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Table of Contents

Articles

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ASPECTS OF BANDI TONOLOGY

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Bandi tonology offers three points of interest. The first is low tone opacity. Several tone rules act to obscure the presence of underlying low tones in Bandi. In some cases low tones are lost completely while in other cases underlying low tones are manifested phonetically as downstep tones or as the low of a falling glide. The net result of Bandi tone rules is to create considerable opacity with respect to low tones. Second, is the treatment of polarizing tones. In Bandi, polarization rules cannot merely create a new tone, but must assign tone height to an underlying tone of unspecified tone height. Finally, there are formal problems that result from adherence to the OCP. A rule of tonal dissimilation becomes unduly complicated if it is assumed that the OCP prohibits sequences of like tones. A contrast between nouns with a LH and LLH melody also argues against the OCP.

1. Introduction

The Bandi[1] language has a rich tonal system that provides numerous challenges for the analyst. Few studies of Bandi tonology exist, and they are limited in scope.

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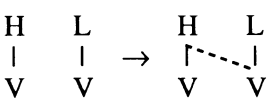
[1]The Bandi people live in northern Liberia. The traditional tribal area comprises a fifty mile arc stretching from the Guinea border in the north to the Lofa River in the south. This area today is included in the Kolahun administrative district of Lofa County, Liberia. There are an estimated 67,500 speakers of the Bandi language comprising six clans which, according to a survey conducted by The Institute for Liberian Languages [Sindlinger & Thompson, 1975], are 96.5 % cognate one with another. Linguistic innovations occur most often in the clans nearest the related languages of Loma to the east and Mende to the southwest. Welmers [1958] classifies these three languages along with Kpelle and Loko, as the Southwest Mande languages. The data for this paper were collected by Rodewald during six and a half years of work for The Institute for Liberian languages as a literacy and translation consultant among the Bandi people. All data

2.1. H Tone Spread. The first phonetic rule involves the rightward spreading of a H onto a vowel which is already associated with a L. The final morphemes in (2b,d) (*wà* 'on] and *lɔ̀* 'see') have falling tones, while in (2a,c) these same morphemes have L's. In each case the preceding H has spread onto the final syllable resulting in a phonetic falling tone.

(2) a. *pèlè wà* 'on a path'
b. *ndɔ̀wɔ̀lɔ́ wâ* 'on land'
c. *àà sùwà lɔ̀* 'he can see an animal'
d. *àà nìkà-í kɔ̂* 'he can see the cow'

H Tone Spread (HTS) operates throughout the speech string. Consequently phrase final L's are heard as falling tones. Phrase-internal L's that are affected by H Tone Spread are discussed in in the next section. The H Tone Spread rule is formulated as follows:

H Tone Spread (HTS)

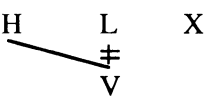


2.2. Contour Simplification. The next phonetic rule involves the delinking of a L from a phrase medial vowel upon which a H has spread (by HTS). The effect of delinking a L is to mask the presence of an underlying medial L. Delinking does not occur when the vowel is followed by a phrase boundary as seen in the forms in (2) that ended with a falling tone. The various forms in (3) demonstrate the delinking of L.

(3) a. *sánî* 'bottle'
b. *sání-ŋg!í* 'the bottle'
c. *sání mbà* 'on a bottle'
d. *àà nìkà lɔ̀* 'he can see a cow'
e. *àà nìkà-í lɔ̂* 'he can see the cow'
f. *àà nìkà-í lɔ́!í vólú* 'he can see the cow behind you'

The underlying form of 'bottle' is */sánì/*. The isolation form of 'bottle' is given in (3a) where H Tone Spread has applied giving the word final falling tone.[3] The same stem, however, has a H on the second syllable when suffixed with the definite article, as in (3b), or when followed by a postposition as in (3c). Similarly, the verb */lɔ̀/* 'see' surfaces with three different tone melodies (*lɔ̀*, *lɔ̂*, and *lɔ́*). In (3d) it is preceded by a L and the underlying L of the verb is unchanged. In (3e) H Tone Spread has spread the H of the preceeding definite marker *-í* onto the verb producing a falling tone phrase finally. This same situation occurs in (3f), but the verb is no longer phrase final, consequently the L of the verb is delinked leaving only the H still linked. Thus a two syllable sequence within a phrase with an underlying HL tone sequence will surface as HH. This is accomplished by first spreading the H (H Tone Spread) to the second syllable and then by delinking the L when it is on a phrase medial syllable. It is clear that the L is merely delinked and not deleted because a following H is always downstepped as we see in (3b). We are calling this rule Contour Simplification:

Contour Simplification (CS)

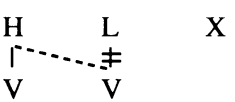


condition: X is not a phrase boundary

It is assumed that H Tone Spread has operated earlier to create the contour tone that is the input to Contour Simplification. Ordering also helps explain why there is no contour tone on *mbà* 'on' in (3c): H Tone Spread cannot reapply after Contour Simplification.

There is another possible analysis of this phenomenon. The above rules could be formulated as a single spreading and delinking rule as in (4).

(4)



condition: X is not a phrase boundary

This alternative is shown to be incorrect in speech situations where this rule fails to apply and a phonetic contour is produced. Such situations occur when a speaker interrupts his/her speech and abnormally places a phrase boundary (or pause) following an underlying H L sequence of tones. The presence of the

[3] The underlying form of the word for 'bottle' never occurs on the surface. In isolation the final L tone is always masked by H Tone Spread resulting in a final falling contour. We posit this underlying form with confidence owing to the limited distribution of falling contours and the pervasive action of H Tone Spread throughout Bandi in producing all falling contours.

contour tone in these situations is indicative of the prior application of H Tone Spread. Note the two derivations in (5) which show two different manifestations of the same underlying string when we assume an optional process we call Pause Insertion is part of the derivation[4].

(5)	*/àà nìkà-í lɔ̀ tì vòlú/*	*/àà nìkà-í lɔ̀ tì vòlú/*
H Tone Spread	*àà nìkà-í lɔ̂ tì vòlú*	*àà nìkà-í lɔ̂ tì vòlú*
Pause Insertion	———	*àà nìkà-í lɔ̂ # tì vòlú*
Contour Simplification	*àà nìkà-í lɔ́ tì vòlú*	———
	'he can see the cow behind them'	

In the derivation on the left in (5) the phrase is acted upon normally by the two tone rules. The H of the definite marker *-í* spreads to the verb *lɔ̀* 'see' by H Tone Spread and the resultant contour is simplified to a H by Contour Simplification. In the derivation on the right, the insertion of pause prevents the application of Contour Simplification and a phonetic falling tone remains on the verb. Thus, the rule proposed in (4) is shown to be incorrect. The above derivations also show that H Tone Spread must precede Contour Simplification.

2.3. Downstep. The last of the phonetic rules accounts for the downstepping of a H when preceded by a L. In Downstepping, the entire tone register is lowered. In other words, the pitch interval from H to L remains constant; however, following a L, a H is phonetically slightly lowered in absolute pitch from a previous H. Downstepping occurs whether or not the L is associated with a vowel. H's occurring after a downstepped H continue on the same relative pitch as the downstepped H. The net effect of a Bandi speech string is that of a continual lowering or downdrifting in which each H or string of H's preceded by a L is phonetically lower than preceding H's. The downstepping rule is fomulated as follows:

Downstep

L H → L !H

The action of the three rules just described accounts for most H!H sequences where no L is apparent.

2.4. Noun Types in Isolation. The phonetic rules described above mask certain underlying tone melodies. We provide isolated tone patterns on nouns at this point

[4]Pause insertion can be compared to halting speech.

because they can only be understood in light of the phonetic rules. For example, H Tone Spread will always cause an underlying HL melody on a noun in isolation to surface as H HL. The following chart shows the surface forms of nouns occurring in isolation following the application of the phonetic rules of H Tone Spread and Contour Simplification.

(6)

	CV	CVV	CVCV	CVVCV	CVCVCV
L	*mbà* 'rice'	*ndìì* 'heart'	*pèlè* 'road'	*kààlì* 'snake'	*mbòlòbà* 'cutlass'
H	*kpɔ́* 'platform'		*kéké* 'dog'		
LH		*tèé* 'chicken'	*pèlé* 'house'		
LLH			*nyàhá* 'woman'		*ndɔ̀wɔ̀lɔ́* 'earth'
HL		*káî* 'car'	*sánî* 'bottle'	*péénì* 'pen'	
LHL			*mìyâ/mìyáâ* 'banana'	*glàásî* 'glass'	*sìméndî* 'cement'

Nouns with a L melody or LH melody are quite common in Bandi. While there are also a large number of nouns with a surface H melody, we maintain that the surface H pattern on the bulk of nouns is derived by rule while nouns with a lexical H melody are quite rare. (For example, only two CV nouns (*kpɔ́* 'platform' and *gbɔ́* type of animal) and two CVCV nouns (*kéké* 'dog' and *tɔ́lɔ́* 'sunbird')with a lexical H melody have been recorded.) In addition, almost all nouns which exhibit a lexical HL or LHL pattern are clearly borrowed words. However, for a small number of these words, such as 'bottle' and 'banana', we do not have sufficient information to discern whether or not these nouns have been borrowed although we are strongly inclined to believe that they are. Also note that we have categorized the noun *nyàhá* 'woman' with LLH melody nouns even though it manifests a surface LH in isolation. There are numerous nouns which pattern like 'woman'. Reasons for categorizing these nouns as LLH will be discussed below.

2.5. Tone Mapping. In order to associate tone autosegments to the segmental tier we propose a tone mapping rule for Bandi. Tone mapping applies at the earliest stage of the derivation.

TONE MAPPING: Operating within morpheme boundaries and moving left to right, associate tones to vowels in a one to one manner. If there are more vowels than

tones associate the rightmost tone to the remaining vowel(s). If there are more tones than vowels associate excess tones to the final vowel.

We are now ready to see the combined effects of tone mapping and the phonetic rules. The derivation in (7) demonstrates the actions of these rules.

