CvCv

When toneless object markers are added to these verbal infinitives we observe tonal allomorphy in the object as seen in the examples below.

(29) a. *ú-kú-zíík-à* 'to bury'
ú-kú-mú-zíík-à 'to bury him'

b. *ú-kú-ˡtéék-à* 'to put down'
ú-kú-mù-téék-à 'to put him down'

This tonal allomorphy is accounted for straightforwardly by our analysis, illustrated in (30) below.

(30)

a.	b.	
ku-mu-ziik<a>	ku-mu-teek<a>	U.R.
H	H H	
-------	ku-mu-teek<a>	Low Insertion (13)
	H L H	
-------	ku-mu-teek<a>	Tonal Assoc. Convention (5)
	H L H	
ku-mu-ziik<a>	ku-mu-teek<a>	Right H Spread (7)
H	H L H	
ku-mu-ziika	ku-mu-teeka	Visibility & Low Def. (8)
H L	H L H L	
úkúmúzííkà	*úkúmùtéékà*	
'to bury him'	'to put him down'	

Next let us consider deverbal nominals and their corresponding verbal infinitives. In Chilungu deverbal nominals are formed by adding a noun class marker and nominalizing suffix onto a verb root. This is demonstrated in (31).

(31)

a.	*ú-kú-sáákúl-à*	'to comb'
	í-chí-sáákúl-ò	'comb' (Class 7/8)
b.	*ú-kú-ǃlúúng-à*	'to hunt'
	ú-mú-ǃlúúng-ì	'hunter' (Class 1/2)

It should be evident that if we assume that the root for 'comb' is toneless and the root for 'hunt' is High toned, the surface patterns follow straightforwardly from our rules above (see derivations of Tone Class I and Tone Class II nouns, respectively, above.) It turns out that it is also possible to create deverbal nouns with the prefix /ka-/ and suffix /-a/, as in (32). This prefix can be added to virtually any verbal root and differs from the class 12 prefix /ka-/ in that the former is toneless while the latter is High toned. (Additionally the class 12 prefix usually has a diminutive reading associated with it, whereas the nominalizing /ka-/ does not.)

(32) a. *ú-kú-tót-à* 'to stab'
kà-tòt-à 'one who stabs'

ú-kú-kóm-à 'to kill'
kà-kòm-à 'one who kills'

b. *ú-kú-!lóósh-à* 'to mourn'
kà-lóósh-à 'one who mourns'

ú-kú-!témw-à 'to love'
kà-témw-à 'one who loves'

The verbal infinitives in (32a) clearly belong to Tone Class I, which we have analyzed as toneless. Whereas these roots generally surface with a High-toned stem-initial syllable, as a result of the Rightward High Spread of a preceding High-toned prefix (see (28a)), we see in (32a) that when a toneless prefix is added, the underlying toneless nature of the root is evident phonetically. In (32b), containing verbal infinitives of Class II, we see that when a toneless prefix precedes, the root-initial mora surfaces as a High (instead of a High that is downstepped due to a preceding High, as in (28b)).

Further evidence that the Class I pattern is best analyzed as having a toneless stem-initial mora and not a High-toned one can be seen in verbal imperatives where again, in the absence of a High-toned prefix, the underlying nature of the root tone is revealed. In (33), imperatives for both Tone Class I and Tone Class II verbs are given.

(33) a. *kú-tót-à* 'to stab'
tòt-à 'stab!'

kú-kóm-à 'to kill'
kòm-à 'kill!'

b. *kú-!lóósh-à* 'to mourn'
lóósh-à 'mourn!'

kú-!témw-à 'to love'
témw-à 'love!'

The surface tonal patterns of both deverbal nominals and imperatives fall out straightforwardly from our analysis and argue against any analysis in which the initial mora of Tone Class I roots is underlyingly High.

While the focus of this paper is the range of tonal patterns in Chilungu nouns, we note that the rules developed here are also relevant for finite verbal morpho-

logy. This can be seen in the finite Remote Future Progressive forms in (34) of *kú-fúl-à* 'wash' and *kú-ǃsúl-a* 'hit'.[18]

(34) *tú- là-á-fúl-án-à* — *tú-là-á-ǃsúl-án-à*
we-F-P-wash-R-FV — we-F-P-hit-R-FV
'we will be washing each other' — 'we will be hitting each other'

If we assume that the subject marker /tu-/ and progressive prefix /-a-/ are High-toned and that the remaining verbal affixes are toneless, the phonetic forms are derived straightforwardly by our rules, as illustrated by the following derivations (35).

(35)

a.	b.	
tu-la-a-ful-an<a>	tu-la-a-sul-an<a>	UR
H H	H H H	
tu-la-a-ful-an<a>	tu-la-a-sul-an<a>	Low Insertion (13)
H L H	H L H L H	
tu-la-a-ful-an<a>	tu-la-a-sul-an<a>	Tonal Assoc. Con. (5)
H L H	H L H L H	
tu-la-a-ful-an<a>	tu-la-a-sul-an<a>	Right H Spread (7)
H L H	H L H L H	
tu-la-a-ful-an-a	tu-la-a-sul-an-a	Visibility & Low Def. (8)
H L H L	H L H L H L	
túlàáfúlánà	*túlàáǃsúlánà*	
'we will be washing each other'	'we will be hitting each other'	

We note in the derivation above that Low Insertion must be iterative as it applies twice in (35b). Additionally we see that the rule of Rightward High Spread is not confined to nominal roots and prefixes as it applies to the verbal tense/aspect prefix /a-/ in (35a).

[18] F=future, P=progres-sive, R=reciprocal, FV=Final Vowel.

3. Alternative analyses

We would now like to contrast briefly our approach with one which would not involve extraprosodicity. First, we have shown above that CVCV roots can have five possible stem tone patterns.[19]

(36) Tone patterns with bimoraic roots

a. (Class I) *ú-mú-lómò* 'mouth' (9a)

b. (Class II) *ú-lú-ǃlímì* 'tongue' (14a)

c. (Class IIIa) *á-má-sàká* 'sorghum' (21a)

d. (Class IIIb) *ú-mú-sànà* 'waist' (25a)

e. (Class IV) *ì-chì-zùlè* 'tobacco garden' (26a)

Monosyllabic noun roots have four, not two, possible tonal patterns.

(37) Tone patterns with monomoraic roots

a. (Class I) *á-má-vì* 'excreta' (6)

b. (Class II) *í-kû-twì* 'ear' (20)

c. (Class III) *í-chí-ǃpá* 'eyelid' (22c)

c. (Class IV) *ù-mù-nwè* 'finger' (27a).

It is therefore not possible to entertain analyses used commonly in the literature which assume that each mora is underlyingly either H or not, or even one

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19 While the claims made in this paper are based solely on the synchronic data, we provide a brief summary here of the relationship between the Chilungu Tone Types for CVCV roots and Proto-Bantu forms reconstructed by Guthrie [1967-71]. (With regard to Proto-Bantu nominal prefixes, preprefixes have been reconstructed as High-toned, while class prefixes have been reconstructed as Low-toned.) While most Proto-Bantu *LL roots wind up in Tone Class I /ø<>/ (e.g., *-dòmò 'mouth' → *ú-mú-lómò*), a portion wind up in Tone Class IV /øø/ (e.g., *-pùḍ̀ → *chì-pùzì*.). Most Proto- Bantu *HL roots wind up in Tone Class II /H<>/ (e.g., *-dímì 'tongue' → *ú-lú-ǃlímì*), although a few wind up in Tone Class IIIb /Hø/ (e.g., *-cúngù 'poison' → *ú-sùùngù* 'pain from poison'). Nearly all Proto-Bantu *LH roots wind up in Tone Class IIIa /øH/ (e.g., *-càká 'kaffircorn' → *á-má-sàká* 'sorghum'). It turns out that Proto-Bantu *HH forms are somewhat evenly split between Tone Class II /H<>/ (e.g., *-kúnyú 'fig tree' → *ú-mú-ǃkúnyù*) and Tone Class IIIb /Hø/ (e.g. *-démá 'lame person' → *í-chí-lèmà*). In sum, Proto *H generally winds up being analyzed as High. The only exception in this regard is the second TBU in the *HH forms, though it should be noted that the synchronic /Hø/ forms become HH after Rightward High Spread. The most intriguing historical issue, though one clearly outside the scope of this paper, is how certain root-final Proto *L's became analyzed as underspecified while others became analyzed as extra-prosodic.

which assumes that each mora is underlyingly either H or L, as this type of analysis will only generate 2^n tonal classes (where n=number of morae in root), predicting a four-way distinction in (36) and only a two-way distinction in (37). Such an approach is clearly inadequate to the task of generating all the Chilungu patterns.

With regard to trimoraic roots, it turns out that there are six distinct tone patterns. The undergeneration of tonal patterns for such roots is not a problem in a system without extraprosodicity where each TBU has two tonal possibilities, since such a system generates eight tone classes. As can be seen in Table I (page 6), our analysis predicts that there should be seven possible underlying forms. It turns out that there are six distinct attested tone patterns in nouns with trimoraic roots. This result is straightforwardly predicted by our analysis since the distinction between two of the forms of Tone Class III, where the H is non-final, is neutralized by Final High Deletion, which deletes the root H in both cases. The six attested patterns are given in (38).

(38) Tone patterns with trimoraic roots

a.	(Class I)	*ú-lú-nyélélè*	'ant'(see (9b))
b.	(Class II)	*í-lí-ǃínsózì*	'tear' (14c)
c.	(Class II)	*mùsátò*	'python' (15b)
d.	(Class IIIa)	*ú-lú-tàándá*	'star' (22a)
e.	(Class IIIb)	*í-chí-pùtùlwà*	'piece' (25b)
f.	(Class IV)	*ì-chì-sààsà*	'door' (26)
		chìpùzì	'pumpkin' (26)

It should be noted that there is one respect in which our analysis is more restrictive than an analysis without extraprosodicity, in that an underlying High in all our underlying representations is associated to only one TBU. If we assume some morpheme structure constraint which permits a maximum of one TBU to be linked to an underlyingly High tone, then any purely binary distinction on TBU's (without extraprosodicity) would predict only 4 tonal patterns for trimoraic roots (one toneless, and three involving a High linked to a single TBU), failing to account for two of these six patterns.

One way to account for all the distinctions in (36)-(38) without extraprosodicity would be to allow contour tones underlyingly. We submit there are (at least) two major problems with this approach. First, allowing underlying High, Low, and Falling tones (or alternatively High, Low, and Rising) on any mora generates 3^n tonal classes. This approach would undergenerate in the case of monosyllabic forms, as it would only generate a three-way distinction. The

approach would overgenerate in the case of bimoraic nouns as it generates nine tonal classes, while only five are attested (36). In the case of trimoraic forms, 27 distinct forms would be predicted, while only six are attested. Secondly, even if the over-/undergeneration problem is ignored or partially remedied (e.g., by limiting underlying contours to a single prosodic position such as the penultimate syllable), in looking at the actual surface forms in (36)-(38) it does not seem obvious at all which forms should be analyzed as containing a Falling (or Rising) tone underlyingly. We conclude that while this approach would not involve lexical extraprosodicity, it overgenerates and seems an ad hoc solution to the problem.

A second alternative account of the Chilungu data not involving extraprosodicity would posit a three-way underlying distinction—High, Low, or nothing—for any mora (as was assumed, for example, in Pulleyblank's [1986] analysis of Tiv and Margi). Such an analysis would propose an underlying High where we posit High, an underlying Low where we posit extraprosodicity (effectively shielding the word-final syllable from the effects of Rightward High Spread), and underspecification everywhere else. This alternative analysis, like the previous one, suffers from over-/undergeneration in the exact way just described, as 3^n tonal classes are once again predicted to occur, but demonstrably do not. Crucially, what would be needed in this approach would be some Morpheme Structure Constraint, relegating underlying Low's to word-final morae. We submit, however, that this is clearly arbitrary and simply descriptive rather than predictive, as there is nothing inherent in Low tones which should limit their distribution in this way. In contrast, the special status of word-final morae is directly accounted for under an analysis assuming extraprosodicity which by definition may only be domain-peripheral (with the unmarked edge being the right).

Finally, let us consider a third alternative analysis in which extraprosodicity is not lexical, but rather, completely general. In an effort to overcome the overgeneration problem, let us assume that there is maximum of one linked underlying tone per morpheme, whether that be a Low or High tone. Plausible underlying representations for the five tone classes of CVCV roots would be as given in (39). (Surface forms are given in parentheses.)

(39) a. Tone Class I CVCV (cv́-cv́cv̀)

b. Tone Class II CVCV (cv́-!cv́cv̀)
|
H

c. Tone Class IIIa CVCV (cv́-cv̀cv́)
|
H

d. Tone Class IIIb CVCV (cv́-cv̀cv̀)
|
L

e. Tone Class IV CVCV (cv̀-cv̀cv̀)
|
L

Given these UR's, one could assume a general rule of extraprosodicity which applied to toneless word-final morae. Given the Rightward High Spread rule above, this would correctly predict that the final syllable in Tone Classes I and II surfaces as Low. The general extraprosodicity rule would not affect Tone Classes IIIa and IV as the final mora is linked to a tone. Final extraprosodicity would in fact apply to Tone Class IIIb, but its effect would be vacuous as the stem-initial Low serves to block the rightward spreading of any High to its left. It is the Tone Class IV forms, however, that seem problematic for this analysis. If, for example, we assume a word-final Low as shown in (39e), then we could posit a rule which spreads a word-final Low tone to the left. The rule would not only have to be iterative, but it would also have to be formulated such that the Low spreads onto a mora already linked to a High tone (e.g., the High of the subject marker in this case), after which the High tone would delete or delink. Alternatively, one could posit a rule which would delete or delink a High if followed by a word-final Low tone. Both of these approaches seem completely ad-hoc as they are not general processes which affect a Low tone. The deletion/delinking of the High must only be triggered by a word-final Low, and not any other Low such as the inserted one in (39c). This is especially odd as it turns out that the trigger Low must be the one *furthest away* from the target High.

Another drawback of the above analysis is evident when we consider the monomoraic roots, since a High vs. Low vs. ø distinction gives us three possible UR's instead of four. In the case of trimoraic roots, having a Low linked to the middle mora would predict a surface form where the class prefix is High and the root is High-Low-Low. Such patterns seem unattested. From a typological

perspective, while positing underlying Lows in a Narrow Bantu language is not unheard of (cf. Cassimjee [1983]), it is certainly extremely rare as most of these languages are analyzed in terms of an underlying H vs. ø distinction (where the TBU varies from the mora, syllable, or morpheme).

We therefore conclude that the problems entailed in the alternative analyses which we have considered outweigh any "gain" of excluding the kind of lexical extraprosodicity proposed here (and elsewhere as discussed above). Our account, assuming extraprosodicity yields the desired generation of tonal classes, and requires tonal rules which we have noted are attested elsewhere in the literature.

4. Lexical extraprosodicity within generative theory

The central and most innovative aspect of our analysis is the assumption that extraprosodicity can be lexically conditioned. The sub-theory of extraprosodicity as it was initially formulated allowed for peripheral constituents (e.g., a segment, mora or syllable) to be invisible for the purposes of stress placement (cf. Liberman and Prince [1977], Nanni [1977], and Hayes [1981]). First we wish to note that it is *not* the case that stress systems which exhibit extrametricality must exhaustively mark the final constituent of every word in the language as extrametrical. In English, final extrametricality is invoked for nouns, but not for verbs (accounting in part for pairs such as *rébel* (n.) vs. *rebél* (v.); *pérvert* (n.) vs. *pervért* (v.), etc.). Hayes [1995] lists other languages in which extrametricality is used in certain lexical classes, but not others, or to distinguish regular vs. exceptional forms. These include Spanish [Harris 1983], Polish [Franks 1985], Yawelmani [Archangeli 1984], Piraha [Everett 1988], Djingili [Chadwick 1975], and Chamorro [Chung 1983]. We would suggest that, as with many other phonological phenomena, what is systematic in one language may be found to be less systematic and more lexical in another. Stress is a case in point. While its placement is generally predictable, it nevertheless can be lexical (as, for example, in Russian). The same has been shown to be true of the placement of "accent". While its placement is generally predictable, certain accents must be lexically determined in Chaga [McHugh 1990], KiYaka [Kidima 1991], and Llogori [Goldsmith 1991]. We therefore suggest that our proposal that extraprosodicity can be lexically as well as phonologically determined is not an unnatural outgrowth of generative theory.

