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VOWEL HARMONY IN KLAO: LINEAR AND NONLINEAR ANALYSES*

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Klao, a Kru language spoken in Liberia, has a nine-vowel system. Like most other Kru languages, it displays harmony sensitive to pharyngeal constriction (tongue-root retraction). What gives the Klao vowel-harmony system special interest is the fact that a great deal of variation occurs, suggesting that vowel harmony is in some way optional. This provides a counter-example to the claim (made in Clements [1977]) that root-controlled vowel harmony is always obligatory. Given this optionality, the question arises as to which model best captures the facts of Klao vowel harmony. Two frameworks are considered: one, along the lines of Anderson [1980], treats vowel harmony as one more assimilation rule, and the other, following the model found in Clements [1981], handles vowel harmony autosegmentally.

1. Introduction

The insights that autosegmental phonology has brought to the study of tone suggest that other phonological phenomena as well are best characterized autosegmentally. Vowel harmony is one such phenomenon, and several autosegmental accounts of it have appeared in the past few years. The leading proponent of the autosegmental treatment of vowel harmony in African languages has been Clements [1977, 1980, 1981]. His 1981 article on Akan presents a highly constrained model with which he accounts for vowel harmony in the Asante dialect of that language.

The question to be taken up in the present article is how best to account for the facts of vowel harmony and other vowel-assimilation processes in Klao, a Kru language spoken in Liberia. First, a linear analysis will be presented. It will be consistent with the conclusions drawn in Anderson

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*I am grateful to my consultants Samson Tiklo and Dubel Nyankun and also to Wɛdiyɔ Samusɛ for their apt assistance. Steve Anderson, Will Leben, and Nick Clements made valuable criticisms of an earlier draft of this paper. Bruce Hayes and Nancy Lightfoot also made helpful comments.

[1980]: that is, that vowel harmony is most aptly characterized as being one kind of vowel-assimilation rule and, consequently, most appropriately accounted for by one's treating it like other vowel-assimilation rules. In the course of the linear analysis, evidence will be introduced for the claim that Klao's vowel system is undergoing a restructuring. Then, once the linear analysis has been presented, a nonlinear analysis along the lines of Clements [1981] will be undertaken.

Kru languages are spoken in Liberia, the Ivory Coast, and Upper Volta. Greenberg [1963] placed them within the Kwa branch of Niger-Congo but acknowledged that the assignment was "tentative". Subsequent analyses—Vogler [1974], Bennett and Sterk [1977], and Welmers [1977]—have concluded independently that the Kru languages ought to be separated from Kwa in any classificatory scheme but do not agree as to the proper place within Niger-Congo for these languages.

Within Kru, Klao is a western Kru language (according to Marchese's [1979] division).[1] Like many other "languages" in the Kru group, Klao is more accurately considered as a dialect continuum. The present work concentrates on Talo Klao, the variety spoken in Nifu, Sasstown Territory, Liberia.

Klao has nine oral vowels and seven nasal vowels:[2]

	Front	Back	Front	Back
High	i	u	ĩ	ũ
Mid	e,ɪ	o,ʊ	ẽ	õ
Low	ɛ	a,ɔ	ɛ̃	ã,ɔ̃

The vowels /ɪ/, /ʊ/, /ɔ/, and /a/ (and their nasal counterparts) are [-EXPanded]. This feature was proposed by Lindau [1975] as a refinement

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[1]Most of the literature on Klao, e.g. Elimelech [1974] and Lightfoot [1974], refers to the language as "Kru"; more recently, "Kru" has been reserved for the language group, and "Klao" has been used to specify the language in question.

[2]The vowel symbols employed here are those used in Ivorian publications on Kru languages. /ɪ/ and /ʊ/ in Klao are, phonetically, not as high as their [-EXP] counterparts in several other Kru languages.

of [Advanced Tongue Root (ATR)] and is consistent with her findings that pharyngeal constriction is a better correlate of the difference between, for example, vowels like Klao's /e/ and /ɪ/ than is tongue-root retraction. ([+EXP] corresponds to [+ATR].)

1.1. Verb suffixes. A number of assimilation rules operate on the Klao vowels. The language has many verb suffixes of the shape (l)V, and they provide the usual site for the operation of these rules. Specifically, the suffixes are the following:[3]

/e/	Passive, Benefactive, Lexical Causative, Contrary-to-Fact, Past Incompletive, Recent
/o/	Conditional, Remote, Locative
/a/	Subordinating
/le/	Dative, Reciprocal, Locative
/la/	Locative

There are no suffixes of the form /lo/ .

Other verb suffixes include the following:

/ma/	Conditional
/ka/	Non-Present
/aka/	Yesterday
/kã/	Tomorrow
/oma/	Day Before Yesterday
/lama/	Day After Tomorrow
/wa/	Anterior, Interrogative
/ke/	Negative Perfective

Finally, object pronouns behave phonologically as part of the verb. They are the following:

	Sg	Pl
1	mú	ãmù
2	mù	ãmú
3	ɔ̃, ɛ̃	Ĩ

(Generally, ɔ̃ refers to animate beings, and ɛ̃ to inanimate objects.

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[3]The behavior of these suffixes with regard to tone requires further investigation and will not be discussed here. However, a general statement can be made with regard to these suffixes that those which are identical segmentally tend to have identical tonal behavior as well. Thus, tone does not, for the most part, serve to distinguish and disambiguate these suffixes from one another.

The functions of the suffixes and object pronouns are treated in Singler [1979a, 1979b].)

So pervasive are the assimilation rules that positing suffixal vowels to be /e/ and /o/ is a somewhat tenuous claim. (Singler [1979a] gives the arguments for this claim.) In the nonlinear analysis presented subsequently, these and all vowels are specified only for the features [BACK], [ROUND], and [LO].

2. Linear Analysis

2.1. Nasality-assimilation and [HI]-assimilation. All of the assimilation rules to be discussed are alike in that they are progressive (rather than regressive) and operate iteratively.

There is a rule of nasality-assimilation whose domain of operation is all sonorants.

(1) Nasality-Assimilation

$$\begin{bmatrix} +\text{SON} \\ <[+\text{CONS}]> \end{bmatrix} \rightarrow \begin{bmatrix} +\text{NAS} \\ <[-\text{CONT}]> \end{bmatrix} / [+\text{NAS}]\_\_\_\_$$

Examples:	/nū-a	-wa/	/ pī -le -la/	
	do-SUBORD	-ANT[4]	cook-DAT-LOC	
	'had done'		'cook here'	
	nũ-a	-wa	pĩ -ne -la	(1)
	nũ-ã	-wa	pĩ -nẽ -la	(1)
	nũ-ã	-w̃a	pĩ -nẽ -na	(1)
	nũ-ã	-w̃ã	pĩ -nẽ -nã	(1)
	[nũ͂ã͂w̃ã͂]		[pĩ͂nĩ͂nã͂]	

(/pī-le-la/ undergoes Rule (2), discussed directly, as well.)

Also, [HI]-Assimilation operates upon $[^{-LO}_{+EXP}]$ vowels (/i, e, u, o /) in the following way:

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[4]The following abbreviations are used:

ANT	Anterior	PSV	Passive
COP	Copula	REC	Recent
DAT	Dative	RECIP	Reciprocal
LOC	Locative	REM	Remote
NOM	Nominalizer	SUBORD	Subordinating

(2) [HI]-Assimilation

$$\begin{bmatrix} +\text{SYL} \\ -\text{LO} \\ +\text{EXP} \end{bmatrix} \longrightarrow [+\text{HI}] \;/\; \begin{bmatrix} +\text{SYL} \\ +\text{HI} \end{bmatrix} ([-\text{SYL}])\_\_\_\_$$

Examples:	/dɪ̄ -o/	/dɪ̄ -le -a -la/
	eat-REM	eat-DAT-SUBORD-LOC
	'ate long ago'	'eat here'
	di -u	di -li -a -la (2)
	[dɪ̄ú]	[dɪ̄lɪ̄ālā]

2.2. Vowel harmony. Almost all Kru languages display vowel harmony. Clements [1974:281] notes

> ...the role of tongue root advancing in the so-called 'horizontal' vowel harmony systems found widely in Africa and elsewhere. In such systems, vowels are classified into two sets (with possible overlap) such that only members of a single set may cooccur within the domain of harmony; the primary phonetic characteristic distinguishing the two sets...is the position of the tongue root.

(As noted above, the findings of Lindau's research show pharyngeal constriction to be a better correlate than retraction of the tongue root.)

Thus, in Klao, vowel harmony refers to the feature [EXP]. With regard to it, Klao vowels can be divided into three categories:

A	B	C
$\begin{bmatrix} -\text{LO} \\ +\text{EXP} \end{bmatrix}$	$\begin{bmatrix} -\text{LO} \\ -\text{EXP} \end{bmatrix}$	[+ LO]
i u		
e o	ɪ ʊ	
		ɛ a, ɔ

A Category A vowel must be followed by another Category A vowel (including itself) or by a Category C vowel, e.g.

(3) $A_i + A_i$: [tētḗ] 'law'
$A_i + A_j$: [ɟēpō] 'to know'
A + C: [tɪ̄ūbɔ̀] 'Monrovia'

Similarly, a Category B vowel must be followed by another Category B vowel (including itself) or by a Category C vowel, e.g.

(4) $B_i + B_i$: [tɪ̀ɪ̀tɪ̄ɪ̄] 'buying' (adj.)
$B_i + B_j$: [ɟɪ̄pʊ̄] a proper name
B + C: [bʊ̄bɔ́] 'trousers'

The Category C vowels are "opaque", a term taken from Clements [1980, 1981]. An opaque vowel "interrupts harmony domains, and may...initiate new domains subject to its control" [1981:119]. Thus, what follows a Category C vowel ordinarily agrees with it for [EXP] (or is another Category C vowel).

(5) [+ EXP]: [cɛ̄|ō] 'red'
[- EXP]: [fāǹɔ̀] 'fear'
C + C: [ɟātnɛ̀] 'star'

The examples that have been given thus far are all monomorphemic forms (except for [t̀ɪ̄t̀ɪ̄]) for which the harmony is expressed through the following MSC:

(6) C_0 V C_0 V
[α EXP] ↓
{[α EXP], [+ LO]}

A kindred P-rule operates on verb suffixes:

(7) Vowel Harmony ([- EXP]-Assimilation)

$$\begin{bmatrix} +\text{SYL} \\ -\text{HI} \\ -\text{LO} \end{bmatrix} \longrightarrow [-\text{EXP}] \,/ \begin{bmatrix} +\text{SYL} \\ -\text{EXP} \end{bmatrix} C_0 \_\_\_\_\_$$

Examples:	/dIā́-Ie -Ie/	/dī -Ie -a -Ie/	
	kill-DAT-LOC	eat-DAT-SUBORD-LOC	
	'kill there'	'eat there'	
	-----	di -Ii -a -Ie	(2)
	dIa -Iɩ -Ie	di -Ii -a -Iɩ	(7)
	dIa -Iɩ -Iɩ	-----	(7)
	[dIāIɩ́Iɩ́]	[dīIīāIɩ̄]	

With regard to the operation of Rule (7), it is significant that ɛ is a [+ EXP] vowel. This fact places it at variance with the other low vowels (a and ɔ), both of which are [- EXP]. The consequence of this difference is clear with regard to vowel harmony: while the other low vowels are ordinarily followed by [- EXP] vowels, ɛ is ordinarily followed by a [+ EXP] vowel:

(8)	/dā´ -e/	/fɔ̄` -e/	/dɛ̄ -e/
	call-REC	breathe-REC	come from-REC
	'called recently'	'breathed recently'	'came from recently'
	[dāí]	[fɔ̄í]	[dɛ̄é]

Probably, the fact that ɛ is [+ EXP] represents a recent innovation. In most other Kru languages having vowel harmony, when ɛ is the conditioning factor, the focus vowel is always [- EXP].[5]

2.3. Variation in verb forms. The rules posited thus far—Nasality-Assimilation, HI-Assimilation, and Vowel Harmony—generate only grammatical output. However, there are forms occurring in Klao at variance with the Vowel-Harmony Rule (7) set out above.

To begin with, when the conditioning vowel is low and the focus is /e/ or /o/ , the Vowel-Harmony Rule generates the following forms:

(9) a. /ɟā´ -o/
climb-REM
'climbed long ago'
[ɟāó]

/dɛ̄ -e/
come from-REC
'came from recently'
[dɛ̄é]

/dɛ̄ -o/
'came from long ago'
[dɛ̄ó]

/fɔ̄` -e/
'breathed recently'
[fɔ̄í]

/fɔ̄` -o/
'breathed long ago'
[fɔ̄ó]

However, the following forms also obtain:

(9) b. /ɟā´ -o/ [ɟāɔ́] and [ɟāó]
/dɛ̄ -e/ [dɛ̄ɛ́]
/dɛ̄ -o/ [dɛ̄ɔ́]
/fɔ̄` -e/ [fɔ̄ɛ́]
/fɔ̄` -o/ [fɔ̄ɔ́]

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[5]Marchese [1979] identifies /ɛ/ as an [-ATR], i.e. [- EXP], vowel. Using Sapir's terminology, Innes [1966] singles out /ɪ/ and /ɑ/ as "bright" (as opposed to "muffled") vowels in Grebo. However, the fact that /ɛ/ , /ɔ/ , and /a/ are always followed by "bright" vowels or themselves can be taken as evidence that they, too, are "bright", i.e. [- EXP]. Unlike most other Kru languages, Krahn (as described by Duitsman [1978]) has [+ EXP] low vowels, /ɛ/ , /ɔ/ and /a/ .

The only case where no variation occurs is when the conditioning vowel is /a/ and the suffixal vowel is /e/ .

(9) c. /ɟā́ -e/ [ɟāí] , not [*ɟāé] or [*ɟāé]
'climbed recently'

Also, for the underlying sequence /...ɔ + ɪe.../ , surface variation occurs:

(10) /bɔ̄ - ɪe/ [bɔ̄ɪī] , [bɔ̄ɪē]
'stop there' (a command)

These variants require a weakening of the vowel-harmony system. What appears to be the case is that the restriction as to what may follow a Category C vowel (only a vowel that agrees with it as to the feature [EXP]) is no longer in effect.[6]

However, there are also variants when the conditioning vowel is a Category B vowel:

(11) /wɪʊ̄́ -ɪe -ɪe/ /nī -o/
be born-DAT-LOC COP-LOC
'be born there' 'be there'
[wɪʊ̄ɪíɪí] , [wɪʊ̄ɪéɪé] [nī̃ʊ̃́] , [nī̃ʊ̃́]

(In the second example in (11), neither variant violates vowel harmony; in the first example, however, the second variant does.)

There are, then, violations of vowel harmony and variation to be accounted for. Rather than invoking stopgap and ad-hoc devices to account for these (though they may well prove unavoidable), it is appropriate to search for the cause of the violations and the variation. Certain patterns can be seen in the problematic forms; all the forms displaying variation fall into one of the following categories:

1. /ɔ/, /ʊ/, or /ɛ/ is the conditioning factor, or
2. an unrounded [-EXP] vowel (/a/, /ɪ/) is the conditioning factor and /o/ is the focus vowel.

2.4. A restructuring of the vowel system. The disruption of vowel harmony and other facts of the language provide evidence that a restructuring of

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[6]Additionally, there are a few lexical exceptions to vowel harmony, e.g. [nā̃nū̃] 'feather' and [w̃ɛ̀nɔ̃̄] 'to smell'.

the vowel system is in progress: specifically, /ɛ/ is becoming more /e/-like, and /ɔ/ and /ɷ/ are becoming more like each other. For the vowel-harmony system to be weakened is consistent with these changes.

As noted above, that /ɛ/ is [+ EXP] (and behaves accordingly in the vowel-harmony schema) almost certainly represents an innovation. Indeed, it can be argued that this feature change represents the first step in a merger between /ɛ/ and /e/ , the resultant vowel being /e/. At the same time, ɔ and ɷ have become virtually interchangeable as the [- EXP] manifestation of the suffixal vowel /o/ . These two vowels, too, seem to be in the process of merging; here, however, since ɷ sometimes behaves like ɔ and vice versa, it is not yet possible to predict which of the two vowels will survive.

2.4.1. Evidence from word-formation rules. One piece of evidence for the restructuring of the vowel system comes from two similar word-formation rules that affect monosyllabic verb-stems.

Partial Reduplication: Klao reciprocal forms have a /-le/ suffix; additionally, if the verb stem is monosyllabic ($C_1^2V_1^2$), a copy of the first consonant and first vowel of the stem is placed before the stem:

(12) /tū -le/
hug-RECIP
'hug each other'
/tu-tū-le/
[tūtū|Īˋ]

/pl̄ō -le/
'sell each other (something)'
/po-pl̄ō-le/
[pōpl̄ō|ēˋ]

/bĪsĪ -le/
'thank each other'
/bĪsĪ-le/
[bĪsĪ|Īˋ]

There are, however, adjustments in the prefixal vowel: if the first stem vowel is /a/ , the preposed copy is /ɪ/ :

(13) /ɟl̄ā -le/
'want each other'
/ɟɪ-ɟl̄ā-le/
[ɟĪɟl̄ā|Īˋ]

/dā′ -le/
'call each other'
/dɪ-da-le/
[dĪdā|Īˋ]

Also, when the first stem vowel is /ɔ/ , either /ɔ/ or /ɷ/ may occur

as a prefixal vowel; the same is true when the first stem vowel is /ɷ/ :

(14) /kɔ̄ -le/ 'possess each other' (i.e. 'marry each other')
/kɔ-kɔ̄-le/ , [kɔ̄kɔ̄nɪ̄`] ,
/kɷ-kɔ̄-le/ [kɷ̄kɔ̄nɪ̄`]

/ɲɷ̄ -le/ 'kiss each other'
/ɲɷ-ɲɷ̄-le/, [ɲɷ̄ɲɷ̄nɪ̄`] ,
/ɲɔ-ɲɷ̄-le/ [ɲɔ̄ɲɷ̄nɪ̄`]

Finally, when the first stem vowel is /ɛ/ , the prefixal vowel is /e/ :

(15) /plɛ̄ -le/ 'tell each other' /pe-plɛ̄-le/ [pēplɛ̄lē`]

According to Innes [1966], Grebo, a language closely related to Klao, has a comparable rule for reciprocal forms. (It is not, however, limited to monosyllabic stems.) The prefix vowel is a preposed copy of the first vowel of the stem except when the latter is low. Then, it is either /ɷ/ or /ɪ/ : it is /ɷ/ when the stem vowel is /ɔ/ or when the initial stem-consonant is one of a set of bilabial and labiovelar consonants; it is /ɪ/ when the stem vowel is /ɛ/ or /a/ and the stem-initial consonant does not belong to the set of special consonants. Apart from the consonant-induced exceptions in the Grebo rule, the Klao rule differs from it in these ways:

1. when the first vowel in the stem of a Klao verb is /ɛ/ , the preposed copy is [+ EXP] rather than [- EXP].
2. when the first vowel in the stem of a Klao verb is /ɔ/ , the preposed copy can be either /ɔ/ or /ɷ/ , and
3. when the first vowel in the stem of a Klao verb is /ɷ/ , the preposed copy can be either /ɔ/ or /ɷ/ .

These differences lend further support to the notion that a restructuring of the vowel system is in progress. (It will be noticed as well that the forms that occur parallel the output of the Vowel-Harmony Rule; that is, the stem vowel of the reciprocal rule corresponds to the conditioning factor for vowel harmony, and the prefixal vowel corresponds to the focus vowel.)

Full Reduplication: Klao nominalized verbs have an -ɛ suffix; if the verb stem is monosyllabic (and is followed by no verb suffixes), it undergoes reduplication:

(16) /pɔ̄ -ɛ/ /pɪ̄ -ɛ/
put-NOM 'cooking' (n.)
'putting' (n.)
/pɪ-pɪ̄-ɛ/
/po-pɔ̄-ɛ/
[pɔ̄pwɛ̄] [pɪ̄pɪ̄ɛ̄]

Again, there is adjustment of the vowels. When the stem vowel is /ɔ/ , either /ɔ/ or /ɑ/ may appear in the first syllable. The same is true when /ɑ/ is the stem vowel.[7]

(17) /bɔ̄ -ɛ/ /bɔ-bɔ̄-ɛ/ , [bɔ̄bwɛ̄] ,
stop-NOM /bɑ-bɔ̄-ɛ/ [bɑ̄bwɛ̄]
'cessation'

/fɑ̄-ɛ/ /fɑ-fɑ̄-ɛ/ , [fɑ̄fwɛ̄] ,
'awaiting' (n.) /fɔ-fɑ̄-ɛ/ [fɔ̄fwɛ̄]

In this case, there is no adjustment when /ɛ/ is the stem vowel.[8]

(18) /plɛ̄-ɛ/ /plɛ-plɛ̄-ɛ/ [plɛ̄plɛ̄] ,
'telling' (n.) not [*plɛ̄plɛ̄]

2.4.2. Evidence from the lexicon. Klao publications offer further evidence for the restructuring hypothesis, particularly for the merger of /ɔ/ and /ɑ/ . The most dramatic evidence comes from the names of the language and dialect under study. The Kru Literacy-Literature Program of the United Methodist Church, which is responsible for the bulk of the existing literature in Klao, spells the language and dialect names "Klaɑ"

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[7]A rounded vowel becomes w in the environment ___+ ɛ , where ɛ is the nominalizer. (Thus, it is not possible to ascertain whether /bɔ-bɑ̄-ɛ/ and /bɑ-bɑ̄-ɛ/ are also acceptable output from the word-formation rule.) Tiklo, the principal consultant for this work and the author of some pamphlets in Klao, found both <bɔ̄bɔ̄ɛ̄> and <bɑ̄bɑ̄ɛ̄> (and likewise <fɔ̄fɔ̄ɛ̄> and <fɑ̄fɔ̄ɛ̄>) to be unacceptable spellings of /bɔ̄-ɛ/ (and /fɑ̄-ɛ/). The fact that variation is *not* permitted in the second syllable of these words suggests that it is that syllable that is basic. (On the other hand, not everyone shares Tiklo's fastidiousness with regard to spelling, as the discussion in 2.4.2. reveals.)