(7) **Isolated forms** [*màsà-ŋgí*] [*ì*] [*pèlé-î*] [*-tìí*] [*tɔ̀-ŋgɔ́*]
chief-def 3S house-def plural see-pst

L H L LH L LH L H

UR masa-ŋgi i pɛlɛ -i -ti i tɔ-ŋgɔ

L H L LH L LH L H

T-Mapping masa-ŋgi i pɛlɛ -i -ti i tɔ-ŋgɔ

L H L LH L LH L H

H Tone Spread masa-ŋgi i pɛlɛ -i -ti i tɔ-ŋgɔ

L H L LH L LH L H

Contour Simp. masa-ŋgi i pɛlɛ -i -ti i tɔ-ŋgɔ

L H L L!HL L!HL !H

Downstep masa-ŋgi i pɛlɛ -i -ti i tɔ-ŋgɔ

PR [*màsà-ŋgí í pèl!é-í -tì!í tɔ́-ŋg!ɔ́*]
'the chief saw the houses'

As stated earlier, the domain of Tone Mapping (TM) in Bandi is the morpheme, therefore, in (7) TM is used to associate tone in a one-to-many manner only on the noun for 'chief'. Notice also that the underlying tone sequence for 'house' and 'see-pst' are both LH. However, in the surface form, the L of 'see' becomes a floating tone after being affected by H Tone Spread and Contour Simplification, whereas the initial L of 'house' is not affected by these rules and is manifested as a L tone in the surface form. As noted earlier the H following each of these L's becomes a downstepped H whether the preceding L is associated with a vowel or not. Thus, whenever a downstepped H is encountered in a surface form, a L can be posited immediately preceding the downstepped H in the tonal tier.

The overall effect of the rules of H Tone Spread and Contour Simplification is to mask the presence of some underlying L's. In many instances their existence

can only be detected in two ways: by the presence of downstepped H's and as the last tone in phrase final falling contours.

3. Morphological Tone Rules

In addition to the phonetic rules, other tone rules may also operate within a phonological phrase. Since these rules always operate within a specific morphological context we call them morphological rules.

Besides the morphological tone rules, there is a segmental rule that changes the initial consonant of a stem from its underlying hard consonant alternation to its weak alternation. For example, the initial consonant *nd* will become *l* in the appropriate environment. Because this rule does not affect the tonal data we present we will not attempt to describe the appropriate environments or list the initial consonant alternations in this paper. In some derivations we will assume the previous operation of this segmental rule. In others, however, we will make provision for this rule to operate so that the reader may understand how the surface form is derived.

3.1. L Tone Displacement. Displacement of L's occurs when a H spreads onto a following vowel associated with a L and the L is deleted from the tonal tier. We call this rule L Tone Displacement.

Although similar in some respects, L Tone Displacement differs from the phonetic rule of H Tone Spread. In H Tone Spread, H spreads rightward onto a vowel associated with a L. Even in those situations where the L is delinked (as occurs phrase internally) the L remains on the tonal tier, but unassociated with any vowel and is manifested phonetically as either a downstep or fall. By contrast, in L Tone Displacement, there is no L influence such as a downstep or fall remaining in the surface form. We represent this difference by spreading a H onto a vowel associated with L, but with the effect that the L is completely deleted, not merely delinked. The difference between H Tone Spread and L Tone Displacement is demonstrated in (8). In (8a), the H of *mbà-í* 'rice-def' spreads onto the following postposition resulting in a fall. In example (8b), the H of *pèlé* 'house' spreads onto the following postposition and completely replaces the L with no phonetic manifestation of the original L.

(8) a.	**H Tone Spread**	*mbà-í + wà*	→	*mbà-í wâ*	'on the rice'
b.	**L Tone Displacement**	*pèlé + wà*	→	*pèlé wá*	'on a house'

L Tone Displacement is a morphologically conditioned rule; only verbs, modifiers, postpositions, and nouns may undergo this rule. Initial L's on these morphemes are displaced and deleted by the spread of a preceding H in three situations: first, when a noun or pronoun with a H or LH melody precedes a verb

in a verb phrase as in (9a); second, when either a noun or pronoun with a H or LH melody precedes a noun or modifier in a compound as in (9b); or third, when either a noun or pronoun with a H or LH melody precedes a postposition in a postpositional phrase as in (9c-e). If any of these morpheme orders occur, the final H of the first morpheme spreads to the following syllable displacing and deleting a resident L. The examples in (9c-e) also show that the tone on the noun/pronoun may be either a (H)H or LH.

(9)	a.	*kéké + lùkpé*	→	*kéké lúkpé*	'push a dog'
	b.	*kéké + wù-ngí*	→	*kéké wú-ngí*	'the dog head'
	c.	*kéké* + wà	→	*kéké wá*	'on a dog'
	d.	*pèlé + wà*	→	*pèlé wá*	'on a house'
	e.	*í + wà*	→	*í wá*	'on you'

There are no downstepped H's in (9a,b) as would be expected had H Tone Spread, Contour Simplification, and Downstep operated on these forms.

If a noun or pronoun has an underlying tone melody other than H or LH, L Tone Displacement does not operate. When nouns or pronouns with L, HL, or LLH[5] melodies precede a morpheme with an initial L, that initial L will remain unchanged by L Tone Displacement. It is, however, subject to subsequent rules such as H Tone Spread.

The examples in (10) all fail to undergo L Tone Displacement. Examples (10a-d) all fail because the tone patterns on the first morpheme of the phrase is not H or LH. The examples in (10e-i) fail because the appropriate morphemes are not adjacent to each other. In (10a, d, e, f) the failure of L Tone Displacement to apply allows the operation of the phonetic tone rules, causing a downstep to appear in (10a, e, g) and a final fall to appear in (10d, h).

(10)	a.	*ndɔ̀wɔ̀lɔ́ + lùkpé*	→	*ndɔ̀wɔ̀lɔ́ lúkp¡é*	'push earth'
	b.	*tì + wà*	→	*tì wà*	'on them'
	c.	*nìkà + wà*	→	*nìkà wà*	'on a cow'
	d.	*ndɔ̀wɔ̀lɔ́ + wà*	→	*ndɔ̀wɔ̀lɔ́ wâ*	'on land'
	e.	*màsà-ngí + lùkpé*	→	*màsà-ngí lúkp¡é*	'push the chief'

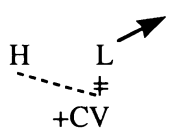
[5]Note that an LLH melody violates the OCP. There are nouns in Bandi that pattern as if they have an underlying LH melody and others that pattern as if they have an underlying LLH melody. Mende nouns have a similar distinction [Leben 1978]. Leben dealt with this by maintaining the OCP and developing a complex set of tone mapping rules. Later in this paper we present data to show that adherence to the OCP also complicates Bandi verb morphology.

f.	*màsà-ngáî + tùkpé*	→	*màsà-ngáí tùkpé*[6]	'push the chiefs'
g.	*tɛ̀-í + lùkpé*	→	*tɛ̀-í lúkpˡé*	'push the chicken'
h.	*ngù-ngí + wà*	→	*ngù-ngí wâ*	'on the/his head'
i.	*kéké-î + lùkpé*	→	*kéké-í lùkpé*	'push the dog'

As an historical note it is highly likely that the condition on L Tone Displacement is derived from nouns whose historical melody is H. Cognates of many Bandi LH melody nouns, such as *pèlé*, exhibit H melodies in other Southwest Mande languages. Dwyer [1973, 1974] posits an historical "pre-reference" marker which he suggests causes the strengthening of noun initial consonants in Southwest Mande languages. It is interesting to speculate that the segmental material of this particle prefix (**ǹ*) decayed leaving a floating L. This tone eventually became a part of synchronic tone melodies by spreading onto the first syllable of synchronic nouns, in effect pushing the original melody one syllable to the right. Thus, historical H melodies on nouns have become synchronically LH and historical LH melodies have become LLH. If this is the case, then it appears that a fairly simple historical condition has become synchronically complex and serves to explain why it is that only H and LH melodies spread and delete a following tone whereas LLH melodies do not. If we adopt this interpretation we could simplify the condition of L Tone Displacement by saying that the H is part of an historical H melody.

The L Tone Displacement rule may be formulated as follows.

L Tone Displacement (LTD)



Where (+) = boundary between either
1. noun/pronoun + postposition
2. noun/pronoun + modifier/noun
3. object noun/pronoun + verb

An arrow has been used in order to denote the delinking and complete deletion of the L . The deleted L has no influence, such as downstep, on subsequent rules.

The following derivations contrast morphemes with a H or LH melody (11a and 11c), which cause L Tone Displacement to occur, with other word melodies (11b and 11d), which do not cause L Tone Displacement to occur.

[6]Note that the initial consonant of the verb *tùkpé/lùkpé* 'to push' alternates. This initial consonant alternation is common in Bandi and occurs in a morphological environment identical to that we have outlined for L Tone Displacement.

(11)

	a. *pèlé+mbà* house+on	b. *ndɔ̀wɔ̀lɔ́+mbà* land+on	c. *í+mbà* 2S+on	d. *tì+mbà* 3PL+on
Isolated forms	L H L	L L H L	H L	L L
UR	pɛlɛ mba	ndɔwɔlɔ mba	i mba	ti mba
	L H L	L L H L	H L	L L
Seg. rules	pɛlɛ wa	ndɔwɔlɔ wa	i wa	ti wa
	L H L	L L H L	H L	L L
Tone Map.	pɛlɛ wa	ndɔwɔlɔ wa	i wa	ti wa
	L H L		H L	
L Displ.	pɛlɛ wa	———	i wa	——
		L L H L		
H Tone Spr.	———	ndɔwɔlɔ wa	——	——
PR	[*pèlé wâ*] 'on a house'	[*ndɔ̀wɔ̀lɔ́ wâ*] 'on land'	[*í wá*] 'on you'	[*tì wà*] 'on them'

It is not necessary for a H to be associated to the segmental tier in order for L Tone Displacement to occur. Assume for the moment that the underlying melody for *tùkpé* 'to push' is LH. Since our tone mapping rule for Bandi is limited to morpheme by morpheme mapping, conditions will arise where morphemic tones are not associated by the tone mapping rule. For example, in Bandi the '1S' pronoun morpheme is a floating H. When this '1S' H pronoun occurs before a verb, postposition, or noun, Tone Mapping does not associate this tone to a vowel. Floating tones left in this manner become associated through L Tone Displacement. This process is demonstrated in (12).