There is, of course, good precedent for positing extraprosodic elements in tone systems. Derived extratonality has been postulated in a variety of analyses. Pulleyblank [1986] suggests that the first vowel of toneless verb roots is extratonal in Tonga, while Goldsmith [1990] states that word-initial vowels are extratonal in Kirundi. Myers [1987] suggests that word-final syllables are extratonal in Shona, Odden [1988] that word-final TBU's in Safwa and Kinga are extraprosodic. And Kenstowicz [1994] asserts that pre-pausal vowels are extratonal in Makua.

With regard to lexical extratonality, Pulleyblank [1986] states that toneless subject prefixes in Tonga are all extratonal. In Margi, Pulleyblank's analysis assumes that the 2nd and 3rd person suffixed pronouns are extraprosodic, as well as the 2nd sg. and all plural subject enclitics. Poser [1984] assumes that certain suffixes in Japanese are lexically extratonal.

Perhaps the most explicit theory to date on the formalization of extraprosodicity within Generative Grammar is that given by Inkelas [1989]. In that work, Inkelas makes the strong claim that "only those phonological elements belonging to affixes and clitics can be lexically invisible." All the analyses involving extratonality mentioned above are consistent with her claims since the only unpredictable (and therefore lexical) marking of extraprosodicity are of nonlexical forms.[20]

Blevins' [1993] analysis of Lithuanian, however, seems to directly challenge Inkelas's claims. In Blevins' analysis, the four accent types described in the traditional literature on Lithuanian are accounted for by positing distinct underlying tonal representations for each tonal class. For our purposes here, we simply note that the formal difference between the traditional "acute" (long Falling) and the "circumflex" (long Rising) accents in word-initial position results from the absence or presence, respectively, of lexical extraprosodicity of the word-initial mora. The present analysis of Chilungu is quite parallel to Blevins' analysis of Lithuanian in that lexical extraprosodicity is not consigned to a handful of exceptional forms, but is used to distinguish an entire tonal class (specifically, one in Lithuanian, and two in Chilungu).[21] We conclude in this regard that Inkelas' claim that only affixes and clitics can be extraprosodic is too strong and must be loosened in the face of evidence provided by languages such as Lithuanian and Chilungu. As far as we can tell this does not invalidate or necessitate revisions in other aspects of Inkelas's [1989] theory of extraprosodicity.

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[20] Interestingly, our proposal that the verbal Final Vowel is lexically extraprosodic is consistent with Inkelas's claims. Yet the rules necessitated by that assumption (e.g., (unbounded) Rightward High Spread) are applicable in the tonology of nouns only if certain final syllables can be made extraprosodic.

[21] One other instance where lexical extraprosodicity has been suggested in the analysis of a tone language can be found in Odden's [1988] analysis of Kimatuumbi where he parenthetically suggests that a certain subset of nouns have an extraprosodic final syllable. As the idea is not pursued there in any detail, however, we cannot elaborate upon it further here.

With regard to the claim that none of the Chilungu tonal classes can be treated as "exceptional", we found in our database that the percentage of nouns in the various tonal classes are as follows: 36% in Class I, 29% in Class II, 26% in Class III (15% in IIIa, 11% in IIIb), and 9% in Class IV. Therefore, while it is certainly true that more nouns exhibit final extraprosodicity than those which do not, if, e.g. the lack of final extraprosodicity (on toneless syllables) was 'exceptional' then a full 20% of the lexicon (Class IIIb & IV) would have to be marked as exceptional. Given these numbers, it seems more reasonable to us to treat these as tonal classes in their own right rather than 'exceptions'. In Appendix A, 171 representative nouns are given by tonal class.

5. Summary

We have argued above that the complex array of surface tonal patterns in Chilungu can be accounted for in a restrictive autosegmental model where 1) roots have a maximum of one High tone, 2) Low tones are completely underspecified underlyingly and 3) certain roots exhibit lexically marked final extraprosodicity. We have shown that the rules necessary to derive the surface forms are relatively few in number and are attested elsewhere in Bantu.

Several historical and theoretical points of interest have been raised. Diachronically, Chilungu is interesting because there are more phonemic tonal contrasts than were present in Proto-Bantu. While Proto-Bantu had a two way tonal distinction in nouns with monosyllabic roots, Chilungu has a four way distinction (compare Table I and the data in (37)), and while Proto-Bantu had a four way tonal contrast in nouns with CVCV, Chilungu has a five way contrast (compare Table I and the data in (36)). The "extra" distinctions were shown to be a result of the introduction of final extraprosodicity in certain roots.

Chilungu is interesting theoretically as well. First, we found evidence that downstep in Chilungu is not a late phonetic effect, but is best accounted for by an early rule in the phonology. This was particularly evident in the derivation in (15a) where the inserted Low links to a free TBU.

Second, we saw that the Linking Constraint does not seem to hold in Chilungu, at least as concerns the rule of Final High Deletion as formalized in (24). We suggested that perhaps this constraint might need to be viewed as cross-linguistically parametric or modified to interpret association lines in a rule as a 'minimal' requirement for tonal associations.

Finally and most importantly, while cases of predictable extraprosodicity are numerous, we submit that the nominal tonology in Chilungu is most insightfully analyzed by assuming that certain noun roots (as well as the Final Vowel *-a*) exhibit lexical extraprosodicity. We pointed out that this type of extraprosodicity (within a tone system) is not only attested elsewhere, but should be seen as a development quite parallel to the lexicalization of other formal elements which are generally predictable, such as stress and accent.

Appendix A

Nouns of Tone Class I

ámávì	'excreta'	*ítámà*	'cheek'
íbélì	'firstborn'	*ívílézù*	'beard'
ícháálò	'field'	*ízálà*	'hunger'
ìchífúlà	'well'	*ízéengò*	'wooden pole'
ìchíintù	'thing'	*móótókà*	'car'
ìchíláyò	'promise'	*úlálò*	'bridge'
ìchílézù	'chin'	*úlápò*	'oath'
ìchísáákúlò	'comb'	*úlípílò*	'payment'
ìchísáálì	'sugar-cane'	*úlúkwì*	'log of firewood'
ìchízúúngù	'English'	*úlúnyélélè*	'ant'
ífwà	'leaf'	*úlúpyà*	'brush fire'
íímbálà	'burn from fire'	*úlúsékò*	'laugh (n.)'
íímbálámínwè	'ring'	*úlwééndò*	'journey'
íímbávì	'paddle'	*úlyáámbà*	'fish scale'
íímbázò	'ribs'	*úmúlámù*	'brother-in-law'
íímfwéélè	'sheep'	*úmúlómò*	'mouth'
íímpálà	'baldness'	*úmúlyáángò*	'doorway'
íímpápà	'skin (animal)'	*úmúnjílì*	'warthog'
íímpéléémbè	'antelope'	*úmútì*	'tree'
íínkálà	'crab'	*úmúúnsì*	'mortar'
íínkóóndè	'banana'	*úmúúntù*	'person'
ííntólómílò	'windpipe'	*úmúzà*	'wind'
íínzóvù	'elephant'	*úmúzì*	'village'
íkásà	'arm'	*úmúzííngà*	'beehive'
ílúà	'flower'	*úmwéénzò*	'heart'
íng'óómbè	'cow'	*umwíílì*	'body'
ípúlà	'wax'	*úmwííyúlù*	'sky'
ísè	'hoe (large)'	*úmwóóngólólò*	'backbone'
ísótè	'grass'	*útóóngè*	'cotton'
ísúmò	'spear'	*wáángà*	'witchcraft'

Nouns of Tone Class II

ámá'fútà	'oil'	*ìchí'bálà*	'scar'
chí'tálà	'floor mat'	*ìchí'kózì*	'vulture'
í'wé	'stone'	*ìchí'lóótò*	'dream'
í'yááyì	'egg'	*ìchí'pútè*	'boil'

Tone Class II, continued

ícháásáánzì	'broom'	*ílí́ínò*	'tooth'
ícháásímà	'well'	*ílí́ínsò*	'eye'
ícháyé	'shoulder'	*ílí́ínsózì*	'tear'
íímbâlì	'side'	*íng'á́ándà*	'house'
íímbêzù	'seed'	*ínyó́óngà*	'snail'
íímbîlà	'announcement'	*ítú́úndù*	'back'
íímfûtì	'gun'	*mùsátò*	'python'
íímpêlà	'end'	*ú́túúlò*	'offering'
íímpûmì	'forehead'	*ú́úchì*	'honey'
íímvîmbò	'swelling'	*úlú́límì*	'tongue'
íímvûlà	'rain'	*úlú́péchè*	'kernel'
ííndîmì	'tongues'	*úlú́úzì*	'river'
ííndôbò	'fish-hook'	*úlwá́álà*	'fingernail'
íínká́ándà	'skin (human)'	*úmú́cháángà*	'sand'
íínkú́únkà	'pigeon'	*úmú́káátè*	'bread'
íínsí́ímbì	'iron'	*úmú́kázyáánà*	'girl'
íínsí́íngò	'neck	*úmú́kúnyù*	'fig tree'
íínsônyì	'shame'	*úmú́kúúndù*	'anus'
íínzó́ókà	'snake'	*úmú́lúúngì*	'hunter'
íkûtwì	'ear'	*úmú́únsúúndò*	'leech'
ílí́ínì	'egg'		

Nouns of Tone Class IIIa

ámásàká	'sorghum'	*úmúmpàká*	'boundary'
ámátùùnzí	'urine'	*úmúpèní*	'knife'
ícháínùùngí	'porcupine'	*úmúsànó*	'chief wife'
íímbòó	'buffalo'	*úmúsànyá*	'day'
íímfíífí	'darkness'	*úmúsàzí*	'calabash bottle'
ííntáándá	'grove'	*úmúsèlú*	'nausea'
ínyúùngú	'pot'	*úmúyìíndá*	'loin cloth'
ítáángá	'cattle pen'	*úmwéélé*	'knife'
úlúkùùngú	'dust'	*úmwíípá*	'nephew'
úlúòyá	'bee sting'	*wáází*	'blood'
úlútàándá	'star'	*wíínà*	'pit'
úlwáálá	'flat rock'	*wóóngó*	'brain'
úmú!sé	'basket'		

Nouns of Tone Class IIIb

ákálàándà	'misfortune'	*úlúnyèèlè*	'hair'
ákálùùmbà	'lightning'	*úlúpèèmbè*	'horn'
ámálìíndì	'graves'	*úlúpèènzù*	'cockroach'
ícHílèmà	'lame person'	*úlútùùngù*	'hip'
ícHípùtùlwà	'piece'	*úmúlàándù*	'fault; debt'
ícHísìkì	'tree stump'	*úmúlùùndù*	'raised ground'
ícHíùùmbà	'wall'	*úmúsànà*	'waist'
ícHíùùngù	'caterpillar'	*úmútùùmpè*	'stupid person'
ílíìndì	'grave'	*úsùùngù*	'pain from poison'
úlúkòpyò	'eyelash'		

Nouns of Tone Class IV

chìmànì	'left hand'	*ìíndà*	'stomach'
chìpùzì	'pumpkin'	*mpàángà*	'forest'
chìsàkà	'maize'	*mùkòlò*	'hoe'
chìtìíndì	'dung'	*mùtùùmpè*	'peas'
chìtìítì	'mashed eggplant'	*mùùmbùlwè*	'monitor lizard'
chùùlà	'frog'	*ùmùnwè*	'finger'
ìchìsàásà	'door'	*ùmùyèèmbà*	'green bean'
ìchìzùlè	'tobacco garden'	*yèèmbà*	'lake'

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AVATIME NOUN CLASSES AND CONCORD*

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Avatime is one of 14 "Central-Togo" (or "Togo Remnant") languages, spoken in Ghana, Togo, and Benin. These languages differ from their nearest Kwa group relatives in that they have active systems of noun classes and concord. Avatime has 13 noun classes, each with a distinct nominal prefix. Prefixes (as well as most other affixes) agree in [ATR] vowel harmony with the host noun root. Some classes impose invariable low tone on the prefix while prefix tone of other classes may be any of three lexically determined tones. Definiteness is marked by a set of suffixes. The ultimate segmental shapes and tones of these suffixes depend on the interaction of the respective class prefix shapes and coalescence phenomena with stem final vowels. There are correlations between noun class and nominal semantics, and nominal derivation is done in part through class choice. A number of attributive modifiers show class concord with the head noun. In the variety of Avatime studied here, such concord is only though vocalic prefixes on attributive modifiers, not by full CV prefixes as is typical of Bantu languages. Some attributives also have "tonal concord", which is not class concord per se, but refers to the tone of the head noun's prefix. Not all attributive modifiers have overt concord marking.

1. Introduction

Avatime is one of 14 languages referred to as "Central-Togo" languages in Kropp Dakubu and Ford [1988]. Most earlier literature on these languages uses the term "Togo Remnant Languages" in English or "Togorestsprachen" in German. These languages are spoken east of Lake Volta in Ghana, in contiguous areas of

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Togo, and in the case of one language, Basila, in Benin. Greenberg [1966] classifies the Central-Togo languages together with Ewe, Akan, Gã, and a number of other languages as the "b" subgroup of his "Kwa" group. Stewart [1989:221] refines the classification within this subgroup, proposing that the Central-Togo languages are not a genetic unit. Rather, some of these languages, including Avatime, are in the "Left Bank" sub-group, which includes Ewe, whereas others are in the "Nyo" sub-group, which includes Akan, Gã, and Baule. The most extensive comparative study of the Central-Togo languages as a group is Heine [1968]. The main works specifically on Avatime are Funke [1909, 1910], Kropp [1967], and Ford [1971a, 1971b].

What has struck researchers about the Central-Togo languages from the earliest times is the fact that they have active noun class systems utilizing prefixes and concord much like the Bantu languages. This is in contrast to the languages which are their closest linguistic relatives, where lexical noun class and concord systems are entirely absent. This paper will present some of the features of Avatime noun classes and concord system.

2. Phonological Preliminaries

In this section I provide just an inventory of the features of Avatime phonology which explain the transcription I use and/or which are of particular interest for the noun class and concord system. See Schuh [1995] for a more extensive description of Avatime phonology, including evidence and arguments for some of the more problematic facets of the phonological system.

2.1. Consonants

Table 1. Avatime consonants

	Bilabial	Labio-dental	Dental	Alveo-palatal	Velar	Labiovelar
Stops	p, b		t, d		k, g	kp, gb
Fricatives	(ʃ), ʋ	f, v	s, z		x, ɣ	xw, ɣw
Affricates			ts, dz			
Nasals	m		n	ny	ŋ	ŋw
Liquid(s)			l [l/r]			
Semivowels	w			y		

The parenthesized (ʃ) is found only in loanwords. The sounds [l] and [r] are in complementary distribution, [r] occurring only as the second consonant of a CC cluster where the first consonant is [+coronal]. *Ts* and *dz* vary in pronunciation

between dental and alveopalatal affricates. The choice of pronunciation is partly individual, though the dental pronunciation seems to be typical of older speakers.