[8]An ad hoc rule deletes a or ɛ when it is followed by the nominalizing suffix.

and "Talɷ" in some publications and "Klaɔ" and "Talɔ" in others. That the distinction between these two vowels is not simply one between dialects or even between speakers can be seen, for example, in an article that appeared in the June 2, 1978, issue of Klāɔ̀-á Tì, the Methodist newspaper. Presumably, the article, "Dɛ̄kɔ̄tì ɲɔ̄ Kɔ̄-Wa ɲnɔ̄´ Dūɛ̄?" ("Why One Wife?") has a single author. However, on each page of the three-page article is a new spelling of the word for 'marriage', kɔ̄kɷ̄ɛ̄ (p.3), kɷ̄kɔ̄ɛ̄ (p.4), and kɔ̄kɔ̄ɛ̄ (p.5).[9]

2.4.3. Acoustic phonetic evidence. When changes in the phonological system are posited, it is appropriate to look for corresponding phonetic changes (though the former could take place without the latter). In fact, acoustic phonetic data do provide evidence, albeit inconclusive evidence, that supports restructuring.

Singler [1979a] provides the details of this evidence. Sound spectrograms were made of the speech of two speakers of the Talo dialect of Klao. Table 1 shows the average values of F_1 and F_2-F_1 for front vowels for the two speakers. ("n" is the number of spectrograms made of a given vowel.)

Table 1: Formant frequencies for front vowels

	Speaker One			Speaker Two		
	F_1	F_2-F_1	n	F_1	F_2-F_1	n
[i]	325	2063	2	281	1816	5
[e]	455	1710	5	414	1487	3
[ɛ]	446	1662	6	517	1318	9
[ɪ]	560	1580	5	487	1440	7

Speaker Two shows a clear distinction between /e/ and /ɛ/. On the other hand, for Speaker One, the average values of these vowels are very close to each other, so close that any difference between them is inconsequential.

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[9] 'dūē' , in the title of the newspaper article, is apparently a misspelling of /dūɛ̄/ . The remaining permutation of ɔ and ɷ in the word for 'marriage' would yield kɔ̄kɔ̄ɛ̄ . Because Klāɔ̀-á Tì is mimeographed and because corrections do not always "take", it is possible to see that one of the instances of kɔ̄kɷ̄ɛ̄ on p.3 was originally kɷ̄kɷ̄ɛ̄ (the final permutation) but was altered.

Only Speaker One was tested with regard to back vowels. Table 2 shows the findings.

Table 2: Formant frequencies for back vowels

	Speaker One		
	F_1	F_2-F_1	n
[u]	313	550	2
[ɔ]	392	475	3
[ɔ]	592	391	3
[ɷ]	513	275	4
[a]	713	900	2

The more limited evidence pertaining to back vowels, while not so provocative as evidence from the same speaker with reference to front vowels, does suggest that the distance between [ɔ] and [ɷ] is sufficiently small to support the possibility of a convergence of the two vowels (Mona Lindau, personal communication).

As a final comment on the restructuring, it should be noted that, along the Liberian coast, Klao is the westernmost Kru language still using [EXP] as a distinctive feature and still displaying vowel harmony. While the Kru languages east of Klao all continue to use [EXP] and display vowel harmony, the Kru languages west of Klao—Bassa, Dewoin, and Kuwaa—all have the seven-vowel systems of their Mande and West Atlantic neighbors. It could well be that ultimately the vowel mergers will provide still another example of the convergence process that Dwyer [1975] describes as characteristic of Liberia and Sierra Leone.

2.5. The assimilation rules revised. To return to the assimilation rules, the mergers being suggested are evolving in piecemeal rather than sweeping fashion. Consequently, those rules which purport to convey the state of assimilation processes in Klao must be complex rather than simple. Nasality-Assimilation and HI-Assimilation are unaffected and remain as stated in (1) and (2), respectively.[10]

[10]There is no phonemic ẽ in Klao. The increasing appearance of [ẽ] as a surface allophone of /e/ (after /ɛ̃/, e.g. /cɛ̃-le/, 'cut with', [cɛ̃nẽ]) may alter this.

Of the needed adjustments, a rule of LO-Assimilation, operating optionally, can account for the variation when the conditioning vowel is /ɔ/ or /ɛ/ and the focus vowel, which follows immediately, is a mid vowel.

(19) LO-Assimilation (Optional)

$$\begin{bmatrix} -\text{HI} \\ -\text{LO} \end{bmatrix} \longrightarrow [+\text{LO}] \; / \; \begin{bmatrix} +\text{LO} \\ \left\{ \begin{matrix} [-\text{BK}] \\ [+\text{RD}] \end{matrix} \right\} \end{bmatrix} \_\_\_\_$$

The rule is a straightforward rule of assimilation.[11] The following provide examples of the operation (and non-operation) of it:

(20) /dɛ̄ -e/ — come from-REC — 'came from recently'

dɛ -ɛ → [dɛ̄ɛ́] ~ [dɛ̄é]

/fɔ̄ˋ -e/ — breathe-REC — 'breathed recently'

fɔ -ɪ → fɔ-ɛ → [fɔ̄ɛ́] ~ [fɔ̄ɪ́] (7) (19)

An assimilation rule of this sort is by no means a necessary consequence of the proposed mergers. (Indeed, though it is much more limited in application, a similar rule, operating obligatorily, exists in Grebo even though mergers are apparently not in progress there.)

A rule that does seem to follow directly from the merger of back vowels is one which, operating optionally, permits [...ɪɔ...] and [...aɔ...] segments to be in variation with [...ɪo...] and [...ao...] segments, respectively.

(21) Back-Vowel Adjustment (Optional)

$$\begin{bmatrix} -\text{HI} \\ -\text{EXP} \\ +\text{RD} \end{bmatrix} \longrightarrow [+\text{LO}] \; / \; \begin{bmatrix} -\text{EXP} \\ -\text{RD} \end{bmatrix} + \_\_\_\_$$

[11] Inasmuch as the language does not have front $\begin{bmatrix} -\text{EXP} \\ +\text{LO} \end{bmatrix}$ vowels or back $\begin{bmatrix} +\text{EXP} \\ +\text{LO} \end{bmatrix}$ vowels, it is assumed that a general principle of the language "corrects" the feature values for [EXP] for forms which have undergone Rule (19).

Examples:

/nɪ̄ -o/		/nā′ -o/	
COP-LOC		drink-REM	
'be there'		'drank long ago'	
nɪ̃ -õ		nã -õ	(1)
nɪ̃ -ɔ̃		nã -ɔ̃	(7)
nɪ̃-ɔ̃ ---		nã-ɔ̃ ---	(21)
[nɪ̄ɔ̄́] ~ [nɪ̄ṓ]		[nāɔ̄́] ~ [nāṓ]	

Two more cases remain to be dealt with, viz.,

1. when /a/ is the conditioning vowel in a non-nasal environment and /o/ is the focus vowel, e.g.

(22) /ɟā′-o/ [ɟāó] (as well as [ɟāṓ] and [ɟāɔ́])

2. when /o/ or /ɔ/ is the conditioning vowel in a non-nasal environment and the suffix is /ɪe/ , e.g.

(23) /bɔ̄-ɪe/ [bɔ̄ɪ̄e] (as well as [bɔ̄ɪɪ̄])

/fō-ɪe/ [fōɪ̄e] (as well as [fōɪɪ̄])

The alternatives are to add rules of disharmony to undo the work of the Vowel-Harmony Rule posited in (7) in precisely these instances or to impose conditions that make the operation of the rule optional in just these cases.

It is possible to argue that there is already a rule of disharmony, LO-Assimilation, Rule (19), and that it is appropriate to account for forms like those in (22) and (23) by adding additional rules of disharmony. The suffixal vowel (underlyingly [+ EXP]) in a form like /kɔ̄-e/ becomes [-EXP] as a consequence of the operation of vowel harmony and, subsequently, [+ EXP] by the operation of LO-Assimilation:

(24) /kɔ̄-e/

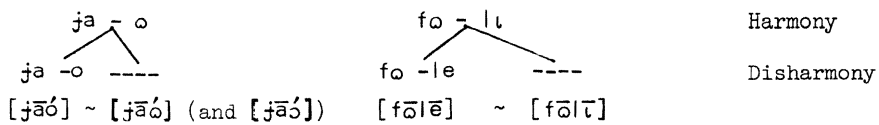
'possessed recently'

kɔ̃ -ẽ	(1)
kɔ̃ -ɪ̃	(7)
kɔ̃ -ɛ̃ ----	(19)
[kɔ̄ɛ̄́] ~ [kɔ̄ɪ̄́]	

In such cases, however, the variants that obtain, [kɔ̄ɛ̄́] and [kɔ̄ɪ̄́] , reflect competing assimilation processes. [- EXP]-Assimilation (vowel harmony) is "sacrificed" to LO-Assimilation in those cases where Rule (19)

applies (to /...ɛ-o.../ and /...ɔ-e.../ forms). [kɔ̃ĩ̃] displays [- EXP]-Assimilation while [kɔ̃ɛ̃] displays LO-Assimilation. In contrast, one cannot claim a comparable trade-off for the forms in (22) and (23). In a sequence of vowel harmony followed by vowel disharmony for these forms, there is no evidence of assimilation of the type that motivates Rule (19):

(25) /ɟā́-o/ 'climbed long ago' /fō-le/ 'be numerous there'

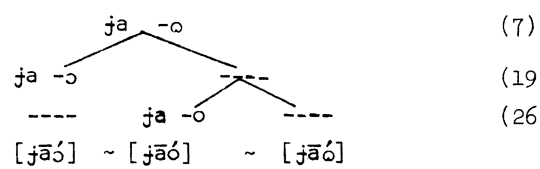


The form that rules of vowel disharmony—if posited—would take would be the following:[12]

(26) Vowel Disharmony I (Optional)

$$\begin{bmatrix} -\text{HI} \\ -\text{LO} \\ +\text{RD} \end{bmatrix} \longrightarrow [+\text{EXP}] \;/\; \begin{bmatrix} -\text{RD} \\ -\text{EXP} \\ -\text{NAS} \end{bmatrix} \_\_\_\_$$

Example: /ɟá -o/



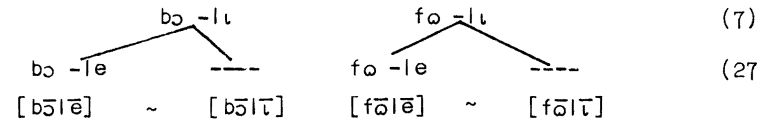
(27) Vowel Disharmony II (Optional)

$$\begin{bmatrix} -\text{HI} \\ -\text{LO} \\ -\text{RD} \end{bmatrix} \longrightarrow [+\text{EXP}] \;/\; \begin{bmatrix} +\text{RD} \\ -\text{EXP} \\ -\text{NAS} \end{bmatrix} + \begin{bmatrix} +\text{CONS} \\ +\text{SON} \end{bmatrix} \_\_\_\_$$

---

[12] A condition would have to be imposed on Rule (27) such that, in cases where iterative operation of the rule was possible, if the rule operated, it operated iteratively. Thus, the possible surface variants of /wlṓ-le-le/ 'be born there' would be [wlōlélé] (where Rule (27) had operated) and [wlōlĩ́lĩ́] (where it had not), but not [*wlōlélĩ́].

Examples: /bɔ̄ -le/ /fɷ̄ -le/



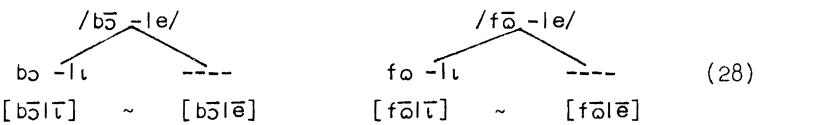
These rules would, as noted, be rules of dissimilation. The alternative to such rules is the imposition of conditions on the Vowel-Harmony Rule, (7), to make the rule optional in the cases outlined in (22) and (23). Thus, surface forms at variance with vowel harmony are accounted for by the non-operation of an existing rule (rather than by the successive operation of antithetical rules). To achieve this, the following conditions are imposed:

(28) Revised Vowel-Harmony

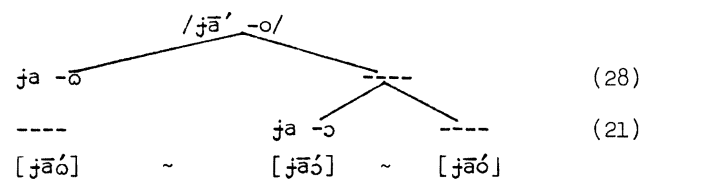
$$\begin{bmatrix} -\text{HI} \\ -\text{LO} \\ \langle[+\text{RD}]\rangle_b \end{bmatrix} \longrightarrow [-\text{EXP}] \,/\, \begin{bmatrix} -\text{EXP} \\ \langle[+\text{RD}]\rangle_a \\ \langle -\text{RD} \\ -\text{NAS} \rangle_b \end{bmatrix} \begin{Bmatrix} +\text{CONS} \\ +\text{SON} \\ -\text{NAS} \end{Bmatrix}_a \_\_\_$$

Condition: Optional when either set of bracketed pairs obtains.

Examples when the $\langle \ldots \rangle_a$ elements are present:



Examples when the $\langle \ldots \rangle_b$ elements are present:



Both solutions, i.e. the use of disharmony rules (26) and (27) or the revision of the Vowel-Harmony Rule (28), yield all and only actually occurring surface forms. The question that remains is which of the two solutions more perspicuously accounts for the data. The concept of vowel harmony, as it has existed not only in Kru languages but in numerous others, entails the spread of one or more features from one vowel (the conditioning vowel)

to other vowels. In the disharmony solution, the conditioning vowel triggers a change in feature values at one stage in the derivation (from [+ EXP] to [- EXP]) and then triggers the opposite change (from [- EXP] to [+ EXP]) later in the same derivation. The conditioning vowel (in a form like /ɟā'-o/) remains constant throughout the derivation; why it should trigger feature changes that are diametrically opposite to each other is not apparent. Indeed, apart from the obvious fact that it yields the actually occurring surface forms, no motivation presents itself for such a solution.

In the Revised Vowel-Harmony (RVH) solution, on the other hand, the conditioning vowel triggers, at most, a single change (in [EXP]). It does not condition a change in values at one stage in the derivation and then condition the opposite change subsequently. Rather, it either effects a feature change or it fails to. As noted earlier (section 2.4.), there is evidence of a restructuring of the Klao vowel system. The weakening of distinctions between feature values (and, therefore, between vowels) seems to be causing a concomitant weakening of the vowel-harmony system. The evidence at hand suggests that the way that this is manifesting itself is *not* by the creation of new rules in direct opposition to existing ones but rather by the erosion of the domain of the existing vowel-harmony rule. This is precisely what the RVH solution expresses. It is for that reason that the RVH solution is held to be the preferred one.

2.6. An additional vowel-harmony rule. The discussion of vowel-harmony thus far has concentrated upon changes in the suffixal vowels /e/ and /o/. There is an additional rule that acts to preserve vowel harmony, i.e. to prevent the juxtaposition of Category A and Category B vowels, but it does so with regard to -i, the third-person-plural object pronoun. The following verb-plus-pronoun combinations indicate the range of 3pl vowel-harmony:

(29)

/dɪ̄-ṯ/	[dɪ̄ṯ]	'eat them'	/kɔ̄-ṯ/	[kɔ̄ṯ]	'have them'
/ɟē'-ṯ/	[ɟēí]	'see them'	/fɷ̄-ṯ/	[fɷ̄ṯ]	'wait for them'
/ɟlɛ̄-ṯ/	[ɟlṯ]	'like them'	/dā'-ṯ/	[dṯ']	'call them'
/tṯ̀-ṯ/	[tṯ̀ṯ]	'buy them'			
/dū-ṯ/	[dūṯ]	'pound them'			
/plō-ṯ/	[plōṯ]	'sell them'			

(When the final vowel of the stem is /ɛ/ or /a/ and there are no verb suffixes between the stem and a vowel-initial object pronoun, the stem-final vowel is deleted. Also, when there is a sequence of the suffix /ɪe/ followed by a vowel-initial pronoun, the suffixal vowel is deleted.) As the examples in (29) indicate, the change occurs not only when the conditioning vowel is [- EXP] but also when it is /ɛ/ . This seems to be a vestige from the time when /ɛ/ was [- EXP]. It is apparently the only instance in which /ɛ/ currently triggers a feature change from [+ EXP] to [- EXP]. (At the same time, because of the deletion of stem-final /ɛ/ , the surface form does not violate vowel harmony.)

The change from /ɪ/ to [ɪ] occurs only when no verb suffix intervenes between the verb stem and the pronoun, as the following forms illustrate:

(30) /kpɔ̃ -T̄/ [kpɔ̃ɪ̃]
'borrow them'

/kpɔ̃ -ɪe -T̄/ [kpɔ̃nɪ̃] , not [*kpɔ̃nɪ̃]
borrow-LOC-them
'borrow from them'

A consequence of the non-operation of the relevant rule (proposed below) on suffixed verbs is that surface violations of vowel harmony are routine. This raises the question as to whether a verb followed by an object pronoun constitutes one word or two. If it constitutes two, then this type of vowel harmony must be posited as extending across a word-boundary, the only instance in the language where this occurs.

Evidence as to the status of object pronouns can be drawn from comparing them to possessive pronominal adjectives, specifically when both forms are vowel-initial, e.g.[13]

[13]The final ʊ of the first-person and second-person object pronouns is ordinarily realized as a voiceless vowel. Its behavior with regard to vowel harmony has not been considered.

(31)

	Object Pronouns	Pronominal Adjectives
3sg (animate)	ɔ̄	ɔ̄ - á
3sg (inanimate)	ɛ̄	ɛ̄ - á
1pl	ā̀mù	à - á
2pl	ā́mú	ā - á
3pl	T̄	T̄ - á

The appropriateness of comparing the two comes from the fact that they are both vowel-initial (pronouns being the only vowel-initial forms in the language) and that they can both occur immediately after the verb, as in (32):

(32) /T̄ ɟē′ ā̀mù/ 'they saw us'

/ī ɟē′ à-á ɟū′/ 'they saw our child'

Pronominal adjectives are clearly independent words; if object pronouns are, too, they should behave like pronominal adjectives.

Klao has several rules that apply to sequences of vowels. Some apply across word-boundaries, affecting, in the present context, stem-vowels, suffixes, object pronouns, and pronominal adjectives alike. On the other hand, several rules affecting vowel sequences apply to stem-vowels, suffixes, and object pronouns but not to pronominal adjectives. (Singler [1979a] lists several rules with regard to which object pronouns behave differently from pronominal adjectives; these include that paper's Rules 18, 21, 22, 24 and 25.) In every case, the object pronouns behave just like (other) verb suffixes. This division in applicability between object pronouns and verb suffixes, on the one hand, and pronominal adjectives, on the other, also extends to Nasality-Assimilation (Rule (1)) as the following forms illustrate:

(33) /kpɔ̃̄-le T̄/ 'borrow from them' [kpɔ̃̄nT̄]

/kpɔ̃̄-le ī-á dɛ̃̄′/ 'borrow from their mother' [kpɔ̃̄nī̃ yīɛ̄ dɛ̄′] , not [*kpɔ̃̄nī̃ ȳīɛ̃̄ dɛ̄′]

All of this evidence argues that object pronouns are to be separated from verbs (and other verb suffixes) by a morpheme, rather than a word, boundary, and that, consequently, the rule of 3pl vowel-harmony should have the following shape:

(34) 3pl Vowel-Harmony

$$\begin{bmatrix}+\text{SYL}\\+\text{HI}\end{bmatrix} \longrightarrow \begin{bmatrix}-\text{HI}\\-\text{EXP}\end{bmatrix} \;/\; \left[\begin{bmatrix}+\text{SYL}\\ \left\{\begin{matrix}[+\text{LO}]\\[-\text{EXP}]\end{matrix}\right\}\end{bmatrix}\right]_{\substack{\text{VERB}\\\text{STEM}}} \quad \_\_\_\_$$

3. Nonlinear Analysis[14]

In discussing Schachter and Fromkin's [1968] linear analysis of Akan vowel harmony, Clements [1981:125] comments:

> ...they adopt a rule-based model of vowel harmony which accounts for vowel harmony in terms of two independent types of statements: MSC's determining cooccurrence restrictions in roots, and P-rules determining the harmonic category of affixes. Within this framework, it is entirely accidental that the same set of restrictions on vowel cooccurrence should apply internally in roots and externally across morpheme boundaries.

In contrast, Clements' account of Akan vowel harmony achieves a fundamental unity. A single mechanism, his Association Conventions (discussed below), accounts for vowel harmony in roots and affixes alike.

The linear model used above (in Section 2) for Klao has the same disadvantages that Clements points out in Schachter and Fromkin's analysis. The question that arises, then, is whether a nonlinear analysis, specifically one that makes use of Clements' autosegmental model, can more satisfactorily

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[14]Nick Clements made several helpful comments regarding an earlier version of Section 3. They have been incorporated into this version. It should be noted, though, that he has not seen this newer version and, further, that what is presented here is *my* version of how he would treat the Klao data rather than an actual analysis by him.

account for vowel harmony in Klao.[15]

3.1. Clements' model. In his nonlinear account of ATR vowel harmony in the Asante dialect of Akan, Clements [1981] shows that all one need specify is the ***P-segment(s)*** (the feature or features that have been "autosegmentalized"—in Akan, [ATR]) and the ***opaque segments,*** which he defines as "those segments which are associated with an autosegmentally-represented feature or feature matrix in underlying representation" (p. 136). (In the Akan case, the low vowel is opaque.) As cited earlier with reference to Klao, Clements' definition of an opaque vowel is that "...it interrupts harmony domains, and may...initiate new domains subject to its control" (p. 119). Clements restricts the class of possible opaque segments by saying that

> ...opaque segments are identified in terms of context-free statements which do not assign them features other than those they bear intrinsically, as a result of the usual Segment Structure Conditions. (p. 154)

A third part of the specification consists of

> ...the class of ***P-bearing units,*** that is, units which must be associated with P-segments under the provisions of the well-formedness conditions governing the class of autosegmentalized features in question...(pp. 135-36)

In the Akan case, this consists of all [+ SYL] segments; however, since only [+ SYL] segments are [+/- ATR], Clements concludes that it is unnecessary to specify the P-bearing units.

Thus, in Akan, the following statement determines vowel harmony:

(35) i. P-segments: [ATR]
ii. opaque segments: [+ SYL, + LO]

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[15]Halle and Vergnaud [1981] distinguish between directional harmony (where "the harmonic features propagate in one direction only") and dominant harmony (where "the propagation occurs in both directions"). They argue that directional harmony is best described metrically, and dominant harmony autosegmentally. Anderson [forthcoming] argues against Halle and Vergnaud's proposal and argues instead that dominant vowel harmony can be accounted for in a linear model by using mirror-image rules. Mirror-image rules would not be necessary in the Klao case, however: leftward harmony is limited to cases involving prefixes created by full or partial reduplication (as described in 2.4.1.); as such, it would be incorporated into word-formation rules.