(12)

H + L H	TM	H + L H	LTD	H + L H		
+ *tukpe*	→	+ *tukpe*	→	+ *tukpe*	'push me'	

3.1.1. Objections to L Tone Displacement. There is a possible alternative analysis to the data we have provided in support of L Tone Displacemement. In Dwyer's [1973:118] treatment of Bandi nouns he proposes a rule of Low Tone Advancement. Many of the forms that we treat as having an underlying LH

melody, Dwyer would treat as having a simple H melody. Low Tone Advancement then spreads a L from a preceding morpheme to the right. This results in a surface LH melody. If we were to extend Dwyer's analysis to verbs, we might posit that the underlying form of the verb 'to push' (presented as LH, *lùkpé*, in (9), (10), and (12)) has an underlying H melody, *lúkpé*. Notice in (13) that the verb 'to push' alternates between a LH pattern and a HH pattern. Dwyer's analysis would predict that all of the LH patterns are the result of spread from the preceding L. Following this reasoning we must assume a floating L preceding the verb in (13c).

(13) a.	*túkpé*	'push me'
b.	*í lúkpé*	'push you'
c.	*tùkpé*	'push (something)'
d.	*mù lùkpé*	'push us (inclusive)'
e.	*nì lùkpé*	'push us (exclusive)'
f.	*wú lúkpé*	'push you (plural)'
g.	*tì lùkpé*	'push them'

We reject this analysis. The forms in (14) demonstrate the presence of an underlying L on the verb stem. Note in (14a, b) that L appears on the verb even though no apparent L occurs on the preceding morpheme to trigger a rule such as Low Tone Advancement. In addition, in (14c-f) the verb appears with a surface H!H pattern. We claim this pattern is the result of the phonetic rules of H Tone Spread and Contour Simplification. If the underlying melody of the verb is considered to be H, there is no explanation for the downstepped H.

(14) a.	*sání tùkp!é*	'push a bottle'
b.	*pèlé-í lùkpé*	'push the house'
c.	*sání-ng!í lúkp!é*	'push the bottle'
d.	*sùwà-í lúkp!é*	'push the animal'
e.	*sùwà-í-tî!í túkp!é*	'push the animals'
f.	*sání-ng!á-í-tì!í túkp!é*	'push the bottle'

Another common analysis in Southwestern Mande languages [Leben 1978] has been to posit toneless morphemes, more specifically toneless postpositions. These toneless postpositions receive tone according to tone mapping rules which spread the final tone of the preceding morpheme onto the postposition. However in Bandi, this type of analysis also fails. Consider the surface forms in (15).

(15) a.	*pèlέ wá*	'on a house'	*pèlέ yélé*	'to a house'
b.	*pèlέ-í wà*	'on the house'	*pèlέ-í yèlé*	'to the house'
c.	*pèlè wà*	'on a road'	*pèlè yèlé*	'to a road'
d.	*pèlè-í wâ*	'on the road'	*pèlè-í yél!é*	'to the road'
e.	*ndɔ̀wɔ̀lɔ́ wâ*	'on earth'	*ndɔ̀wɔ̀lɔ́ yél!é*	'to earth'

At first glance the data in (15a, c) might appear to support tonelessness on at least the first syllable of Bandi postpositions. The tone of the first syllable of the postpositions 'on' and 'to' is identical to that of the final syllable of the preceding noun. However, in (15b) we see the initial tone of the postposition is the opposite of the preceding definite morpheme. In addition, the single syllable postposition 'on' in (15d, e) is preceded by a morpheme with a final H but exhibits a falling tone while in that same environment the two syllable postposition 'to' exhibits a H!H pattern. If we adopt Leben's "toneless postposition" analysis for Bandi we must posit ad hoc floating tones in abundance in order to explain the above data. Therefore we reject an analysis that posits toneless postpositions in Bandi. The advantage of our analysis is that L Tone Displacement helps us to account for tone morphophonemics on verbs, postpositions, and compounds. Thus, it is not necessary to posit abstract tone melodies and/or toneless morphemes.

3.2. Polarization. Some Bandi morphemes which never occur in isolation have underlying polarized tone. A polarized tone is a tone which is opposite in height of a neighboring tone [Hyman & Schuh 1974]. A polarizing tone may polarize with respect to either a following or a preceding tone in a specific language. In Bandi, there are two rules of polarization, one where a tone polarizes with respect to a preceding tone, and another that polarizes with respect to a following tone. We call these rightward polarization and leftward polarization respectively. All instances of polarizing tones in Bandi are associated with particular morphemes, such as one of the two definite markers for nouns, certain subject pronouns, and one verb suffix. This is consistent with the observations of Hyman & Schuh [1974] and Schuh [1978] that polarization is generally limited to particular morphemes in a language.

A possible approach to formalizing polarizing tones is to lexically mark a polarizing morpheme with the feature [+pol] which would trigger a rule of the following form:

(16) morpheme $\rightarrow$ [αH] / ____[−αH]
[+pol]

Such a notation raises some difficulties. First, by treating a polarizing morpheme as essentially toneless (but with the diacritic [+pol]) problems are created when

Tone Mapping operates. Tone bearing units associated with [+pol] would be toneless on the tonal tier, and one would expect that they would receive a tone through Tone Mapping. For example in Bandi the 3rd. pl. potentive pronoun has the following form:

(17) *tàà* before an underlying H
tàá before an underlying L

If we choose to represent the morpheme in (17) as simply having a L and the [+pol] diacritic, Tone Mapping (unless modified) would spread the L to both vowels. This would then complicate the polarization rule by forcing it to delete (or delink) a tone before creating the polarized output. For example if the form in (18), where the second vowel has a polarized tone, were followed by an underlying L, polarization would have to first delink the tone from the second vowel and then associate a H to it.

(18)

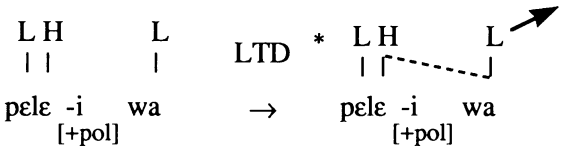
L		L
	T-Map	∧
taa	→	*taa*
[+pol]		[+pol]

Another reason for treating Bandi polarizing tones as separate tones on the tonal tier is that they act as a third tone in what is essentially a two tone (H and L) system. Tones which derive from underlying polarized tones are immune to certain rules. For example, L Tone Displacement, which affects underlying L's, does not affect L's created through polarization. Likewise, H's derived from underlying polarized tones can never be the H that displaces a L as in L Tone Displacement.

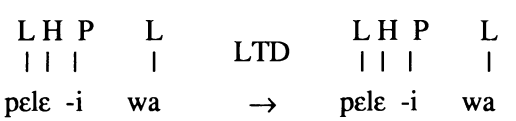
For these reasons, Polarizing tones are ascribed status as an independent underlying tone rather than treating them as a [+pol] diacritic feature on a tone bearing unit. We represent these tones underlyingly with a P in the tonal tier to indicate the presence of a tone of unspecified height. In this way we distinguish them from underlying H's and L's and at the same time allow them to associate with vowels via Tone Mapping. By using the P notation on the tonal tier some advantages become apparent. First, polarized tones can be associated normally via Tone Mapping without modification (as noted previously). Second, since polarizing tones are treated as tones, it is natural that they operate as tones on the tonal tier rather than receiving tone height in accordance with a feature on the segmental tier. Third, the presence of P on the tonal tier, will block the operation of L Tone Displacement, which affects a following associated L. For example, L Tone Displacement can create the incorrect tones in (14a) when the diacritic [+pol]

is used. However, the presence of the P tone on (19b) blocks the inappropriate application of L Tone Displacement (LTD).

(19) a.



b.



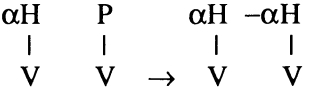
Without the P notation on the tonal tier, rule formulation would need to be complicated in order to be sensitive to the segmental feature [+pol]. With the use of P, the action of tone rules is kept in the tonal tier rather than reaching into the segmental tier.

H and L tones created through the process of polarization do undergo the normal effects of the phonetic rules discussed above. Thus, polarization rules must be ordered before the phonetic tone rules of H Tone Spread, Contour Simplification, and Downstep.

3.2.1. Right Polarization. Only one morpheme in Bandi polarizes with respect to the preceding tone. This morpheme is the definite marker */-i/* which may occur in the noun phrase. For example, */pèlè+i/* 'road + def' becomes [*pèlè-í*] whereas when */-i/* follows a H as in */pèlɛ́/* 'house' it becomes a L, */pèlɛ́-ì/* → */pèlɛ́-î/*. This L is then also subject to a phonetic spread from the preceding H and depending upon its position in the phonological phrase, it may be delinked via the Contour Simplification Rule.

The following rule and derivations illustrate polarization relative to the preceding tone. This process has been labeled Right Polarization. The presence of the feature [+def] in the rule indicates that only a morpheme lexically marked with [+def] will undergo Right Polarization. All other Polarizing tones will undergo Left Polarization (see below).