2.2. Syllable structure. The possible syllable types of Avatime are the following:

Table 2. Examples of Avatime syllable types

V	*ɔ́.nɔ̀*	'person'
	ì.ɣɛ̄	'knife'
CV	*lī.bà.lɛ̄*	'hoe'
C*l*/*r*V	*kī.mlɛ̀̄.mɛ̀*	'anus'
	à.srā.nà	'laziness'
CGV	*ɔ̀.mwɛ̄.nɔ̀*	'orange'
	ā.syā.nà	'horns'
N	*kpā.n̄*	'much, many'

A syllabic nasal (N) occurs only as the final segment in ideophones. A single V syllable is possible only in phrase initial position. If two vowels come together across a boundary, the hiatus is resolved in one of three ways: (i) glottal stop is inserted, e.g., *Yàwò* 'Yawo' + *ɔ̄gɛ̄* 'animal' → *Yàwò 'ɔ̄gɛ̄* 'Yawo's animal'; (ii) one of the vowels is elided, e.g., *mɛ̄* 'my' + *ɔ̄kà* 'father' → *mɔ̄kà* 'my father'; (iii) the first vowel is reduced to a glide, e.g., *ōbī* + *ē* → [ōbyē] 'the child'. Glottal stop insertion applies only at word boundaries. Elision or glide formation apply at clitic and affix boundaries, the choice of process depending on a rather complex interaction of specific morphemes, types of boundaries, and individual vowels (see Schuh [1995]). In the case of glide formation, non-low vowels in V_1 position are converted into corresponding glides. I cannot say to what extent these glides preserve features of the underlying vowels, but as a way to distinguish underlying glides from derived glides, I will use the following orthographic convention:

> CONVENTION FOR REPRESENTATION OF POSTCONSONANTAL GLIDES:
>
> (1) *Underlying glides* will be represented as *w* or *y*.
>
> (2) *Glides derived from underlying non-low vowels* will be represented as the underlying vowels but will bear no tone marking. Tone marking will be on the following vowel, e.g., *ɔ́nɔ̀* 'person' + *ɛ̄* = *ɔ́nɔɛ̀̄* 'the person', *ōbī* + *ē* = *ōbiē* 'the child'.

2.3. Vowels. Avatime has a nine-vowel system, with the vowels divided into two groups, differentiated by a feature generally called "Advanced Tongue Root" (ATR) in West African languages. The vowel system is as follows:

Table 3. Avatime vowels

	Front		Central	Back	
	[+ATR]	[-ATR]	[-ATR]	[+ATR]	[-ATR]
High	*i*	*ị*		*u*	*ụ*
Mid	*e*	*ɛ*		*o*	*ɔ*
Low			*a*		

2.3.1. Vowel harmony. The vowels participate in a cross-height vowel harmony system whereby roots and associated affixes contain only vowels which match for the feature [ATR]. This is easiest to illustrate with affixes whose vowels vary depending on the [ATR] feature of the root to which they are attached.

Table 4. Examples of vowel harmony alternations

i/ị: *lī-gbō-lè/lị̄-gɔ̀-lɛ̀* 'chair'/'year'; *bī-bū-wè/bị̄-gụ̄-wɛ̀* 'thorns'/'wars'; *sī-sē-sè/sị̄-tā-sɛ̀* 'clay'/'saliva'

e/ɛ: (see suffix examples just above; *ɛ* does not appear in any prefixes); *é tē yɛ̄/á mɔ̄ yɛ̄* 'he knows him'/'he sees him'

u/ụ: *kù-bē/kụ̀-mwɛ̀* 'tear'/'salt'; *kù-tsō/kụ̀-pɔ̄* 'monkeys'/'antelopes'

o/ɔ: *ō-dzē/ɔ́-dzɛ̄* 'wife'/'woman'; *ɔ̀-lō-lò/ɔ̀-sɔ̄-lɔ̀* 'crocodile'/'elephant grass'; *wɔ̀ pè/wɔ̀ gà* 'you are tired'/'you walked'; *é tē wō/á mɔ̄ wɔ̄* 'he knows you'/'he sees you'

e/a: *kē-tsō/kā-pɔ̄* 'monkey'/'antelope'; *ē-gbō-là/ā-gɔ̀-lā* 'chairs'/'years'; *mè sē/mà yɔ̄* 'I ran'/'I stood up'

Funke [1909] described a 9-vowel system. All the literature on Avatime since Funke has analyzed Avatime as having 7 surface vowel contrasts, either not recognizing a [±ATR] distinction in the high vowels at all [Kropp 1967, Heine 1968] or claiming that the underlying distinction is phonetically neutralized [Ford 1971a]. Schuh [1995] and Maddieson [1995] show that there is such a distinction, both phonetically and phonologically.

2.3.2. Phonologically distinctive nasalization. There is a phonological contrast between nasalized and non-nasalized vowels. This distinction seems to be disappearing. Funke [1909, 1910] noted nasalization on many more words than do the more recent sources. Ian Maddieson and I found no non-borrowed words in the nominal vocabulary with unconditioned nasalization. Nonetheless, pairs like the following make it necessary to recognize a phonological contrast between nasalized and non-nasalized vowels.

Table 5. Pairs contrasting nasalized and non-nasalized vowels

Nasalized		Non-nasalized	
kūtsítsɪ̀ɪ̄ō	'be red'	kṵtsɪ́tsɪ̀ɔ	'cut off'
kṵzázɑ̀	'be ripe, be fair-skinned'	kṵzāzà	'pass'

2.4. Tone. Most sources on Avatime [Funke 1909, Kropp 1967, Heine 1968] propose a system of three level tones. Ford [1971a], by contrast, describes Avatime as having four tone levels, which he calls tones 1-4 with tone 1 being the lowest.[1] My work on Avatime supports Ford's contention that one must recognize up to four tones. Even though Ford's numbering system is opposite the conventional Africanist tradition, with "1" as highest, I retain his numbering system in order to avoid confusion for anyone who wishes to compare my work with his. I will mark tones with the following diacritics:

Table 6. Tone marking

Tone 1	*à*
Tone 2	*ȁ*
Tone 3	*ā*
Tone 4	*á*

A three-way contrast between Ford's tones 1, 3, and 4 can be heard in a single word such as *tsàkplākpé* [_ – ¯] 'cockroach' or in the tones of prefixes in sets of words such as *kí-nībiè* 'eye' vs. *kṵ̄-mṵ̄mṵ̀è* 'unprocessed rice', *kì-sēwiè* 'stick', where the words all belong to the same noun class and all have the same tone on the first stem syllable. The phonological status of Ford's tone 2 is marginal. Most tokens of tone 2 are derived, either from conflation of tones 1 + 3 onto one syllable or by raising of tone 1. The first process can be illustrated by comparing the effects of adding the tone 3 suffix *ē/ɛ̄* to roots ending in tone 3 vs. roots ending in tone 1:

3 + 3 → 3: *ōkpō* + *ē* → *ōkpoē* [– –] 'the corpse' (cf. *bēkpōwà* 'corpses')
1 + 3 → 2: *ōkpò* + *ē* → *ōkpoɛ̀* [– _] 'the parasite' (cf. *bēkpòwɑ̀* 'parasites')

Derivation of tone 2 through raising of tone 1 is seen in the definite suffixes of most noun classes. These suffixes have tone 2 after tone 1, tone 1 elsewhere, e.g., *lī-bī-lè* 'the seed' vs. *lì-bì-lɛ̀* 'the wound'. I propose that these suffixes have

[1] Ford's [1971a] discussion of tone is exceptionally acute in recognizing subtle distinctions which are crucial for understanding the tone system. Although my data differ from his in relatively minor details and although I propose alternative solutions to his, I would have learned only a fraction of what I was able to discover about Avatime tone without his observations as a guide.

underlying tone 1 which is dissimilated to tone 2 rather than the alternative of having two sets of suffixes with different tones in complementary distribution. Despite the fact that most tokens of tone 2 can be derived from one of these sources, there are enough apparently underived instances of tone 2 that it seems necessary to recognize it as a phonologically distinctive entity. For example, the singular object pronouns bear tone 3 whereas the plural object pronouns bear tone 2, e.g., *ē vù mē* 'he caught me' vs. *ē vù bà* 'he caught them'.

One aspect of the tone system worth pointing out is that syllables bearing tones 3 or 4 are terminated by a glottal stop when at the end of a phrase whereas tone 1 is not, e.g., [*kɪ́dɛ̄'*] 'a mortar' vs. [*kɪ́dɛ̀*] 'the mortar' (< */kɪ́dɛ̄* + *è*/ 'mortar + the'). In the examples above, tone 2 which is derived from tones 1+3 ends in glottal stop ([*ōkpoè'*] 'the parasite') whereas tone 2 which is derived from raised tone 1 does not ([*lìbìlɛ̀*] 'the wound'). The tone 3 pronoun [*mē'*] ends in glottal stop whereas the tone 2 [*bà*] does not, suggesting at least a historical connection of the tone of the latter with tone 1.

3. Avatime Noun Classes

The term "noun class" has been used in two distinct ways in the description of African languages:

(1) a "class" is *a single set* of morphological concords which may show up as affixes on noun stems, affixes on noun modifiers, and pronominal referents to nouns;

(2) a "class" is a *paired set* of concords of type (1) where one member of the pair has a singular referent and the other member of the pair is the plural corresponding to that singular.

Usage (1) is the one used in nearly all work on Bantu languages and West Atlantic languages such as Wolof and Fula. Thus, in Swahili, nouns in Class 1 have a prefix *m-* with a pre-vocalic variant *mw-*, as in *m-tu* 'person', *mw-ana* 'child'; nouns in Class 2 have a prefix *wa-*, whose *-a-* is elided before roots beginning in *a*, as in *wa-tu* 'people', *w-ana* 'children' [Ashton 1966]. The fact that the Class 1 form of a particular root is the singular form for that root and will (virtually) always pair with a Class 2 form as the plural for the same root is irrelevant to the system of classes per se. The term referring to such singular/plural *pairings* is not "classes", but "genders". Thus, in Swahili, 'person' and 'child' belong to the gender consisting of the Class 1/2 pair. It is paired sets of this type which "class" in sense (2) refers to. This usage is typical in work on the Gur languages, e.g., Prost [1964], and nearly all existing work known to me on the Central-Togo languages, including Avatime.

Previous literature on Avatime provides no standardized way to refer to its nominal class system. Besides the fact that the unfortunate choice of usage (2)

rather than usage (1) creates clumsiness in description (one must refer to "the singular of Class *x*", "the plural of Class *y*", etc. rather than simply "Class *x*" or "Class *y*"), previous descriptions of Avatime classes have used five distinct numbering systems for the classes. Nonetheless, all descriptions are consistent in their inventories of class distinctions and the morphological marking of those distinctions. There are 13 classes (using sense (1) of the term "class"). These classes pair into seven genders. One of the genders has two sub-genders, one comprising nouns with overt prefixes, the other with no prefixes, but grouped as a single gender because they govern identical concords.

In order to avoid adding yet another numbering system to descriptions of Avatime, I will refer to classes by their characteristic nominal prefixes, written in small upper case letters, e.g., the "KU class", the "BI class", etc. Reference to the nominal prefixes is sufficient to distinguish the 13 classes. There are two classes with nominal prefixes having the segmental form *o-/ɔ-*, two with the segmental form *be-/ba-*, and two with the segmental form *ku-/kụ-* (the forms separated by slashes are vowel harmony variants—§2.3.1). However, the segmentally identical classes differ from each other in that the tone of one of the classes varies depending on the nominal root to which it is attached, whereas in the other class, the tone is invariably low (tone 1). The two "O" classes also differ in the concords they govern. I will refer to the classes with invariable low tone as the "Ò class", the "BÀ class", and the "KÙ class". See the next page for an explanation of the orthographic conventions used in representing the class-marking affixes.

Table 7. Avatime class prefixes and corresponding definite marking suffixes

Prefixes	Definite Suffixes	Heine [1968]	Ford [1971a]	Ford [1971b]	Kropp Dakubu & Ford [1988]	Funke [1909] Kropp [1967]
O-/bA-	-E/-Ba	I	1	1a	1/2	1
Ø/Ø	-E/-Ba	I	no mention	1b	(1/2)	8
Ò-/Ì (lÌ-)	-LO/-LE	II	7	2	3/4	6
lI-/A-	-LE/-LA	III	2	4	5/6	7
kI-/bI-	-E/-BE	IV	3	3	7/8	4
kU-/bÀ-	-O/-Ba	V	4	5	11/12	2
kA-/kÙ-	-a/-O	VI	5	7	13/14	5
(kU-)/sI-	(-O)/-sE	VII	6	6	9/10	3

Table 7 presents the nominal affixes of Avatime in their singular/plural pairings. The prefixes are an obligatory part of the noun in citation form and most other uses. Nouns can also add suffixes to show definiteness. Some speakers tend to cite nouns without these suffixes and others with the suffixes. The suffixes are included in Table 7 in order to show the typical form that class *concord* morphology takes. The table gives the class numberings from all the sources known to me which describe Avatime noun classes. All these sources other than Ford's terse sketch in Kropp Dakubu & Ford [1988] use the type (2) method of describing noun classes.

The following conventions apply to the affixal forms in the Table:

(1) The forms to the left and right of the slashes are, respectively, the singular and plural members of a class pair or gender.

(2) Lower case letters represent phonetically invariant segments for the particular affix.

(3) Small capital letters represent segments which have phonologically predictable variants. For the vowels, these will be high or mid vowels which harmonize with the [ATR] value of the host, i.e.,

I = *i*/*ị*
U = *u*/*ụ*
E = *e*/*ɛ*
O = *o*/*ɔ*

} with [-ATR]/[+ATR] hosts, respectively.

For the consonants, see §3.2 below.

(4) The parenthesized (kU-) prefix and (-O) suffix in the last row are the singular class markers found in other sources corresponding to the *sI-* class. I found it essentially impossible to elicit "singular" forms for roots in the *sI-* class, all of which are interpretable as mass nouns (see §3.3). Funke [1909:297] notes, "Der Singular dieser Substantive [of his class 3, *ku*/*si*] ist gar nicht oder fast gar nicht gebräuchlich."

(5) The parenthesized (lì-) in the second row is a plural prefix which is an alternative to ì-. This alternative is not mentioned in any of the literature on Avatime but was the preferred form of the speaker who provided most of the data for this study.

3.1. Noun class prefixes. The vowels of class marking prefixes vary according to the [ATR] specification of (the first syllable of) the host, as described in §2.3.1. The tones of four classes (Ò, Ì, BÀ, KÙ) are invariably low, but the remaining class prefixes bear tones which are lexically determined by their hosts. There are, however, restrictions on which tones even those prefixes may bear. Ford [1971a:21] notes that "no noun-class prefixes are found with tone 2". Moreover, prefixes on nouns in the O/BA gender may not bear tone 1 and prefixes on nouns in

the KA and SI classes may not bear tone 4. Table 8 presents examples of nouns with prefixes bearing all the possible tones. Note several minimal pairs distinguished only by the tone on the prefixes.

Table 8. Examples of noun class prefixes showing tonal possibilities

Sing.	Tone	Plural	Tone	Sing. noun	Pl. noun	Meaning (sing. only)
O	4	BA	4	ɔ́dzɛ̄	bádzɛ̄wà	'woman'
	3		3	ōzē	bēzēwà	'thief'
Ò	1	(L)Ì	1	ɔ̀mwɛ̄nɔ̀	ɩ̀mwɛ̄nɛ̀	'orange'
LI	4	A	4	lɩ́ʋānɛ̀	áʋānà	'bean'
	3		3	lībīlè	ēbīlà	'seed'
	1		1	lìbīlè	èbīlà	'tick'
KI	4	BI	4	kɩ́dɛ̀	bɩ́dɛ̄wɛ̀	'mortar'
	3		3	kībuè	bībūwè	'thorn'
	1		1	kìbuɛ̀	bìbūwè	'honey'
KU	4	BÀ	1	kʊ́nyɔ̀	bànyɔ̄wà	'smoke'
	3		1	kūtsē	bètsēwà	'death'
	1		1	kùbɔ̀	bèbōwà	'tear'
KA	3	KÙ	1	kāwà	kʊ̀wɔ̄	'axe'
	1		1	kèziɑ̀	kùziɔ̀	'bowl'
		SI	3		sɩ̄yàsɛ̄	'hair'
			1		sɩ̀yàsɛ̀	'Avatime language'

3.2. Definiteness marking suffixes. Avatime shows definiteness by a series of class sensitive suffixes, seen in column 2 of Table 7. These suffixes have three shapes, viz. BV, LV, V. Excluding the O class, which has a number of idiosyncratic properties, the shape and specific vowels correlate with the prefixes as shown in Table 9.