In addition to specifying the P-segments and opaque segments in the phonological component of the grammar, one specifies roots in the lexicon as to the value each displays for the P-segments. Then, association proceeds in accordance with the following Association Conventions:

(36) i. Given a continuous string S consisting of one or more free P-segments and...[a string T consisting of one or more unassociated P-bearing units]...occurring in its domain, associate (free) P-segments in S to (free) P-bearing units in T in a one-to-one manner from left to right...;

ii. Given...[a string T consisting of one or more unassociated P-bearing units]...after the operation of (i), associate each (free) P-bearing unit in T with the P-segment in whose domain it falls (giving precedence to the P-segment associated with a P-bearing unit to the left of T) (p. 138).

3.2. The autosegmental model applied to Klao. In a nonlinear analysis of Klao vowel harmony, vowels are specified for [BACK], [ROUND], and [LO] but not for [HI] or [EXP].[16] The latter two are the P-segments. The vowels, then, are the following:

(37)

/E/ [- BK, - RD, - LO]			/O/ [+ BK, + RD, - LO]
/ɛ/ [- BK, - RD, + LO]	/a/ [+ BK, - RD, + LO]		/ɔ/ [+ BK, + RD, + LO]

The fact that a low vowel may follow any vowel (but must itself be followed by a vowel that agrees with it as to [EXP]) suggests that they are to be treated as opaque vowels. Indeed, as is required for opaque vowels, their values for [EXP] (and [HI]) are predictable from Segment Structure Conditions:[17]

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[16]It is assumed that nasality could also be handled autosegmentally. For the present, however, nasality has been specified on individual sonorants.

[17]It is assumed here that, in Clements' model, opaque vowels need not be required to display identical values for P-segments.

(38)

[+ LO]	[+ LO, - BK]	[+ LO, + BK]
↓	↓	↓
[- HI]	[+ EXP]	[- EXP]

The following specifications are to be made:

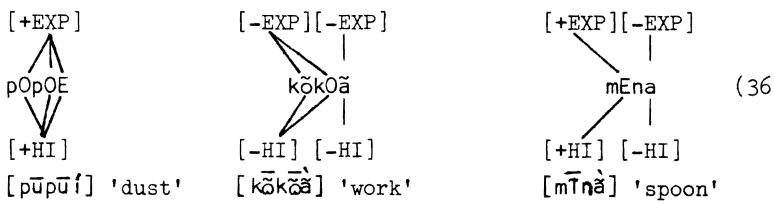
(39) P-Segments: [HI], [EXP]

Opaque Segments: [+ SYL, + LO]

Each root carries a specification on the autosegmental level for the features [HI] and [EXP]; opaque vowels are lexically specified:

(40)

[+EXP]	[-EXP][-EXP]	[+EXP][-EXP]
pOpOE	kõkÕã	mEna
[+HI]	[-HI] [-HI]	[+HI] [-HI]



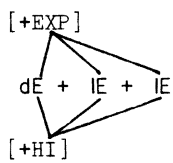
(36)

[pūpūí] 'dust' [kɔ̄kɔ̄ǎ] 'work' [mɪ̄ŋà] 'spoon'

Affixes are ordinarily unspecified for the P-segments, e.g.

(41)

[+EXP]
dE + IE + IE
[+HI]

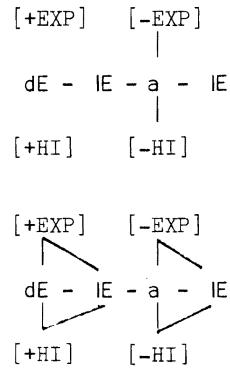


(36)

[dɪ̄ɪ̄ɪ̄] 'eat there'

However, opaque vowels within affixes have the same status as opaque vowels within roots; that is, they are lexically specified for the P-segments:

(42)



(36)

[dī lī̄a lī] 'eat there' (the -a suffix marks subordination)

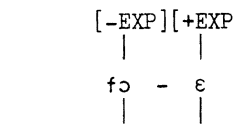
(The status of the 3pl object-pronoun vowel is taken up in 3.4.)

3.3. Accounting for variation. In the Revised Vowel Harmony (RVH) analysis presented above in a linear framework, vowel harmony is effected by a P-rule, the crucial cases of variation accounted for by imposing conditions on that P-rule so as to introduce optionality into its operation. In the nonlinear model, on the other hand, vowel harmony is accomplished by the operation of the Association Conventions. Because conditions parallel to those employed in the linear analysis cannot be attached to the Association Conventions, there can be no nonlinear version of the RVH solution. Rather, the variation that occurs in Klao must be accounted for by the use of optional P-rules (while the Association Conventions remain exceptionless in their application). Rules introduced within the discussion of the linear model, including, crucially, the Vowel Disharmony rules, can be adapted for use in a nonlinear analysis. They operate optionally on representations to which the Association Conventions have not yet applied. The rules in question are the rules of LO-Assimilation (19), Back-Vowel Adjustment (21), and Vowel Disharmony (26, 27). (The treatment of 3pl Vowel Harmony is taken up in 3.4.) Rules (19) and (21) alter features for

[LO], e.g.[18]

(43)

when (19) applies:



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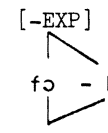
[fɔ̃ɛ́]

when (19) does not apply:

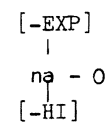
\----- (19)



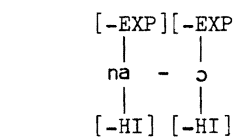
(36)

[fɔ̃í] 'breathed recently'

(44)



when (21) applies:

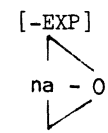


\-----

[nãɔ́]

when (21) does not apply:

\----- (21)



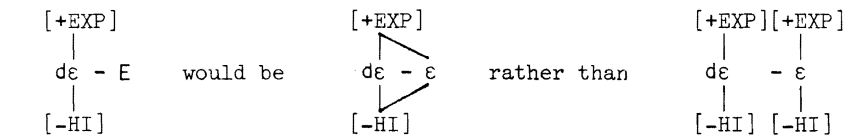
(36)

[nãṍ] 'drank long ago'

---

[18]It follows from the Obligatory Contour Principle (OCP) that the output of, for example, the operation of Rule (19) on

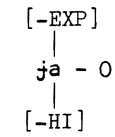
As noted in the discussion of opaque vowels, the feature values for [EXP] (and, trivially, [HI]) for low vowels is predictable; it can be assumed that a rule that creates low vowels (the opaque vowels in the Klao system) specifies the appropriate feature value for [EXP] for those vowels. Inasmuch as Rules (19) and (21) alter values for a segmental (rather than an autosegmental) feature, they are not central to the present discussion. (Moreover, all the analyses proposed here have assumed their existence.) It is the two rules of Vowel Disharmony (26 and 27) that are crucial. In a nonlinear analysis, they would operate by associating the "focus vowel" to an autosegment prior to the application of the Association Conventions, e.g.[19]



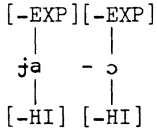
I have used the latter in (43) and subsequently for expository purposes and not as a rejection of the OCP.

[19]Rules (19) and (21) involve a change in the value of a segmental feature. P-segments provide part of the structural description of each rule even though the Association Conventions have not yet applied. This is assumed not to be a problem. Conversely, Rules (26) and (27) involve changes in P-segments (prior to the application of the Association Conventions) yet must make reference to other tiers. Again, this is assumed not to be a problem.

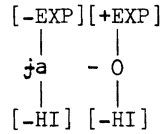
(45)



when (21) applies:



when (26) applies:



when neither (21) nor (26) applies:

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(21)

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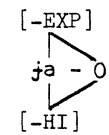
(26)



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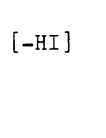
(36)

[ɟāɔ́] 'climbed long ago'

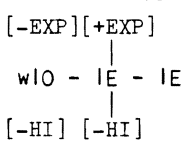
[ɟāó]

[ɟāó]

(46)



when (27) applies:



when (27) does not apply:

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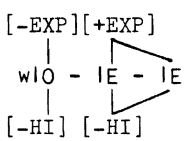
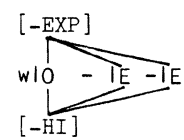
(27)





(36)

[wlɑ̄lélé] 'be born there'

[wlɑ̄lɩ́lɩ́]

The arguments as to the validity of the Vowel Disharmony solution in a non-linear model do not differ in any significant way from the arguments as to

its validity in a linear framework. They will be taken up again in Section 4.

3.4. 3pl vowel-harmony. The 3pl object-pronoun constitutes the one non-opaque vowel for which the P-segments must be lexically associated. Failure to do this yields ungrammatical forms like that in (47a):

(47) a.

[-EXP]
kpõ - lE - E
[-HI]

[-EXP]
kpõ - l - E
[-HI]
Pre-Pronominal Vowel-Deletion

[-EXP]
kpõ - l - E
[-HI]
(36)

[*kpãnĩ] 'borrow from them'

On the other hand, lexically-associating the pronominal vowel to its P-segments yields the correct forms, e.g.

(47) b.

```
[-EXP]   [+EXP]
           |
kpõ  -lE  -E
           |
[-HI]     [+HI]
```

```
[-EXP]  [+EXP]
           |
kpõ  -l   -E        Pre-Pronominal Vowel-
           |        Deletion
[-HI]   [+HI]
```

```
[-EXP]  [+EXP]
  |        |
kpõ  -l   -E        (36)
  |        |
[-HI]   [+HI]
```

[kpɔ̃nɪ̃] 'borrow from them'

At the same time, the rule of 3pl Vowel-Harmony introduced earlier (as Rule (34)) must be employed in a nonlinear analysis as well. This rule, too, precedes application of the Association Conventions. An illustration of its use is provided in (48):

(48)

```
[-EXP] [+EXP]
  |      |
 da  -   E
  |      |
[-HI]  [+HI]
```

```
[-EXP] [-EXP]
  |      |
 da  -   E       (34)
  |      |
[-HI]  [-HI]
```

```
  [-EXP]
    |
d - E            Pre-Pronominal Vowel-Deletion
    |
  [-HI]
```

[dɪ́] 'call them'

4. Conclusion

Much of the apparatus of the nonlinear model differs from that found in the linear; however, whatever advantages that apparatus may seem to possess, the basis for selecting a model must ultimately be the ability of an analysis presented within that model to account for a set of facts. Thus, in the Klao case, the choice of the linear or nonlinear model comes after choosing the Revised Vowel Harmony (RVH) or Vowel Disharmony analysis. Since the RVH analysis is not possible in the nonlinear framework, it follows that, if the RVH analysis is held to be superior in accounting for the Klao facts, the linear model is to be preferred in this case. (On the other hand, since the Vowel Disharmony analysis can be expressed in either model, showing it to be the preferred analysis makes no *a priori* statement about which model should be selected.)

In the discussion of possible competing linear analyses in 2.6., it was argued that the RVH solution does, in fact, more closely mirror the facts of Klao; that is, the consequences for Klao vowel harmony of the mergers in progress in the Klao vowel inventory (with its shrinking from nine to seven vowels) are taken to be the piecemeal erosion of the existing process (as distinctions between feature values grow more and more blurred). Moreover, the placement of conditions allowing for optionality (in precisely the environments where the erosion has taken effect) in vowel harmony is held to correlate with the facts of Klao in a way that the creation of new rules in direct opposition to the existing vowel-harmony process does not. Regardless of the model used to express the Vowel Disharmony solution, the RVH analysis prevails as the more satisfactory one.

That the RVH solution is the one argued for here (and, consequently, that the linear model is the one opted for) reflects the arguments advanced in Anderson [1980]; that is, Klao provides illustration that vowel harmony is not intrinsically different from other assimilatory processes. Rather, vowel harmony is, as Anderson argues, one more type of vowel-assimilation. Like other assimilation processes, it is best accounted for by P-rules, and, like many assimilation processes, it is subject to optional application. This latter claim—of optional application—goes against both Clements'

comment that it is a "remarkable, but generally, unnoticed fact [that]... [t]here is no known case of a (root-controlled] vowel harmony process which applied optionally [1977:112] and Anderson's [1980] suggestion that non-optionality is a necessary but not sufficient property for vowel harmony. However, the facts at hand argue that vowel harmony must—in Klao, at least—be permitted to apply optionally.

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DOWNSTEP IN SUPYIRE*

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Downstep in the vast majority of cases can be traced to the influence of a low tone [Hyman 1979]. This paper discusses the case of Supyire, a three tone language with downstep unrelated to low tone. Sequences of high tones are automatically downstepped. Confusion with mid tone is in most cases avoided by a rule which raises mid to high tone; the two rules together creating a "flip-flop" effect. Supyire also has automatic downdrift of mid and high tones following a low tone. It thus presents an unusual combination of downstep and downdrift in the same language, but unrelated to each other.

1. Introduction

Hyman [1979] lists three criteria which can be used to distinguish a downstepped high tone ('H) from a mid tone (M):[1]

(1) a. if this tone is a 'H, it will contrast with H only after H (or 'H);

b. if this tone is a 'H, a following H tone will necessarily be realized on the same pitch level;

c. if this tone is a 'H, the language should theoretically permit an infinite number of non-low tone levels, i.e. H - 'H - 'H - 'H ... .

Supyire has, in addition to a normal M tone,[2] a 'H which meets all three of the

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*Supyire is a Gur language of the Senoufo group spoken in south-eastern Mali. I would like to thank Ely Sanogo for patiently supplying the data on which this paper is based, and Kenneth L. Pike and Inge Egner for reading and commenting on earlier versions.

[1]Only the last of these criteria is judged to be universal.

[2]The three contrastive levels of tone are seen in the following examples:

nyáárá	'ask'	fyɪ́	'sprout' (noun)
nyaara	'walk'	fyɪ̃	'blind man'
nààrà	'increase'	fyɪ̀	'python'

For a discussion of Supyire phonology and morphotonemics, see Welmers [1950, 1973]. It should be noted that Welmers does not discuss in either of the above works the topic under discussion in this paper.

above requirements. Consider the following examples:

(2) a. kà u ú kú ʼwíí
and he SEQ it look at
'and he looked at it'

b. kà u ú kú bwɔ́
and he SEQ it hit
'and he hit it'

c. u a nàŋkòlyɛ̀ wíí
he PERF man-old look at
'he looked at an old man'

d. u a nàŋkòlyɛ̀ bwɔ́
he PERF man-old hit
'he hit an old man'

e. ntɛ̃ɛ̃ncwɔ́ ʼsí ntáá lí cǎǎra
Ntɛɛncwɔ FUT find it arrive before
'Ntɛɛncwɔ will arrive before it'

f. yyéré ʼsí ʼwíí ʼsáʔáŋkì
stop FUT look again
'stop and look again'

The 'H of wíí in (2a) contrasts with the H of bwɔ́ in (2b),[3] thus satisfying criterion (1a). There is no such contrast after L (or M), as is seen in (2c,d).

Criterion (1b) refers to the familiar terracing effect encountered in languages with downstep. That Supyire downstep causes terracing is seen from (2e). The H of ntáá is realized on the same pitch level as the 'H of sí . The final M of cǎǎra is realized one step lower than the 'H of sí . In other words, the entire register (=pitch region within which tones are realized [Clements 1971]) is shifted down one step.

Criterion (1c) is illustrated by (2f): there are five pitch levels, but the first four of these are H tones.

It seems clear from these examples that Supyire has a downstepped H. However, this downstepping is unusual for several reasons: (a) it is introduced entirely by rule. There is no need for it in the underlying forms. (b) The rule introducing downstep makes no reference to L tone. (c) The step down is

[3]The underlying tone of ku in these examples is M, as is the case for all simple class pronouns. This M becomes H by a process discussed in section 2.

total, i.e. 'H is realized on the same pitch as M would be, resulting in a "temporary" neutralization of the contrast H ≠ M. (d) However, in a majority of the environments where downstep is inserted, another rule raises M to H, avoiding the neutralization mentioned in (c) above, and preserving the contrast H ≠ M in the form 'H ≠ H. (e) Downstep is unrelated to downdrift after L, which also occurs in Supyire. Section 2 deals with (a-d) above. Section 3 deals with (e), and shows how both downstep and downdrift may be accomodated in the framework proposed by Clements [1979]. Section 4 is a summary.

2. Downstep and 'flip-flop'

All cases of downstep in Supyire are introduced by a simple rule:

(3) DOWN: H H ⟶ H 'H

There is no need for downstep in the underlying forms. The effect of this rule as it stands is that successive H tones automatically downdrift. I assume here the framework of autosegmental phonology (cf. Goldsmith [1976]; Leben [1978]), in which CV́, CV́CV́, CV́CV́CV́, etc., have *one* H tone each, a single tone being associated with one or more vowels, as follows:

(4)

Since downstep never occurs within a word in Supyire, the assumption that only one tone is involved in a H tone word of two or more syllables simplifies the statement of the downstep rule. If CV́CV́ had two H tones, as in (5):

(5)

then the downstep rule would have to refer to word boundaries:

(6) H # # H ⟶ H # # 'H

As noted above, DOWN results in the automatic downdrift of H tones. This seems to contradict the data in (2a) and (2b), which show that H and 'H contrast after H. Either DOWN as formulated is wrong, or there is another process which creates sequences of H tone words. As we shall see, it is the second of these alternatives which fits the analysis presented here.

The most frequently downstepped items are verbs. This reflects the low statistical frequency of H tone nouns (less than 5 per cent of all nouns) and

the relatively high frequency of H tone verbs (over 20 per cent of all verbs). In most environments where H tone verbs are downstepped, another rule raises M tone verbs (and simple class pronouns) to H, thus preserving the underlying contrast H ≠ M in the form 'H ≠ H.[4] This involves a flip-flop of underlying tones:

(7)

pitch
1
2

This means that Supyire has the following inventory of tonal contrasts:

(8)

a. after { pause, M, L } : H, M, L

b. after H: either (1) 'H, H, L or (2) 'H, M, L

In other words, the contrast H ≠ M is realized on the surface as either 'H ≠ H or 'H ≠ M after H. Since 'H and M are phonetically identical, the contrast in 'H ≠ M is in reality displaced onto the following words, which show whether terracing has occurred or not.

The rule raising M tone to H, yielding the contrasts in (8b1), may be informally stated as follows:

(9) H-ASSIM:

It is obvious that DOWN must apply before H-ASSIM, or (2b) would have downstep (and both (2a) and (2b) would have downstep before ku). Since a H tone word is downstepped after a H resulting from H-ASSIM, (as in the case of 'wíí in (2a),

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[4]A remarkably similar phenomenon is reported for Konkomba by Abbot and Callow [n.d.]. They set up two "General Tone Rules" as follows:

General Tone Rule 1: "a sequence of high tones is automatically downstepped between each high tone"

General Tone Rule 2: "if the sequence *any tone + high + low* would have occurred, then the low tone is raised to high."

It is possible that the function of this flip-flop is the same in Konkomba as in Supyire. Unfortunately the article by Abbot and Callow is primarily concerned with another tonal problem, so that the above rules are not explained in detail.

the two rules must apply iteratively from left to right. In other words, the application of H-ASSIM creates the environment for DOWN to apply to the right. Following are the derivations which would be required for the examples in (2a) and (2b). The domain of application of the rules is marked by brackets in the derivations.

(10) a.

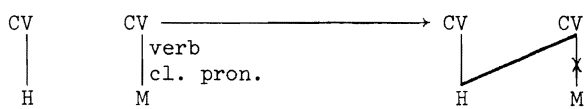
ka	u	u	ku	wii	
L	M	H	M	H	underlying tones
	———				DOWN } 1st application
L	M	[H	H]	H	H-ASSIM }
L	M	H	[H	'H]	DOWN } 2nd application
	———				H-ASSIM }

b.

ka	u	u	ku	bwɔ̃	
L	M	H	M	M	underlying tones
	———				DOWN } 1st application
L	M	[H	H]	M	H-ASSIM }
	———				DOWN } 2nd application
L	M	H	[H	H]	H-ASSIM }

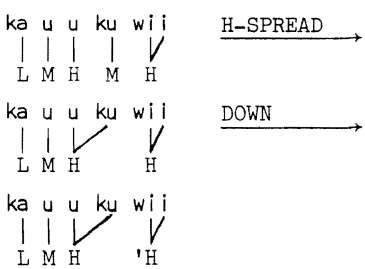
If we extend the analysis of CVCV as having one H tone realized on two successive vowels to permit the possibility of one tone being realized by the vowels of successive ***words***, then the process described above as assimilation could be analyzed instead as spreading (cf. Schuh [1978]; Clements [1982]):

(11) H-SPREAD:



Since in the resulting structure there is only one H and not two, DOWN cannot apply. There is no need to order DOWN and H-SPREAD relative to each other. Each will apply whenever its structural description is met. The examples in (2a) and (2b) will then be derived as follows:

(12) a.



b. ka u u ku bwɔ̃ H-SPREAD →
L M H M M

ka u u ku bwɔ̃ H-SPREAD →
L M H M

ka u u ku bwɔ̃
L M H

Since there is only one H tone in (12b) (though realized on three consecutive words), DOWN cannot apply.

The application of H-SPREAD results in sequences of H tone words on the surface which do not downstep.[5] In every such sequence, only the first word may have underlying H tone. All the subsequent words in the sequence must have underlying M tone. The H tones of the entire sequence are the manifestations of *one* H tone. One H tone is thus realized on a sequence of words, as in the following example:

(13) ka sunɔ si mpa u ta
and diarrhea SEQ come him find 'and then he got diarrhea'

L M H M M M underlying tones
L M H H H H surface tones

This may be diagrammed thus:

ka sunɔ si mpa u ta
L M H

If the analysis with spreading of H tone is accepted, then Supyire is simply

---

[5]Note that in example (2e) H-SPREAD is blocked in the middle of cɑ̃́ɑ̃́rá . There are two classes of M tone verbs. In the first, the spreading H takes over the entire word, whether it is CV, CVV, CVCV, CVVCV, or CVCVCV. In the second, to which cɑ̃́ɑ̃́rá belongs, the spreading H takes over only the first syllable (CV or CVV). If the word has more than one syllable, i.e. if it is CVCV, CVVCV, or CVCVCV, then all vowels after the first syllable will bear the original M tone. Thus the application of H-SPREAD will yield the following configurations:

CVCV CVVCV CVCVCV
H M H M H M

Notice that the difference between these two classes of M tone verbs is neutralized (in this particular environment) when they are monosyllabic. The word bwɔ̃ of (2b) is in the first class, and ta of (13) is in the second class.

a case of a language in which successive H tones downdrift. According to Hombert [1974], this is unlikely in a language with M tone because of possible perceptual confusion with M. This confusion is doubly serious in Supyire because the downdrift is total, that is, a 'H is realized on the same level as a M would be.[6] Thus, if spreading of H does not take place (cf. (8b2)), a sequence of H M L will be phonetically identical to a sequence H 'H 'H. Compare the following examples:

(14) a. mìì lá nyyɛ sí 'fáágá 'wíí
my desire is FUT rock look at
'I want to look at a rock'

b. mìì lá nyyɛ sí bããga wìì
my desire is FUT hoe look at
'I want to look at a hoe'

The succession H 'H 'H in (14a) is phonetically identical to the H M L of (14b).[7] Only by the addition of further words to these sentences can this ambiguity be resolved, e.g.:

(15) a. mìì lá nyyɛ sí 'fáágá 'wíí numɛ̂
my desire is FUT rock look at now
'I want to look at a rock'

b. mìì lá nyyɛ sí bããga wìì numɛ̂
my desire is FUT hoe look at now
'I want to look at a hoe now'

It is evident that terracing has taken place in (15a), since the initial M of numɛ̂ is lower than the tone of wíí . In (15b), terracing has not taken place, and the initial M of numɛ̂ is higher than the tone of wíí .