Right Polarization:



(20)

Isolated Forms	[*pèlé-î*] 'house-def'	[*pèlè-í*] 'road-def'	[*mbà*] 'on'
	L H P L	L P L	
UR	pɛlɛ -i mba house-def. on	pele -i mba road -def on	
	L H P L	L P L	
Seg Rules	pɛlɛ -i wa	pele -i wa	
	L H P L | | | |	L P L ◹ | |	
T-Map	pɛlɛ -i wa	pele -i wa	
L Tone Displ.	----------	----------	
	L H L L | | | |	L H L ◹ | |	
R-Polarization	pɛlɛ -i wa	pele -i wa	
	L H L L | ◹ |	L H L ◹ ◹ |	
H Tone Spread	pɛlɛ -i wa	pele -i wa	
	L H L L | ◹ |		
Contour Simp	pɛlɛ -i wa	----------	
PR	[*pèlé-í wà*] 'on the house'	[*pèlè-í wâ*] 'on the road'	

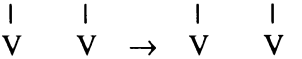
3.2.2. Left Polarization. Polarization of tone also occurs to the left on some Bandi morphemes. That is, some vowels receive a tone opposite in height to the associated tone which follows them. Leftward polarization is also governed morphologically. For example, subject phrases in Bandi require a recapitulative pronoun which contains tense and aspect. We call this pronoun a tense/aspect pronoun. Leftward polarization occurs on the final vowel of tense/aspect pronouns which correspond to 1st person plural inclusive, 1st person plural exclusive, and 3d

person plural. Leftward polarization also occurs on the final vowel of the stative verb copula */lɔ̀/* 'is (no action)' when it is lengthened to */lɔ̀-ɔ/* 'is (action)'.

Through the action of the phonetic rules, H's created through leftward polarization spread phonetically onto the following vowel and may delink a L associated with that vowel. Thus, the phonetic rules may mask an underlying L which governs the creation of a H. For example, in (21a) below, the underlying P-L sequence associated with the 3PL pronoun and the first syllable of 'house', becomes HL via the leftward polarization rule. The HL sequence then undergoes the phonetic rules of H Tone Spread and Contour Simplification leaving a final phonetic sequence of HH. The underlying L from which the polarized tone received its tone is only apparent in the surface form by the downstepping on the H which follows it.

The following rule and derivations illustrate leftward polarization using the 3d person plural tense/aspect pronoun */ti/*.

Left Polarization:



(21) Isolated Forms [*pèlé-î*] house-def [*kéké-î*] dog-def

	P L H P L H	P H P L H
UR	ti pɛlɛ -i tɔ -ŋgɔ they house-def saw-pst	ti keke-i tɔ -ŋgɔ they dog -def saw-pst
	P L H P L H	P H P L H
Seg Rules	ti pɛlɛ -i lɔ -ŋgɔ	ti keke-i lɔ -ŋgɔ
	P L H P L H	P H P L H
T-Map	ti pɛlɛ -i lɔ -ŋgɔ	ti keke-i lɔ -ŋgɔ
	P L H L L H	P H L L H
R-Polarization	ti pɛlɛ -i lɔ -ŋgɔ	ti keke-i lɔ -ŋgɔ
	H L H L L H	L H L L H
L-Polarization	ti pɛlɛ -i lɔ -ŋgɔ	ti keke-i lɔ -ŋgɔ

	H L H L L H	L H L L H
H Tone Spread	ti pɛlɛ -i lɔ -ŋgɔ	ti keke-i lɔ -ŋgɔ
	H L H L L H	L H L L H
Contour Simp.	ti pɛlɛ -i lɔ -ŋgɔ	ti keke-i lɔ -ŋgɔ
	H L!H L L !H	L H L L !H
Downstep	ti pɛlɛ -i lɔ -ŋgɔ	ti keke-i lɔ -ŋgɔ
PR	[*tí pɛ́!ɛ́-í lɔ̀-ŋg!ɔ́*] 'they saw the house'	[*tì kéké-í lɔ̀-ŋg!ɔ́*] 'they saw the dog'

Polarization rules occur before the phonetic rules but are ordered after other rules, such as L Tone Displacement, have applied. Thus, a polarizing tone will derive its height, i.e. H or L, from a H that spreads due to L Tone Displacement. This is evidenced in the following two derivations. The first, (22a), orders Right Polarization before L Tone Displacement, but produces incorrect output. The second derivation, (22b), reverses the order of these two rules and correctly produces [*í wó-î*] 'your stomach-def'.

(22) [*kò-í*] 'stomach' [*í wó-î*] 'your stomach'

		seg rules		TM		R-Pol		LTD				
	H L P		H L P		H L P		H L H		*	H L H		
a.	*i ko -i*	→	*i wo -i*	→	*i wo -i*	→	*i wo -i*	→		*i wo -i*		

		seg rules		TM		LTD		R-Pol		HTS		
	H L P		H L P		H L P		H L P		H L		H L	
b.	*i ko -i*	→	*i wo -i*	→	*i wo -i*	→	*i wo -i*	→	*i wo -i*	→	*i wo -i*	

3.2.3. A Mid Tone Analysis? It is tempting to analyze polarizing tones as historical mid tones which maximally differentiate themselves from a neighboring tone through polarization. However, there is no evidence for a synchronic mid tone in Bandi. We merely speculate here that polarizing tones such as those in Bandi may have a historical source as mid tones in a three level tone system that later collapsed into a two level system.

3.3. Dissimilation. Dissimilation rules differ from polarization rules. We saw earlier that polarization operates on a tone that has no inherent pitch height and assigns either a H or L that is the opposite of the height of a neighboring tone. Dissimilation is similar in its effects, but in dissmilation there is always an identifiable underlying tone [Hyman & Schuh 1974:100].[7] In Bandi, tonal dissimilation occurs when a L # L sequence becomes H # L. Note that in (23) that the final L's of the verbs *bɛ̀* and *vílì* become H preceding the postposition.

(23)

		Diss		HTS		
a.	*bɛ̀ + mbà* leave on (it)	→	*bɛ́ mbà*	→	*bɛ́ mbâ*	'get away from something'
b.	*vílì + mbà* run on(it)	→	*vílí mbà*	→	*vílí mbâ*	'run on something'

It is not merely a L that triggers dissimilation; the L must be in a very specific environment which we describe here. In (24) we provide a partial list of Bandi postpositions with their pronoun clitics. Note that (24c, d, e, g, h) all begin with a L, but only the postpositions in (24c) trigger Dissimilation. Verb final L's followed by any of the other pospositional phrases in (24) remain unchanged.

(24)

	'on'	'to'	'for'	
a.	*mbá*	*ngélé*	*fááwà*	'me'
b.	*í wá*	*í yélé*	*í hááwà*	'you'
c.	*mbà*	*ngèlé*	*fààwà*	'he/she/it/neutral'
d.	*mù wà*	*mù yèlé*	*mù hááwà*[8]	'us (inclusive)'

---

[7]Just as with polarization it is tempting to try to attribute motivation for the dissimilation process to an historical mid tone in the verb final position. Though a mid-tone does not occur in Bandi, a mid tone does occur in Kpelle, a related Southwest Mande language. The Bandi verbs in the examples below all undergo Dissimilation (in the appropriate environments) and their Kpelle cognates all exhibit a mid tone.

Bandi	**Kpelle**	
kùlà	*kūlā*	'take out'
bɔ̀	*kpɔ̄ŋ*	'to help'
sɔ̀ù	*sɔ̄ŋ*	'to catch'
sìɣè	*sīɣē*	'to pick up'

However, a mid tone analysis remains elusive. Since a mid tone does not occur in surface manifestations of Bandi tone, positing an underlying mid tone with the data available is very abstract. A dissimilation process describes the data satisfactorily enough for this analysis.

[8]For brevity's sake we have omitted from this paper a rule dealing with the replacement of melodies and initial consonant alternation. With one notable exception, when a disyllabic word

e.	*nì wà*	*nì yèlé*	*nì hááwà*	'us (exclusive)'
f.	*wú wá*	*ẃ yélé*	*wú hááwà*	'you (plural)'
g.	*tì wà*	*tì yèlé*	*tì hááwà*	'them'
h.	*wà*	*yèlé*	*hààwà*	'reflexive'

We interpret the data in (24) in the following way. The underlying forms of the postpositions are *mbà*, *ngèlé*, and *fààwà* respectively. In (24b, d, e, f, g) it is the final vowel of the clitic pronouns which cause the initial consonant of the postposition to weaken. In (24b, f) the addition of the pronoun clitic with a H causes L Tone Displacement to operate placing a H on the postposition. In (24d, e, g) there is no tone change because the pronoun clitics all have a L.

Having dealt with the obvious cases, we approach (24a). We interpret (24a) as a sequence of a floating H representing the '1S' pronoun (described earlier) followed by the postposition. The sequence of a floating H followed by the L on the postposition causes L Tone Displacement to operate. The result is a H on the first vowel of the postposition.

The reflexive form in (24h) is more difficult to deal with. We speculate that the reflexive morpheme is/was a vowel associated to a L. The vowel accounts for the weakening of the initial consonant of the postposition but is apparently lost. The L has no effect on the tones of the postposition and remains floating. This interpretation is parallel to the '2S' forms in (24b) in which the vowel of the pronoun causes initial consonant weakening but in fast speech the vowel becomes elided.

This leaves (24c). We interpret these forms which are unchanged from the underlying forms as having no clitic pronoun preceding the postposition. Thus, the '3S' pronoun is a null morpheme. This is true throughout Bandi. The meaning '3S' is unmarked on postpositions, verbs, and inalienable nouns.

As stated above only the postpositions in (24c) provide an environment for dissimilation. These are also the only postpositions that have no preceding pronoun. We claim that the environment for dissimilation is a verb with a final L followed directly by a postposition with an initial L; that is, there can be no morpheme intervening between the verb and the postposition. This very restricted environment for dissimilation is illustrated in (25). In examples (25a-e) below, the morphemes following the verb all have an initial L. However, the required morphemic environment for dissimilation is not met and Dissimilation does not occur. Only in example (25f) is the required environment supplied and the verb final L dissimilates to a H. The resulting H then spreads onto the following postposition (H Tone Spread) resulting in a phrase final falling contour.

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with all low melody appears with a weak initial consonant the melody will become HL. The melodies on *hááwà* 'for' in (20d, e, g) are the result of melody replacement.