Table 9. Correlation of prefix and suffix shapes

Suffix shape	BV	LV	V	**Suffix vowel**	*a*	O	E
Prefix shape	*b*V	*l*V, V	*k*V	**Prefix vowel**	*e*/*a*	U	I

The consonants B and L of the suffixes alternate as follows:

B = *b*, *w*, or *m*: It is not clear whether the choice between *b* and *w* is a dialectal, generational, or individual speaker difference. For the most part, B is written *b* in earlier sources, but the speakers on whose speech this study is primarily based had *w* rather than *b*. The variant *m* is found in suffixes following a

nasalized vowel, including a vowel which is nasalized by a preceding nasal consonant, e.g., *ōn̨ɛ̄/bān̨ìmà* 'the person/the people'. Distinctive vowel nasalization seems to be disappearing (cf. §2.3.2). This phenomenon has created cases where the *m* variant shows up today with no apparent conditioning, e.g., *ɔ̄zu̱ɛ̄/bāzū̱mà* 'fly (cf. the entry of Funke [1910], *ɔzū-i-ɛ/ bazū-ma*, with nasalization marked in both singular and plural). Loss of distinctive vowel nasalization has obscured the conditioning for the *m* variant, such that the *b/w* variant is now found where the *m* variant would be expected and the *m* variant is sometimes used even though there is no evidence that conditioning for it was ever present, e.g., *ōnɛ̀/bénèwɛ̀* 'mother' (cf. Funke [1910], *one/bene-ma*) versus *óbuɛ̄/bébūmà ~ bébūwà* 'bee' (cf. Funke [1910], *obu-ie/bebu-ḅa*).

L = *l*, *n*: Conditioning for the *n* variant is the same as for the *m* variant of B described above, viz. following a nasalized vowel, e.g., *līgùmènɛ̀/ēgùmènɛ̀* 'cow'. Parallel to the *b/m* case, there are words where the nasalization conditioning the *n* variant is no longer heard, e.g., *l̩ìklànɛ̀/àklànɛ̀* 'cornbread' (cf. the entry in Funke [1910], *liklã̄-nɛ/aklã̄-na*, with nasalization explicitly marked). However, the *l/n* alternation has remained more stable than the *b/m* alternation. I recorded no cases where the *l* variant was used when the preceding consonant was a nasal, and I found only a couple of cases with *n* where Funke [1910] has *l*.[2] It is worth noting that there are numerous words where both Funke and my data show *n* but where no nasalization is apparent, e.g., *ɔ̀pìnɔ̀/lìpìnɛ̀* 'tail' (= Funke), suggesting that loss of distinctive vowel nasalization has been going on for a considerable period.

With the exception of the Ē suffix of the O class, which bears tone 3, the definite suffixes have tone 2 after stems ending in tone 1 and tone 1 elsewhere. I accounted for this in §2.4 by saying that they have underlying tone 1, which is dissimilated to tone 2 following tone 1. Table 10 illustrates both the consonantal alternations and tones of the suffixes having the shape CV.

[2] In one such case, *ɔ̀dɛ̄nɔ̀* 'squirrel', Funke [1910] shows a nasalized vowel but an *l* suffix, viz. *ɔdɛ̃-lɔ'*. This is the only case I came across in Funke's data where a non-nasal suffix cooccurred with an explicitly nasalized vowel.

Table 10. Examples showing consonant and vowel variants of CV suffixes

Class	Tone 1 suffix		Tone 2 suffix	
BA	bēbīwà bānḭ̄mà	'children' 'people'	bēvèwà̀ bāplḭ̀mà̀	'mice' 'lice'
BÀ[3]	bàlḭ̄wà	'palm trees'	bàsàwà̀ bamɔ'má (Funke)	'cloths' 'boundaries'
BI	bḭ̄fṵ̄wɛ̀ bḭ̄kɔ̄mɛ̀	'fires' 'staple food'	bīkùwɛ̀ bḭ̀dɔ̀mɛ̀	'yams' 'thing(s)'
LI	lḭ̄gbālɛ̀ līnyīnè	'house' 'name'	lìglìlɛ̀ līgùmènɛ̀	'wall' 'cow'
A	āgbālà ēnyīnà	'houses" 'names'	èglìlà̀ ēgùmènà̀	'walls' 'cows'
Ò	òʏūlò ɔ̀mwēnɔ̀	'vehicle' 'orange'	ɔ̀ʏàlɔ̀ òpìnɔ̀	'pig' 'tail'
(L)Ì	lìʏūlè lḭ̀mwēnè	'vehicles' 'oranges'	lḭ̀ʏàlɛ̀ lìpìnɛ̀	'pigs' 'tails'

The purely vocalic suffixes (V) require some additional discussion. Avatime does not tolerate medial syllables without onsets (cf. §2.2). When the vocalic suffixes are added to nominal stems (all of which end in a vowel), one of the vowels elides or the first vowel becomes a glide. Schuh [1995] discusses Avatime vowel hiatus phenomena in detail. We can summarize just those processes which affect the definite vocalic suffixes as follows: (i) like vowels reduce to a single vowel; (ii) high vowels become the corresponding glides; (iii) O as V_1 becomes the corresponding glide before non-O; (iv) E as V_1 elides before non-E; (v) *a* as V_1 elides before E and before O in KÙ class nouns, but in KU class nouns, *a* as V_1 is retained and O as V_2 elides. Table 11 exemplifies these processes.

[3] In my data, I have no examples for this class with an *m*V variant for the suffix, including roots with a nasal consonant. This is primarily a liquid/mass class (see §3.3), and for such nouns the plural would not be in frequent use. As mentioned above, the conditioning for the nasal variant of the suffix, has undoubtedly been obscured for a long time, so these rarely used plurals tend to take the unmarked variant of the suffix. For example, both Chris Bubuama and Funke [1910] give a plural with non-nasal suffix for 'salts', viz. *bàmwèwà̀* (Funke *bamɔ'éba*). Mr. Bubuama provided forms such as *bènūwà* 'waters', *bàmṵ̄wà* 'oils', but Funke [1910] gives only the singular KU class form for these nouns. Of nouns in this class, I found only Funke's form for 'boundaries', seen in the table, with a nasal suffix. Mr. Bubuama gave *bàmwèwà̀* (homophonous with 'salts').

Table 11. Vowel contact processes between final vowels and definite suffixes

Class	Final V	Def. suf.	Result	Example			
KA	a	a	a	kāwā + a	→	kāwà	'the axe'
	O		wa	kāgɔ̄ + a	→	kāgɔà	'the bushfowl'
	E		a	kēlédē + a	→	kēlédà	'the nape'
	U		wa	kētsū + a	→	kētsuà	'the forehead'
	I		ya	kèzī + a	→	kèziā	'the bowl'
KU, KÙ	a	O	a (KU)	kụ̀sà + O	→	kùsā	'the cloth'
			O (KÙ)	kụ̀wā + O	→	kụ̀wɔ̄	'the axe'
	O		O	kụ̄nɔ̄ + O	→	kụ̄nɔ̀	'the flour'
	E		O	kūdè + O	→	kūdò	'the road'
	U		wO	kụ̀mụ̄ + O	→	kụ̀mụ̀ɔ̄	'the oil'
	I		yO	kùdròwī + O	→	kùdròwiō	'the dogs'
O, KI	a	Ē, E	E	ɔ̄gā + Ē	→	ɔ̄gē	'the animal'
				kị̀dzā + E	→	kị̀dzè	'the rat'
	O		wE	ɔ̄nụ̀vɔ̀ + Ē	→	ɔ̄nụ̀vɔ̀ē	'the child'
				kị̄gɔ̄ + E		kị̄gɔè	'the occiput'
	E		E	ōvè + Ē	→	ōvē	'the mouse'
				kị́dē + E		kị́dē	'the mortar'
	U		wE	ɔ̄zụ̄ + Ē	→	ɔ̄zụ̀ē	'the fly'
				kìkù + E		kìkuē	'the yam'
	I		yE	ōbī + Ē	→	ōbiē	'the baby'
				kínībī + E		kínībiè	'the eye'

These vowel hiatus resolutions also cause conflation of the final stem tone and the suffix tone onto one syllable. The suffix Ē of the O class always bears tone 3; the V suffixes of the other classes follow the same tone pattern as the CV suffixes illustrated in Table 10, viz. tone 2 with a stem final tone 1 and tone 1 elsewhere. Table 12 illustrates the tonal results. The tone 3 suffixes are shown with the conditioned glottal stop (cf. end of §2.4), which is absent in other classes.

Table 12. Tones of definite suffixes coalesced with stem final vowels

P F-R*	Class	Example	Underlying		Evidence for underlying	
T 4-3 → T 4'	O	[dzàtɛ́']	/dzàtá + ɛ̄/	'lion'	dzàtáwà	'lions'
T 3-3 → T 3'	O	[ōkpoē']	/ōkpō + ē/	'corpse'	bēkpōwà	'corpses'
T 1-3 → T 2'	O	[ōkpoè']	/ōkpò + ē/	'parasite'	bēkpòwà	'parasites'

4/3 1-2 → 4/3 2	KI	kīkuɛ̀	/kīkù + ɛ̀/	'yam'	bīkùwɛ̀	'yams'
	KU	kūdō[4]	/kūdè + ɔ̀/	'road'	bèdèwà	'roads'
	KA	kāsà-mɛ̀[5]	/kāsà + à/	'waist'	kāsà-mɛ̀	'a waist'
4/3 3-1 → 4/3 1	KI	kɪ́dɛ̀	/kɪ́dɛ̄ + ɛ̀/	'mortar'	bɪ́dɛ̄wɛ̀	'mortars'
	KU	kʊ̄nɔ̀	/kʊ̄nɔ̀ + ɔ̀/	'flour'	bànɔ̄wà	'flours'
	KA	kādzɪà	/kādzī + à/	'hawk'	kādzī'	'a hawk'
1 1-2 → 1 2	KI	kìkuɛ̀	/kìkù + ɛ̀/	'rubber'	bìkùwɛ̀	'slingshots'
	KU	kʊ̀nyà	/kʊ̀nyà + à/	'bow'	bànyàwà	'bows'
	KA	kādròwià	/kādròwì + à/	'dog'	kādròwì	'a dog'
1 3-1→ 1 2	KI	kɪ̀gʊ̄ɛ̀	/kɪ̀gʊ̄ + ɛ̀/	'war'	bɪ̀gʊ̄wɛ̀	'wars'
	KU	kʊ̀mʊ̄ɔ̀	/kʊ̀mʊ̄ + ɔ̀/	'oil'	bàmʊ̄wà	'oils'
	KA	kèzià	/kèzī + à/	'bowl'	kèzī'	'a bowl'

*P = prefix tone; F = final root tone; R = result tone of coalescence

As would be expected, the tone 3 suffix of the O class suffix combines with stem final tone 3 to yield tone 3. This tone 3 suffix also combines with tone 4 to yield tone 4 (the only words which have stem final tone 4 are loanwords, all of which lack a prefix and which take O/BA gender agreements). Tones 1+3 combine to yield tone 2. Note, however, that the resultant syllable is terminated by glottal stop, a characteristic feature of tone 3.

For all but one other case, tones on the syllables resulting from vowel coalescence can be accounted for by a simple rule, viz. *the result syllable bears the tone of the final vowel.* The one case that cannot be accounted for by this statement is the last one, where tones 3-1 coalesce to tone 2 following tone 1. I propose that when the 3-1 underlying contour follows a tone *other than* tone 1, the 3 is absorbed into the preceding non-1, leaving only the 1 on the final syllable, as in 'mortar', 'flour', 'hawk'. Following tone 1, the contour 3-1 in cases like 'war', 'oil', 'bowl' simplifies to tone 2. This account allows us to say that either 1-3 or 3-1 on a single syllable will simplify to tone 2. If the underlying final tone is 3, the final glottal stop appears phrase finally; if the underlying final tone is 1, there is no glottal stop.

The definite suffixes are actually in constituency with the NP rather than just the head noun. Thus, when a noun has a following attributive adjective, the suffix is cliticized to the adjective, e.g., *ɔ̄gā vìdiɛ̀* 'old animal', *bāgā vìdìwà* 'old animals', *lɪ̄klā vìdìnɛ̀* 'old stone', *āklā vìdìnà* 'old stones', etc.

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[4] I transcribed all the examples that I collected from the KU class with tones 3-3 rather than 3-2. Though this could be a transcription error, it may well be the case that the speaker neutralized tones 2 and 3 when he pronounced these words, a neutralization which sometimes takes place, as noted above. Significantly, there is no final glottal stop, even though the level is that of tone 3.

[5] *Mɛ̀* is a postposition meaning 'in', found in the citation form of most nouns indicating locations, e.g., *ɔ̀nyrɔ̄-mɛ̀* 'farm', and words indicating an area on the body (though not specific body parts).

3.3. Lexical distribution of classes and use of classes in nominal derivation and compounding. I assembled a list of 467 nouns, including both derived and underived. Table 13 shows the numbers of nouns in each gender, the overall percentage, and a rough characterization of the semantic ranges typical for each gender.

Table 13. Numerical distribution and semantics of genders

Gender	Number	%	Semantics
O/BA	83	18%	almost all human nouns, wild and domestic animals ('animal', 'goat', 'mouse', 'grasscutter', 'bee', etc.)
Ø	71	15%	almost all borrowed words (no semantic limitations)
Ò/Î	76	16%	wild and domestic animals ('pig', 'chicken', 'squirrel', 'crocodile', 'gecko'), edible plants ('okra', 'orange', 'maize'), domestic items ('mat', 'stirring stick', 'firewood', 'spear'), body parts, esp. internal ('leg', 'heart', 'intestine', 'vein')
LI/A	96	21%	sort of a catch-all class—body parts ('face', 'nose', 'bone', 'breast', 'horn'), times (days of the week, 'year', 'morning', 'day', 'night'), misc. inanimates ('stone', 'hoe', 'headpad', 'drum'), places ('hole', 'mountain', 'sky', 'lake'), acts/emotions ('event', 'life', 'fear', 'work', 'skill', 'lie'), a few animals ('cow', 'snail', 'butterfly')
KI/BI	28	6%	body parts ('eye', 'tongue', 'occiput', 'finger'), edible things ('yam', 'honey', 'rice', 'staple food'), misc. inanimates ('stick', 'money', 'fire', 'mortar', 'thing')
KU/BÀ	37	8%	liquid/mass ('alcohol', 'water', 'oil', 'salt', 'flour', 'smoke', 'shade'), some locatives ('boundary', 'middle', 'bathroom', 'hole', 'road'), all verbal nouns
KA/KÙ	53	11%	animals and birds—primarily wild ('dog', 'antelope', 'monkey', 'tortoise', 'bushfowl', 'hawk', 'bird'), body parts ('leg', 'chest', 'forehead', 'back'), places ('town', 'market', 'compound'), domestic utensils ('ax', 'bowl', 'calabash', 'basket', 'spoon')
SI	23	5%	mass nouns—primarily non-liquid ('grass', 'sand', 'clay', 'excrement', 'hair', 'saliva'), language names

Certain semantic categories fall almost exclusively into certain genders: nearly all *human nouns* fall into the O/BA gender (or the Ø gender, which is a subclass of O/BA without prefixes); nearly all *liquids* and many *mass* nouns are in the KU/BÀ gender, and those which are not in that gender are in the SI gender; *times* seem to prefer the LI/A gender. Other semantic categories are distributed fairly evenly across the genders, e.g., there is no strong correlation of gender for body parts, fauna, or concrete inanimates.

Like most languages with noun class systems, choice of noun class plays a role in derivation. I did not investigate noun derivation in any detail, but Table 14 gives a few of the patterns I found.