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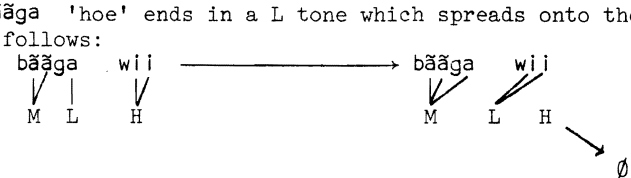
[6]It is significant that Welmers [1950] records 'H verbs as M. In the sentences he elicited where H verbs are downstepped, the verb occurs sentence finally. It is only by the addition of further words in the same sentence that one can distinguish between 'H and M.

[7]The L tone of wii in (14b) is due to a rule which does not concern us here: bããga 'hoe' ends in a L tone which spreads onto the following H tone verb, as follows:

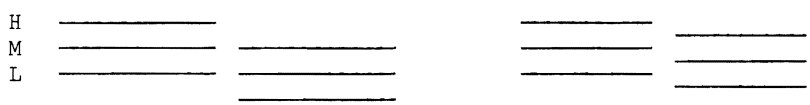


In those environments where spreading does take place (cf. (8b1)), which, as noted above, account for the majority of occurrences of 'H in texts, there is no perceptual confusion: the underlying contrast is preserved as H ≠ 'H, and a true M tone is impossible in that position.

3. Downstep and Downdrift

In the typical case of a language with downstep, downdrift of H after L is also present (cf. Clements [1979:539]), and in fact, downstep is frequently derived from downdrift by the deletion or assimilation of the conditioning L tone. It is interesting that downdrift of H and M after L also occurs in Supyire, but is unrelated to the downdrift of successive H tones resulting from DOWN discussed above. DOWN does not in any way involve L tone. Its phonetic effect is a lowering of the pitch by one step. In contrast, downdrift after L lowers a following M or H only half a step. Using the idea of register suggested by Clements [1979], the two kinds of register lowering may be diagrammed as follows:

(16)



lowering resulting from DOWN

lowering resulting from downdrift after L

It is evident that the same symbol should not be used for both kinds of lowering. DOWN may be revised as:

(17) DOWN: H H ⟶ H 'H

The rule for downdrift after L would then be:

(18) DRIFT: L $\left\{\begin{matrix}H\\M\end{matrix}\right\}$ ⟶ L '$\left\{\begin{matrix}H\\M\end{matrix}\right\}$

Using the framework developed by Clements [1979] (cf. Hyman [1979]), the intervals between the levels in the tone level frame may be established as follows:

(19) PITCH ASSIGNMENT: a) I(H,M) = 2
b) I(M,L) = 2

That is, the interval, I, between H and M is 2, and the interval between M and L is likewise 2. Since H is by convention always 1, this has the effect of assigning initial pitches of 1, 3 and 5 to H, M and L respectively.

The rules accounting for register lowering would then be as follows:

(20) PITCH INCREMENT: a. T_Q ⟶ +2 pitch/"_____

b. T_Q ⟶ +1 pitch/'_____

(T = any tone)

T_Q designates the maximal string of tones in the relevant environment (usually up to the end of the sentence in Supyire). A sample derivation including both kinds of lowering is shown below:

(21)

ka	mii	i	na	a	pa	
and	I	SEQ	afterwards	PERF	come	'and afterwards I came'
L	L	H	H	L	M	underlying tones
L	L	H	"H	L	M	DOWN
L	L	'H	"H	L	'M	DRIFT
5	5	1	1	5	3	PITCH ASSIGNMENT
		1	1	1	1	PITCH INCREMENT b
			2	2	2	PITCH INCREMENT a
					1	PITCH INCREMENT b
5	5	2	4	8	7	surface pitch

4. Summary

Two analyses of the data have been offered in section 2 above. One analyzes the raising of M tone pronouns and verbs to H as assimilation. This analysis requires the extrinsic ordering of the assimilation rule (H-ASSIM) after the rule introducing downstep (DOWN). The alternate analysis allows for the possibility of a single H tone being realized on successive words. The raising of M tone pronouns and verbs is thus analyzed as a case of spreading (H-SPREAD), in which a single tone extends its domain over one or more words to the right, replacing the previous tones of those words. This has the advantage of not requiring extrinsic ordering of the rules involved.

Whichever rule, H-ASSIM or H-SPREAD, is adopted, it is clear that it plays a complementary role with DOWN. The two rules act together to prevent an underlying contrast from being neutralized. If one applied without the other, the contrast between H and M would be neutralized in that context. This does in fact happen in those environments where the grammatical requirements of H-SPREAD

are not met (e.g. in examples (14a) and (14b)). Since the application of DOWN is entirely automatic, it will result in a "temporary" neutralization in just these environments. This neutralization is usually dispelled by further words in the sentence (if there are any) which show whether terracing has taken place or not (cf. (14a) and (14b) with (15a) and (15b)). Even this delayed resolution would not be available if H-SPREAD occurred without DOWN.

A final point of interest concerns downdrift after L. As noted above, downstep in many languages seems to be historically connected with downdrift. This development appears to be taking place in a limited way in Supyire. In fast speech, a word internal L is sometimes not pronounced. Its presence is felt, however, by the lowering of the following tone a half step. This happens most frequently in nouns with final ML on the root, which take a M tone on the definite noun class suffix, e.g.:

(22) pwũŋì
dog-definite singular suffix, noun class 1 'the dog'

ML M	underlying tones
ML'M	DRIFT
M 'M	L deletion
3 3	PITCH ASSIGNMENT
1	PITCH INCREMENT b
3 4	surface pitch

If this process continues, it could result in a surface contrast between H, 'H, and "H following a H tone.

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MOOD AND ASPECT IN KARANG*

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The paper describes the formal and semantic properties of the mood and aspect categories of the Adamawa language, Karang. Three inherent aspect verb classes are established--events, processes, and states--on the basis of semantic and morphological distinctions. A fundamental opposition of the mood-aspect system is between factive and non-factive moods, which distinguish actual and potential situations. Non-factive mood is formally indicated by a high tone and subdivides into the categories subjunctive, predictive, and non-predictive. Verbo-nominals are marked as non-factive. The formal categories of aspect are progressive, habitual, perfect, and non-perfect. When inherent and formal aspect categories with semantically contradictory components are combined, inherent aspect is overriden. The perfective meaning of the perfect category also overrides the imperfective meaning of the progressive.

1. Introduction

The goal of this paper is to present a semantic characterization of the inherent and formal categories which occur in the tense-aspect-mood system of the Karang verb.[1] Having said that much, the next task is to state the ways

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[1]Karang is an Adamawa language spoken to the east of Tchollire, Benue Department, North Province, Cameroon. It can be classed in Greenberg's Adamawa Group 6, which has been further refined by Samarin [1971], and especially by Boyd [1974]. Karang corresponds to the language referred to by Boyd as Ndó Mbàlì. There is a detailed discussion of the classification of Karang in the introduction of our phonology [Ubels 1980]. Apart from the information cited above on classification and the mimeographed phonology, there is no other published material on Karang to date. The language most

in which that general goal is restricted. For one thing, the scope is inherently restricted in that Karang has a relatively low number of formal tense-aspect-mood categories. In fact, tense does not figure as a formal category, there is one basic mood opposition, and the large set of derivational affixes found in many Niger-Congo languages does not occur in Karang.

As a further restriction, no attempt will be made in this paper to exhaustively list the pragmatic functions of the different aspects and moods in discourse, since these functions have not yet been systematically studied. It is the premise here that the general semantic function of a category can be stated somewhat independently of its pragmatic functions. Thus, one might characterize "progressive aspect" as viewing a situation dynamically, duratively, and non-habitually. This is different from stating that progressive aspect functions to express background information in narrative discourse. There is, of course, an intimate connection between a specific pragmatic definition and the general semantic definition, since the latter is derived from the observation of language in use.

Finally, the discussion in this paper will be limited by my personal perspective on what is important or interesting. I am of the conviction that the study of the inherent aspectual meaning of verbs is basic to the study of the meaning of syntactic aspect categories. I consider it interesting that inherent events, processes, and states can in fact be morphologically distinguished in Karang. I have chosen to highlight the factive/non-factive mood distinction because it is so fundamental to the Karang system and because of the generalizations which can be made about it. I have given attention to what happens when semantically contradictory categories combine, because I have been interested in the hierarchical ranking of the categories which emerges.

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closely related to Karang in which there is published phonological and grammatical information is Mbum, which has been described by Hagège [1970]. The material for the present paper was collected during intermittent periods of field work done in Sorombeo between July 1978 and April 1982.

1.1. Phonology[2] and morphology of the verb. Most Karang verb roots are monosyllabic. There are four monosyllabic consonant/vowel patterns: V, VC, CV and CVC. A small class of roots has the shape CVCCV.

Regardless of the CV pattern, every verb root has one tone. Two tone classes, mid and low, are established on the basis of the tone which occurs on the root in its most unmarked form, which is defined as the form occuring when the root functions as the main verb in a negated factive sentence.[3]

Reduplication of the root can also occur. The initial CV of the root is reduplicated and preposed to the root. The lexical or replacive tone of the verb is carried by the preposed CV, while the tone of the full root is neutralized to mid. The entire root, rather than just the initial CV, is repeated in the case where a verbal complement occurs between the two forms of the root. The complement may be either a noun or a pronoun (see examples (2) and (28) below).

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[2]Karang phononology is described in Ubels [1980]. All examples of Karang data cited in this paper are written according to standard Karang orthography, except that implosives are represented by C'. Word nasalization is indicated by cedilla (¸) below the first vowel of the word. The tone of the morpheme is marked as follows: high (´), low (`), rising (ˇ); mid tone is unmarked. The symbol vb represents a labiodental flap. An h following a vowel represents vowel length. In the interlinear English glosses of Karang examples, the following conventions and abbreviations are used:

Colon (:)	Indicates that there is not a one-to-one morpheme correspondence between the Karang example and the English morphemes joined by the colon.		
2s, 3s	Second person singular pronoun, third person singular pronoun		
3p	Third person plural pronoun		
ANAPH	Anaphoric particle	NPERF	Non-perfect
FACT	Factive mood	PROG	Progressive aspect
NFACT	Non-factive mood	PRED	Predictive mood
DCOP	Descriptive copula	QM	Question marker
LCOP	Locative copula	SM	Subordination marker
PERF	Perfect	SUBV	Subjunctive mood

[3]The tone class of the verb can also be determined in affirmative factive sentences, but it is necessary to know where the basic verb tone occurs in a reduplicated verb. Verb reduplication cannot co-occur with negation.

Besides reduplication, there is very little to say about Karang verb morphology. Intransitive verbs are nominalized by the derivational morpheme -na suffixed to the verb root with high tone. The only other affixes which occur with the root are the suffixes -ú , -àw and -ày , which function as demonstratives in the noun phrase, and similarly specify the location of the action or state in relation to the speaker and hearer when suffixed to the verb.

2. Inherent Aspect Classes of the Verb

Before looking at the various syntactic aspect and mood categories, it is necessary to examine the lexicon to see how verbs are classified according to inherent aspectual meaning. The inherent aspectual meaning of a verb potentially affects its ability to combine with the syntactic aspect categories. In addition, the meaning for a given category of aspect or mood may depend upon the lexical aspect class to which the verb belongs, or the meaning of the verb may change when it enters into a particular combination. Thus, an inherently stative verb is likely to exhibit different syntactic and semantic behavior from an inherently dynamic verb when the attempt is made to combine it with a progressive aspect marker if part of the function of progressive aspect is to view a situation dynamically.

There are at least three relevant inherent aspect classes in Karang, which will be referred to as "states", "events", and "processes" in accordance with what has come to be practically standard terminology for these categories. In Karang, these classes are in fact morphologically distinct when they occur in affirmative factive sentences. The semantic distinction which will be made between the classes in the following discussion is based largely upon Comrie [1976: Chapter 2].

States are distinguished from both events and processes in that a stative situation lacks dynamic development, and no effort is required to remain in that situation. Karang has a large number of verbs for which the primary meaning is a stative meaning. In an affirmative factive sentence, a stative

verb occurs in reduplicated form:[4]

(1) ke pɔ̀-pɔkrɔ 'he is old'
3s old

(2) mún bí se mí se 'I am sick'
body my hurt me hurt

Some other examples of Karang stative verbs are sù-su 'be good', zà-zaŋ 'be hot', rə̀-rəh 'be blind', ŋgɪ-ŋgɪ 'be many', tù-tu 'know', yì-yih 'want'.

Events and *processes* differ from states in that for both events and processes there is dynamic development in the situation. Events differ from processes in terms of an inherent perfective/imperfective distinction. Thus an inherent event verb refers to a dynamic situation as a whole, while a process verb makes reference to the internal structure of a dynamic situation. Within the event class, it is likely that further distinctions could be made, such as between inherently telic verbs, punctual achievements, and punctual non-achievements. For present purposes these distinctions are ignored, since there is no formal difference in factive sentences. The verb occurs in unreduplicated form:

(3) ke kə̀h pún 'he arrived home' (punctual)
3s arrive village

(4) ke mboh vùl 'he built a house' (telic)
3s build house

Process verbs, on the other hand, are formally distinct in a rather interesting way. There is a small class of verbs in Karang which normally occur with what has been traditionally called a "cognate accusative" and is referred to by Welmers [1973:464] as "cognate object". The rules of formation

[4] The function of verb reduplication in Karang is a matter for further study. The situation is very similar to that cited by Welmers [1973:336] for Efik, where he notes two "completely different" functions for verb reduplication, either to mark the verb for stativeness or to give it contrastive force. The question which needs to be studied for Karang is whether verb reduplication has one of these functions or the other, or whether they are always combined, and if so whether one of the functions is primary. Verb reduplication cannot co-occur with negation. Because of this and other facts, my present tendency is to consider the primary function of verb reduplication to be to mark assertive or contrastive focus. The reason that stative verbs are normally reduplicated would then have to be that in a stative sentence there is usually assertive focus on the verb.

are analogous to those for verb reduplication in that only the first CV of the verb occurs when the verb is contiguous to its cognate object, but if non-contiguous, the full form occurs:

(5) a. ke pa-pày 'he cultivated'
3s cultivate-cultivation

b. ke pah kè ni pày 'he cultivated with it'
3s cultivate with it cultivation

The cognate object can be distinguished as a nominal rather than a verb root by its tone. By the rules of verb reduplication, a verb root would have mid tone in place of the low tone on pày . In addition, the full form of the verb in (5b) would have to be pay rather than pah . Examples of verbs with cognate objects are listed below. The high tone nominals with final -na have been derived from verbs by the normal nominalization process:

b'a-b'ày	'talk'	yị-yʃhna	'play'
hè-hélɛ	'cough' (more than once)	d'ù-d'úkna	'run'
na-nám	'sleep'	si-sína	'walk'
nda-ndày	'dance'	sà-sákna	'laugh'
sà-sàm	'vomit'		
to-tóm	'urinate'		

All of the verbs in this class are inherently durative or iterative, which is why they are classed as process verbs. More precisely, however, they are what Comrie [1976:44] calls "atelic", which contrasts with telic, and means that they refer to situations which have no intrinsic terminal point. In contrast to a telic situation such as "build a house", in which there is a point at which the situation cannot continue because the house is built, an atelic situation can continue indefinitely, or if it is broken off, it can be said that an instance of the situation has already occurred. Thus, if someone laughing is interrupted, it can be said that he has already laughed.

The class of atelic verbs in Karang can be extended to include more and possibly all verbs which require a lexically specified object, whether cognate or not. Some examples are lu mbèrem 'converse', d'i sìŋ 'sing', ùh mbìh 'swim' (mbìh = 'water'), and a whole set of verbs of saying which take the object b'ày 'word, talk', including gàr b'ày 'boast', fàh b'ày 'argue', dàkla b'ày 'whisper', bàk b'ày 'counsel', and sùr b'ày 'chatter'.

In many cases of atelic verbs, the verb is only attested with its

specific object, cognate or otherwise, or with an even more specific case of that object, as in the (b) examples below:

(6) a. ke nda-ndày 'he danced (a dance)'
3s step-dance

b. ke ndah sʃw 'he danced the initiation dance'
3s step initiation

(7) a. ke sà -sàm 'he vomited (vomit)'
3s vomit-vomit

b. ke sà sém 'he vomited blood'
3s vomit blood

In some cases, a more generic object may be substituted, in which case the verb loses its atelicity:

(8) a. ke si-sʃna 'he walked/he was walking'
3s go-walking

b. ke si gèl 'he went somewhere'
3s go place

(9) a. ke nda -ndày 'he danced (a dance)'
3s step-dance

b. ke ndah fè 'he stepped on something'
3s step something

3. Factive and Non-factive Mood

When there is grammaticalization of the speaker's opinion of the degree of actuality of a situation, those distinctions are considered in this paper to be distinctions of mood. Thus, grammatical categories are considered mood categories if they serve to distinguish between meanings like "it is a fact that" to express what is considered to be an actual situation, "it is possible that" to express a non-actual but potential situation, and "if it were possible that" to express a counter-factual situation.

Karang has one very basic mood distinction. The same or a similar distinction has been noted for other Niger-Congo languages, and it has been noted as well in theoretical discussions of mood and modality, but with very little agreement in terminology. It has been talked about in terms of factative/non-factative [Welmers 1973:346], actualized/non-actualized [Hagège 1970:135], real/non-actual [Bearth 1971:284], manifest/imminent [Johnson 1980:277], factive/non-factive [Lyons 1977:816], realis/irrealis, and

non-future/future. I have chosen to use the terms "factive" and "non-factive.

The next problem is to define the semantic function of these two categories in Karang. It is difficult to give a definition which does not make reference to time, even though the basic distinction is considered to be one of mood rather than tense, for a speaker is most likely to assert the factivity of a situation when that situation has taken place in the past or obtains at the present. And situations which the speaker identifies as non-factive, whether the situation is one which might, may, will, ought to, should, could, or must occur, are situations which lie in the future. The basic function, then, of factive mood is to assert the meaning "it is a fact that" in regard to a situation. It can be added that factive mood describes, in general, situations in which there is no further dynamic development at the moment of speaking. The situation is either fully developed at the moment of speaking or has reached a point of stable development at the moment of speaking [Johnson 1980:277]. There is a special case, however, when factive mood describes a situation which is subsequent to the moment of speech, as in (10) below:

(10) mì tɔ̀r dá 'I have left'
I leave PERF

Sentence (10) is used in a situation of leave-taking, before the speaker actually leaves, when he wishes to assert the absolute certainty of his departure even though it has not yet occurred.

Non-factive mood, as the complement of factive, is used for every situation in which there is further potential for dynamic development, whether the speaker asserts that the development is likely to occur or ought to occur. The universal tendancy to syntactically associate the notion of future possibility with such modal categories as obligation and desire has been pointed out by Ultan [1978:118] and Lyons [1977:817]. Karang data will be presented below in 3.2 to demonstrate the way in which non-factive mood is formally marked, and to indicate the range of subcategories which are grouped together within the notion of potentiality.

3.1. Factive mood with event, state, and process verbs. The inherent perfectivity, stativity, or durativity of a verb affects the way in which the

situation will be temporarily interpreted when factivity is asserted. For an inherently perfective verb, the most likely interpretation is that the situation is fully developed prior to the moment of speaking, so the result is a past tense meaning:

(11) ke kàh púh 'he arrived home'
3s arrive village

(12) ke mboh vùl 'he built a house'
3s build house

Although past tense is the unmarked reading, the context may require a gnomic or general truth reading which lacks temporal reference (even though it is expressed in English with the so-called "present tense"). Thus, a speaker may use an inherent event verb factively in order to make what Goldsmith and Woisetschlaeger [1976] call a "structural description" of how the world is made, as the following example illustrates;

(13) a. ku làb' fe kè mól le 'what do they do with bricks?'
3p do what with brick QM

c. ku mboh kè ni vùl 'they build houses with them'
3p build with it house

The effect of using an event verb in this way, however, is that it loses its inherent perfectiveness, since the sentences in (13) have a customary meaning.