(25)

		No change					
a.	*bɔ̀ + wà*	→				*bɔ̀ wà*	'help yourself'
b.	*bɔ̀ + tì wà*	→				*bɔ̀ tì wà*	'help them'
c.	*bɔ̀ + mbá*	→				*bɔ̀ mbá*	'help me'
d.	*bɔ̀ + kéké wá*	→				*bɔ̀ kéké wá*	'help a dog'
e.	*bɔ̀ + sùwà wà*	→				*bɔ̀ sùwà wà*	'help an animal'
		Diss		HTS			
f.	*bɔ̀ + mbà*	→	*bɔ́ mbà*	→		*bɔ́ mbâ*	'help it'

The dissimilation rule is formulated below.

Dissimilation:

L	L		H	L
|	|	→	|	|
V]$_{verb}$	CV]$_{postpos.}$		V	CV

Dissimilation must be ordered before the polarization rules. Note that in (26) Dissimilation creates a H which in turn causes the preceding polarizing tone to become a L.

(26) *tàa*^{P}*-bɔ̀-mbà* → *tàà bɔ́ mbâ* 'they can help him'

LP L L	TM	LP L L	Diss	LP H L	R-Pol	LL H L	HTS	LL H L
		|| | |		|| | |		|| | |		|| ↾ |
taa bɔ mba	→	*taa bɔ mba*	→	*taa bɔ mba*	→	*taa bɔ mba*	→	*taa bɔ mba*

A possible alternative approach to describing the data presented above is to treat our Dissimilation rule as another type of polarization. Verb final tones affected by this rule might possibly be analyzed as polarizing tones, in addition to those polarizing tones previously discussed. However, such a solution has several drawbacks. First, in the case of dissimilation, L's become H's only in the presence of immediately following postpositions with an inital L but remain L in all other cases. If we treat this as another case of polarization, we will be forced to create an ad hoc default rule to turn all remaining P's into L's. Second, the environment for verb tone dissimilation in Bandi is restricted to morphemes that have nothing in common with the morphemes that carry polarizing tone. Thus, we treat dissimilation as a process that is distinct in character from polarization.

4. Rule Interaction and Opacity in Bandi

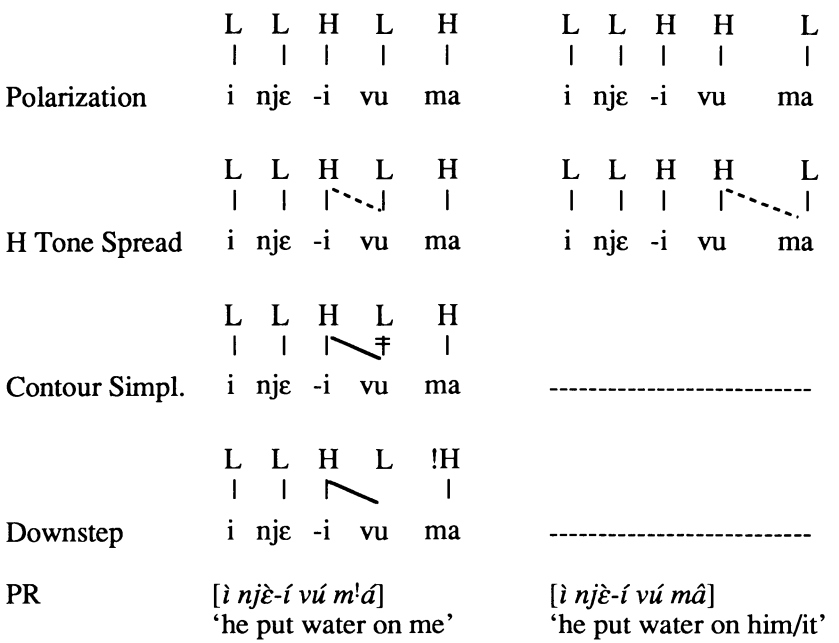
Bandi surface forms are rather remote from their underlying forms. Because of the nature of the rules described above, the presence of underlying L's is often masked. L's may be deleted (by L Tone displacement); they may become part of a

falling contour (by H Tone Spread); or they may be delinked (by Contour Simplification). In the last case the presence of the L will only be apparent phonetically when there is a following downstepped H. L's so affected may be either underlying or created by rules such as Dissimilation or Polarization. Furthermore, the actions of Dissimilation and Polarization are obscured when L's in the environments of these rules are altered. Consequently, there is considerable opacity with respect to L's in Bandi.

In (27) we present two derivations to illustrate these complex rule interactions. The underlying tone of the verb stem [*vú*] 'to put' is L but in these two derivations the verb receives its surface H in two different ways. In (27b) the surface H on the verb stem is the result of Dissimilation. The H then spreads to the following postposition via the H Tone Spread rule resulting in a phrase final falling contour. The L on the postposition that provided the environment for Dissimilation is thus only apparent as part of the falling contour. By contrast, in (30a), the verb stem [*vú*] surfaces with a H, but in this case the H is the result of the H Tone Spread and Contour Simplification rules. This leaves a H on the verb stem and a floating L which causes the following H to be downstepped.

(27) Isolated Forms [*ì*] '1S' [*njɛ̀-í*] 'water-def' [*mà*] 'on (something)'

	L L P L H L	L L P L L
UR	i njɛ -i pu ma he water-def put 1S on	i njɛ -i pu ma he water-def put (3S) on
	L L P L H L	L L P L L
Seg Rules	i njɛ -i vu ma	i njɛ -i vu ma
	L L P L H L | | | | |	L L P L L | | | | |
T-Map	i njɛ -i vu ma	i njɛ -i vu ma
	L L P L H L | | | | ⌒	
L Tone Displ.	i njɛ -i vu ma	----------
		L L P H L | | | | |
Dissimilation	----------	i njɛ -i vu ma



Dissimilation may also occur on the final tone of a disyllabic verb with a HL tone melody. Since the final associated tone of a HL melody is L, dissimilation to a H occurs when the verb is followed by a postposition containing the '3S' pronoun. The action of Dissimilation is masked by the spread of the verb's final H onto the postposition. Thus, an underlying string with a H L L melody can surface as H H H due to the combined effect of Dissimilation and the phonetic rules. Just such a process is exemplified in (28) where the verb *pɛ́lɛ̀* 'touch me' and the following postposition are in focus.

(28) *pɛ́lɛ̀ mbà yí lì* → *pɛ́lɛ́ mbá y!í lî* 'cause me to touch it and go'
touch(me) on(it) you go

The data in (28) show nicely the precarious state of L's in Bandi. There are three underlying L's. The first one (*pɛ́lɛ̀*) is lost completely due to the fact that Dissimilation turns it into a H. The second L (*mbà*) is affected by H Tone Spread, and Contour Simplification and is manifested only as the downstepping of the following H. The third L (*lì*) is affected by H Tone Spread and surfaces as part of the final falling glide.

5. The Obligatory Contour Principle and Bandi

Up to this point in our presentation, the OCP has not been an issue. With the exception of the LLH nouns presented in §2.4 we have assumed conformity to the Obligatory Contour Principle (OCP). Thus we have regarded polysyllabic morphemes with all L's or all H's to have a single tone in their underlying forms which is then associated with all tone bearing units in the morpheme by means of Tone Mapping. There are situations in Bandi where adherence to the OCP presents some difficulties. The problem appears when we encounter disyllabic verb stems with a L tone melody that undergo Dissimilation.

As described above, a L associated with a final syllable of a CVCV (disyllabic) verb stem will undergo dissimilation to a H when it is followed by a postposition. Dissimilation presents no problems when it applies to a disyllabic verb stem with a HL melody, but consider what would happen to a simple L melody on a disyllabic verb stem when the OCP is in force.

(29)

L L L		L L	T-Map	L L	Diss	H L	
	OCP			↖ |		↖ |	
howa ma	→	*howa ma*	→	*howa ma*	→	**howa ma*	'jump on him'
jump on(3S)							

The output of Dissimilation in (29) is incorrect. The correct derivation of 'jump on him' is *hòwà + mà → hòwá mâ* (the final falling tone is due to the H Tone Spread rule). The problem is that only the tone of the final syllable of the verb stem should dissimilate, not the entire melody of the verb. Dissimilation will operate as expected with verb stems of the form CV with a L melody or CVCV with a HL melody, but a CVCV verb with a L melody, as in (29), results in the incorrect form. One could presumably reformulate the Dissimilation rule so that it would look for a one to many linking of a L, delink it from the last vowel of the verb, insert a H on the tonal tier, and then associate the H with the final vowel. However, this cumbersome rule is made necessary only by adherence to the OCP. If we accept the OCP, there is no convenient way to alter the tone on only the final syllable when there is only one tone on the tonal tier that is spread to two or more vowels on the segmental tier. If, however, there were a LL melody on the tonal tier, it would be a simple matter for Dissimilation to change the last tone to H. It is our opinion that any advantages gained by using the OCP are outweighed, in this case, by the heavy cost of rule complexity.[9] We therefore interpret these facts as

[9]It should be noted that Leben [1978] was faced with this same type of problem in Mende. Mende has two groups of nouns. One group acts as if it has an LH melody and the other group acts as if it has an LLH melody. In order to account for the different behavior of these two classes of nouns and still maintain the OCP, Leben was forced to devise an extremely complicated set of tone mapping rules.

arguing against the OCP. Furthermore we propose that the correct derivation of 'jump' is as in (30) where the LL melody is maintained.

(30)

	T-Map		Diss		HTS		
L L L		L L L		L H L		L H L	
		| | |		| | |		| ⌜⌝⌟	
howa ma	→	*howa ma*	→	*howa ma*	→	*howa ma*	'jump
jump on(3S)							on him'

5.1. Is there a LLH Melody? Several linguists have observed an apparent distinction in the related language of Mende between nouns with a LH vs. LLH melody [Dwyer 1971, 1973, 1978; Voorhoeve 1975; Leben 1971; Spears 1967]. Leben [1978] specifically rejected this distinction assuming that the OCP would not allow a LLH melody. Consequently he represented nouns of these classes as both underlyingly LH and invoked an extremely complex set of tone mapping rules (see Sindlinger [1981] for a criticism of this treatment). A similar distinction exists in Bandi nouns though not always on cognates of the Mende nouns. The existence of underlying LLH melodies will, of course, argue against the OCP.