Table 14. Examples of noun classes/genders in nominal derivation

Derived meaning	Class/ Gender	Examples		
VERBAL NOUN	KU	kūsēsē	< sē 'run'	'running'
		kụ̄klàklà	< klà 'read, count'	'reading'
		kūŋàŋà	< ŋà	'eating'
AGENT NOUN	O/BA	ōsēsē	< sē 'run'	'runner'
		ɔ̄klàklɛ̄	< klà 'read'	'reader'
		ɔ̄dɔ̀ŋɛ̄	< bī-dɔ̀ + ŋà 'thing + eat'	'eater'
LOCATIVE NOUN	Ò/Ì	òsēlɔ̀	< sē 'run'	'place to run'
		ɔ̀klàlɔ̀	< klà 'read'	'library'
		ɔ̀dɔ̀ŋàlɔ̀	< bī-dɔ̀ + ŋà 'thing + eat'	'chop bar'
LANGUAGE	SI	sìyàsɛ̀	< ?	'Avatime'
		sìyòfɔ̄nɛ̀	cf. yòfɔ̄nɛ̀ 'European' < yof- (< Ewe) + ɔ́nɔ̀ 'person'	'English'

Order in genitive phrases is /possessor + possessed/. The two nouns are juxtaposed with no further marking, e.g., *ɔ́nɔ̀ līgùmè* 'a person's cow'. Compounds can be formed by such juxtaposition, but with the whole compound bearing the class marking of N2 and no separate prefix on N2, e.g., *sīnūgūpìsɛ̀* 'mustache' < */ò-nūgū-lò* 'mouth' + *sī-pì-sɛ̀* 'body hair'/. I am not sure to what extent this compounding process is productive in Avatime. For all the acceptable examples I was able to coin, the regular genitive construction was an alternative, and my informant rejected many examples of compounds which I suggested, accepting only a regular genitive construction (cf. last example in Table 15). In Table 15, the genitive alternative shows the nouns with their regular noun class marking. Noun class prefixes are hyphenated.

Table 15. Compounds with class of N_2

Genitive	Compound	Genitive or compound meaning
lī-gùmènɛ̀ kɨ̀-dzɛ̀ ò-ʋèsìlō kɨ̀-dzɛ̀ kā-pɔà kɨ̀-dzɛ̀	kī-gùmèdzɛ̀ kī-ʋèsìdzɛ̀ kɨ̀-pɔ̄dzɛ̀	'cow meat' 'sheep meat' 'antelope meat'
lī-gùmènē sɨ̀-mɨ̀sɛ̀ ò-ʋèsìlɔ̄ sɨ̀-mɨ̀sɛ̀ kā-pɔà sɨ̀-mɨ̀sɛ̀	sì-gùmèmīsɛ̀ sɨ̀-ʋèsìmɨ̀sɛ̀ sɨ̀-pɔ̄mɨ̀sɛ̀	'cow dung' 'sheep dung' 'antelope dung'
ɔ́-kɔ̄nɛ̀ lī-gblèlɛ̀ fɔ̄mízíē lī-gblèlɛ̀	lɨ́-kɔ̄gblèlɛ̀ *but* *lɨ-fɔmizigblele	'chicken coop' 'rabbit coop'

4. Concord in Attributive Modifiers

All nominal attributive modifiers follow the head noun. We can distinguish three types of concord in attributives: (i) full prefix concord, (ii) vocalic concord, (iii) tonal concord. Both Funke [1909] and Ford [1971a] report a few constructions with full prefix concord of the type $Pref_C$-N + $Pref_C$-modifier (subscript C = a particular class) familiar from Bantu languages. Thus, Funke [1909:308] gives examples of the indefinite *-tɔ̄* such as *ɔ́-nɔ ɔ́-tɔ* 'a certain man' vs. *kí-dɔ' ki-tɔ* 'a certain thing', and Ford [1971a:28-29] gives examples of ordinal numbers such as *kī-kù kī-tɔ̀pwyɛ̀* 'the first piece of rubber', *ɔ́-nɔ̀ ɔ̄-ʋlɛ̄* 'the second person'. In my field work, I elicited many examples of nominal constructions containing attributive modifiers, including counterparts of those illustrated from Funke and Ford, but I found no examples of full prefix concord. Although I did not check to see whether full prefix counterparts were possible alternatives, it is safe to say that these were not the normally used forms for the speakers with whom I worked. The discussion here will therefore be limited to *vocalic concord* and *tonal concord.*

Vocalic concords are changes in initial vowels of the attributives which are sensitive to the classes of the head nouns. There are two sets of vocalic concords: those used with cardinal numbers and the interrogative 'how many?' and those used with the indefinite *-tɔ̄* and the demonstrative *-yà* 'this, these'.[6] Table 16 shows the vocalic concords for the respective classes. For the numbers, the singular classes obviously can only be modified by *-le* 'one', which is given in parentheses. For the plural classes, the prefix harmonizes with the [ATR] specification of the number's root—all the examples here use 'four', which is [+ATR]. See an explanation of the tones below.

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[6] It is possible that the latter are used for other clitics such as the distal demonstrative *-kɔ́lɔ'* (cf. Funke [1909:306]), but I collected paradigms only for those mentioned.

Table 16. Vocalic concords for noun classes

Class	Cardinal # concord			Indefinite & demonstrative concord		
O	*to(lɛ̀)*	ōvè tɔ̀lɛ̀	'1 mouse'	E	ōvětɔ̄	'some mouse'
BA	*tɥe-/tɥa-*[7]	bēvè tɥènɛ̀	'4 mice'	*a*	bēveătɔ̄	'some mice'
Ò	*to(lé)*	ŏpō tɔ̀lɛ̀	'1 door'	E	ŏpoéyà	'this door'
(L)Ì	*ti-/tị-*	lĭpō tìnɛ̀	'4 doors'	E	lĭpoéyà	'these doors'
LI	*ti(lɛ̀)*	lị̄bà tɪ̀lɛ̀	'1 hoe'	E	lị̄béyà	'this hoe'
A	*te-/ta-*	ābà tɛ̀nɛ̀	'4 hoes'	*a*	ābáyà	'these hoes'
KI	*ti(lɛ̀)*	kị̀gū̄ tìlɛ̀	'1 war'	E	kị̀gụ́éyà	'this war'
BI	*tu-/tụ-*	bị̀gū̄ tùnɛ̀	'4 wars'	E	bị̀gụ́éyà	'these wars'
KU	*tu(lɛ̀)*	kū̄lī̀ tùlɛ̀	'1 palm tree'	O	kū̄lị́óyà	'this palm tree'
BÀ	*tɥe-/tɥa-*	bàlī̀ tɥènɛ̀	'4 palm trees'	*a*	bàlị́áyà	'these palm trees'
KA	*tye(lɛ̀)*	kèzī tièlɛ̀	'1 bowl'	*a*	kèziáyà	'this bowl'
KÙ	*tu-/tụ-*	kùzī tùnɛ̀	'4 bowls'	O	kùzióyà	'these bowls'
SI	(There are no count nouns in this class.)			E	sì̀mị́éyà	'this excrement'

The vocalic concords for the *indefinites and demonstratives* are the same as the vowels of the definite *suffixes* of the respective classes with the exception of the Ò class (see Table 7 and examples in Tables 10 and 11). The concord vowel of the demonstrative *-yà* always bears tone 4. See below for the tone of the concord vowel of the indefinite *-tɔ̄*.

The vowels in the *numeral prefixes* are the same as the vowels in the noun class prefixes (including their [ATR] alternates) with the exception of BI, whose numeral prefix has -U-. The other BV numeral prefixes have a rounded glide followed by a non-high vowel. It therefore appears that historically or in synchronic derivation for the BI class, the high vowel has coalesced with the glide (**twI-* → *tU-*). A similar account can explain the variants of the numeral prefixes corresponding to the kV noun class prefixes. The KA class has a front glide preceding the non-high *e* (which is the expected vowel in the numeral prefix for this class, since *e* is the [+ATR] variant for the *e/a* vowel alternates). Assuming that the *-y-* in the KA class agreement prefix correlates with the K in the same way that the round glide in the BV agreements correlates with the B, the KI, KU, and KÙ classes must have all had high vowels which coalesced with the *-y-* glide (**tyI-* → *tI-*, **tyU-* → *tU-*).

I borrow the term *tonal concord* from Ford [1971a:24ff.].[8] Tonal concord differs from vocalic concord in that tonal concord is not, strictly speaking, a type of

[7] The glide in this prefix seems to vary between [w, y, ɥ]. The variant I most frequently notated is the latter.

[8] Ford [1971a:24ff.] uses the term "tonal concord" in two distinct ways. One is the tonal alternation of the definite suffixes, which is conditioned by the preceding tone (Tables 10 and 12).

nominal class concord. In tonal concord, the tone of an attributive modifier prefix is determined by the tone of the head noun prefix, regardless of the class of that noun. Among the attributive modifiers that I investigated, I found three cases of tonal concord. These are the cardinal numeral, the interrogative 'how many?' (which differs only slightly from the cardinal numerals), and the indefinite *-tɔ̄*.

For *cardinal numbers*, if the noun class prefix bears tone 3 or tone 4, the numeral prefix bears tone 2; if the noun class prefix bears tone 1, the numeral prefix does as well.

Table 17. Tones of cardinal numeral prefixes[9]

Class	Tone 4 or 3 prefix on head noun		Tone 1 prefix on head noun	
O	ɔ́dzɛ̄ tɔ̀lɛ̀ ɔ̄gā tɔ̀lɛ̀	'1 woman' '1 animal'	(no tone 1 prefixes in this class)	
BA	bádzɛ̄ tu̱ɛ̀nɛ̀ bāgā tu̱ɔ̀và	'4 women' '2 animals'	(no tone 1 prefixes in this class)	
Ò	(no tone 3 or 4 prefixes in this class)		ɔ̀mwɛ̄ tɔ̀lɛ̀	'1 orange'
(L)Ì	(no tone 3 or 4 prefixes in this class)		lì̩mwɛ̄ tìnɛ̀	'4 oranges'
LI	lí̩vā tì̩lɛ̀ lí̩bà tì̩lɛ̀	'1 bean' '1 hoe'	lìglì tìlɛ̀	'1 wall'
A	ávā tɛ̀nɛ̀ ābà tɔ̀và	'4 beans' '2 hoes'	ègli tàvà	'2 walls'
KI	kí̩dɛ̄ tì̩lɛ̀ kīkù tì̩lɛ̀	'1 mortar' '1 yam'	kì̩gū̩ tìlɛ̀	'1 war'
BI	bí̩dɛ̄ tù̱và bīkù tù̱nɛ̀	'2 mortars' '4 yams'	bì̩gū̩ tù̱và	'2 wars'

Ford's other use of "tonal concord" is the correlation of the tone of an attributive modifier prefix with a head noun class prefix. I use the concept of "tonal concord" only in the second way.

[9] I do not fully understand the tones of number roots. In counting forms, the illustrative numbers here have the following tones: *ɔ̀lé* 'one', *ɔ̀và* 'two', *ɔ̀né* 'four'. Significantly, those marked with tone 4 here ('one' and 'four') do not terminate in glottal stop, in contrast to all lexical substantives which end in tone 3 or 4 (see end of §2.4). 'Two' is also tonally peculiar in that it has two level low tones [_ _], in contrast to the canonical pattern of a series of lows which drops before pause. In enumerating nouns, the numbers which end in tone 4 in isolation end in tone 2, i.e., if the numeral prefix bears tone 2, the numeral root has the same pitch and if the numeral prefix bears tone 1, the numeral root rises only to the level of tone 2.

KU	kū̱lī̱ tùlɛ̀ '1 palm tree'	kù̱sà tùlɛ̀	'1 cloth'
BÀ	(no tone 3 or 4 prefixes in this class)	bàlī̱ tɥàʋà bàsà tɥ̱ɛ̀nɛ̀	'2 palm trees' '4 cloths'
KA	kāwɛ̄ tyɛ̀lɛ̀ '1 axe'	kèzī tyèlɛ̀	'1 bowl'
KÙ	(no tone 3 or 4 prefixes in this class)	kù̱wɛ̄ tùnɛ̀ kùzi tù̱ʋà	'4 axes' '2 bowls'

Ford [1971a:28] assigns tone to the numeral prefixes with the following rule:

$$\text{Cardinal prefix} \rightarrow \begin{bmatrix} \text{-high} \\ \alpha\text{raised} \end{bmatrix} / [_{\text{N pref.}} [\alpha\text{high}] \ldots \_\_]$$

i.e., provide a numeral prefix with tone 1 (= [-high, -raised]) if the tone of the nominal prefix is [-high] (= tone 1) and tone 2 ([-high, +raised]) if the tone of the nominal prefix tone is [+high] (= tone 3 or 4). This rule has in its favor the fact that it works, but the phonetic motivation, if any, is minimal. Moreover, there is no apparent link to other Avatime tonal processes. I suggest that the underlying tone of the numeral prefix is tone 1 (the tone found in all the counting forms) and that the tone of the head noun prefix is copied onto the numeral prefix syllable, producing a 3/4+1 or 1+1 tonal combination on the prefix. In the latter case, the result will automatically be tone 1. We have seen elsewhere that tones 3+1 on one syllable coalesce to tone 2. There are at least two possible accounts for the coalescence of tones 4+1 to tone 2. We might simply say that any non-1+1 coalesces to tone 2. Alternatively, we might say that tone 1 is copied to a numeral prefix if the head noun prefix bears tone 1 and tone 3 is copied to the numeral prefix elsewhere.

Ford [1971a:32] lists the interrogative *-sɛ̀* 'how many?' as having prefixes with invariable tone 2 rather than showing tonal concord. My principal informant did have tonal concord for this word. Tonal concord for 'how many?' differs from numeral tonal concord in that the prefix has a rising glide when the head noun prefix has tone 3 or 4 and a falling glide when the head noun prefix has tone 1. For semantic reasons, 'how many?' cooccurs only with plural count nouns. Illustrations in Table 18 are with the A and BI classes, which are the only plural classes with nouns bearing all three possible prefix tones, 4, 3, 1.

Table 18. Tones of prefixes for *-sɛ̀* 'how many?'

Class	Tone 4 or 3 prefix on head noun		Tone 1 prefix on head noun	
A	ávā tǎsɛ̀ ābà tǎsɛ̀	'how many beans?' 'how many hoes?'	èglì tâsɛ̀	'how many walls?'
BI	bí̩dē tǔ̩sɛ̀ bīkù tǔ̩sɛ̀	'how many mortars?' 'how many yams?'	bì̩gū̩ tû̩sɛ̀	'how many wars?'

The contour tones start at about the level of tone 2 and rise to about the level of tone 4 or fall to the level of tone 1, respectively. Iconically, it is as if the prefix of *sɛ̀* bears tone 2 and the prefix tone of the head noun is placed *after* that tone. There are several problems with this analysis, however. First, all other cases of derived contour tones that I know of in Avatime involve conflating tones 1+4 on one syllable to give a rising tone—other tonal conflations yield level tones rather than contours. Second, the "iconic" analysis for 'how many?' is unrelated to that for the cardinal numbers, even though the prefixes seem to be identical. I must therefore leave this as a problem without a satisfactory solution.

Among attributive modifiers, the final example of tonal concord to be examined is the vocalic prefix of the indefinite marker *-tɔ̄*. In this case, the prefix is a vowel, which coalesces with the final vowel of the head noun to form a single syllable. One must therefore take into consideration the tone of the head noun prefix and the tone on the last syllable of the head noun. Tables 19a and 19b below show the tones of the syllables resulting from the coalescence of the suffix tone, which is derived from the tone of the head noun prefix, and the final tone of the noun stem.

Table 19a. Indefinite *-tɔ̄* on nouns with tone 3 or 4 prefix (P = prefix tone of noun, F = final tone of noun, R= result tone from coalescence of F+P)

Class	P-3/4, F-3 → R-4		P-3/4, F-1 → R-1̂4 (see below)	
O	ɔ́dzɛ́tɔ̄ ɔ̄gátɔ̄	'some woman' 'some animal'	ōvětɔ̄	'some mouse'
BA	bádzátɔ̄	'some women'	bēveătɔ̄	'some mice'
LI	lí̩vátɔ̄	'some bean'	lí̩bětɔ̄	'some hoe'
A	ábátɔ̄	'some beans'	ābătɔ̄	'some hoes'
KI	kí̩dɛ́tɔ̄	'some mortar'	kīkɥ̩ětɔ̄	'some yam'
BI	bí̩dɛ́tɔ̄	'some mortars'	bīkɥ̩ětɔ̄	'some yams'
KU	kū̩lí̩tɔ̄	'some palm tree'	kūdětɔ̄	'some road'
KA	kāwátɔ̄	'some axe'	(no examples elicited)	
SI	sí̩wɛ́tɔ̄	'some grass'	(no examples elicited)	

Table 19b. Indefinite *-tɔ̄* on nouns with tone 1 prefix

Class	P-1, F-3 → R-3(?!) (see below)		P-1, F-1 → R-1	
Ò	ɔ̀mwɛ̄tɔ̄	'some orange'	(no examples elicited)	
(L)Ì	l̩ìmwɛ̄tɔ̄	'some orange'	(no examples elicited)	
LI	(no examples elicted)		lìglìtɔ̄	'some wall'
A	(no examples elicited)		èglìtɔ̄	'some walls'
KI	k̩ìgū̩tɔ̄	'some war'	(no examples elicited)	
BI	bìgu̩ɛ̄tɔ̄	'some wars'	(no examples elicited)	
KU	(no examples elicited)		kù̩sàtɔ̄	'some cloth'
BÀ	bàl̩iātɔ̄	'some palm trees'	bàsàtɔ̄	'some cloths'
KA	kèzītɔ̄	'some bowl'	(no examples elicited)	
KÙ	kùzītɔ̄	'some bowls'	(no examples elicited)	
SI	sìm̩ītɔ̄	'some excrement'	(no examples elicited)	

There is variation in the results of the vowel coalescences—most commonly, V_2 (the prefix of *-tɔ̄*) is elided, but sometimes V_1 (the stem final vowel of the head noun) is elided and sometimes V_1 is retained as a glide (see Schuh [1995] for more detailed discussion). I have given the forms as I recorded them in my notes. See Table 17 above for the stem final vowels and tones of the illustrative nouns; see Table 16 for the vowels of the prefixes of *-tɔ̄*.