For a stative verb, the most likely interpretation is that the situation is stable at the moment of speaking, so the result is a present tense meaning:

(14) mún bí se mí se 'I am sick'
body my hurt me hurt

A present tense reading is not required, however, if the context refers to a stable situation in the past:

(15) kè lew mún bí se mí se 'yesterday I was sick'
yesterday body me hurt me hurt

Further, some stative verbs are more of the structural description type, tending to refer to situations which are more or less permanently stable:

(16) hày nàymbìh ri-ri 'hippo meat is tasty'
meat hippo sweet

It is more difficult to assign an unmarked temporal meaning to process

verbs, even though all the examples in section 2 were translated with simple past tense. For some verbs, it seems more natural to understand that the situation is fully developed at the time of speaking, as for example (5a), repeated here as (17a):

(17) a. ke pa -pày 'he cultivated'
3s cultivate-cultivation

b. ke pah kè ni pày 'he cultivated with it'
3s cultivate with it cultivation

An equally valid translation would be 'he went on cultivating', which maintains the past time reference, but brings out the durativity of the situation. Example (5b), repeated here as (17b), can similarly be translated 'he went on cultivating with it'. It can also very easily have the structural description reading 'he cultivates with it'. for example as a response to a question like, "What does he do with a hoe?" Such a customary reading is highly compatible with the inherently continuous meaning of the atelic verb. It is also natural for some process verbs like na-nám 'sleep' and yɨ-yʃhna 'play' to refer to a situation which is stable at the moment of speaking by virtue of their inherent atelicity. Even though the situation is dynamic, there is no movement toward an intrinsic terminal point. The situation is continuous or repetitive and in that sense can be considered stable. Thus, these verbs can have a present reading, which seems to be about as equally unmarked as a past tense reading. Since there is also the possibility of a structural description reading, there is much ambiguity with regard to the temporal interpretation of these verbs:

(18) ke na -nám 'he slept, he continued sleeping, he is sleeping,
3s lie-sleep he sleeps'

3.2. Non-factive mood.

3.2.1. Rule of formation. The basic generalization concerning formation of non-factive mood is stated in Rule 1:

Rule 1: [non-factive] → H

Rule 1 says that for non-factive mood add a high tone. Where to add the high tone depends upon a further distinction within non-factive mood which is considered here to be a semantic distinction, although the distinction can almost be stated syntactically in terms of subordinate and main clauses. The

opposition will be labelled with the terms "subjunctive" and "non-subjunctive". The following rule locates the placement of high tone for non-subjunctive mood:

Rule 2. [non-subjunctive] → V / H

Rule 2 says that for non-subjunctive mood, high tone attaches to the verb, replacing the lexical tone. Example (19) contrasts a factive and non-factive, non-subjunctive sentence:

(19) a. ke mboh vùl 'he built a house'
3s build house

b. ke mbóh vùl 'he will/might build a house'
3s build:NFACT house

The tone placement rules for subjunctive mood are as follows:

Rule 3. [subjunctive] → b'a/NOUN SUBJECT
H
→ PRO/PRONOUN SUBJECT
H
→ V/Ø SUBJECT
H

Rule 3 says that for subjunctive mood, high tone attaches to the particle b'a if the subject of the clause is a noun. If the subject noun is replaced by a pronoun, b'a drops out and the high tone replaces the lexical tone of the pronoun. When the subject of the subjunctive clause is the same as the matrix clause, the pronoun drops out and high tone attaches to the verb, so that the distinction between subjunctive and non-subjunctive is neutralized. Example (2) illustrates an embedded subjunctive clause with noun, pronoun, and zero subjects:

(20) a. mì yìh b'ày Gama b'á òh píhna yé
I want that Gama SUBV finish work his
'I want Gama to finish his work'

b. mì yìh b'ày ké òh píhna yé
I want that 3s:SUBV finish work his
'I want him to finish his work'

c. mì yìh b'ày òh pí̀hna bí
I want that finish:SUBV work my
'I want to finish my work'

3.2.2. The meaning and use of subjunctive mood. Subjunctive and non-subjunctive are both moods of potentiality as subcategories of non-factive mood. The semantic distinction between them rests in the notions of possibility and will. In non-subjunctive mood, the speaker simply asserts the possibility or likelihood of the situation, as in (19b) above. In subjunctive mood, there is the added semantic component that the potential situation may be outside the control of the speaker. An example is the use of subjunctive in imperative and hortative clauses to express the speaker's desire that the situation occur:

(21) a. mú . hị mí mbìh . 'give me some water'
2s:SUBV give me water

b. ŋgérmbáy b'á kòr mú 'may God protect you'
God SUBV guard 2s

Another common use of subjunctive is in the complement clause with modal verbs expressing various kinds of volition as in (20) above. Karang modal verbs which take the subjunctive are listed below:

yìh b'ày 'want, wish that'
vbi b'ày 'ask that' (request)
gòŋ b'ày 'beg that' (request, demand)
hị b'ày 'give that' (command, permission)
màh b'ày 'be sufficient that' (necessity, obligation)
sù b'ày 'be good that' (preference, obligation)

With verbs of volition, the subjunctive expresses potential lack of control by the subject of the matrix verb rather than by the speaker, as example (22) illustrates:

(22) ke yìh b'ày Gama b'á òh pìhna yé
3s want that Gama Subv finish work his
'he wants Gama to finish his work'

Here the speaker is reporting the modal viewpoint of the subject of the matrix verb, just as the mood of a complement clause in reported speech records the viewpoint of an embedded speaker who is the subject of the matrix clause:

(23) ke b'àh se ke mbóh vùl 'he said that he will build a house'
3s say that 3s build:NFACT house

With the verbs màh b'ày 'be sufficient that' and sù b'ày 'be good that', used for necessity or obligation, there is no overt matrix subject, and it is the viewpoint of the speaker of the main discourse that is registered:

(24) sù b'ày ké pòŋ pǐhna yé 'he ought to stop working'
good that he:SUBV cease work his

There is intended or desired potentiality in the expression of purpose, so the subjunctive is used in purpose clauses:

(25) ke hị nàŋ hị wụ́y yé b'ày ké d'ùh
3s give grain give wife his that 3s:SUBV pound
'he gave his wife grain for her to pound'

A final use of subjunctive mood is in the subordinate clause of contrary-to-fact conditions:

(26) ké si rá lekol le,ke tǔ fè
3s:SUBV go PAST(?) school SM 3s know:NFACT thing
'if he had gone to school, he would know something'

The combination of potentiality with past time results in counter-factive meaning. The use of subjunctive in the subordinate clause adds the additional meaning that the situation referred to there is in a world outside that over which the speaker has no control.

3.2.3. Predictive mood. It was stated that in non-subjunctive non-factive mood, the speaker simply asserts the possibility or likelihood of the potential situation, whereas subjunctive adds the notion of lack of control of the potential situation. Within non-subjunctive mood, the semantic distinction between possibility and likelihood is grammaticalized in Karang, as illustrated below:

(27) a. ke mbóh vùl 'he will/might build a house'
3s build:NFACT house

b. ke b'ày mbón vùl 'he is going to build a house'
3s PRED build:NFACT house

The distinction between the two examples is that in (27b) the speaker is asserting a higher degree of certainty that the potential situation will

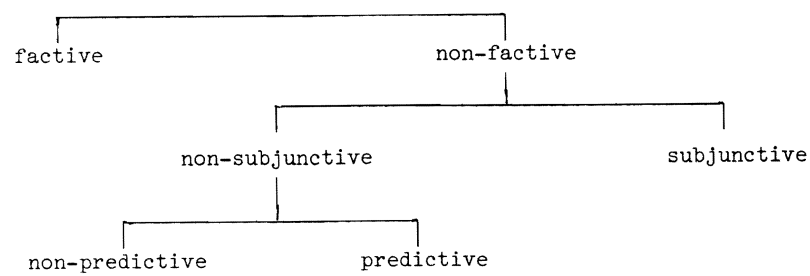
actually occur. The grammatical category which formalizes the assertion of a likely potentiality will be called "predictive mood", and is marked by the preverbal element b'ày . The non-factivity of predictive mood is indicated by the presence of a high tone. The occurrence of the high tone on the verb distinguishes predictive from subjunctive. Predictive mood is often used in the context of an imminent situation, since the speaker is most likely to assert a high degree of certainty that the situation will occur precisely in such a context. That the function of predictive mood is to assert likelihood rather than imminence, however, is illustrated in the following example:

(28) ke b'ày d'ún nàŋ d'uh 'she is surely going to pound grain'
3s PRED pound:NFACT grain pound

The likely context in which (28) would be used is for a small girl who is observed imitating her mother. The speaker is asserting that the child will perform the activity when she grows up.

The basic mood categories of Karang may now be schematized as follows:

Table 1. Classification of Karang mood oppositions



3.2.4. Nominalization and non-factive mood. Example (29) illustrates the derivation of a nominal from the verb kạ̀h 'arrive' by the addition of the nominalizing suffix -na and the replacement of the lexical tone of the verb with high tone:

(29) a. mì kạ̀h lew sạ́ 'I arrived a long time ago'
I arrive ago distant

b. kạ́hna bí lew sá 'my arrival was a long time ago'
arriving my ago distant

In Karang there is no way to formally distinguish different kinds of verbo-nominals such as infinitives, participles, and gerunds. There is only one basic category which includes all three. The basic rule of formation is stated as follows:

Rule 4. [verbo-nominal] → V
                          |
                          H

Rule 4 says that to derive a verbo-nominal from a verb, replace the lexical tone of the verb with high tone. A further rule can be stated for intransitive verbs which suffixes -na to the verb.

For transitive verbs, however, there is no nominalizing suffix, as (30) illustrates:

(30) ke b'a nzùk mbóh vùl 'he is a house-builder'
3s be person building house

Rule 4 is identical to the tone placement rule for a finite verb in non-factive non-subjunctive mood. For transitive verbs, verbo-nominals and finite verbs are formally indentical, and it is necessary to depend upon the syntactic context to distinguish the two. There are contexts, however, in which it is difficult to decide which it is. In (20c), repeated here as (31), it was noted that the contrast between subjunctive and non-subjunctive mood is neutralized in the embedded clause. In fact, the embedded verb could also be a verbo-nominal, just as the English translation uses an infinitive:

(31) mì yìh b'ày ɔ́h píhna bí 'I want to finish my work'
I want that finish:NFACT work my

When an intransitive verb is substituted in the embedded clause, the verbo-nominal form occurs:

(32) mì yìh b'ày tɔ́rna 'I want to leave'
I want that leaving

There are some contexts where it is possible to interchange a finite verb and verbo-nominal form with no apparent change in meaning:

(33) a. mì tɔ́r wàra 'I'm leaving right now'
I leave:NFACT immediately

b. mì tɔ́rna wàra 'I'm leaving right now'
I leaving immediately

There are two possible explanations for the fact that verbo-nominals can function in the same environments as finite non-factive verbs: either the factive/non-factive opposition is neutralized when verbs are nominalized, or nominalized verbs are non-factive. If there is neutralization, then high tone on the verb has two different functions in environments which can be very difficult to distinguish: sometimes it marks nominalization, and other times non-factivity. If verbo-nominals are non-factive, the generalization concerning high tone is complete: high tone marks non-factivity. Since in non-factive mood the situation is viewed as a potentiality, in cases where verbo-nominals are used, the notion of potentiality ought to be asserted. This condition holds in (31) - (33), where verbo-nominals substitute for finite verb forms, and also in (30), where the meaning can be restated as 'he is a person who potentially builds houses'. A more difficult case is (29b), where the situation has already occurred. There is not the same factive assertion that the event has occurred as in (29a), but at the same time the notion of potentiality has been cancelled by the combination with a past time reference. Because the idea of potentiality is usually present, and because of the correspondences in form and usage to non-factive verbs, verbo-nominals are considered to fall within the non-factive mood category.

4. Aspect

In addition to the grammaticalization of the speaker's point of view concerning the actuality or potentiality of a situation through categories of mood, different points of view of the internal constituency of the situation may also be formally distinguished as categories of "aspect". Even though a situation may consist of distinct phases, the speaker may have access to grammatical devices which allow him to either present the situation in its entirety without referring to its duration, or to focus attention upon the situation as a durative process. In a way, the inherent durativity

of static and atelic situations is grammaticalized in Karang since stative and atelic verbs can be formally identified, at least in certain contexts, as was noted in section 2. But there is another kind of formal marking of aspect in Karang of a more general nature, not necessarily restricted to certain lexical classes as the formation of a cognate object can only apply to atelic verbs. At the same time, there may be restrictions, or at least effects, upon the combination of a formal aspect category with a lexical class, since the lexical classification is itself based upon aspectual distinctions. The formal aspect categories of Karang and the effects of combining categories with each other and inherent aspects is the topic of this section.

4.1. Progressive. Progressive aspect in Karang is formally marked by the auxiliary verb yò , which has as its literal meaning 'stand' or 'stop', and also functions as a locative copula:

(34) ke yò vùl 'he is in the house'
3s LCOP house

For progressive aspect, the nominal indicating location in the locative clause is replaced by a verb-nominal:

(35) a. ke yò gína 'he is coming'
3s PROG coming:NFACT

b. ke yò mɓóh vùl 'he is building a house'
3s PROG building:NFACT house

As an auxiliary verb, yò carries mood specification by virtue of its tone. In (35) above, the low tone specifies factive mood. At the same time, the high tone of the verbo-nominal specifies non-factive mood. The result of the combination of factive and non-factive mood is that the situation is viewed both as actual and as potential. The speaker is asserting that at least one phase of the situation has occurred, but that there is potential for further dynamic development. It is also possible to specify non-factive mood for the auxiliary, locating all phases of the situation in the domain of potentiality:

(36) ke yó mbóh vùl 'he will be building a house'
3s PROG:NFACT building:NFACT house

It is further possible to combine progressive aspect with other subcategories of potentiality, both predictive and subjunctive:

(37) a. ke b'ày yó mbóh vùl
3s PRED PROG:NFACT building:NFACT house
'he is certainly going to build a house'

b. sù b'ày ké yò mbóh vùl
good that 3s:SUBV PROG building:NFACT house
'I prefer that he be building a house'

Part of the meaning of Karang progressive aspect can be deduced from the fact noted above that different phases of the situation are implied. The situation is being viewed in its duration, which is to say that reference is being made to its internal temporal constituency. So one component of progressive aspect is durativity. But durativity is a component shared by all the subcategories of imperfective aspect, whether habitual, continuous stative, or continuous dynamic (cf. Comrie [1976:Section 1.2]). That progressive aspect is more limited than imperfectivity as a whole is demonstrated by the fact that Karang utilizes a separate construction to explicitly indicate a habitual situation, which will be presented in 4.2 below. That progressive aspect is more limited than continuous aspect as a whole is demonstrated by the fact that there are stative verbs which cannot combine with progressive aspect, notably yì-yih 'want' and tù-tu 'know'. The basis for the incompatibility is that progresseive aspect has non-stative meaning. In summary, the function of progressive aspect in Karang is to explicity view a situation as durative, non-habitual, and dynamic.

Although there are a few inherently stative verbs which cannot combine with progressive aspect, for most the combination is possible:

(38) a. mbìh zà-zaŋ 'the water is hot'
water hot

b. mbìh yò záŋna 'the water is becoming hot'
water PROG heating:NFACT

What is noteworthy about (38b), however, is that the combination has affected the meaning of the verb: it has lost its inherent stativity. The situation

is dynamic.[5]

The same type of effect occurs when progressive aspect is combined with inherent event verbs. The inherent perfectiveness of the verb is cancelled out by the meaning of progressive aspect, so that the situation is viewed as a durative process:

(39) a. ke mboh vùl 'he built a house'
3s build house

b. ke yò mbóh vùl 'he is/was building a house'
3s PROG building:NFACT house

Since process verbs are inherently dynamic and durative, they are highly compatible with progressive aspect. The effect of using a formal grammatical category to make these meanings explicity is that a perfective reading is excluded as a possibility:

(40) a. ke pa -pày 'he cultivated, he was cultivating'
3s cultivate-cultivation

b. ke yò pá -pày 'he is/was cultivating'
3s PROG cultivating:NFACT-cultivation

4.2. Habitual. Habitual aspect has not yet been sufficiently studied to make a detailed statement of its formalization and meaning. In the discussion on the meaning of event, state and process verbs with factive mood in section 3.1, one of the possible readings for all three types of verbs was that of reference to a customary situation. So a simple non-habitual form does not exclude habitual meaning as long as the context permits it, just as the non-progressive form of a process verb still permits a progressive meaning. But just as it is possible to make the progressive meaning explicit through the use of a formal construction, it is also possible to make explicit by formal means that the situation is habitual. The constructions is illustrated in (41):

(41) ke si wáka b'a sí -ú kpàrvbàw kè típele zàỳ
3s go field DCOP going:NFACT-there always with morning early
'he always goes to the farm early in the morning'

---

[5] See example (53) below for further effects of aspectual marking on inherently stative verbs.

The construction consists of the verb followed by what is referred to as the "descriptive copula" b'a and the verbo-nominal form of the same verb. The combination of the verb with the verbo-nominal in the above example again combines factive and non-factive mood. The device for combining the moods is formally different from progressive aspect, but the effect is the same. The situation is viewed in one of its phases as actual, and in another as potential. Again, the situation is viewed in its duration, as repeated over a long period of time. Thus, habitual aspect also has durativity as part of its meaning. Another part of the meaning is, of course, that the situation is habitual.

It is possible to combine habitual and progressive aspects, in which case the repetitive meaning of habitual combines with the continuous or "in-process" meaning of progressive:

(42) mì gi tə̀w yé le, ke yò b'a kʃ́ mbete kpàrvbàw
I come vicinity his SM 3s PROG DCOP reading:NFACT book always
'whenever I go to his place, he is always reading a book'

Example (42) is different from (41) formally in that only the nominalized form of the verb kʃ occurs. The marking for mood which had been carried by the finite verb in (41) has been taken over by the progressive auxiliary yò, allowing the verb to drop out.

4.3. Perfect and non-perfect. Several languages in the approximate geographic vicinity of Karang have a particle which occurs at the end of the clause which is usually translated "already". Other Adamawa languages for which it is reported are Mbum [Hagège 1970:315] and Duru [Bohnhoff 1972:172]. It is also reported for Jukun in Benue Congo [Welmers 1973:410], Sara-Ngambay in Chari-Nile [Thayer 1971:36], and Lele in Chadic (Pam Simons, personal communication). The forms in the different languages are as follows:

Karang	dá	Sara-Ngambay	ŋgà
Mbum	wâ	Lele	d'è
Duru	só'ó		
Jukun	ra		

The meaning of the particle in the tense-aspect-mood system is generally given as "completed action". In Sara-Ngambay and Lele there is a second

particle translated 'still' or 'yet' which forms an opposition pair with 'already'. This particle also occurs in Karang. The forms are as follows:

Karang	b'áy
Sara-Ngambay	b'eí
Lele	b'ey

The meaning given for Sara-Ngambay is "non-completed action". Example sentences with the use of the forms in Karang are given in (43):

(43) a. ke mboh vùl dá 'he has built the house'
3s build house PERF

b. ke mboh vùl rá b'áy 'he is still building that house'
3s build house ANAPH NPERF

One of the differences in the examples above is clearly aspectual in that it concerns the way in which the internal temporal consituency of the situation is being viewed. In (43a) the situation is viewed as a whole, that is, perfectively, while in (43b) the situation is viewed in its duration, that is, imperfectively. Part of the meaning assigned to the category marked by dá is therefore perfectivity. That the meaning of the category marked by b'áy is imperfectivity as a whole rather than some subcategory of imperfective is supported by the fact that it includes repetetive as well as continuous action. Another possible reading for (43b) besides the continuous reading is 'he is building that house again'.

There is a further difference in these two categories, however, which goes beyond the way in which the internal time of the situation is viewed in that it involves the locations of the situation in reference to an external point of time, the moment of speech. In (43a) it is understood that the situation has occurred prior to the moment of speech, while in (43b) the situation overlaps with the moment of speech. A further implication in (43a) is that the result of the past situation is still effective at the moment of speech, in this case, that the house is still standing. This is especially clear with a stative verb:

(44) mbìh rá zàŋ dá 'the water has become hot'
water ANAPH hot PERF

The meaning of (44) is that a situation has occurred prior to the moment of

speech--the heating of the water--and that the effect of this situation continues--the water is still hot.

The point of reference to which the situation is related does not have to be the moment of speech. It is also possible for the speaker to establish a reference point in the past or future, or a completely relative time point, which the situation either precedes or overlaps:

(45) gèlké ke èl púh dá le, ke sụ fè
when 3s return village PERF SM 3s eat thing
'when he had returned home, he had something to eat'

In (45), a reference point has been established in the past, and the use of dá indicates that the action of returning home had occurred prior to that reference point. It is also possible for (45) to have the general truth reading 'when he has returned home, he has something to eat', in which case the reference point is completely relative rather than related to real time, but the function of dá is unchanged, still indicating the occurrence of a situation prior to the reference point with a continuing effect. The point of reference can also be located in the future:

(46) pele dá ra ke gi b'áy
tomorrow PERF SM 3s come:NFACT NPERF
'he will be coming tomorrow'

An expanded translation of (46) would be 'when tomorrow has arrived, he will be coming'. The reference point is 'tomorrow'. The use of dá indicates that the arrival of the time period precedes the time period, but that the result is still in effect, namely, it is still tomorrow. The use of b'áy indicates that the action of coming overlaps with the time period.

The semantic function of the category indicated by dá , then, is to combine the aspectual notion "perfective" with the temporal notion that the situation occurs prior to an established reference point but the effect of the situation overlaps with the reference point. The label given to the Karang category is "perfect". The label for the opposing category, which combines the aspectual idea "imperfective" with the temporal notion that the situation overlaps with an established reference point, is "non-perfect".

Perfect and non-perfect can both combine with any mood category, either factive as in (43), or any of the categories of non-factive:

(47) a. ke d'úh mbìh dá 'he will have drawn water'
3s draw:NFACT water PERF

b. ke d'úh mbìh b'áy 'he will draw water again'
3s draw:NFACT water NPERF

(48) a. ke b'ày d'úh mbìh dá 'he will certainly have drawn water'
3s PRED draw:NFACT water PERF

b. ke b'ày d'úh mbìh b'áy 'he will certainly draw water again'
3s PRED draw:NFACT water NPERF

(49) a. mì yìh b'ày ké d'úh mbìh dá 'I want him to have drawn water'
I want that 3s:SUBV draw water PERF

b. mì yìh b'ày ké d'úh mbìh b'áy 'I want him to draw water again'
I want that 3s:SUBV draw water NPERF

Perfect and non-perfect can also combine with progressive aspect:

(50) a. ke yò mbóh vùl dá 'he has started building a house'
3s PROG build:NFACT house PERF

b. ke yò mbóh vùl rá b'áy 'he is still building a house'
3s PROG build:NFACT house ANAPH NPERF

The compatibility of progressive and non-perfect in (50b) is not surprising because both categories view the situation imperfectly. Example (50a) is more interesting. It illustrates the effect of combining perfect with the progressive of an inherent event verb. The meaning of an event verb is inherently perfective:

(51) ke mboh vùl 'he built a house'
3s build house

When combined with progressive aspect, the inherent perfective aspect of the verb is cancelled by the imperfectiveness of progressive:

(52) ke yò mbóh vùl 'he is/was building a house'
3s PROG build:NFACT house

Finally, in (50a) the perfectiveness of perfect cancels the imperfectiveness of progressive to yield a resultant inceptive meaning: the beginning of the situation is viewed as having occurred prior to the moment of speech.

The same ranking of categories is manifested with an inherently stative verb:

(53) a. mbìh zà-zaŋ 'the water is hot'
water hot

b. mbìh yò záŋna 'the water is becoming hot'
water PROG heating:NFACT

c. mbìh yò záŋna dá 'the water has started getting hot'
water PROG heating:NFACT PERF

In (53b), the dynamicness of progressive has cancelled out the inherent stativeness of the verb. In (53c), the perfectiveness of perfect has cancelled out the imperfectiveness of progressive, again yielding an inceptive meaning.