5.1.1. Bandi LH and LLH melodies. Above we presented a three syllable LLH melody noun, *ndɔ̀wɔ̀lɔ́* 'earth'. The simplest explanation for such a word is that this noun has a LLH melody which maps tones to segments in a one to one manner. We present here evidence that certain two syllable nouns with an apparent LH melody have in fact underlying LLH melodies.

In isolation the Bandi nouns *pèlé* 'house' and *nyàhá* 'woman' both have a LH tone pattern. However, as may be seen in (31), these nouns affect some following morphemes differently. Notice the postposition 'on' in (31c) exhibits a H following 'house' but a falling tone following 'woman'. Futhermore, the verb 'to push' in (31d) has a HH pattern following 'house' but a H!H pattern following 'woman'. It should be noted that the two nouns in (31) are each representative of two large classes of frequently occuring nouns.

(31)

	'house'	'woman'
a. isolation	*pèlé*	*nyàhá*
b. definite	*pèlé-î*	*nyàhá-î*
c. postposition phrase	*pèlé wá*	*nyàhá wâ*
d. verb phrase	*pèlé lévé*	*nyàhá lév!é*

The L Tone Displacement (LTD) rule described above helps us to account for *pèlé wá* in (31c) and *pèlé lévé* in (31d). We assume that the underlying melody for 'house' is LH and the melody for the postposition 'on' and the verb 'to cut' is L

and LH respectively. These forms may then be derived as in (32) through the action of only one rule, namely LTD.

(32)

		Seg Rules		T-Map		LTD		
	L H L		L H L		L H L		L H L	
a.	*pɛlɛ mba*	→	*pɛlɛ wa*	→	*pɛlɛ wa*	→	*pɛlɛ wa*	*pèlé wá*
	L H L H		L H L H		L H L H		L H L H	
b.	*pɛlɛ teve*	→	*pɛlɛ leve*	→	*pɛlɛ leve*	→	*pɛlɛ leve*	*pèlé lévé*

While LTD accounts for the *pèlé* examples, it will not explain the *nyàhá* examples. In fact all nouns of the *nyàhá* class appear to be exceptional to L Tone Displacement. Thus, part of the class distinction between these two types of nouns is in their different behavior with respect to the LTD rule.

Earlier we pointed out that *ndɔ̀wɔ̀lɔ́* 'earth' is also exceptional to LTD. For example, the postposition *wà* 'on' exhibits a falling contour following the LLH noun for 'earth' in *ndɔ̀wɔ̀lɔ́ wâ* just as it did following *nyàhá* in (31c). Without the constraint of the OCP the melody for 'earth' appears to be a simple LLH melody.

We propose that the commonality shared by *ndɔ̀wɔ̀lɔ́* and *nyàhá* is that both have an underlying LLH melody. While the association of the LLH melody to *ndɔ̀wɔ̀lɔ́* is a straightforward one-to-one mapping, association of this melody to *nyàhá* involves another complication. In the derivation of *nyàhá* and *nyàhá wâ*, Tone Mapping will create a LH contour on the end of the noun, but rising contours never appear on the surface in Bandi. They are, however, realized phonetically as a slightly higher H.[10] In (31) we demonstrated the differences in morphological behavior between *pèlé* class and *nyàhá* class nouns. In addition, when the isolation forms of these two classes are compared, the high pitch of the *nyàhá* class all manifest a slightly higher pitch than those of the *pèlé* class. We assume that a late phonetic adjustment rule converts a rising pitch to a slightly raised H. Consequently in our derivations we will leave LH sequences mapped to a single vowel rather than try to make a distinction between two different H's.

By assuming an underlying LLH melody we can now derive the forms in (33) without reference to LTD.

(33)

	a.	b.
	L LH L	L L H L
UR	*nyaha wa*	*ndɔwɔlɔ wa*
	woman on	earth on

[10]For a fuller treatment of this phenomenon see Rodewald [1989].

	L LH L	L L H L
	| |/ |	| | | |
T-Map	*nyaha wa*	*ndɔwɔlɔ wa*
	L LH L	L L H L
	| |/`·.|	| | |`·.|
HTS	*nyaha wa*	*ndɔwɔlɔ wa*
	c.	d.
	L LH L H	L L H L H
UR	*nyaha leve*	*ndɔwɔlɔ leve*
	woman cut	earth cut
	L LH L H	L L H L H
	| |/ | |	| | | | |
T-Map	*nyaha leve*	*ndɔwɔlɔ leve*
	L LH L H	L L H L H
	| |/`·.| |	| | |`·.| |
HTS	*nyaha leve*	*ndɔwɔlɔ leve*
	L LH L H	L L H L H
	| |/`·.∓ |	| | |`∓ |
Contour Simp	*nyaha leve*	*ndɔwɔlɔ leve*
	L LH L!H	L L H L!H
	| |/\ |	| | |\ |
Downstep	*nyaha leve*	*ndɔwɔlɔ leve*

We claim that the nouns in (33) all have underlying LLH melodies. We view these forms as not exceptional to LTD, rather LLH nouns are excluded because the condition on LTD states that H is part of a LH or H melody.

5.1.2. Nominal compounds. As additional evidence for the LLH distinction we present data from nominal compounds where *nyàhá* and *pèlé* class nouns differ in their behavior. In the simplest cases compounding is merely the joining of two

morphemes and tone mapping is a simple one to one mapping of the underlying tones of both.[11] This simple one to one mapping is demonstrated in (34).

(34) *nìkà + tèvé-ndáâ → nìkà-lèvé-ndáâ*

L L L H	H L	Seg rules	L L L H	H L	T-Map	L L L H	H L	HTS	L L L H	H L
nika-teve-ndaa	→	*nika-leve-ndaa*	→	*nika-leve-ndaa*	→	*nika-leve-ndaa*

However compounds containing disyllabic LLH and LH nouns can not be treated as simply. Compare the tone of the verb *teve/leve* in (35) with (34). Furthermore, the tone of 'woman' becomes LL in (35b).

(35) a. *pèlé-lévé-ndáâ* 'the act of cutting a house'
b. *nyàhà-lévé-ndáâ* 'the act of cutting a woman'

We can derive (35a) with existing rules. We demonstrate this in (36).

(36)

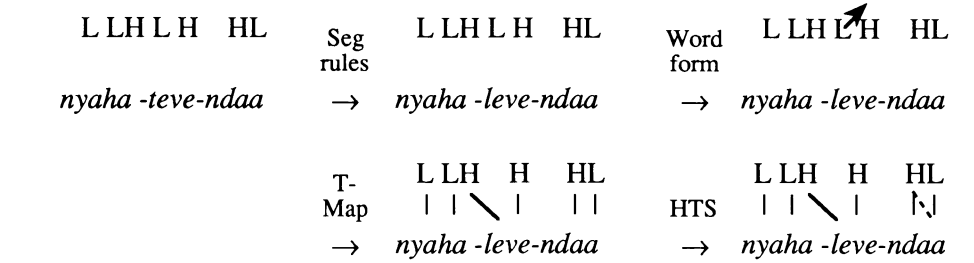
L H L H	H L	Seg rules	L H L H	H L	T-Map	L H L H	H L
pɛlɛ-teve-ndaa	→	*pɛlɛ-leve-ndaa*	→	*pɛlɛ-leve-ndaa*
LTD	L H L H	H L	HTS	L H L H	H L
→	*pɛlɛ-leve-ndaa*	→	*pɛlɛ-leve-ndaa*

In (36) the underlying tones are mapped in a one to one manner and LTD accounts for the missing L on *tèvé*. However, (35b) presents a complication. It appears that the LLH melody is spread over two morphemes; the LL appearing on 'woman' and the H appearing on 'cut'. We propose a word formation rule which deletes the first tone of the second morpheme in those cases when the first morpheme has more tones than vowels. Tones are then mapped normally.

(37) a. *nyàhá* + *lèvé-ndáâ* → *nyàhà-lévé-ndáâ* 'the act of cutting a woman'
woman cut-nom. suf.
b. *nyàhá* + *lɔ̀-ndáâ* → *nyàhà-lɔ́-ndáâ* 'the act of seeing a woman'
woman see-nom. suf.

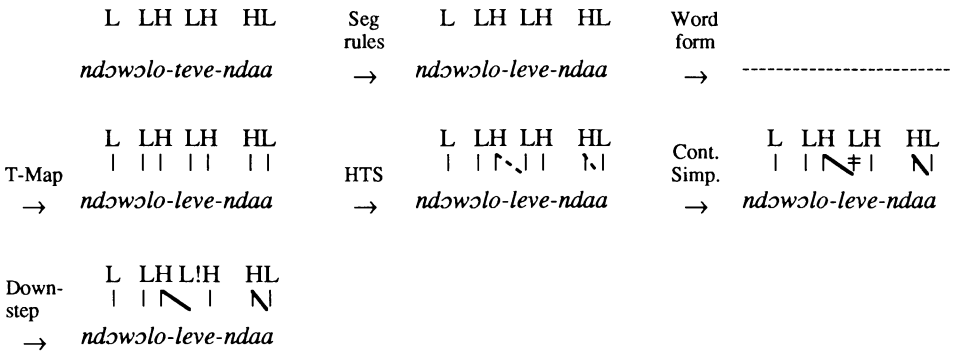
[11]Compounding can be quite complex involving the complete replacement of the second morpheme's tone melody. This melody can differ depending upon the class of nouns and morphemes involved.

Sample derivation



When a LLH melody occurs on a three syllable morpheme our word formation rule does not apply because of the restriction in the rule which allows it to apply only when there are more tones than vowels. Thus, in (38) tone mapping procedes normally.

(38) *ndɔ̀wɔ̀lɔ́* + *lèvé-ndáâ* → *ndɔ̀wɔ̀lɔ́-lévꜜé-ndáâ* 'the act o' cutting earth'
earth cut-nom. suf.