My data differ from Ford's [1971a:24-25] in two respects. A minor difference is in the rising contour seen in the right-hand column of Table 19a. Ford describes this as a 1-4 rise. In my data the starting point of the contour is rarely, if ever below the level of the preceding tone and is sometimes higher. There is probably no substantive difference here. In any account, the contour clearly comes from a combination of tone 1+3/4. The fact that the starting and ending points of the contour are not at the predicted pitch levels probably has no phonological significance.

The second, perhaps more substantive difference between mine and Ford's data is the realization of tones P-1+F-3 in the left-hand column of Table 19b. Here, Ford [1971a:25] has a surface realization of R-2, e.g., */lìbī + tɔ̄/ → lìbǐtɔ̄* 'some tick' with tones 1-2-3 rather than tones 1-3-3 as in my data for an expression like 'some orange'. It would, in fact, make me happier to have the tones that Ford gives inasmuch as I have suggested at several points that the major source of tone 2 is conflation of tones 1 and 3. However, I have numerous tokens of the construction in question, including recordings which I have carefully checked, and they are consistent in showing the 1-3-3 tone pattern. One possibility is that the sequence 2-3# levels to 3-3# (or 2-2#). As noted in footnote 9, numeral root tones appear to undergo such a leveling. This solution would need further checking.

Ford [1971a:27] assigns tone to the indefinite prefixes with the following rule:

$$\text{Indefinite adjective prefix} \rightarrow \begin{bmatrix} \alpha\text{high} \\ \alpha\text{raised} \end{bmatrix} / [_{\text{N pref.}} [\alpha\text{high}] \ldots \_\_\_$$

i.e., provide the prefix of *-tɔ̄* with tone 1 (= [-high, -raised]) if the tone of the nominal prefix is [-high] (= tone 1) and tone 4 ([+high, +raised]) if the tone of the nominal prefix tone is [+high] (= tone 3 or 4). This rule has the same problems as those for Ford's similar rule for the numeral prefixes. Moreover, the two rules together each make the other look all the more arbitrary. Unlike the numeral prefix, however, there is no readily apparent analysis whereby the prefix of *-tɔ̄* can be assigned a single underlying tone from which all the surface forms result, i.e., it appears that the prefix of *-tɔ̄* does gets its tone from the head noun's prefix tone through "tonal concord". As an alternative to Ford's abstract account, making use of variables, I suggest that the prefix of *-tɔ̄* simply copies the tone of the head noun prefix. This accounts for prefix tones 4 and 1. In the case of tone 3, Ford [1971a] documents a number of environments where tone 3 is raised to tone 4 before another tone 3 (see Schuh [1995] for some discussion). I propose that the copied tone 3 undergoes this raising before the tone 3 of *-tɔ̄*.

There are some attributive modifiers which Ford [1971a] gives with prefix concord, and, in some cases, tonal concord but with which my informants had no concord marking at all. Ford provides very few examples. I have tried to pair examples from his and my data which are comparable:

Table 20. Attributive modifiers with prefixes in Ford [1971a] but lacking prefixes in Schuh's data

Modifier	Schuh		Ford [1971a]	
'no, none'	kī-kù tɔ́tɔ̄	'no yam'	kī-bū kī-tɔ́tɔ̄	'no thorn'
	kị̀-gū̀ tɔ́tɔ̄	'no war'	kì-bū kì-tɔ́tɔ̄	'no honey'
'which?'	ɔ́-dzɛ̄ wɔ̀lí[10]	'which woman?'	ɔ́-lū ɔ̄-wɔ̀lì	'which buffalo?'
	ɔ̀-mwɛ̄ wɔ̀lí	'which orange?'	ɔ̀-lɛ̄ ɔ̀-wɔ̀lì	'which crocodile?'
'any at all'	ɔ́-dzɛ̄ kákeēlū	'any woman'	bī-fū bī-kákeɛ̀lū	'any fires'
	kù̀-sà kákeēlū	'any cloths'	bì-sēbì bì-kákeɛ̀lū	'any sticks'
ordinals	ɔ̄-vè ʋlɛ̀	'the 2nd mouse'	ɔ́-nɔ̄ ɔ̄-ʋlɛ̀	'the 2nd person'
	kī-kù tɔ̀pyɛ̀	'the 1st yam'	kī-kù kī-tɔ̀pwyɛ̀	'the 1st yam'
	kị̀-gū̀ tɔ̀pyɛ̀	'the 1st war'	kì-kù kì-tɔ̀pwyɛ̀	'the 1st piece of rubber'

[10] I elicited examples of 'which ...?' in the frame ___ *wɔ̀lí wɔ̀ mɔ̀?* 'which ___ did you see?'. The final syllable of 'which?' changes to tone 4 in this environment, accounting for the difference in the tone of my and Ford's examples.

To conclude this section it is worth calling attention to one case where no sources on Avatime report concord yet which is one of the canonical environments for concord in Bantu languages, viz. attributive adjectives. The examples in Table 21 do have concord in the definite suffixes, but as pointed out above, these are in constituency with the entire NP and are not obligatorily present:

Table 21. Examples showing lack of prefix concord in attribute adjectives

Cl.	'big'		'tall'		'old'	
O	ɔ̄gā vìdiɛ̀	'animal'	ɔ́nɔ̄ dzɔ́dzɔɛ̄	'person'	ɔ̄gā kókoɛ̄	'animal'
BA	bāgā vìdìwà	'animals'	bánɔ̄ dzɔ́dzɔ̄wà	'people'	bāgā kókōwà	'animals'
LI	lɪ̀klà̀ vìdìnɛ̀	'stone'	lītō dzɔ́dzɔ̄lɛ̀	'mountain'	līgbō kókōlɛ̀	'chair'
A	āklà̀ vìdìnà	'stones'	ētō dzɔ́dzɔ̄là	'mntns'	ēgbō kókōlɛ̀	'chairs'
KI	kīkù vìdiɛ̀	'yam'	kìsēwī dzɔ́dzɔɛ̀	'stick'	kɪ́dē kókoè	'mortar'
BI	bīkù vìdìwɛ̀	'yams'	bìsēwī dzɔ́dzɔ̄wɛ̀	'sticks'	bɪ́dē kókōwè	'mortars'

5. Remarks on Referential Concord

To limit the scope of this paper, I have described in detail only concord of attributive modifiers of nouns. Avatime also has a full range of referential words which show concord with their referents. Funke [1909] and Ford [1971a, 1971b] report on some such referential uses for which I did not collect full paradigmatic data. *Adjectives* may be used substantively by adding the class prefixes of their referents, e.g., [Funke 1909:320] *o-kpékpe/be-kpékpe* 'the short one' (O class)/'the short ones' (BA class), [Ford 1971a:31] *bā-gɔ̄gɔ̄-bà/bà-gɔ̄gɔ̄-bà* 'the rest' (BA class)/'the rest' (BÀ class).[11] Similarly, *demonstrative pronouns* and *indefinite pronouns* can be formed using the prefixes of their referents, e.g., [Funke 1909:306] *li-lɛ-tsyia/la-lá-tsyia* 'this one' (LI class)/'these' (A class), [Funke 1909:308] *bá-tɔ* 'certain ones' (BA class).

There is a full set of personal pronouns corresponding to the respective classes. Two uses of these pronouns are as direct objects of verbs and as free pronouns, not bound to any morphosyntactic host. The pronoun corresponding to the O class bears tone 3 and all the rest tone 2. The resemblance to the definite suffixes (Table 7) is obvious, the only differences being the initial *y-* glide for the O class pronoun

[11] Ford [1971a:31] says that the substantival adjective prefixes have tonal concord as follows: tone of the prefix on the adjective will be tone 3 if the tone of the referent's prefix is tone 3 or 4 (i.e., [+h]) and tone 1 if the tone of the referent's prefix is tone 1. However, the only examples he gives are from the O and BA classes, where the prefix tones *must* be 3 or 4, and the Ò and BÀ classes, where the prefix tone must be 1. The crucial cases for testing the claim of tonal concord would be those such as the KI or BI classes, where the referent could bear any of the tones 1, 3, 4.

and the initial *k*-'s in the KV classes. The frames for eliciting the nouns and corresponding pronouns head the respective columns.

Table 22. Personal pronouns corresponding to classes

Class	*wɔ mɔ ...?*[12] **'Did you see the ...?'**	*ma mɔ ...?* **'I saw IT/THEM.'**	
O BA	ɔ̄gē bāgāwà	yē wà	'animal' 'animals'
Ò (L)Ì	ɔ̄mwēnɔ̀ ì̩mwēnè	lɔ̀ lɛ̀	'orange' 'oranges'
LI A	lɪ̩bàlɛ̀ ābàlà	lɛ̀ là	'hoe' 'hoes'
KI BI	kīkuè bīkùwè	kɛ̀ wɛ̀	'yam' 'yams"
KU BÀ	kū̩lɪ̩ɔ̄ bàlɪ̩wà	kɔ̀ wà	'palm tree' 'palm trees'
KA KÙ	kāŋwɪ̩à kù̩ŋwɪ̩ɔ̀	kà kɔ̀	'broom' 'brooms'
SI	sɪ̩wāsè	sē	'grass'

Two final cases of interest because they involve both class concord and tonal concord are *subject agreement clitics* of verbs [Ford 1971a:49] and prefixes on *the possessor morpheme -nē* used in independent possessive constructions as illustrated below [Ford 1971a:31]. The segmental forms for the agreement clitics for the respective classes are as follows: *e/a*[13] (O class), *be/ba* (BA class), *è/è* (Ò class), *lì/lɪ̩* ((L)Ì class), *li/lɪ̩* (LI class), *e/a* (A class), *ki/kɪ̩* (KI class), *bi/bɪ̩* (BI class), *ku/kʊ̩* (KU class), *bè/bà* (BÀ class), *ke/ka* (KA class), *kùi/kʊ̩* (KÙ class), *si/sɪ̩* (SI class). The

[12] I have not marked tones in the Avatime frames. The verb *mɔ* and the subject pronoun change tone depending on the initial tone of the object. Object tones are *not* affected, however.

[13] The 3rd singular subject clitics for the O class raise descriptive issues which I have not fully worked out. The vowel harmony variants here appear in most affirmative tenses, e.g., [+ATR] *ē sē* 'he ran', [-ATR] *ā gà* 'he walked', but in the negative, this clitic has the variants *o/ɔ*, e.g., [+ATR] *ǒ sē* 'he didn't run', [-ATR] *ɔ̌ gà* 'he didn't walk'. This cannot be explained by a negative marker "*o*", since there is no alternation in the first person singular pronoun, which has the *e/a* variants everywhere, e.g., *mè sē/mě sē* 'I ran/I didn't run', *mà gà/mǎ gà'* 'I walked/ I didn't walk'. I did not check whether O class human and non-human referents govern the same agreement pattern.

prefixes for the possessor construction are the same as the respective nominal prefixes. I present only representative examples of each to illustrate tones:

kūdō ***kū*** *kēmè*	'the road is big'
kùtsō ***kùi*** *kēmè*	'the monkeys are big'
kūwà ***kū*** *lį́ ní kēpāmè*	'the medicine is in the house'
kụ̀wɔ̄ ***kù*** *lį́ kēpāmè*	'the axes are in the house'
kį́-déyà mē ***kį́-****nē*	'this mortar is mine' ('mortar-this my *ki*-possession')
kī-kuéyà mē ***kį́-****nē*	'this yam is mine'
kị̀-gụéya mē ***kị̀-****nē*	'this war is mine'

According to Ford [1971a:49], the subject agreement prefixes bear tone 3 if the referential noun prefix bears tones 3 or 4 (cf. fn. 11). I did not collect paradigms of all possible tonal combinations to check this. The tone on the possessor prefix is the same as the tone on the prefix of the *-tɔ̄* indefinite, i.e., tone 4 if the prefix of the referential noun bears tones 3 or 4, tone 1 if the prefix of the referential noun bears tone 1 (see Tables 19a, 19b and discussion). Note that both *-tɔ̄* and *-nē* bear tone 3.

6. Conclusion

There is relatively little information available on the Central-Togo languages in general and on Avatime in particular. Funke [1909, 1910], the most extensive published works on Avatime, are valuable descriptive studies, but in many respects, they do not meet the standards and needs of modern linguistics. The only extended, reliable modern linguistic study on Avatime is Ford [1971a], which is unpublished and which is available only in its original manuscript form in the library of the University of Ghana Linguistics Department. Moreover, although this dissertation was of tremendous help in guiding my own research, it is primarily a syntactic study with only the bare essentials of the phonology and nominal morphology. Ford [1971b] is a study of the noun class system, but it is of limited value as a descriptive work on Avatime. The descriptive portion consists entirely of tables of class affixes and concords without presentation of a single full word of Avatime, and the main point of the paper is the application of a theory of markedness to the noun class system rather than a description of Avatime *per se*.

The purpose of this paper has been to provide descriptive information on the linguistic feature for which the Central-Togo languages are best known, viz. their active noun class systems. Nearly all previous works have laid out the noun class system, but the present paper provides more detail than any single previous work. Besides the inherent linguistic interest of Avatime itself, the information here

should be of typological, comparative, and historical interest. The aspects of Avatime presented here also have a number of features of general linguistic interest, e.g., the concept of tonal concord (first noted by Ford [1971a]), the results of tone and vowel coalescence, and the variety of concord types (or lack of them).

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NCs IN MOGHAMO: PRENASALIZED ONSETS OR HETEROSYLLABIC CLUSTERS?*

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This paper is concerned with the analysis of nasal-plus-oral-stop sequences in Moghamo, a Grassfields Bantu language of Cameroon. Although Stallcup [1978] tentatively analyzed these sequences as heterosyllabic clusters, the evidence suggests that they are actually prenasalized syllable onsets. First, the distribution of NCs closely parallels that of unambiguous onsets: they occur both initially and medially in words of several grammatical categories. Instances of unambiguous heterosyllabic clusters, by contrast, are rare. Second, while the nasal portion of noun-initial NCs was historically a prefix, it appears to be part of the root synchronically. Third, the nasal portion of an Niger-Congo does not appear to be phonologically tone-bearing. Finally, the contention that NCs are on-sets is supported by native speaker intuitions.

1. Introduction

Many Niger-Congo languages have word-initial clusters or units consisting of a nasal consonant followed by a homorganic oral consonant. These entities (henceforth NCs) pattern differently in different languages. In some languages, for example in many Gur [Naden 1989] and Kwa languages, tonal and distributional facts argue that the nasal consonant in such cases is a separate syllabic segment. In these languages, a word-initial NCV sequence is syllabified .N.CV, as illustrated in the Nawuri examples in (1) (from Casali [1995]). (The word-initial nasal consonants in (1a,b) are first person singular subject pronoun prefixes, while those in (1c,d) are noun class prefixes.)