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ON THE DEVELOPMENT OF THE VERB INFINITIVE PHRASE IN YORUBA*

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This paper will concentrate on a type of verb complement structure referred to as the HTS construction in Yoruba, essentially to show four points: a. that it is an older form of the verb-infinitive phrase in Yoruba, out of which the infinitival gerunds, the à-ti complements, and (by a historical change) the serial verbal constructions originate; b. that the HTS construction is different from (and should not be confused with) the infinitival gerunds, since they are demonstrably distinct constructions; the infinitival gerunds which do not have HTS equivalents number in the hundreds, far too many to be exceptions; c. that the HTS constructions show Yoruba to be related to neighboring Kwa languages like Igbo, Itsekiri and Efik. Furthermore, the serial verb constructions will be shown to be far more productive and economical than the HTS constructions, the infinitival gerunds, and the à-ti complements; hence the former's gradual replacement of the latter, probably to suggest a direction of change (from relative complexity to relative simplicity and productivity); and lastly d. that it will become necessary to modify a portion of the orthography of the language to accomodate these new facts.

1. Introduction

Nothing seems to have defied rigorous analysis in Yoruba grammar as the structure of what has been referred to as the infinitive phrase (cf. Bamgbose [1971:38]). There are three main markers that have at one time or another been

*Professor Awobuluyi's comments and those of Russell G. Schuh have given this paper a completely new shape. Several of the final year students in the "Issues in Yoruba Syntax" classes, University of Ilorin, over the past two years have reacted to the material. I gratefully acknowledge all contributions; whatever errors still remain are in spite of them.

associated with this structure: (i) láti (<ní + à-ti) 'to'; (ii) à-ti 'to'; and (iii) a high tone syllable (HTS), 'to', all three occurring mutually exclusively in the same position in a complex sentence:[1]

(1) a. Adé fẹ́ ẹ́ wá
b. Adé fẹ́ láti wá
c. Adé fẹ́ àti wá
'Ade wants to come'

In general, there are not strong restrictions on the use of láti or àti as complementizers in a verb phrase. Both are almost freely interchangeable since they come from the same source ní + à-ti . The only tangible restriction is that they co-occur with embedding verbs. However, not all Yoruba embedding verbs permit the high tone syllable (henceforth HTS). The following list, drawn largely from Awobuluyi [1970] and Bamgbose [1971], is arranged in two groups (the significance of this division will be spelt out later):

GROUP A		GROUP B	
rọrùn	'be easy'	fẹ́	'want; be about to'
dára	'be good for/to'	wá	'come; be about to'
ṣe/jẹ́	'be possible'	bẹ̀rẹ̀ sí	'start; be about to'
pẹ́	'be late'	sí'wọ́	'stop; refrain; cease;
yá	'be fast; be on time'	yé	'stop; refrain; cease'
gọ̀	'be unreasonable'	dẹ́kun	'stop; refrain; cease'
dùn	'be easy'	mọ̀	'know'
tó	'be enough; be ready; be capable'	kọ́	'learn'
yé	'be clear to'	ní	'has to; will have to'
ṣòro	'be difficult'	kú/kún	(verb of greeting)
ṣú/gọ́	'bores; tires'		
wù	'pleases; appeals to'		
fẹ́rẹ̀	'be almost'		

[1]This translation is following Bamgbose [1971].

From the different types of analyses of the HTS and related structures in Yoruba, all of which are well documented in Awobuluyi [1970] and Bamgbose [1971], the following can be said to be the outstanding issues:

a. the HTS is a marker of the infinitive verb--Crowther [1852:19]; Bowen [1858:56]; Rowlands [1954:386; 1969:67]; Ward [1952:116] and Bamgbose [1971:38];

b. the HTS is a prefix--Crowther [1852:19]; Bowen [1858:56]; Ward [1952:116]; Rowlands [1954:386; 1969:67] and Bamgbose [1971:38];

c. the HTS is underlyingly /i/ --Crowther [1852:19]; Bowen [1858:56]; Ward [1952:116]; Rowlands [1969:67]; Awobuluyi [1970:35; 1978:77] and Bamgbose [1971:38];

d. the HTS is derived from a gerundive reduplicated nominal source--Bowen [1858:38]; Ward [1952:116]; Abraham [1958:xxvi]; Awobuluyi [1967:129, 136; 1970:34; 1977:77];

e. the HTS is derived from a verb-verb source--Ward [1952:116]; Rowlands [1954:386; 1969:67]; Bamgbose [1971:38];

f. it is the first verb, rather than the second, which conditions the appearance of the HTS--Bamgbose [1966:77; 1971:37].

Additional crucial issues to this discussion, but which are either not raised in the previous analyses or are obscured by them, are:

g. whether or not there is a semantic basis (besides a purely structural basis) for the HTS group of verbs;

h. the pattern of interrelationships between the HTS and the láti/àti constructions; between these on the one hand, and the serial verb constructions on the other; and between the HTS and tense in an embedded structure;

i. whether or not Yoruba now has what can be called a verb infinitive phrase;

j. whether or not àti can be broken down into the prefix à- and ti, and the consequence thereof; and finally

k. whether or not the surface linear order of the words can fully explain what verbs condition the HTS.

In this paper, we intend first to show that the proper understanding of the HTS underlies our insight into the verb complement structures in Yoruba, and further to demonstrate how previous analyses of the group of verbs that co-occur with the HTS have failed to reveal the true (syntactic and semantic) nature of such verbs. Secondly, and most importantly, we intend to establish the interrelationship between the HTS constructions on the one hand, and the láti /à-ti

structures and the serial verb constructions on the other. Thirdly, we intend to use the rules of grammar as they apply to these structures to suggest a possible modification of the relevant portion of the Yoruba orthography.

2. The Nature of the High Tone Syllable (HTS)

2.1 Prefix source. Among the issues emanating from the previous analyses, points (b), (c), (f) and (k), can easily be disposed of. The claim that the HTS is a prefix has no clear synchronic evidence. If it is truly a prefix, then it must be a very peculiar one. When verbals take prefixes, the new derivatives become cemented as compounds, with their former internal morpheme/word boundaries wiped out. The HTS does not do such a thing, as we will go on to show. Previous writers have taken the prefix claim for granted for too long, without considering the phonological, as well as the morphological implications. We therefore reject the prefix interpretation in a synchronic description, on the grounds that it violates both phonological (with its initial high tone) and morphological principles (for not converting the base to a compound). Rather, the HTS is a separate particle on its own, its phonetic shape being dependent on the preceding vocalic form.[2]

The claim that the HTS is underlyingly /i/ is based on cases where there are two alternative pronunciations, as in:

(2) a. iṣẹ́ náà ṣe í ṣe =
b. iṣẹ́ náà ṣe é ṣe
work the possible do
'the work is possible to do'

where (2b) is produced by backward assimilation. However, there is intense controversy over its derivation. As we shall go on to show, it seems too tempting

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[2] The high tone phenomenon with its phonetic shape being dependent on the preceding vocalic segment, is not restricted to the infinitive structure. Others are: (i) the subject demarcator; (ii) the progressive tense spread, as in Olú ń sùn HTS lọ (Olu PROG sleep PROG go) 'Olu is sleeping away'; and (iii) in negative polarity reduplication, as in kò sùn HTS sùn (not sleep HTS sleep) 'did not sleep at all'.

to argue that the /í/ in (2a) is the remnant of the gerundive C_1 í-C_1V... form, after the initial C- has been deleted. Otherwise, (3b) would be claimed to be derived from a non-attested (3a):

(3) a. *òjò fẹ́ rírọ̀ ≠ b. òjò fẹ́ ẹ́ rọ̀
rain wants pouring rain wants pour
'it wants to rain'

That a totally ungrammatical sentence would suddenly become grammatical as a result of a phonological deletion rule is unsatisfactory. It is not that (3a) is unpronounceable, but that it is ill-formed. 'Rain wants pouring' is not the same thing as 'it wants to rain.' On the other hand, the claim that the HTS is a prefix would force one to compare the HTS as a prefix with other prefixes in the language. No other prefix has a high tone, and no other prefix fails to produce a nominal compound after attaching to a stem. Certainly, the two positions--that the HTS is an ordinary prefix, and that it is derived from a gerundive source--are untenable.

That it is the first verb, rather than the second, which conditions the surfacing of the HTS, is a bit misleading without further clarification. In embedding, directionality is determined by the relative position of the subordinate verbs to the main predicate. The term "pre-infinitive verb" as used by Bamgbose [1971:37], can only be true at the surface structure, since, as we shall go on to show, there are two main types of embedding involved here: one to the right of the matrix verb, and the other to the left of it, in deep structure. In other words, the surface linear order of words cannot fully explain what verbs condition the HTS.

Claims (a), (d), (e), (g), (h), (i) and (j) therefore, form the central issues in this discussion. The centre of the controversy is whether the HTS is derived from a gerundive reduplicated nominal source via initial consonant deletion, or from a verb-verb source.

2.2. Gerundive source. Gerunds are formed by prefixing a syllable consisting of a copy of the initial consonant of the predicate stem, plus a high tone /í/, on to the stem, as in

(4) a. gbí-gbàgbé 'forgetting' (< gbàgbé 'to forget')
b. kí-korò 'being bitter' (<korò 'bitter')

Essentially there are three main structures in which gerundive forms can occur: (a) gerundive adjectives, (b) factive gerunds (cf. Lees [1960:64]), and (c) infinitival gerunds.

The gerundive adjectives are derived from predicate adjectives, and function primarily as qualifiers of nouns, as in

(5) ewé kí-korò
leaf bitter
'bitter leaf'

On the other hand, a gerundive form of this type can also function as a head nominal form, and can be qualified (and possibly quantified), as in

(6) kí-korò rẹ́ dára
being-bitter its good
'its bitterness/ its being bitter is good'

(7) kí-korò díẹ̀ rẹ́ dára
being-bitter small its good
'its mild bitterness/its being mildly bitter is good'

Like gerundive adjectives, factive gerunds can occur in two structural patterns: either as in (8) and (9) on the one hand, or like (10), on the other:

(8) Ií-lọ-Olú dùn mí (subject complement)
going-Olu sadden me
'Olu's going saddens me'

(9) mo ti gbàgbé e Ií-lọ-Olú (object compelement)
I have forget of going-Olu
'I have forgotten (about) Olu's going'

(10) Ií lọ -tí -Olú lọ dùn mí (subject complement)
going-that-Olu go sadden me
'the fact that Olu went saddens me'

The factive gerunds are generally either subject (as in (8) and (10)), or object of factive predicates, as in (9). Example (10) has been variously referred to in Yoruba syntax as factive nominalization (cf. Awoyale [1974:390]; Bamgbose [1975:205]), or verb phrase relativization (Awobuluyi [1972]). Note that (8) and (10) are synonymous; they both presuppose that Olu went. The factive gerunds therefore acquire their factivity from the factive predicates with which they co-occur. Note further that the gerunds in (8) and (10) are immovable, as in

(11) **ó dùn mí Ií-lọ-Olú
it saddens me Olu's going

(12) ?*ó dùn mí lí-lọ tí Olú lọ
it saddens me going that Olu went

The infinitival gerunds, on the other hand, are essentially objects of prepositions (fún 'for'; sí '(in)to'; and ní 'to, at, in') as in:

(13) a. Adé pẹ́ sí lí-lọ =
b. Adé pẹ́ ní lí-lọ
Ade be late in going
'Ade is/was late in going'

(14) a. iṣu dára fún jí-jẹ =
b. iṣu dára ní jí-jẹ
yam be good for eating
'Yam is/was good for eating/to eat'

These gerunds are claimed to be infinitival because they lack: (a) a definite tense of their own, (b) any overt subject of their own, and (c) they in themselves do not limit the truth value of their own predicates. Their main predicates are usually emotive verbs. These points are worth noting since Yoruba does not have the type of inflections that will automatically mark embedded verbs as infinitives. These points will also re-emerge when we come to examine the serial verb constructions. Furthermore, it is our contention, as we shall go on to show, that gerundivization is occupying the slot for the embedded tense. Similarly, all other factive and non-factive nominalizing prefixes, à- and ì-, have the characteristic of neutralizing embedded tense. That is why lí-lọ and jí-jẹ in (13) and (14) respectively, cannot limit their own truth value; rather, pẹ́ and dára do that. And, similarly, in the following,

(15) a. Adé pẹ́ sí à -ti -lọ =
b. Adé pẹ́ ní à -ti -lọ
Ade be late in fact-have-go
'Ade was late in going'

(16) a. iṣu dára ní à -ti -jẹ =
b. ?iṣu dára fún à -ti -jẹ
yam good for fact-have-eat
'yams are good for eating/to eat'

(which are synonymous with (13) and (14) respectively), the embedded tense has been neutralized. Our attempt to impose tense interpretation on (15b) and (16b) has resulted in semantic awkwardness. The ti in (15) and (16) must have ear-

lier been related to the perfective marker, ti . Note further that as is to be expected, both (13) and (14), with pẹ́ and dára , can occur with the HTS:

(17) a. Adé pẹ́ HTS lọ
b. Adé pẹ́ é lọ
'Ade was late to go'

(18) a. iṣu dára HTS jẹ
b. iṣu dára á jẹ
'yam is good to eat'

where again the embedded tense is non-definite. These pairs, from (13) through (18), have equivalent meanings.

2.3 Rules for embedding nominalizations. What now remains to be established are the processes of derivation. On the one hand is the claim that (13) and (14) result in (17) and (18) by phonological deletion; while on the other hand is the claim that (17) and (18) come from (15) and (16) by a process of replacement. These two claims apart, it is only what we have referred to as infinitival structures, among the three, that are relevant to our discussion; and these structures can be derived by prefixing Cí- or à-ti- to the predicate stems.

The matrix verbs with which the HTS co-occur have been subdivided into two main groups. Group A is largely subject-embedding, while Group B is largely object-embedding. Each group will now be examined to establish the link between the two, as it concerns the HTS.

2.3.1. Group A verbs. These subject-embedding verbs are essentially TOUGH-verbs.[3] Tough Movement applies to almost any non-subject complement NP in Yoruba. Such an NP may be the direct object, indirect object, locative object, directional object, time object, though not manner adverbials and predicative

[3]Tough Verbs and Tough Movement in English are discussed in Postal [1971:27-31].

ideophones.[4] Examples are:[5]

(19) a. ọmọ náà rọrùn ní à-ti-bí ---[5]

b. ọmọ náà rọrùn ní bí-bí --- OBJECT

c. ọmọ náà rọrùn HTS bí ---
baby the easy in being-delivered/to deliver
'the baby was easy to deliver/in being delivered'

(20) a. ìyà ṣe HTS kọ̀ --- fún Ẹbùn DIRECT OBJECT
misery possible shake off for Ẹbun
'misery is possible to shake off for Ẹbun'

b. Ẹbùn ṣe HTS kọ ìyà fún --- INDIRECT OBJECT
Ẹbun possible shake off misery for
'Ẹbun is possible to shake off misery for'

(21) ilé dùn HTS fún ọmọ ní ìwé --- LOCATIVE OBJECT
house easy give child book
'house is easy to give a child a book'

(22) owúrọ̀ dùn HTS fún ọmọ ní ìwé --- TIME OBJECT
morning easy give child book
'morning is easy to give a child a book'

(23) ilé dùn HTS gbé ìwé lọ --- DIRECTIONAL OBJECT
house easy carry book go
'home is easy to carry a book to (to go to)'

(24) **pẹ̀lẹ́-kùtù dùn HTS fún ọmọ ní ìwé --- PREDICATE IDEOPHONE
much ease easy give child book
'much ease is easy to give a child a book'

(25) **tìlé-tìlé dùn HTS kó lọ --- ADVERB OF DEGREE/
completely easy gather go EXTENT
'completely is easy to gather (and to) go'

The following is the approximated deep structure for sentences like (20a) and (20b):[6]

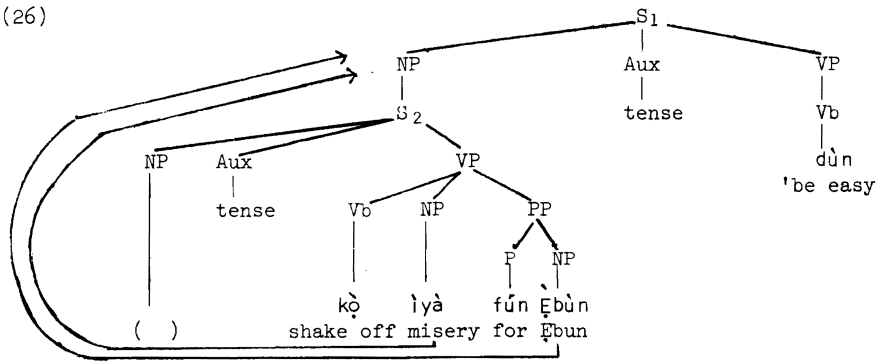
---

[4]Ideophones are consonant-initial forms which are basically non-verbals; they can function predicatively and nominally (cf. Awoyale [1974, 1979, 1980, 1981a]).

[5]The lines in these sentences indicate semantic gaps created by movement.

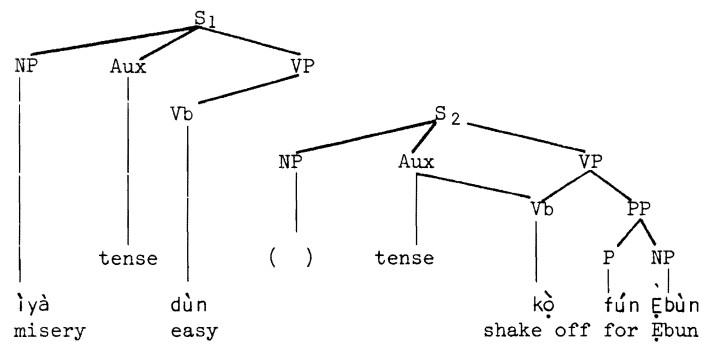
[6]Yoruba has no category of tense. All references to tense stand for aspect.

(26)



Tough Movement will move a non-subject complement NP in the direction of any of the two arrows after Extraposition has moved S_2 out and adjoins it to the right of the top VP. The following will be the result of the two operations (Extraposition and Tough Movement) for (20a):

(27)



It is possible for dùn 'be easy' in (26) to have what Curme [1931:192] calls a "sentence dative" accompanying it, so that the verb phrase will be dùn fún mi 'be easy for me', or any other suitable NP. The occurrence of sentence datives is characteristic of most TOUGH verbs. In (26) therefore, we will have to assume that a rule like Unidentified NP Deletion has erased the subject NP of S_2. But in other cases with a sentence dative, Equi-NP Deletion may be employed, as in the following intermediate derivation:

(28) ìyà dùn fún mi (èmi kọ̀ --- fún Ẹ̀bùn)
misery easy for me (I shake off --- for Ẹbun)
'misery is easy for me that I shake off for Ẹbun'

where èmi , which is within the scope of mi in deep structure, will delete through Equi.

The structural configuration of (27) after embedded subject deletion is now

(29) ìyà tense dùn (tense kọ̀ fún Ẹ̀bùn)
misery easy (shake off for Ẹbun)
'misery is easy to shake off for Ẹbun'

which can now be realised as any of the following:

(30) a. ìyà dùn HTS kọ̀ fún Ẹ̀bùn =(infinitivization)
b. ìyà dùn ní kí-kọ̀-fún-Ẹbùn =(gerundivization)
c. ìyà dùn ní à-ti-kọ̀-fún-Ẹbùn =(prefixation)
'misery is easy to shake off (in shaking off) for Ẹbun'

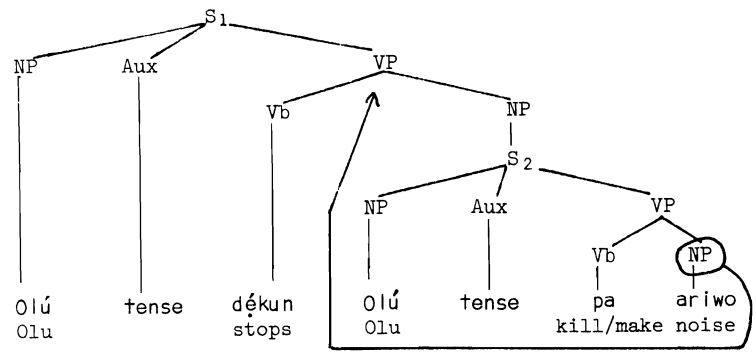
through Infinitivization. Infinitivization is automatic once the embedded subject has left its original position. Later on, we shall discuss the significance of this close interaction between these processes. To sum up here, the following rules can be said to have applied in these derivations: Extraposition, Tough Movement, Unidentified NP Deletion/Equi-NP-Deletion, Infinitivization (HTS/gerundivization/prefixation).

2.3.2. Group B verbs. The object-embedding verbs form a large group, but only the ones listed earlier permit the HTS. An example of this group in a sentence is (31):

(31) a. Ọlú dẹ́kun HTS pa ariwo = (by HTS)
b. Ọlú dẹ́kun ní à-ti-pa-ariwo = (by prefixation)
c. Ọlú dẹ́kun ní pí-pa-ariwo = (by gerundivization)
'Olu ceases to make noise/making (killing) noise'

with (32) as an approximated deep structure:

(32)



Equi-NP-Deletion will delete the embedded subject to derive (33):

(33) Olú tense dẹ́kun (tense pa ariwo)
Olu stops (make/kill noise)
'Olu ceases to make/kill noise'

which is converted to any of (31). However, (31) has other equivalents:

(34) a. Olú dẹ́kun ariwo HTS pa (=31a)
b. Olú dẹ́kun ariwo ní à-tí-pa (=31b)
c. Olú dẹ́kun ariwo ní pí-pa (=31c)
'Olu ceases noise (in) to make/making'

We propose that raising is what is involved here. The rule however, is Object-Object Raising rather than the familiar Subject-Object Raising in generative syntax (cf. Postal [1974] and Awoyale [1981b]).

2.3.3. Co-occurrence restrictions. Besides the two groups of verbs, each functioning as a distinct group, the two groups also cut across each other. In other words, just as members of one group can embed each other, some members of Group B can conveniently embed Group A, but not the other way round without considerable semantic difficulties.

Table 1 below illustrates the patterns of co-occurrence between these verbs; the vertical ones can pair up with the horizontal ones as ticked (X and ? indicate impossibility and doubtful co-occurrence respectively).