Disyllablic nouns which react identically to *nyàhá* are quite numerous. We provide here a partial list of these nouns which we claim have an underlying LLH melody.

(39)	*nyàhá*	'woman'	*ndòpó*	'child'
	sìyɛ́	'man'	*jàkó*	'monkey'
	fàsá	'shrimp'	*ngàlá*	'god'

5.2 Summary of OCP arguments. We have presented two major arguments against the OCP. First, we argued that the Dissimilation rule becomes unduly complicated if the OCP is invoked. Second, we established the need for underlying

LLH melodies to explain forms like *ndɔ̀wɔ̀lɔ́* 'earth' as well as the difference between the *nyàhá* and *pèlé* classes of nouns.

6. Conclusion

This paper has described and formalized several of the major tone rules of Bandi. Some additional rules exist that have been described in Rodewald [1989], but we have chosen to limit the scope of the present paper. The tone rules of Bandi were described as participating in two classes, phonetic rules that operate in the domain of the phrase, and morphological rules that have limited morphemic environments. It was proposed that for Bandi polarizing tones must be treated as an underspecified tonal autosegment present underlyingly on the tonal tier. This tone is then associated to tone bearing units via Tone Mapping. The actual phonetic pitch height of the polarizing tone is supplied by a combination of morphological and phonetic rules. This treatment proved necessary in order to prevent inappropriate spreading of tones either by rule or Tone Mapping. Thus, polarizing tone has a status equivalent to that of an underlying L or H.

Adherence to the OCP causes unnecessary rule complication in Bandi. Single tone word melodies created by the OCP on disyllabic stems are incorrectly affected by the Bandi morphological rules of Dissimilation and L Tone Displacement. It is possible to maintain the OCP by making rules sensitive to features such as a one to many linking of tones to segments and requiring the rule to insert and associate tones. We maintain that simpler rule formation is obtained if we suspend the OCP and allow melodies with a sequence of like tones in Bandi.

We presented data showing that Bandi nouns with a LH pattern fall into two distinct classes according to their behavior. We argued that the best course is to posit underlying LLH melodies for some disyllabic nouns. Again, the action of the OCP would cause much rule complication or force us to a much more elaborate system of tone mapping much as Leben [1978] was forced to do in Mende. Finally, the opacity of underlying L tones was discussed.

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ACOUSTIC CUES FOR THE PERCEPTION OF TONES OF DISYLLABIC NOUNS IN EDO

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Most studies on speech perception, with particular reference to the perception of tones, explained this phenomenon mainly from the auditory point of view. Many questions were therefore left unanswered with regard to the mechanisms involved in the perception of tone. This paper attempts to explain this phenomenon from an acoutic standpoint using recorded disyllabic Edo nouns. It reveals in particular that certain acoustic cues are indispensable for an Edo speaker/hearer in the perception of tones of disylabic nouns, the form and the direction of change of F_0 variation being the most important. F_0 is realized in different ways for a given speaker depeinding on the tone pattern as well as the frequency zone characteristic of each of the two basic tonemes, High and Low.

0. Introduction

In this paper the various acoustic cues used by Edo speakers/hearers in the perception of tones of disylabic nouns are considered. Edo has two distinctive tones, High and Low, combined in the following manners in disyllabic nouns: V́CV́, V̀CV̀, V̀CV́ and V́CV̀.

Studies by Wescott [1962, 1965], Amayo [1976], Omozuwa [1987a, 1987b], Lhote et al. [1986], among others, show that

(a) sequences of High tones on contiguous syllables are realized on the same pitch level;

(b) sequences of Low tones on contiguous syllables are realized *not* on the same pitch level but as a short downglide (a case of successive lowering of like tones);

(c) a Low tone immediately following a High tone is realized as a Falling tone since the Low tone assimilates to the level of the High tone preceding it before its characteristic downglide;

(d) a Low tone preceding a High tone is realized as a low level tone (in physical terms).

The purpose of this paper is to determine the acoustic cue(s) used by Edo speakers/hearers in the perception of the basic tonemes, High and Low, in a given tone pattern.

1. Experimental Procedures

This investigation was carried out in three stages. In the first stage, a list consisting of the English translation of 28 Edo disylabic nouns (7 different nouns for each of the four tone patterns—cf. list of test words in APPENDIX I) organized in random order was read by a female Edo speaker. The 28 test words were recorded by means of a magnetic tape recorder (a Revox B77 MK II high fidelity stereo tape recorder), a glottometer, and subsequently analysed logarithmically by a melody analyser and graphically by an oscillograph (a two-channel Oscillomink Recorder).

In the second stage, the recorded items were played back to a group of eight listeners from five different linguistic groups in a purely listening/repetition task. The purpose of making non-Edo speakers repeat Edo words was merely a means of simulating Edo tones in the absence of appropriate equipment for speech synthesis. Thus, the "mistakes" made in the production of Edo tones by the non-Edo speakers will serve as a basis for the interpretaton of the perceptual cues for the perception of tones in such Edo nouns. The repetitions by each of the eight listeners were also recorded by means of a magnetic tape, a glottometer, and subsequently analysed by a melody analyser connected to an oscillograph which gives the graphical representation of the analysed signal. This exercise thus provided a second list of 224 (8 x 28) tokens for further analysis. Table 1 in APPENDIX II shows the fundamental frequency (F_0) values and duration of seven V́CV́ words pronounced by a female Edo native speaker (ED) and eight non-Edo speakers from five different linguistic groups: 1 Yoruba native speaker (YB); 1 Ika native speaker (IK); 1 Hausa native speaker (HS); 3 French native speakers (two females: a phonetician and musicologist (FR_1), a speech therapist (FR_2); and a male speaker and non-linguist (FR_3); 2 native speakers of Cantonese Chinese (CH_1 and CH_2, both phoneticians).

In the third stage of the investigation, the lsit of 224 tokens was presented to ten Edo native speakers/hearers who were asked to write down in English the meaning of each test item presented to them. This is a purely linguistic perception exercise in which the listeners use their previous knowledge of their language in assessing

which of the productions/repetitions are acceptable or non-acceptable utterances in Edo.

1.1. Presentation of results, and discussion. The acoustic and perceptual results of each tone pattern considered in this investigation will be presented separately. For each tone pattern all the productions/repetitions by each of the eight listeners from five different linguistic groups accepted by the native speakers/hearers are classified separately from those productions/repetitions rejected with the goal of assessing, from the acoustic tracings, the acoustic cue(s) necessary for accepting or rejecting a given utterance in Edo. The acoustic properties of the accepted items for each tone pattern are compared with those of the rejected items.

The F_0 values for each syllable of each test word were taken at three points: at the beginning of the F_0 realization (F_0i), at a point two-thirds of the F_0 realization (F_0 2/3), and at the end of the F_0 realization, F_0f. F_0 values are expressed in Hertz (Hz) while duration is expressed in milliseconds (ms). F_0m represents the mean value of F_0 variation for each syllable. Two asterisks before the abbreviations for a given speaker shows that that word pronounced by that speaker was unanimously rejected by Edo speakers/hearers in the perception test.

1.2. Interpretation of acoustic results.

1.2.1. Perception of a sequence of high tones on disyllabic nouns of the V́CV́ type. Fundamental frequency (F_0) values in Table 1 show that in sequences of High tones on disyllabic nouns (this is also true for polysyllabic nouns), a High tone is perceived only if the tone on the first syllabic peak, V_1, is realized on the same pitch level, i.e. in the same frequency zone as the tone on the second syllabic peak, V_2, independently of variations in the duration of the F_0 realization (there is usually no marked difference in the mean relative intensity for such contiguous High toned syllables). The physical realization of a High tone in Edo in terms of F_0 variation is

(a) absence of F_0 variation from the beginning to the end of the F_0 realization for a given High toned syllable (cf. the word [*úkó*] 'gourd' pronounced by ED and FR_1)

or

(b) a gradual rise from the beginning to the end of the F_0 realization, i.e. $F_0f \geq F_0i$ (cf. the word [*úkó*] pronounced by YB, IK, CH_1, and CH_2).

Results of this experiment also show that a V́CV́ sequence is automatically perceived as a V̀CV́ tone sequence if the direction of change of F_0 variation on the first syllabic peak is falling, i.e. F_0f is less than F_0i (cf. the word [*úkó*] pronounced by FR_2 and FR_3). In addition, the tone sequence is perceived as a Rising tone followed by a High tone if the value at a point 2/3 of the F_0 variation is more than the F_0i of the first syllabic peak but less than its F_0f and the F_0i of the second syllabic peak (cf. the words [*ágó*] 'tin' and [*ágá*] 'chair' pronounced by HS, or the word [*úkú*] 'praise name for the king' pronounced by HS, FR_2, and FR_3).

Our investigation further revealed that a 1/4 tone difference between the end point of the F_0 variation on the first syllabic peak and the beginning of the F_0 variation on the second syllabic peak is not perceptually significant in the perception of High tones in a V́CV́ sequence. This is probably why the word [*èkó*] 'Lagos' pronounced by FR_1 was perceived as [*ékó*] (?) by Edo listeners. In the pronunciation of this word by FR_1, F_0 variation is nil on each of the two syllabic peaks but in absolute terms the difference between the F_0f of the first syllabic peak and the F_0i of the second syllabic peak is 1/4 of a musical tone.

1.2.2. Perception of tones of disyllabic nouns of the V̀CV́ type. A low tone is perceived on the first syllabic peak if the difference between the F_0f value of V_i and the F_0i value of V_2 is more than 1/4 of a musical tone. In other words a V̀CV́ word is perceived in Edo only if the difference between F_0f of the first syllabic peak and the F_0i of the second syllabic peak is more than a 1/4 of a tone (cf. Table 3 in APPENDIX II for the F_0 realization of the V̀CV́ word types in Edo).