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(1) a. *.m.ba.* 'I am coming'
b. *.n.sʊ.* 'I have'
c. *.n.ta.* 'alcoholic drink'
d. *.n.kɛ.* 'days'

In other languages, for example Fula, Wolof, and many Bantu languages (e.g., Ewondo, Chichewa, Kinande), the evidence demands instead that NCs be analyzed as unitary "pre-nasalized" segments which constitute a syllable onset both word-initially and intervocalically. This is illustrated in the Wolof examples in (2), drawn from Ka [1987].[1]

(2) a. *.mbaam.* 'donkey'
b. *.ndab.* 'utensil'
c. *.Njaay.* (person's name)
d. *.ngooñ.* 'cattle food'
e. *.le.mpo.* 'tax'
f. *.di.ndi.* 'to take off'
g. *.fu.nki.* 'to balloon'
h. *.go.ngo.* 'perfumed powder'

In the case of Moghamo, a Grassfields Bantu language of Cameroon, Stallcup [1978] opts for an analysis of the N and C as belonging to different syllables, as in (1), after a carefully considered comparison with an alternative, same-syllable analysis, comparable to that in (2). The aim of this paper is to show that, while Stallcup's reasoning is generally valid as far as it goes, a fuller treatment of the evidence—including some facts not available to Stallcup—actually supports treating NCs in Moghamo as unitary, "prenasalized" syllable onsets, not only in word-initial position but in intervocalic position as well.

Although a claim that the two halves of an NC are syllabified together in a single syllable onset does not logically require analyzing the NC as a single segment rather than as a consonant cluster, phonologists have in fact generally treated tautosyllabification as going hand-in-hand with monosegmental status. Here, however, I am not primarily interested in how many segments are involved, but in the question of whether or not the nasal and non-nasal portions of a Moghamo NC belong to the same syllable. In keeping with this emphasis, I will hereafter refer to a syllabification pattern like that in (1) as a heterosyllabic analysis and the pattern in (2) as a tautosyllabic analysis.

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[1] The symbols used are those of Ka. These appear to have IPA values as follows: Nj = [ɲɗʒ], ñ = [ɲ], ng = [ŋg], e = [ɛ], o = [ɔ].

The data on which this paper is based represent the Batibo dialect, which also formed the basis of Stallcup's study.[2] In general, data from our study are in very close agreement with his, although there are isolated lexical differences, e.g., the word 'dog', which is [bok] in his data, is [buk] in the speech of our consultant, Ms. Bridget Teboh.

The remainder of this paper is organized as follows. Section 2 provides background on the Moghamo phonological system. Section 3 briefly describes the inventory of attested NCs and their distribution. Section 4 summarizes Stallcup's reasons for treating NCs as heterosyllabic clusters and provides counterarguments in favor of the tautosyllabic analysis. Section 5 provides additional evidence, from native speaker intuitions, in support of the tautosyllabic analysis. The paper ends with a brief conclusion in section 6.

2. Background

2.1 Segment Inventory. Setting aside the possible monosegmental status of NCs, Moghamo has a total of eighteen consonant phonemes, as shown in (3).

(3) Moghamo consonants

p	t	tʃ	k	ʔ
b	d	dʒ	g	
m	n	ɲ	ŋ	
f	s			
		z		
		y	w	

/s/ and /z/ are often realized as alveopalatal fricatives [ʃ] and [ʒ]. This variation seems to be free rather than conditioned.

The oral vowel inventory, according to Stallcup [1978], is given in (4).

(4) Moghamo vowels

i	ɨ	u
e	ə	o
	a	ɔ

[2] Data were collected as part of a class in Field Methods at UCLA during the Winter and Spring quarters 1994 and are based on the speech of our language consultant for the class, Bridget Teboh, a UCLA graduate student majoring in African Area Studies. She is from the village of Batibo, in the North-West Province of Cameroon.

Three of these vowels, /i/, /e/, and /a/ have distinctive nasal counterparts. The status of [ə] and [ɨ] as separate phonemes is dubious, as there are few if any clear examples of contrast between these segments. Since I have not so far been able to completely predict the relative distribution of these segments, however, I will follow Stallcup in treating them as separate phonemes. Contrast between [ɔ] and [o] is limited; the former is largely restricted to closed syllables and the latter to open syllables. There are however a few examples of [ɔ] in open syllables, e.g., [nɔnɔʔ] 'many', and some possible cases of [o] in closed syllables as well. /e/ tends to be pronounced as [ɛ] in closed syllables.

2.2 Syllable Structure. Syllables have the basic structure C(w)V(C). Onsetless syllables do occur but are restricted, as in many languages, to word-initial position. The attested Cw onsets are /bw/, /tw/, /dw/, /sw/, /zw/, /tʃw/, /kw/, /gw/, and /ŋw/. Vowel length is not contrastive. Syllable codas are restricted to /p/, /t/, /k/, /m/, /n/, /ŋ/, /ʔ/, and, in a few lexical items, /d/. Setting aside cases involving word-medial NCs, which will be discussed below, closed syllables in non-word-final position are almost non-existent. Stallcup does, however, cite a few examples of non-final closed syllables, including the following:

(5) a. *bɔmɾi* 'to meet'
b. *ŋwaʔɾi* 'to read'

In Ms. Teboh's speech, these forms are [bɔmni] and [ŋwaʔaɾi], respectively.[3]

Word-final /n/ (and, less commonly, /ŋ/) are sometimes elided in fast speech, as in the examples in (6). When this happens, the preceding vowel is nasalized. (This vowel generally undergoes compensatory lengthening, although this has not been indicated in the transcriptions in (6)).

(6) a. *azet zɔn* → *azet zɔ̃*
tree this
'this tree'

b. *aben mət* → *abɛ̃ mət*
country his
'his country'

c. *mbən bo* → *mbə̃ bo*
your arm
'your arm'

[3] The form [ŋwaʔaɾi] actually means 'to write' in Ms. Teboh's speech. I assume that the gloss 'to read' given for example (5b) by Stallcup is simply an error. Ms. Teboh's form for 'to read' is [kaɾi].

/p/ is also sometimes elided word-finally, but only when followed by a word beginning with a consonant.

(7) a. *mbɔp kə gwɛ* → mbɔ kə gwɛ̃
they PERF sleep
'they slept'

b. *izɔp nəp* → izɔ nəp
their house
'their house'

In other cases, underlying word-final consonants (including some instances of final /p/) may surface with a following epenthetic vowel (generally [ə]); the underlying coda consonant is then presumably resyllabified as an onset to the syllable containing the epenthetic vowel.

(8) a. *azet mət* → *azeɾe mət*
tree his
'his tree'

b. *atuk mət* → *atuɣə mət*
head his
'his head'

c. *nəp ŋwaʔaɾi* → *nəbə ŋwaʔaɾi*
house book
'school'

d. *itum nən* → *itumə nən*
my-PL-N bird
'my birds'

Examples (8a) and (8b) also illustrate a common lenition process, in which certain intervocalic instances of /t/ and /k/ are realized as [ɾ] and [ɣ], respectively. (/p/ is sometimes realized as [β] in this same environment as well, e.g., [nəbə] in (8c) might also be pronounced [nəβə].)

The factors which determine exactly when epenthesis applies are not yet clear; it appears to be optional at least under some circumstances. Two things are reasonably clear however: First, [ə]'s resulting from epenthesis do not seem to be distinguishable in quality or duration from [ə]'s which are underlying (i.e., the epenthetic [ə]'s are not merely excrescent). Second, epenthesis does not apply utterance-finally, but only when the word-final consonant is immediately followed by a word beginning in a consonant.

2.3. Tone. The tonal system of Moghamo is complex.[4] Four tone levels appear on the surface. There are also a variety of contour tones. Evidence from tone has an important bearing on the analysis of NCs, as we shall see later.

3. Distribution and Behavior of NCs

Four NCs occur in Moghamo, all of which consist of a nasal consonant followed by a homorganic voiced obstruent: [mb], [nd], [ɲdʒ], and [ŋg].[5] These occur both word-initially, as in (9), and word-medially, as in (10).

(9) a. *mbi-tikup* [mbiɪikup] 'boxes'
b. *ndandan* 'many'
c. *ɲdʒik* 'sheep'
d. *ŋgoʔ* (person's name)

(10) a. *sambe* 'seven'
b. *kɔndi* 'think'
c. *ŋwəmbi* 'smile'
d. *taŋgi* 'make'

The word-initial NCs occur most frequently in nouns, although they are also found in two verbs, [ɲdʒɔ] 'enjoy', which is a borrowing from English, and [mbəŋənə] 'daydream'. In addition, initial /nd/ occurs in the quantifier [ndandan] 'many', while /mb/ occurs in some demonstratives (e.g., [mbɔn] 'these') and pronouns (e.g., [mbɔp] 'they').[6] Stallcup's (p.77) assertion that root-medial NCs occur only in verbs is largely correct, although we have found two exceptions, the numeral [sambe] 'seven', and the loan word [maŋgoɾo] 'mango'. Also, there are a number of personal names in which an NC is directly preceded by an initial vowel, e.g., [aŋgum] (more examples are given below). It is not clear whether these initial vowels may be analyzed as prefixes, or whether the names should be considered monomorphemic.

The word-initial NCs in (9) contrast with "near-initial" NCs that surface with a preceding vowel. Stallcup (p.76) found just two examples of these initial VNC sequences:

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[4] For an analysis of tone in the Ngambo dialect of Moghamo, see Asongwed and Hyman (1976).

[5] [ŋw] also occurs in a few words. It is not entirely clear whether this is to be treated as an NC analogous to /mb/, /nd/, /ɲdʒ/, /ŋg/, or as a Cw cluster patterning with the clearly attested Cw's /bw/, /tw/, /dw/, /sw/, /zw/, /tʃw/, /dʒw/, /kw/, and /gw/. I follow Stallcup in assuming the latter.

[6] In its occurrence in demonstratives and possessive pronouns, /mb/ functions as a separate morpheme, an "agreement consonant" which marks the noun class of the head noun. (See p. 160.)

(11) a. *à-mbǎn* 'boil' (noun)
b. *ì-ŋgɔ̄n* 'plaintain'

The word-initial vowels in both examples are noun class prefixes. In my own data, (11b) is [ŋgɔn], with no initial [i]. Our data contain a number of additional examples, including the following:

(12) a. *áŋgūm* (person's name)
b. *íŋgwàrí* (person's name)
c. *íɲdʒìkì* (person's name)
d. *í-ŋgɔ̄p* 'mother'

According to Stallcup, some word-initial NCs (those belonging to his noun gender 9/10) may be optionally realized with a prothetic vowel [i]. As examples, he gives the following (p.147):

(13) a. *mbap* ~ *imbap* 'vegetable'
b. *ndɔŋ* ~ *indɔŋ* 'horn'
c. *ɲdʒim* ~ *iɲdʒim* 'back'
d. *ŋgup* ~ *iŋgup* 'chicken'

(13a) does not occur in our own data. We have occasionally transcribed (13c) and (13d) with an initial [i], although I suspect that such pronunciations are rare at best in our consultant's speech.

4. Analysis of NCs

4.1. Distributional Evidence. One of Stallcup's reasons for analyzing NCs as heterosyllabic clusters is that they are of limited distribution. According to his data, intramorphemic NCs are basically limited to occurring medially in verb roots.[7] (The initial NCs in (13) are not exceptions to this statement from his viewpoint because he analyzes the nasal portion as a separate morpheme, a noun class prefix. The initial VNCs which occur in nouns do constitute exceptions to this statement; however, as stated above, Stallcup's data contained only two such examples, i.e., the words in (11).) It is precisely in this position that his data also contain at least a few medial CC sequences which must clearly be analyzed as heterosyllabic, as in (5) above.

[7] Stallcup notes that medial NC's in verbs (as well as the rarer CC clusters that occur in words like those in (5)) have arisen from heteromorphemic N+C sequences historically. There is, of course, no reason why this would necessarily rule out a synchronic analysis as unitary syllable onsets.

If it is in fact true that intramorphemic NCs are restricted to exactly those positions in which unambiguous heterosyllabic clusters occur, this would indeed favor a heterosyllabic analysis of these entities. It must be noted, however, that CC clusters of the type in (5) appear to be very rare. (As noted above, moreover, only one of the two forms in (5) actually contains a cluster in our consultant's speech.) Also, intramorphemic NCs in our own data are not entirely restricted to medial position in verb roots. As noted previously, we have several morpheme-medial occurrences in non-verbs, as well as at least one (discounting the loanword [ɲdʒɔ] 'enjoy') initial NC in a verb root. I argue below, moreover, that both the N and C portions of the word-initial NCs in noun like those in (13) are actually part of the noun root; the N should not be analyzed as a noun class prefix. If this is correct, then it would appear that NCs can occur in both morpheme-initial and morpheme-medial position.

4.2. Morphological and Tonal Evidence. In support of a heterosyllabic analysis of NCs, Stallcup gives a further argument based on morphological and tonal considerations:

> When NC occurs in gender 9/10 nouns [this gender includes the nouns in (13)—RC] there is a morpheme boundary between the N and the C and the N is syllabic with a low tone.

There are three potentially separate (but clearly interrelated) claims here:

1. There is a morpheme boundary between the N and the C in these cases.
2. The N is syllabic.
3. The N bears a low tone.

It is not immediately obvious how damaging the first of these claims, if true, would be to a tautosyllabic analysis of NCs, since there are languages in which linguists have argued that NCs are syllabified as single onset segments in surface representations even though the nasal constitutes a separate morpheme. This is true, for example, of Wolof [Ka 1987], Bafanji [Jun 1992] and Kindendeule [Ngonyani 1992]. The last two claims would, however, presumably be seriously damaging to the tautosyllabic analysis if their truth could be established. This is because onset consonants are not, in general, expected to bear tone, nor, of course, should they be syllabic. I will argue, however, that each of these claims is based on a problematic interpretation of the data.

Consider first the claim that the N and C portions of these word-initial NCs are separated by a morpheme boundary; more specifically, Stallcup claims that the N portion is a noun class prefix. He does not justify this claim directly, and as far as I can tell the only pieces of evidence for it are the following two facts:

1. The noun gender[8] (Stallcup's gender 9/10) to which the NC initial nouns belong (as determined by concord and other facts) is related historically to the Proto-Bantu gender 9/10, which had homorganic nasal consonants as both singular and plural class prefixes.
2. A considerable number of the nouns in Moghamo gender 9/10 begin with NCs. (Other nouns in this gender have, in Stallcup's analysis, either an /i-/ prefix or a zero prefix in both singular and plural forms.)

While this evidence is suggestive to some degree, it is not really convincing. Whatever the historical origin of the initial NCs in gender 9/10 may be, there is nothing in the present day language to suggest that they are not simply part of the root. For one thing, there are no morphological alternations: the same word-initial NCs show up in both the singular and plural forms of these nouns, in all contexts, as in the examples in (14).

(14) a. *ndɔŋ* 'horn/horns'
b. *ɲdʒim* 'back/backs'

This is not the case in general: all other genders take different noun class prefixes with their singular and plural forms.[9] Second, there are other nouns in the 9/10 gender which clearly lacks prefixes in both the singular and plural forms, e.g., [buk] 'dog'.[10] In the absence of clear evidence to the contrary, I see no reason not to assume that nouns in this same gender, like [ɲdʒim] 'back(s)', which have initial NCs, are also monomorphemic. Third, the only initial NCs which occur are those in which the C is a voiced plosive, i.e., /mb/, /nd/, /ɲdʒ/, and /ŋg/. The absence of other clusters, e.g., those in which the C portion is a voiceless obstruent, is at the very least suspicious: if N is really a noun class prefix we might expect it to occur before roots commencing in a variety of consonants. The restriction to NCs in which C is a voiced stop makes perfect sense, on the other hand, if these NCs are unitary prenasalized segments, since these are precisely those prenasalized consonants which are most favored cross-linguistically.[11]

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[8] Following Stallcup, I use the term "gender" to refer to a group of nouns which have both singular and plural class markers in common.

[9] I except from this statement a few single class genders, e.g., Stallcup's 6a, whose (non-count) nouns (e.g., [minip] 'water') do not show distinct singular and plural forms.

[10] This word is [bok] in Stallcup's data.