Table 1: Mutual Embedding Among Group A Verbs

	pẹ́	sú	jẹ́/ṣe	tó	yá	ṛorùn	wù	dára	dùn	yé	sòro	gọ̀
gọ̀	x	x	x	x	x	x	x	x	x	x	x	x
sòro	√	x	√	x	√	x	x	x	?	x	x	x
yé	x	x	√	√	?	?	?	√	√	?	?	x
jẹ́/ṣe	√	√	x	x	√	√	x	x	√	x	?	x
dùn	√	x	√	√	√	x	x	x	x	?	x	x
dára	√	x	√	√	√	?	x	x	x	x	?	x
wù	x	x	√	√	√	?	x	√	√	?	?	x
ṛorùn	√	x	√	√	√	x	?	x	√	√	x	x
yá	x	√	√	?	?	√	√	?	√	√	?	x
tó	x	√	√	x	√	√	√	x	x	√	x	x
jẹ́	√	√	x	√	√	√	x	√	√	√	√	x
sú/gọ́	√	x	√	√	√	√	√	x	√	√	√	x
pẹ́	x	√	√	√	√	√	√	√	√	√	?	x

These verbs are mostly factive, which probably explains their high degree of mutual embeddability. The following points on the table are worth noting. First, gọ̀ 'be unreasonable' scores zero in mutual embedding. No other verb on the list can embed it, just as it cannot embed any of the others. However, gọ̀ can embed almost any active verb, as in

(35) a. Adé gọ̀ HTS sọ ọ̀rọ̀
b. Adé gọ̀ ní à-ti-sọ-ọ̀rọ̀
c. Adé gọ̀ ní sí-sọ-ọ̀rọ̀
'Ade be unreasonable talk/talking talk'

Secondly, those verbs among them which are either semantically similar, or are semantically incompatible, cannot embed each other; an example is

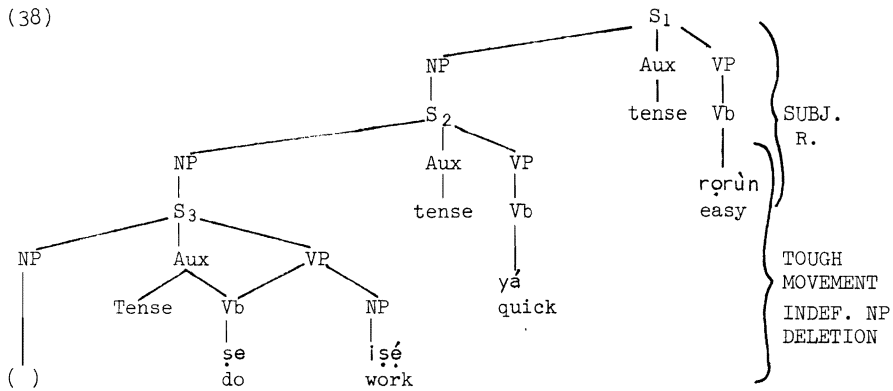
(36) a. **iṣẹ́ ṛorùn HTS ṣòro HTS ṣe
b. **iṣẹ́ ṛorùn ún ṣòro ó ṣe
work easy difficult do
'work is easy to be difficult to do'

This sentence is ruled out on the basis of meaning alone. On the other hand, we can have the following as an example of multiple embedding:

(37) iṣẹ́ nàà rọrùn HTS yá HTS ṣe
work the easy quick do
'the work is easy to be done quickly'

with (38) as an approximated deep structure:

(38)



After Tough Movement on S_2, iṣẹ́ 'work' will become the derived subject, and from thereon, Subject Raising will apply to derive (37).

The à-ti- and Cí- versions of (37) on the other hand are very weird indeed:

(39) a. **iṣẹ́ nàà rọrùn ní à-ti-yá ní à-ti-ṣe

b. iṣẹ́ nàà rọrùn ní à-ti-yá-HTS-ṣe
work the easy in fact-have-quick-do
'it is easy for the work to be quick to do'

(40) a. **iṣẹ́ nàà rọrùn ní yí-yá ní ṣí-ṣe

b. iṣẹ́ nàà rọrùn ní yí-yá-HTS-ṣe
work the easy in being-quick-do
'it is easy for the work in being quick to do'

We contend that the grammaticality of (39b) and (40b) is due to a global application of à-ti- and Cí- prefixation to the underlined stem, rather than a cyclic application which the ungrammatical (39a) and (40a) suggest. In another section below, we shall provide appropriate explanation for the similar behaviour of these verbs.

The following table illustrates the patterns of co-occurrence between these verbs, again pairing the vertical ones with the horizontal ones as ticked.

Table 2: Mutual Embedding Among Group B Verbs

	ní	wá	bẹ̀rẹ̀(sí)	fẹ́	yé	dẹ́kun	mọ̀	kọ́	ṣíwọ́	kú
kú	x	x	x	x	x	x	x	x	x	x
ṣíwọ́	x	x	x	x	x	x	x	x	x	x
kọ́	x	x	x	x	x	x	x	x	x	x
dẹ́kun	x	√	x	?	x	x	√	√	x	x
yé	x	√	√	√	x	x	x	√	x	x
fẹ́	?	√	√	x	√	√	√	√	√	x
wá	?	x	√	√	√	√	√	√	√	x
bẹ̀rẹ̀(sí)	√	√	x	√	√	√	√	√	√	x
ní	x	√	√	√	√	√	√	√	√	x

Again the following points about the table are worth noting. First, ní is a polarity negative-sensitive item, and therefore cannot occur without kò or a negative equivalent. That probably explains why it has the highest frequency relative to this context. Secondly, none of the verbs denoting cessation, yé , dẹ́kun and ṣíwọ́ , can occur in mutual embedding to avoid tautology. Thirdly, the two verbs of perception, kọ́ and mọ̀ cannot embed each other because of their cognitive interpretation. Fourthly, kú scores zero on the chart of mutual embedding because it is an absolute idiom; it occurs as a greeting verb with no particular meaning in regular usage. And finally, the remaining three verbs, bẹ̀rẹ̀ sí , wá and fẹ́ , which are process verbs, score the highest in mutual embedding. In fact, the three of them can co-occur, as in the following:

(41) a. Adé bẹ̀rẹ̀ sí HTS wá HTS fẹ́ HTS lọ ilé-ìwé
Ade start come want go school
'Ade now is about to want to go to school'

b. Adé bẹ̀rẹ̀ sí HTS fẹ́ HTS wá HTS lọ ilé-ìwé
Ade start want come go school
'Ade now wants to be about/ready to go to school'

c. Adé wá HTS fẹ́ HTS bẹ̀rẹ̀ sí HTS lọ ilé-ìwé
Ade come want start go school
'Ade has come to want to start to go to school'

d. Adé wá HTS bẹ̀rẹ̀ sí HTS fẹ́ HTS lọ ilé-ìwé
Ade come start want go school
'Ade has come to start to want to go to school'

e. Adé fẹ́ HTS bẹ̀rẹ̀ sí HTS wá HTS lọ ilé-ìwé
Ade want start come go school
'Ade wants to start now to go to school'

f. Adé fẹ́ HTS wá HTS bẹ̀rẹ̀ sí HTS lọ ilé-ìwé
Ade want come start go school
'Ade wants to be about to start to go to school'

Though these verbs freely embed in these contexts, each of them is contextually undergoing a semantic change from a basic meaning to a derived one: fẹ́ 'want' > 'be about to'; wá 'come' > 'be about to'; bẹ̀rẹ̀ sí 'start' > 'be about to'. Only lọ has a constant meaning in (41). The implication of this observation is that it is possible for a (process) object-embedding verb as in (41) to become subject-embedding, as in the following:

(42) iṣẹ́ náà fẹ́ HTS wá HTS bẹ̀rẹ̀ sí HTS ṣe
work the want come start do
'the work wants to be about to start (to be done)'

The possibilities with prefixation and gerundivization follow the same patterns as in (39) and (40), as in the following:

(43) a. **Adé bẹ̀rẹ̀ sí ní wí-wá ní fífẹ́ ní lÝ-lọ-ilé-ìwé

b. **Adé bẹ̀rẹ̀ sí ní wí-wá ní fí-fẹ́-HTS-lọ-ilé-ìwé

c. ?Adé bẹ̀rẹ̀ sí ní wí-wá-HTS-fẹ́-HTS-lọ-ilé-ìwé
Ade start in going want go school
'Ade started in going/coming in wanting in going to school'

(44) a. **Adé bẹ̀rẹ̀ sí ní à-ti-wá ní à-ti-fẹ́ ní à-ti-lọ-ilé-ìwé

b. **Adé bẹ̀rẹ̀ sí ní à-ti-wá ní à-ti-fẹ́-HTS-lọ-ilé-ìwé

c. Adé bẹ̀rẹ̀ sí ní à-ti-wá-HTS-fẹ́-HTS-lọ-ilé-ìwé
Ade start in fact-have/of-come-want-go-school
'Ade started to be going to be wanting to be going to school'

Again cyclic application, either prefixation or gerundivization, will produce the totally ungrammatical sentences in (43a, b) and (44a,b).

Besides the three process verbs, fẹ́ , wá and bẹ̀rẹ̀ sí , in mutual embedding the combined string can further embed either kọ́ or mọ̀ , but not dẹ́kun and ṣíwọ́ because of the conflict in meaning with bẹ̀rẹ̀ sí . Examples are:

(45) a. Adé fẹ́ HTS wá HTS bẹ̀rẹ̀ sí HTS kọ́ iṣẹ́ HTS ṣe
Ade want come start learn work do
'Ade wants now to start to learn to (do) work'

b. Adé fẹ́ HTS wá HTS bẹ̀rẹ̀ sí HTS mọ̀ ìṣẹ́ HTS ṣe
Ade wants come start know work do
'Ade wants to be about to start to know (how) to (do) work'

c. *Adé fẹ́ HTS wá HTS bẹ̀rẹ̀ sí HTS ṣíwọ́ ìṣẹ́ HTS ṣe
Ade wants come start stop work do
'Ade wants to be about to start to stop to (do) work'

d. *Adé fẹ́ HTS wá HTS bẹ̀rẹ̀ sí HTS dẹ́kun ìṣẹ́ HTS ṣe
Ade wants come start stop work do
'Ade wants to be about to start to stop to (do) work'

In Table 3 below, the vertical entries (Group B) can pair with the horizontal ones (Group A) as ticked.

Table 3: Group B Verbs Embedding Group A Verbs

	pẹ́	ṣú	jẹ́/ṣe	tó	yá	rọrùn	wù	dára	dùn	yé	ṣòro	gọ̀
kú	x	x	x	x	x	x	x	x	x	x	x	x
ṣíwọ́	x	x	x	x	x	x	x	x	x	x	x	x
kọ́	x	x	x	x	x	x	x	x	x	x	x	x
mọ̀	x	x	x	x	x	x	x	x	x	x	x	x
dẹ́kun	x	x	x	x	x	x	x	x	x	x	x	x
yé	x	x	x	x	x	x	x	x	x	x	x	x
fẹ́	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x
wá	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x
bẹ̀rẹ̀(sí)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x
ní	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	?

There are two points to note on these patterns of cross-embedding. First, it is significant that only the process verbs in Group B permit cross-embedding, while the others do not. Even the perception verbs, mọ̀ and kọ́ , do not. It is very probable that the three process verbs and the Group A verbs belong to related semantic fields. The second point is that gọ̀ is almost totally excluded in cross-embedding, perhaps to further highlight the point that gọ̀ is gradually losing its distribution with the HTS. We can use the following to illustrate cross-embedding among these verbs:

(46) a. iṣẹ́ náà fẹ́ HTS wu Ẹbùn HTS ṣe
b. iṣẹ́ náà fẹ́ ní à-ti-wù-Ẹbùn-HTS-ṣe
c. iṣẹ́ náà fẹ́ ní wí-wu-Ẹbùn-HTS-ṣe
work the want please Ẹbun do
'the work wants to appeal to Ẹbun to do/in doing'

3. Relation of the HTS to Other Structures

3.1. Infinitivization and/or gerundivization. The preceding pages have shown the close affinity between the HTS phenomenon on the one hand and gerundivization and factive prefixation on the other. What now remains to be shown is whether it is gerundivization (i.e. infinitival gerunds) that results in the HTS through phonological deletion rules as contended by Bowen [1858], Ward [1952], Abraham [1958] and Awobuluyi [1967, 1970, 1978]; or outright replacement of láti and à-ti- by í , by Bamgbose [1971]; or of the HTS by láti/á-ti- and the infinitival gerunds as we contend here.

However, before going further, let us summarize the points made so far. First, there is overwhelming evidence that the HTS is closely related to a verb-verb sequence as witnessed in (39), (40), (43) and (44), where cyclic gerundivization and á-ti- prefixation are blocked. Secondly, the HTS, gerundivization, and á-ti- prefixation, on the one hand, and tense-aspect on the other hand are mutually exclusive; hence the HTS, the gerundive marker, and the à-ti- prefix, each becomes the leftmost node in its own clause, as in (34). Thirdly, (34) has demonstrated that we need a rule like Object-Object Raising to explain the pervasive object inversion in Yoruba. Recall that the derived object now comes in front of the HTS, the gerundive marker, and the á-ti- prefix, and therefore, technically, is no longer part of the remnant of the embedded clause, but a derived direct object of the upper verb. And fourthly, there is a greater similarity between the sets of rules that apply in both Group A and B verbs. So far, the following syntactic processes have been featured: Equi-NP-Deletion/Indefinite NP Deletion; Raising; Extraposition; Tough Movement; (Sentence Dative Deletion); Infinitivization (Gerundivization; à-ti- prefixation; HTS).

3.1.1. Derivation of the HTS from gerunds. The claim that the HTS is a relic of the gerundive structure seems to be supported by one very strong point. The

high tone /ĺ/ in the structure already provides explanation for the HTS. This is backed up by the correspondence between the infinitival gerundive phrase and the HTS phrase, as in the following:

(47) a. Olú pẹ́ HTS dé =

b. Olú pẹ́ ní dí-dé
Olu late arrive/in arriving
'Olu was late in arriving/to arrive'

Hence it is claimed that (47a) is derived from (47b) after both ní and /d/ have been unilaterally deleted. However, the same correspondence also exists between the HTS and the à-ti- phrase, as in the following:

(48) a. Olú pẹ́ HTS dé =

b. Olú pẹ́ ní à-ti-dé
Olu late arrive/in arriving
'Olu was late in arriving/to arrive'

This same evidence leads Bamgbose to claim that /i/ must have replaced à-ti . In other words, the issue at stake is in finding how these three are inter-related.

We take this side of the coin first. While it looks simple enough to derive the HTS from the /ĺ/ of the gerund, there are several problems that positively advise against such a move. First, at least three prepositions feature in the infinitival gerundive phrase: fún, ní and sí , as pointed out earlier in (13) and (14). Therefore, the appropriate deletion rule will be a preposition deletion rule rather than ní- deletion. Such a preposition deletion will be a syntactic rule, not a phonological rule. Yet, deletion of the initial consonant of the gerundive phrase is dependent on the preposition deletion; that is, making a phonological rule dependent on a syntactic rule. Unless the preposition is deleted, the initial consonant of the gerund cannot delete; we do not have (49):

(49) **iṣẹ́ náà ṣòro ní HTS ṣe
work the difficult in do
'the work is difficult to do'

In other words the two crucial rules that are supposed to derive the HTS do not belong in the same component of the grammar. While one of them is motivated (i.e. preposition deletion), the other (i.e. initial consonant deletion of

the gerund), is not clearly motivated.[7]

Secondly, gerundivization in Yoruba makes compound lexical items out of a string, just like other instances of prefixation, so that if lọ ilé 'go home' is gerundivized, we have lí-lọ-ilé or lí-lọ-lé 'going home' as a single word. Similarly, when a compound verb like gbàgbọ́ 'believe' is gerundivized in a verb phrase, we have gbí-gba-ọmọ-gbọ́ 'believing the child' but not *gbí-gba ọmọ gbọ́ . However, the HTS plus verb sequence does not function like (nor does it mean) a gerundive phrase, as in

(50) a. iṣẹ́ náà kò ṣe ní ṣíṣe[8] ≠ b. iṣẹ́ náà kò ṣe HTS ṣe
work the not do in doing work the not possible do
'the work is not done in doing/at all' 'the work is not possible to do'

(51) a. **ọjà kò ní ní títà ≠ b. ọjạ kò nḭ́ HTS tà
wares not have to in selling wares not have to sell
'the wares will not/have not in selling' 'the wares will not sell'

Furthermore, while the gerundive phrase can undergo some transformations, its HTS equivalent cannot. While lí-lọ-ilé 'going home' in (52) can focus, its HTS equivalent cannot:

(52) a. Adé pẹ́ ní lí-lọ-ilé

b. Adé pẹ́ HTS lọ ilé → Adé pẹ́ ẹ́ lọ ilé
'Ade is late in going home' 'Ade is late to go home'

(53) a. lí-lọ-ilé ni Adé pẹ́ sí (*ni)

b. **ẹ́ lọ ilé ni Adé pẹ́ sí (*ni)
going is Ade late in
'going home is what Ade was late in'

Our explanation for the blockage in (53b) is that the HTS does not cement its constituents the way gerundivization does: ẹ́ lọ ilé is not a word the way lí-lọ-ilé is.

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[7]The objection here, though, may be more of description than of explanation or analysis.

[8]The full meaning of (50a) is that the work was not done at all, not even attempted; whereas (50b) implies that the work was attempted but was not possible to do.

Thirdly, the ill-formedness of (49) has shown that ní (on which either the gerundive marker or the à-ti- depends) and the HTS are mutually exclusive. In other words, the HTS can function independently of the ní ; that is, either (54) or (55), not both:

(54) iṣẹ́ náà ṣòro ṣe
work the difficult do

(55) iṣẹ́ náà ṣòro ní ṣí-ṣe
work the difficult in doing
'the work is difficult to do/in doing'

Yet, if the HTS truly comes from the gerund, then the two should be able to co-occur in a clause. In addition, both the à-ti- phrase and the gerund crucially depend on a preposition before they can surface at all. If therefore the gerund and the HTS are the same thing, then there should be no conflict with ní .

Fourthly, while gerundivization destroys the verb phrase nature of the stem and replaces it with a quasi-nominal sense, the HTS on the other hand preserves the verb phrase nature, hence the difference in grammaticality between the following two:

(56) mo fẹ́ HTS máa lọ
I want keep on go
'I want to keep going'

(57) **mo fẹ́ mí-máa-lọ
I want keeping-on-going

Similarly, while a gerundive structure can be potentially ambiguous,[9] the HTS equivalent is not usually so:

(58) mo mọ ọkọ̀ ní wí-wà
I know vehicle in driving (as a process)
'I know driving/how to drive'

(59) mo mọ ọkọ̀ wí-wà
I know vehicle driving (as a profession)
'I know driving/vehicle driving'

(60) mo mọ ọkọ̀ HTS wà = mo mọ ọkọ̀ ó wà
I know vehicle drive I know vehicle drive(as in 58 only)
'I know driving/how to drive' 'I know driving/how to drive'

And finally the co-occurrence restrictions on both the gerundive phrase

[9]Cf. Bamgbose [1971:39] for a similar view on the potential ambiguity of these forms.

and the HTS are not the same. While (41) and (45) show that we can have as many of the HTS as possible, (40) and (43) show the impossibility of more than one gerundive marker. If they truly come from the same source, the main problem should be unpronounceability rather than ill-formedness.[10]

These points put together make the conclusion that the HTS cannot be directly derived from a gerundive source inescapable.

3.1.2. Derivation from láti or à-ti- . Now to the other side of the coin. Bamgbose [1971] claims that either láti or à-ti- can be replaced by /í/ ; and so, he sets up láti for all the so-called infinitives in Yoruba, out of which à-ti phrase and the í- phrase are derived. He then specifies two environments for the replacement: (a) where /í-/ replaces láti when the verb after láti does not govern a nominal (i.e. the verb is not transitive); and (b) where /í-/ replaces either láti or à-ti- when such a verb governs a preceding nominal.

The problems with this analysis are equally tremendous. First, the decision both to make láti basic, and to replace láti or à-ti- with /í-/ , is arbitrary, the process can work the other way round. Secondly, the impossibility of directly deriving the HTS from either láti or à-ti- , but resorting to a process of replacement, has created a gap in the argument. Thirdly, the verbs that Bamgbose claims to precede láti (which í- replaces) do not fall neatly into two (formal and/or semantic) classes. Following his division, while in (a) we have fẹ́ 'want', ní 'has to', pẹ́ 'be late', tó 'be enough, be ready', yé 'stop', and bẹ̀rẹ̀ sí 'start' (p.44); in his (b) we have bẹ̀rẹ̀ sí 'stop, start', mọ̀ 'know', ṣe 'possible', yé 'clear to' and kú (verb of greeting) (p.45). Not only is there a conspicuous overlap, there is also crosslisting in the types of embedding verbs. Fourthly, it is not obvious whether í- should be related to à- in à-ti or to ní in ní à-ti > l'á-ti > l'áti . In other words, are the HTS, à-ti- and l'á-ti on the same level?

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[10]It seems to us that this is more than a descriptive problem since ill-formedness is not matched by unpronounceability.

3.1.3. The HTS as underlying. The position we take here is that the HTS, rather than being directly derived from ĺ- , or replacing l'á-tí/à-tí- , may be older and more representative than either of the two. Something like it, phonologically /*ĺ-/ , has been attested in Igbo, Itsekiri, Efik and Igala. In fact, Yoruba, Igbo and Igala are very close on this; and like Yoruba, the verbs that permit the /ĺ-/ vary, but the context is still between verbs:

(61) a. English: I want to see him
Yoruba: mo fẹ́ HTS rí ì
Igbo: achoro-m ĺ- hu ya

b. English: he began to cry
Yoruba: o bẹ̀rẹ̀ sí HTS so'kún
Igala: ì tsanè é raku

In fact, Igala uses the HTS to form all verbal nouns, gerunds and infinitives:

c. Igala: é-rakú yò mẹ̀
to cry/crying good enough
'to cry/crying is good enough'

This type of distribution would seem to suggest that the HTS is no longer a Yoruba affair, but may be older and more widespread than has hitherto been assumed; and further that the HTS is only recently being replaced by actual lexical items or lexicalized phrases in individual languages, most especially in the Kwa group. It can be conjectured that the systematic phasing out of the HTS as a verbal prefix in Yoruba has to do with the non-functioning of the HTS as a verbal prefix, in keeping with its function in other languages. Synchronically, Yoruba verbs no longer have prefixes, hence the conspicuousness of the HTS in Yoruba grammar.[11] Historically, therefore, the HTS could be regarded as another variant of the associative morpheme in Yoruba (cf. Welmers [1952]); in this case, between a sequence of verbs.

Viewing the HTS as an associative morpheme will explain much of its distri-

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[11]Both the HTS and the subject demarcator, also on high tone, are probably relics of noun class affixes which proto-Yoruba shared with Bantu languages of the Niger-Congo family.

butional properties as well as its relationship to both the gerund and the à-ti- structure in Yoruba complement structures. Unlike both the gerund and the à-ti- phrase, the HTS cannot introduce subject complements; it can only function between a sequence of two or more appropriate verbs, relating subordinate verbs to the main verb. On the other hand, the language now has three other possibilities in addition to the HTS: (a) the gerund, (b) à-ti- , and (c) a zero associative morpheme as in serial verb constructions. These three now serve as alternatives to the HTS, in terms of relating subordinate verbs to the main verb.

Both the gerund and the à-ti- need either a preposition or particle to introduce them. In this regard, the prepositions fún , sí and ní merely signal a node in a derived position. In other words, one can conjecture that since the basic word order of Yoruba is SVO, any node that has by one reason or another vacated its original position, in the journey from deep to surface structure, and yet does not end up inside the SVO, will end up behind any of the three prepositions.[12] For example, (62) is considered more basic than (63):

(62) mo mú ìwé fún Olú =
I take book give Olu
'I gave a book to Olu'

(63) mo fún Olú ní ìwé
I give Olu book
'I gave Olu a book'

yet, with the interchange of position between ìwé and Olú , ní has to introduce ìwé which is taking up a position outside of the SVO order. In other words, the presence of ní in l'à-ti is just to introduce the nominalization. The fact that we can do without it in both the gerundive phrase and the à-ti- phrase, shows that not much importance should be attached to it. Rather, the HTS should be related to both the gerundive marker and the à-ti .

Not much will be said on the relationship between the HTS and the gerund since as we have indicated, the two should be regarded as two separate processes. The only similarity between them which is important to our discussion is that

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[12]It is interesting to note that this 'filter' affects only rightward movement of NP nodes; hence the different types of Raising attested in Yoruba do not yield the particle ní .

both the HTS and the infinitival gerund relate subordinate predicates to the main one; the former does this directly, while the latter does so indirectly via **Cí-** prefixation.

À-ti- on the other hand performs the same function in a more complex manner. Originally, one could conceive of à-ti- as two morphemes: the prefix à- and -ti- . Awoyale [1974:390] claims that à- is primarily a factive nominalizing prefix, as in à-dédé-lọ (fact-for-nothing-go) 'going-for-nothing', dédé being a factive predicate. Ti on the other hand, has a different history. Abraham [1958:639-40] lists the following entries for ti :

a.	ti	(perfective particle)	'has'
b.	ti	(genitival particle)	'of/for somebody'
c.	ti	(directional particle)	'issued from, came out of'
d.	ti	?	'how?'

Of these four, only (c) and (d) can occur in a nominal compound:

(64) a. à-ti-ìgboro-lọ (fact-from-town-go) 'going-out-from-town'

b. à-ti-lè-lọ (fact-manner-able-go)'being-able-to-go'

neither the perfective ti nor the genitival ti can.

These supposed four ti 's however can be divided into two groups: (i) the perfective ti (as in (a)), and (ii) the genitival/manner/source ti as in (b, c and d). The latter pattern of grouping is common in many languages.[13] In this context however, the -ti- in à-ti- has lost its full perfective interpretation, since in this type of nominalization, tense-aspect has been neutralized; though it can still be shown that the sense of ti in our à-ti- complements is related to the perfective ti :

(65)	a.	ti	lọ	'has gone'
	b.	ti-ilé-lọ	(from home go)	'went from home'
	c.	à-ti-ilé-lọ	(fact-from-home-go)	'fact-of going-from-home'
	d.	à-ti-lè-lọ	(fact-manner-able-go)	'fact-of being able-to go'

We contend that tense-aspect neutralization by prefixation has resulted in a shift or loss of meaning of ti .

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[13] Cf. de in French and Spanish; da in Hausa; where a single morpheme is used for genitive, source, conjoining and manner (Russell Schuh, personal communication).

Synchronically, the originally morphologically complex form à-ti- has come to be treated as two separate forms in Yoruba grammar and writing. When it is used to conjoin two noun phrases as in Olú àti Adé 'Olu and Ade', it is written and understood as a unit. On the other hand, when it is used with a subjectless verb, it is an affix. In fact, Abraham [1958:75] would derive the conjunction àti from the genitival ti , but not the other à-ti- , which he claims forms verbal nouns. We however claim that à-ti- is derived from a neutralized perfective particle.

3.2. The HTS constructions vs. serial verb constructions. Having shown that the infinitival gerunds (marked with Cí-) and the à-ti- complements are two different constructions in their own right, from the HTS constructions, and that the former cannot directly derive the latter, we now want to show that the only two constructions in Yoruba which *directly* relate main and subordinate verbs to each other are the HTS constructions and the serial verb constructions. In spite of the similarity in function however, the two are different from each other. The serial verb constructions, which are myriad, are principally characterized by the significant absence of overt markers of the verb infinitive; the HTS constructions on the other hand, have the HTS located strategically between two (or more) verb phrases in agreement with the main verb. An example of the latter construction is:

(66) a. kò ní HTS wá HTS bẹ̀rẹ̀ sí HTS fẹ́ HTS kọ́ iṣẹ́ HTS ṣe

b. kò ní ín wá á bẹ̀rẹ̀ sí í fẹ́ é kọ́ iṣẹ́ é ṣe
not have come start want learn work do
'he will not be about to start to want to learn to (do) work'

(66), however, without the HTS or any other overt marker, is completely unacceptable:

(67) ** kò ní wá bẹ̀rẹ̀ sí fẹ́ kọ́ iṣẹ́ ṣe

(67) Would have been the serial verb equivalent of (66). The serial verb construction can be illustrated with the following examples:

(68) iṣẹ́ náà ṣú/gọ́ mi Ø pẹ́
work the bore me late/long time
'the work bored me for a long time'

(69) iṣẹ́ náà ṣòro Ø pẹ́
work the difficult late/long time
'the work was difficult for a long time'

Both these two patterns of co-occurrence in (68) and (69) are unacceptable with the HTS, the serial verb constructions being more productive and far less restrictive than the HTS forms. However, the two types of constructions can be combined, with each yet maintaining its identity, as in the following:

(70) iṣẹ́ náà sú mi Ø pẹ́ HTS ṣe
work the bore me long time do
'in doing the work, I got bored for a long time'

Furthermore, some non-permissible sequences of multiple HTS predication of these verbs will easily pass as serial verb constructions:

(71) iṣẹ́ náà rọrùn Ø dára Ø pẹ́ Ø tó
work the easy good long enough
'the work is very easy enough for a long time (to do)'

(72) a. **iṣẹ́ náà rọrùn HTS dára HTS pẹ́ HTS tó

b. iṣẹ́ náà rọrùn ún dára á pẹ́ é tó
work the easy good long enough
'the work is easy to be good to be long to be enough'

We contend that the basic difference between the HTS constructions and the serial verb constructions, among others, is the inability of the former to progressively subordinate its clausal meaning to the overall sentential meaning. That is, in the HTS constructions, the HTS makes the unit within its domain a small island. In the serial verb constructions however, there is a single focal meaning to which the other smaller propositions are subordinate. In (71), rọrùn 'be easy' is the focal meaning (i.e. the main assertion), while in (72) there are at least three focal meanings, rọrùn 'be easy', dára 'be good', pẹ́ 'be long', without any acceptable sum total.

Note further that in (71), rather than in (72), there is a gradual shift (in context) in the meaning of the predicates following the head predicate: dára 'be good' > 'very'; pẹ́ 'be late' > 'for a long (time)'; tó 'be capable' > 'be enough (time and/or degree)'. The possibility of reducing a full verbal meaning to a semi-verbal meaning (what Ansre calls "verbid") has cleared (71), while blocking (72), in spite of the obvious similarities between the two. The same fact seems to be true of the so-called prepositions in Yoruba: fún 'give' > 'to/for'; ní 'have' > 'at'; sí 'exist' > 'to/into'; mọ́ 'touch' > 'against'; ṣáájú 'precede' > 'before'.

In other words, the full facts about the HTS, the infinitival gerunds and

and the à-ti- complements, and the serial verb constructions, point to a historical change, with the HTS preceding the serial verb constructions. Right now, the latter type of construction is far more productive and far more economical than the former. The possibility of verbs serializing enables far more semantically compatible verbs to be juxtaposed without any overt marker between them, as in

(73) Olú bá mi Ø fi ọwọ́ Ø wó ọ Ø tì Ø sí òkè Ø dè mí
Olu help me use hand push it touch be at top precede me
'Olu helped me to use (my) hand to push it up before I returned'

where all the underlined items are potential verbs; yet there is no overt marker between them.

The final picture we get from these facts is one where the HTS precedes all the other forms of relating predicates to each other in Yoruba. That is, the other three--the infinitival gerunds, the à-ti- complements, and the serial verb constructions with zero associative morpheme--originate from the HTS; and since the serial verb constructions are far more productive and far more economical, we can conclude that the change is from a position of relative complexity to relative simplicity:

(74) HTS complements → infinitival gerunds → serial verb constructions
HTS complements → à-ti- complements → serial verb constructions

That this may be the true picture can be seen from the fact that, of the four constructions, the HTS complements are far more restrictive and far less productive,[14] while at the other end are the serial verb constructions which are far more productive and far more economical. The infinitival gerunds and the à-ti- complements, in the middle, run parallel lines to each other. While they are more productive than the HTS complements, they fall far short of the serial

[14]Presumably there will be some dialects which will allow more HTS than others, as in (35a), which is common in the writer's dialect.

verb constructions.[15]

3.3. Summary. In summing up, does Yoruba now have infinitive constructions? The *Shorter Oxford English Dictionary* [1933:1067] defines an infinitive as "the name of that form of a verb which expresses simply the notion of the verb without predicating it of any subject...a verb that is not inflected to indicate person, number, or tense." By that definition, Yoruba would be claimed to have a verb infinitive structure, even though the language does not have inflections. First, the gerunds, which are claimed to be infinitival, arise from a loss of subject, and a subsequent neutralization of the tense, otherwise there will be no explanation for the exclusion of tense in the infinitival gerundive structures. Secondly, the à-ti- complements similarly arise after a loss of subject, and a subsequent neutralization of tense. The ti in the à-ti- complements does not allow a perfective interpretation. Even the prefix à- has lost the normal factive interpretation that one would normally have associated with it. In other words, à-ti has constituted itself into an idiom, and hence a special marker of a type of nominalization--the infinitive, in a synchronic description. In this indirect manner therefore, these two constructions relate subordinate predicates to the main predicate.

As for the HTS and the zero associative morpheme in the serial verb constructions, the conclusion we have been led into by this discussion, is that the HTS represents an older form of the infinitive phrase, while the zero associative morpheme is the neutralization of all these markers of the infinitive phrase, as a result of a historical change. Note also that in these two constructions, like the former two, tense has also been neutralized. In surface structure, the serial verb constructions are marked for tense once; that is, the tense of the main predicate usually determines the tense of the other predicates.

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[15]As is to be expected, there is hardly anything which can be expressed by HTS, infinitival gerunds and à-ti complements, which cannot be expressed in serial verb constructions; but this cannot be the other way around.

4. Yoruba Orthography and the HTS/à-ti- Complements

In the light of our discussion of the HTS and the à-ti-complements, we suggest that the present Yoruba orthography be modified to reflect the uniqueness of these two structures. The HTS should not be written together with the verb since it is not a prefix, as is being done presently; rather it should stand on its own as a free morpheme, just as we have done in this paper. Similarly the à-ti should now be treated as an independent marker for the infinitive verb. Fortunately, most Yoruba writers follow this recommendation, because they intuitively feel that à-ti has now been lexicalized. In other words, (75a) should be preferred to (75b):

(75) a. Olú gbà àti lọ
b. *Olú gbà àti-lọ
'Olu agreed to go'

For (75b) to be acceptable, the low tone on gbà would have to change to mid, and in that case, the interpretation would differ:

(75) c. Olú gba à-ti-lọ
'Olu agreed to/accepted fact-of-having-to-go'

On the other hand however, both gerundivization and the other types of nominalization by prefixation create new and full words out of the stems, and should be written to reflect this fact, as in:

(76) a. à -tètè -dé -ilé -sùn (factive nominalization with à-)
fact-early-reach-house-sleep
'(fact of) getting-home-to-sleep'

b. tí -tètè -dé -ilé -sùn (gerundivization)
ing-early-get-home-sleep
'getting-home-early-to-sleep'

c. *ì -tètè -dé -ilé -sùn (non-factive nominalization with ì-)
non-fact-early-get-home-sleep
'getting-home-to-sleep'

5. Conclusion

This paper has concentrated on the HTS construction to show four important points: (a) that it is an older form of the verb-infinitive phrase, out of which the infinitival gerunds, the à-ti- complements, and (by a historical change) the serial verb constructions, originate; (b) that the HTS construction is different from (and should not be confused with) the infinitival gerunds,

since both have been shown to be distinct constructions; the infinitival gerunds which do not have HTS equivalents are in hundreds, far too many to be exceptions; (c) that the HTS constructions have shown Yoruba to be related to some of its neighbouring Kwa languages, like Igbo, Itsekiri and Igala. Furthermore, the serial verb constructions have been shown to be far more productive and far more economical than the HTS constructions, the infinitival gerunds and the à-ti- complements, hence the former's gradual replacement of the latter set, probably to suggest a direction of change (from relative complexity to relative simplicity and productivity); and lastly (d) that it will become necessary to modify a portion of the orthography to accomodate these new facts.

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Studies in African Linguistics
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FOURTEENTH CONFERENCE ON AFRICAN LINGUISTICS

University of Wisconsin - Madison

April 7 - 10, 1983

Thursday, April 7

Morning — OPENING SESSION

H. Carter (SOAS), "African Tonal Systems and Carribean Creoles"

A. Bamgbose (University of Ibadan), "Negation and Serial Construction in Yoruba"

C. Eastman (University of Washington), "Exclamations in Standard Swahili as Cultural Communication"

T. Childs (UC, Berkeley), "An Autosegmental analysis of Kisi Noun Class Morphophonemics"

R. M. Newman (UCLA), "Deriving Adverbials in Hausa"

A. Kimenyi (California State University, Sacramento), "The Verbal Origin of Kinyarwanda Conjunctions" (delivered by L. Niyonkuru)

I. Maddieson (UCLA), "The Analysis of Complex Phonetic Elements in Bura and the Syllable"

D.G. Churma (Ohio State University), "The Nature of Tonological Representation: Evidence from Loko"

Afternoon — BANTU SYNTAX

S. Salone (Ohio State University), "The Pragmatics of Reality and Non-reality Conditions in Swahili"

C.H. Perez (University of Wisconsin), "The Shona Passive and Government Binding Theory"

A. Biersteker (Northern Illinois University), "Tense Shift and Discourse Semantics: The Case of Embu Narrative"

K. Demuth (Indiana University), "The Acquisition of Relative Clauses in Sesotho"

V.L. Bergvall (Harvard), "Pro-drop, Small pro, and 'Rich' Agreement in Kikuyu and Swahili"

Afternoon — BANTU PHONOLOGY

K. Kahigi and D. Haubert (Michigan State), "Sumbwa Tones"

L. Niyonkuru (Wisconsin, and University of Burundi), "The Tonal Structure of Kirundi Words Borrowed from Kiswahili"

D. Odden (Yale), "Three dialects of Kipare"

Friday, April 8

Morning — PIDGINS AND CREOLES

D. K. Nylander (Alberta), "Serial Verbs, the θ Criterion and the Projection Principle: a Case Study (Krio)" (extended version of abstract read)

C. E. Debose (UC, Berkeley, College of Alameda), "A Reanalysis of Black English Verb System as Decreolization"

R.N. Agheyisi (Benin), "Linguistic Implications of the Changing Role of Nigerian Pidgin English"

A. P. Omamor (Ibadan), "Towards Extricating Nigerian Pidgin from a Straitjacket: a Preliminary Study"

A. E. Lessick (Ohio University), "Let Me Hear Your Body Talk: Compounds in Ngie and Pidgin"

NILOTIC

B.L. Hall (SUNY/Stony Brook) and K.E. Steinberger (CUNY Graduate Center), "Jumjum: A Preliminary Report"

K. C. Gjerlow-Johnson (CUNY Graduate Center) and E. B. G. Ayom (Khartoum and CUNY Graduate Center), "The Passive in Bor Dinka"

R. M. R. Hall, K. Denning, L. Galati, A. Oszkodar, A. Schwartz, and B. Wijnen (Queens College, CUNY), "Some Common-Nilotic Plants and Animals"

G. J. Dimmendaal (Leiden), "Prominence Hierarchies and the Syntactic Structure of Turkana"

C. Creider (Western Ontario), "Constraining Autosegmental Phonology: Evidence from Nandi Tone"

Afternoon — NILO-SAHARAN

J. P. Hutchison (Boston), "Major Constituent Case Markings in Kanuri"

N. Cyffer (Institut für Ethnologie und Afrika-Studien), "Case Markings in Kanuri"

M. L. Bender (Southern Illinois), "Serial Verbs in Kunama"

G. Hudson (Michigan State), "The Principled Grammar of Amharic Basic Stems"

M. Gasser (UCLA), "Thematic Links and Discourse Continuity in Amheric"

MOSTLY HAUSA

P. Newman and P. J. Jaggar (UCLA), "Synchronic Violations of the Hausa Lo Tone Raising Rule"

V. Regan (Indiana), "The Domino Principle in Vai Compounds and Nominalizations"

M. Lindau (UCLA), "Question Intonation in Hausa"

H. Cavanagh (Harvard), "A Unified Account of Hausa Grade Seven Verbs"

MISCELLANEOUS

N. Mothibatsela (Botswana), "Some Problems with Word-Identification in Bantu with Specific Reference to Tswana and Zulu"

B. S. Hartford and M. Lewis (Indiana), "Code Switching in Ewe and English"

A. A. Kiyawa (Wisconsin, Sokoto), "The Politics of Language in Nigeria: Nativization of the English Language and its Sociopolitical Implications"

S. L. Cushingham (Yale), "The Relational Grammar Unaccusative Hypothesis and Swahili"

V. Manfredi (Nsukka), "Surface Generalizations about Tone Bearing Units: Some Parameters of Variation in the Igbo Language Area"

Saturday, April 9

Morning WEST AFRICAN SYNTAX

W. Badecker (Indiana), "Object Clitics and Tonal Mutation in Enugu Igbo"

L. Marchese (San Diego State), "Pronominalization in Godie Discourse"

L. Schwartz and M. Lewis (Indiana), "Serial /e/ in Ewe: Switch Reference in Linkless Multiverbal Structures"

O. E. Essien (Calabar), "Emphasis as a Category in Ibibio"

MISCELLANEOUS

M. Kenstowicz (Illinois), "The Phonology of State in Kabyle Berber"

D. J. Dwyer (Michigan State), "The Evolution of the Definite Suffixes in Southwestern Mande"

P. R. Bennett (Wisconsin), "Nuclear Vocabulary: Some Applications in Historical Linguistics"

K. Rice, E. Cowper, P. Conteh (Toronto), "The Environment for Consonant Mutation in Mende"

Afternoon FORM, FUNCTION AND MEANING IN YORUBA

F. N. Akinnaso (California; Ife), "On the Form and Function of Grammatical Parallelism in Yoruba Ritual Communication)

O. O. Oyelaran (Ife), "Grammatical Relations in Yoruba" (read by F. Aninnaso)

Y. Awoyale (Ilorin), "On Focusing of Verbal Elements: Constituents in Yoruba Serial Verb Constructions"

S. A. Ekundayo (Ife), "Sociolinguistic Manifestations of Yoruba Suggestive Puns and Graded Insults: Elements of Political Linguistics"

BANTU

E. J. Kutik (Harvard), "The KI CH Alternation in Swahili"

E. Bertoncini (Instituto Universitario Orientale, Napoli), "Some Non-Standard Features in Modern Literary Swahili"

G. Poulos (South Africa), "Instances of Semantic Bleaching in Southeastern Bantu"

T. J. Hinnebusch (UCLA), " Lexicostatistics in Comparative Bantu Studies"

H. Kamany (Quebec), "Clausal Complements in Bamileke Ghomal"

M. Balisidya (Wisconsin), "A Language Policy: The Tanzanian Experience"

NILOTIC WORKSHOP

B. Wallace-Gadsden (New Rochelle/CUNY Graduate Center), A.M. Weader, R. M. R. Hall (Queens College, CUNY), and E. M. Yokwe (Juba; Illinois), "Toward an Understanding of Eastern Nilotic Relic Morphology".

E. B. G. Ayom (Khartoum; CUNY Graduate Center), "Some Dinka Tongue Twisters: A Linguistic and Pedagogic Exegesis"

G. B. Vincent (Juba; CUNY Graduate Center), "Juba Arabic from a Bari Perspective"

C. Creider (Western Ontario): "Aspects of Comparative Tonology of Southern Luo"

YOURUBA WORKSHOP

B. R. Badejo (Maiduguri), "A Phonetico Semantic Analysis of Verb Noun Contradictions in Yoruba"

Y. Awoyale (Ilorin), "Reflexivization in Kwa Languages"

A. Obabode (Ibadan), "Metaphoric Processes: The Yoruba Case"

Sunday, April 10

Morning THE MAGIC IN LANGUAGE

P. A. Noss (Calabar), "The Ideophone in Gbaya Syntax"

H. S. Schoeman (Africa Institute of South Africa), "The Shades of Meaning"

A. Rialland (CNRS), "Le Langage Siffle Gurma et Moba"

C. Nakibuuka and N. Byangwa (Makerere), "Historical and Dialectal Evidence in Child's First Language Acquistion"

B. Oluikpe (Nsukka), "Igbo Slang Expressions: A Linguistic Survey"

ARABIC

I. M. Abu-Salim (Yarmouk), Vowel Shortening as a Metrical Rule"

J. Keegan (CUNY), "The Role of Syllable Structure in Moroccan Arabic Phonology"

A. A. Amer (Tanta), "The Expression of Past Time in Egyptian Colloquial Arabic"

INVITED SPEAKERS

Fikani Senkoro (Dar es Salaam), "Ethnolects and Foreign Languages in the Context of Tanzanian Language Policy"

Ibrahim Yaro Yahaya (Bayero), "Towards the Perfection of Writing Systems: Examples from Hausa and English Orthographic Conventions"

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