[11] In fairness, there are points which could be raised in response to this third argument. To begin with, Stallcup (p.151) suggests a historical explanation for the absence of NC's in which C is voiceless: the diachronic loss of homorganic nasals before voiceless consonants is common. If we assume that the nasals were not just lost absolutely before voiceless C's, but changed to [i] (perhaps via an intermediate [i̥n] stage), we could explain another surprising fact, that nouns in gender 9/10 commence with [i] (which Stallcup takes to be a prefix) if and only if the following

continued on next page...

Note moreover that even if the nasal portion of the initial NCs in nouns in gender 9/10 could be analyzed as a separate morpheme, i.e., a noun class prefix, this analysis could not be extended to the verb root [mbəŋənə] 'dream'. Demonstratives like [mbin] 'those' and [mbon] 'these' pose the same difficulty. Here the evidence is perhaps even more telling, since the general forms of demonstratives in Moghamo are /C+in/ ('those') and /C+on/ ('these'), where C is an "agreement consonant" that may be either /mb/, /w/, /z/, or /t/; the choice of which C is employed depends on the noun class of the head noun. Clearly, treating this /mb/ as a cluster is suspicious, in view of the fact that in all other cases the agreement C is an unambiguous singleton consonant.

There is a further argument to support my contention that these initial N's are not prefixes but rather part of the root. In certain contexts, nouns may appear without the class prefixes that they take in most contexts. This is possible for example following possessive pronouns, as illustrated in (15), using nouns that take the prefixes /fi-/ (singular, class 19) and /ti-/ (plural, class 13).

(15) a.	*i-fum fi-nən*	~	*i-fumə nən*	'my bird'
b.	*i-tum ti-gwire*	~	*i-tumə gwire*	'my ants'

According to Ms. Teboh, the forms without the prefixes are more likely to be used by older people, while those with the prefixes are more likely to be used by younger people. If the N portion of an NC-initial noun were in fact a prefix, then we might expect that it could also be optionally omitted. This is never possible. A word like [ɲdʒim] 'back' is never realized as *[dʒim], without the initial nasal portion, for example.[12]

Next consider the claim that the initial N's are syllabic. Presumably the main piece of evidence for this is their tone bearing status, which I discuss below. In principle, we might also look for evidence from phonological processes that are sensitive to syllable count or from extralinguistic sources such as language games, poetry, or music. Stallcup does not discuss any such evidence, however, nor do I have any of my own to offer. (See section 4 below, however, for a different type of extralinguistic evidence involving native speaker intuition.) Beyond this, a sufficiently long duration of the nasal portion of an NC would at least contribute to the auditory impression that this N constitutes a separate syllable. This kind of impressionistic evidence must be treated with some care, however, for it seems unlikely that there is anything like an invariant cross-linguistic durational threshold between an initial .N.CV. sequence and an initial .NCV. sequence. In the absence

consonant is voiceless. Note however that even if Stallcup is completely correct about how things developed historically, this does not necessarily argue against a synchronic analysis of NC's as syllable onsets.

12 I would like to thank Larry Hyman for alerting me to the relevance of this type of data by pointing out the existence of this type of situation in Aghem.

of clear evidence of syllabicity from other sources, then, it would seem that the syllabicity or non-syllabicity of the initial Ns hinges essentially on the tonal facts. It is these to which I now turn.

If the N portion of a word-initial NC does indeed bear a low tone, this would argue against analyzing NCs as unitary onsets, since onset consonants are not, in general, expected to be tone-bearing. (And in fact other onset consonants, whether voiced or voiceless, are not tone-bearing in Moghamo.) It is true that the N of an initial NC sequence is realized on a lower pitch than a following high tone. In a word like [ŋgó?] (a person's name), for example, the pitch of [o] is higher than that of the initial [ŋ]. Crucially, however, the mere fact that these Ns are realized with a low pitch does not necessarily mean that they bear a low tone in either underlying or surface phonological representation. As voiced segments, they must of course be realized with some fundamental frequency; it is conceivable that the low F0 with which they are realized might be assigned only in the phonetic component, and that the Ns are phonologically toneless. To put it differently, the claim that these Ns are tone-bearing requires a demonstration that they may bear *contrastive* pitch. As far as I can tell, no such evidence exists.

The nasal portions of word-medial NCs also fail to bear contrastive tone. Instead of being uniformly low in pitch, however, these medial Ns are always realized on the same pitch as the preceding vowel.[13]

(16) a. *tèmbá* (type of fruit)
([m] realized on same low pitch as [e].)

b. *mɔ́ kə̀ kɔ̀ndī* 'I thought'
([n] realized on same low pitch as [ɔ].)

c. *kɔ́ndí* 'think!'
([n] realized on same high pitch as [ɔ].)

d. *áŋgūm* (person's name)
([ŋ] realized on same high pitch as [a].)

Other evidence that the nasal portion of NCs is phonologically toneless comes from tonal stability. When an underlying high-toned word-final vowel directly

13 In contrast, word-final nasal consonants need not be realized on the same pitch as the preceding vowel, cf. [átʃáń] 'village' [ítáǹ] 'five', [ɲàm] 'animal', [bè?éḿ] 'carry me'. It is not completely clear that the presence of the nasal coda is what licenses the final contours in [ítáǹ] and [bè?éḿ], however, since there are words in which contours occur on final light syllables, e.g., [fîmî] 'vein', [átʃwî] 'sun'. It might, therefore, be possible to analyze these words as [ítân] and [bè?êm], in view of the fact that much of the fall/rise actually occurs on the final nasal and can be viewed as a low level coarticulatory effect. More investigation is needed in this area.

precedes a word-initial low-toned vowel, as in the examples in (17), the adjacent vowels often coalesce into a single (lengthened) vowel which bears both the original tones, i.e., it surfaces with a falling (H-L) tone.[14]

(17) a. *nàʔá àmóʔó* → *nàʔâːmóʔó*
'give the banana' (imperative)

b. *bèʔé ìŋwàʔàrì* → *bèʔêːŋwàʔárì*
'carry the books' (imperative)

When, however, a word-final high-toned vowel directly precedes a word-initial NC, as in (18), the low pitch with which the N is realized when its word is pronounced in isolation typically disappears without a trace (note in particular that it does not trigger downstep, which regularly results from floating low tones in Moghamo), and the N is pronounced instead with the same high pitch as the preceding vowel.

(18) a. *zó ɲdʒìk* → *zóɲ́dʒìk*
'buy a sheep' (imperative)

b. *àmə́ ɲdʒàbí* → *àmə́ɲ́dʒàbí*
'my sister'

c. *bèʔé ŋgóʔ* → *bèʔéŋ́góʔ*
'carry Ngoʔ' (Ngoʔ = person's name)

d. *bèʔé mbíkwá* → *bèʔéḿbíkwá*
'carry small things'

The forms in (18) do have optional variants in which the low pitch of the nasal does surface, e.g. we have the forms in (19) as alternate realizations of (18c,d).

(19) a. *bèʔé ŋgóʔ* → *bèʔéŋ̀góʔ*
'carry Ngoʔ' (Ngoʔ = person's name)

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[14] Whether or not coalescence applies depends on a number of factors, including the number of moras in the first of the two words. These are discussed in Casali [1994]. When coalescence applies to sequences of non-identical vowels, it generally involves the elision of the first vowel with compensatory lengthening of the remaining (second) vowel. Where the first vowel is mid and the second high, however, (as in (17b)) the vowel which surfaces is often phonetically identical to the second vowel.

b. *bè?é mbíkwá* → *bè?émbíkwá*
'carry small things'

Two things are relevant here however. First, the examples in (18) and (19) nevertheless contrast with those in (17), in which the low tone of the word-initial prefix vowel is *obligatorily* preserved, i.e., there is no optional form *[nà?á:mó?ó] as a variant of (17a). Second, according to Ms. Teboh, it is the forms in (18) which are more typical of normal adult speech. She describes the pronunciations in (19) as being characteristic of slow speech, like one would use in talking to a child. It is thus reasonable to assume that these variants are pronunciations which arise when each word is pronounced deliberately as a separate utterance or intonational phrase. If this is so, then the low pitch which surfaces in the forms need not be regarded as a phonologically present low tone, but may be treated as a simple consequence of producing the second word in conformity with the pronunciation that it has in isolation.[15]

I conclude that the nasal portion of NCs in Moghamo is not phonologically tone-bearing. Phonetically, it simply receives the pitch of an immediately preceding vowel if there is one; otherwise, it is pronounced with a relatively low pitch. A further source of evidence that the nasal portions of NCs are phonologically toneless comes from the patterns these words exhibit when whistled. In order to hear tonal patterns more clearly, we would often ask Ms. Teboh to whistle the tonal pattern of a word or phrase. Invariably, the result (in words not involving NCs) would show a one-to-one correspondence between the number of whistled pulses and the number of syllables in the word. For example, a two-syllable word with a L H tone pattern is whistled as a low pulse followed by a high pulse, with a very short pause between the pulses. Rising or falling tones on single syllables are whistled as unbroken rising or falling pulses. Significantly, an initial NC typically does not receive a pulse when a word is whistled, e.g., [ɲdʒɨ̀k] 'sheep' would be whistled with only a single low pulse, suggesting that the initial N, though it is pronounced with a low pitch, is not actually tone-bearing.[16] Similarly, [mbə́ŋə́nə́] 'daydream' is whistled with three high pulses; there is no pulse corresponding to the initial nasal, although in normal speech this segment is pronounced with a relatively low pitch.

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15 Here it must be noted however that the forms in (19) were produced without a noticeable pause between the two words.

16 I would like to thank Peggy MacEachern for pointing out the relevance of the whistling patterns.

5. Native Speaker Intuitions

Stallcup did not have evidence from native speaker intuition about syllable division available to him. However, he clearly recognized it's importance (p.78):

> I am not certain, however, how a native speaker would syllabify these words...[i.e., those with NCs--RC]...This would be the most cogent argument for or against a prenasalized series of consonants in Moghamo.

The purpose of this section is to present some limited evidence of this type, based on the intuitions of our Moghamo consultant, Ms. Teboh.

In order to introduce her to the kind of question I was interested in, I first asked Ms. Teboh to divide two- and three-syllable words which contained no NCs into natural parts. The words chosen were those in (20), where the dots correspond to the divisions given by Ms. Teboh.

(20)	a.	*fi.ɾi*	'black'
	b.	*ti.gwi.ɾe*	'ants'
	c.	*i.kwi.ɾi*	'yesterday'
	d.	*a.di.ŋi*	'hill'
	e.	*me.yi*	'women'
	f.	*i.mo.ʔo*	'bananas'
	g.	*mi.nip*	'water'
	h.	*fi.nən*	'bird'
	i.	*bəd* (no div.)	'people'

These divisions coincide exactly with the syllable breaks we would expect.

Ms. Teboh was then given a list of words which, in addition to containing more relatively unambiguous words without NCs, also contained three words with NCs. In each case, her divisions preserved the NC as a unit:

(21)	a.	*sa.mbe*	'seven'
	b.	*kɔ.ndi*	'think'
	c.	*ŋgoʔ* (no div.)	(person's name)

These data support the analysis of NCs as unitary segments in the syllable onset rather than as heterosyllabic clusters.

6. Conclusion

I have argued, on the basis of a variety of evidence, that NCs in Moghamo are prenasalized onsets rather than heterosyllabic clusters. In addition to being fully consistent with the distributional, morphological, and tonal facts of the language, this analysis is supported by native speaker intuitions about syllable structure.

By way of conclusion, I would like to briefly raise one further question: assuming that the tautosyllabic analysis is correct, what evidence does the child learning Moghamo use to arrive at this analysis? While it will not be possible to answer this question here, it seems useful to at least clarify what is at issue.

Setting aside my use of evidence from native speaker intuitions, both my own arguments for this analysis and Stallcup's arguments for the opposing, heterosyllabic analysis are based on criteria of the sort that have long been used to address similar "interpretation" problems that commonly arise in connection not only with NCs but with a number of other phenomena (for example, labialized and palatalized consonants) that occur in African languages. These include a consideration of well-established syllable and/or word patterns, evidence from tonal behavior, morphological evidence, and economy and symmetry of the phonemic inventory. While I believe that a sufficiently thorough evaluation of evidence based on these criteria does in fact vindicate the tautosyllabic analysis, the arguments involved necessarily involve a certain amount of subjective weighting of various criteria. As a result, the fact that two linguists employing roughly the same criteria can arrive at different conclusions is not surprising.

It seems extremely unlikely, on the other hand, that the child learning Moghamo employs the same kind of balancing of multiple criteria (each of which is suggestive but not necessarily completely determinate) which both Stallcup and I have relied upon. For while evidence based on these criteria is sufficiently subjective and subtle to permit two linguists to arrive at opposite conclusions, there is little to suggest that native speakers experience a similar indeterminacy. If they did, we might expect significant interspeaker variation and/or inconsistency of judgment on the part of individual speakers in their intuitive analysis of NCs. While I cannot be certain that this state of affairs does not in fact arise in Moghamo (having worked with only a single speaker) I am not aware of any evidence in the literature on languages with NCs which would suggest this type of variability. In the absence of such evidence, the most reasonable a priori assumption is that different native speakers' analyses of NCs in a particular language do in fact typically converge on the same representation (which in the case of Moghamo we have taken to be a tautosyllabic representation). If this is correct, we must apparently conclude that native speakers have access to some different (or further) principle(s) than the "checklist" of suggestive but not fully determinate criteria which are most commonly appealed to by linguists. I am not prepared to speculate here on what these principles might be; I note, however, that this is clearly a matter that deserves further attention.

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PUBLICATIONS RECEIVED

Kofi Agawu. *African Rhythm: A Northern Ewe Perspective*. Cambridge and New York: Cambridge University Press. 1995. Pp. xx, 217. Contact the publisher for information on price.

[From the Prologue]: "For many people, 'African rhythm' still means 'African drumming.' Yet only one of the book's chapters (Chapter 4) deals with drumming; all the others are concerned with song and performed speech. ... There is, then, something of a dissonance between the overwhelming emphasis in the popular imagination on 'African drumming' as the site of "complex rhythms,' and the considered statements by specialists that song holds the key to understanding these musical cultures.

If song lies at the heart of African musical expression, and since song consists of a fusion or integration or amalgamation of words (or "language" or "text") and music...then a productive approach to the analysis of song will include primary emphasis on the rhythms of language....

It is this view of the centrality of language, a centrality enshrined in the claim that 'without African languages, African music would not exist,' that underlies the approach taken in this book. I have arranged the contents to progress from the less concrete (rhythm as polysemous metaphor, rhythm as a fluid temporal process) to the more concrete (rhythm as technical concept, rhythm as a precise, quantifiable process) and back again. Accordingly, Chapter 1 [Rhythms of society] begins with a 'soundscape' of Northern Ewe society, a fictional ethnography which allows us to listen for manifestations of 'rhythm' in the spectrum of physical activities that take place during a single twenty-four-hour period. Chapter 2 [Rhythms of language] studies the rhythms of spoken and performed language, seeking to draw out the intrinsic 'music' of language in motion. Chapter 3 [Rhythms of song] is devoted to song. It begins at the beginning, so to speak, with children's songs and rhymes, proceeds to various adult genres, and ends with a 'close listening' to one particularly beautiful Northern Ewe lament. Chapter 4 [Rhythms of drumming and dancing] analyzes the rhythms of drum music, not as a repository of word-generated rhythms, but as a set of 'temporal spaces'—with apologies for the mixed metaphor—in which performers (and listeners) play with 'pure' rhythms. Chapters 5 [Rhythms of musical performance] and 6 [Rhythms of folktale performance] move beyond the 'local' to the 'global' in musical and verbal performance. Chapter 5 contains an analysis of a single thirty-five minute performance of song, drumming, and dancing by a group of youngsters ..., while Chapter 6 examines a folktale performance.... Chapter 7 [Epilogue: representing African rhythm] revisits a model for conceptualizing Northern Ewe rhythmic processes introduced towards the end of Chapter 1, and closes with some reflections on some of the issues involved in notating African rhythm..."

The book is accompanied by a CD of some of the speech and songs discussed in the book.

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TOTAL ENCLOSED _____

NAME: _____

ADDRESS: _____

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(Make checks payable to **Russell G. Schuh**)