1.2.3. Perception of a sequence of low tones on disyllabic nouns of the V̀CV̀ type. In a sequence of Low tones on disyllabic nouns, a Low tone is realised on the first syllabic peak either as a Low level tone (cf. the F_0 values for the word [*ùgò*] 'name of a village' pronounced by ED, YB, and FR_1 in Table 2), in which case the difference between the F_0f of the first syllabic peak and its F_0i is nil, or generally as a slightly falling tone (cf. the F_0 values for the same word pronounced by IK, HS, CH_1 and CH_2 in Table 2) in which case the F_0f of the first syllabic peak is more than the F_0i of the second syllabic peak. In both cases, the Low tone on the second syllabic peak *cannot* be realized physically as a low level tone in Edo but as a falling contour with a steeper gradient (cf. F_0 values for all speakers in Table 2). If the low tone on this syllabic peak, i.e. V_2 , is realized physically as a level tone a V̀CV́ sequence is likely to be perceived if the F_0f of the Low tone on V_1 is less than its F_0i, while a V́CV́ sequence is likely to be perceived if the

difference between the F_0f and the F_0i of V_i is nil. Further perceptual tests using synthesized materials are needed to support these claims.

It should be noted that for the same speaker, the F_0 values of the first syllable of the V̀CV̀ tone pattern is very close to the F_0 values of the first syllable of the V́CV́ tone pattern. This has no effect on the perception of tones of these two word types since the direction of the F_0 realization of the two tone patterns is basically different (cf. §§1.2.1, 1.2.3).

It is also in this sequence of homotonous Low tones that F_0 variation is directly proportional to variation in intensity. In other words, intensity (I) varies with F_0, the intensity at the end of a V̀CV̀ sequence being less than the intensity at the beginning of the sequence since the direction of change of F_0 on the first syllabic peak is the same (generally) as that of the second syllabic peak.

1.2.4. Perception of tones of disyllabic nouns of the V́CV̀ type. This study also reveals that the Low tone on the second syllabic peak of a V́CV̀ sequence is realized physically as a High-falling tone. In other words, F_0 variation on the second syllabic peak has its source in the frequency zone of the preceding High tone. Acoustic results presented in Table 4 in APPENDIX II clearly show that the onset of this tone is realized as a level tone (in the same frequency zone as the preceding High tone) for the first 20ms or more before the usual down glide (in the case of words with intervocalic voiced consonants). Where the intervocalic consonant is voiceless, the F_0i value of the second syllabic peak is usually higher than the F_0f of the first syllabic peak. In cases where the F_0i of the second syllabic peak is lower than the F_0f of the first syllabic peak by 3/4 of a tone or more, i.e. where the F_0i of the second syllabic peak is *not* in the same freqency zone as the F_0f of the first syllabic peak, there is distortion of the usual Low tone perception in such V́CV̀ words, i.e. a High-falling tone (cf. the word [*ázà*] pronounced by FR_3 and [*íbà*] pronounced by CH_2). The Low tone in such cases is perceived more or less like the low tone of a V́CV̀ word of the neighbouring and closely related Esan language, i.e. as a Low level tone. This study therefore corroborates earlier claims (based essentially on structural/auditory analyses) in respect of the realization of a Low tone after a High tone in Edo, viz. there is an assimilatory tonal process whereby a Low tone following a High tone is first assimilated to the level of the preceding High before its characteristic downglide (cf. Amayo [1976]; Omozuwa [1987a]). This phenomenon has been described by Hyman [1973, 1975] for other languages. Thus a H-L sequence is realized as a H-H͡L.

2. Comments on Acceptability/Unacceptability of Pronunciation to the Native Speakers/Hearers

In this section we shall make some brief remarks on the acceptability/unacceptability judgements of the non-Edo speakers' repetitions of the test words by the ten Edo speakers/hearers. We will equally comment on the influence of the mother tongue (and some other factors) of the non-Edo speakers on the amount of "mistakes" made in producing Edo tones.

2.1. ÝCÝ words. The repetitions of five out of the eight non-Edo speakers were accepted as being properly pronounced. The repetitions of the word [*úkó*] 'gourd' by FR_2 and FR_3 were rejected by all the "judges". It could be observed from the acoustic tracings that the direction of change of F_0 realization of the High tone on the first syllabic peak is completely different from that of the accepted tokens: F_0f of V_1 is less than its F_0i whereas F_0f of V_2 is more than its F_0i in the case of FR_2; F_0f of V_2 is equal to its F_0i in the case of FR_3. Consequently, the "word" [*ùkó*] (which is meaningless in Edo) is perceived instead of the stimulus [*úkó*] presented. The same explanation holds for the repetition of the word [*úkú*] 'praise name for Edo king' by FR_3 and perceived by Edo listeners as [*ùkú*] which is also meaningless. In this case, even though F_0f of V_1 is equal to its F_0i, its $F_0$2/3 is different from F_0i and F_0f by 3/4 of a musical tone, i.e. 12Hz (according to the conversion scale used in this work since F_0 values were taken in quarters of tone below a reference frequency of 600Hz). On the other hand, F_0i of V_2 is more than F_0f of V_1 by one musical tone. This was what probably gave the perceptual impression of a Low tone on the first syllabic peak contrasting with a High tone on the second syllabic peak (cf. §1.2.2 above).

The repetitions of the seven ÝCÝ words by the HS speaker were judged to be "partially accepted", "accepted from a non-native speaker", etc., by the ten Edo listeners. A close observation of the F_0 contour of these test words as realized by the HS speaker reveals that the duration of the first syllabic peak is highly exaggerated. Moreover, F_0i to $F_0$2/3 is considerably lower in pitch than F_0f. Thus a "Rising tone" is perceived (cf. Omozuwa [1987a:307]) on V_1 rendering the pronunciation an "unnatural" realization of the ÝCÝ stimulus. However, a difference in meaning was not signalled by the Edo native speaker/hearers since there is no distinctive R - H tonal melody on VCV words.

2.2. ỲCỲ words. Some of the repetitions of four out of the eight non-Edo speakers were judged "unnatural" or "partially accepted" or "accepted from a non-native" by the ten Edo listeners. The repetition of the word [*ìdȉ*] by CH_2 was considered "partially accepted" even though the Low-Low tone melody on the ỲCỲ word

was "properly" realized. This partial acceptability arises from the fact that the CH_2 speaker used the voiced alveolar fricative [*z*] instead of the voiced alveolar stop [*d*] in intervocalic position of the word, i.e. [*ìdĭ*] was realized as [*ìzĭ*]. The words [*ùdè*] and [*òkò*] pronounced by FR_2 and FR_3 were considered "partially accepted by Edo native speakers" in view of the fact that the direction of change of the F_0 realization on V_1 is different from that of V_2: F_0f of V_1 is more than its F_0i whereas F_0f of V_2 is less than its F_0i. Consequently, a High tone is perceived on V_1 whereas a Low "level" tone is perceived on V_2 (cf. also the realization of [*òdò*] as [*ó'dò*] by FR_3). If the low tone on V_2 were realized by this speaker as a Falling tone, i.e. the usual realization of a Low tone after a High tone in Edo (cf. §2.4), the way [*òdò*] was realized by FR_3 would have led to a difference in meaning since the Edo language contrasts */òdò/* 'yellow fever' with */ódò/* [*ódô*] 'potash'. However, [*ó'dò*] as realized by FR_3 was considered as a foreigner's pronunciation of */ódò/* 'potash', i.e. a tonetic "level" Low tone after a High as in the neighbouring and closely related Esan language instead of a tonetic Falling tone after a High in Edo. As characteristic of HS's repetition, the words */ùdè/*, */ùdù/*, */òdò/*, and */àdà/* were realized as [*ŭdè*], [*ŭdù*], [*ŏdò*], and [*ădà*] respectively, and thus judged "partially accepted" by the Edo listeners. This is remarkably different from the way the same HS speaker realized the words [*ùgò*] 'name of a village' and [*òkò*] 'parcel'. The pronunciation of these words by HS was unanimously accepted by the Edo listeners.

2.3. ỲCÝ words. Some of the repetitions of six out of the eight non-Edo speakers were either "rejected" or considered "partially accepted" by the ten Edo listeners. The words [*èdó*], [*èbó*], and [*èkó*] realized by FR_1were perceived as [*édó*], [*ébó*], and [*ékó*] respectively. They were thus rejected by the Edo listeners since they have no meaning. The F_0 realization of the first two words by FR_1 reveals that F_0f of the first syllabic peak is more than its F_0i (F_0i to $F_0$2/3 of the second syllabic peak being the same as the F_0f of the first syllabic peak). In the case of the word [*èkó*] realized by FR_1 and perceived by the Edo listeners as [*ékó*], it would be observed tha the F_0 variation is nil on both the first and second syllables: 252Hz (corresponding to 30 quarters of a musical tone on our conversion scale) from the beginning to the end of the F_0 realization on the first syllabic peak, 260Hz (corresponding to 29 quarters of a musical tone) from the beginning to the end of the F_0 realization on the second syllabic peak. Thus the difference between the pitch of the first syllabic peak and that of the second syllabic peak is 4Hz corresponding to 1/4 of a musical tone below 600Hz). This seems to suggest that a 1/4 of a musical tone is not sufficient to distinguish a Low tone from a High tone in Edo ỲCÝ words. This corroborates our earlier claim that for a ỲCÝ tone sequence to be perceived in Edo, the difference between the F_0f of V_1 and the F_0i of V_2 *must*

be more than 1/4 of a musical tone. A difference of 1/4 of a musical tone (or less) between the F_0f of V_1 and the F_0i of V_2 renders such a ṲCV́ tone pattern to be perceived as a V́CV́ pattern as shown by the pronunciation of the word [*èkó*] by FR_1 (cf. also the F_0 contour of the same word realized by the HS speaker, rejected as the ṲCV́ stimulus, and perceived as a V́CV́ "word" with no specific meaning in Edo). The pronunciatoin of the word [*èdó*] by FR_2 was considered partially accepted by the Edo native speakers/hearers in view of the fact that this speaker realized the ṲCV́ pattern as a ṲCV̌ pattern, a tone pattern that does not exist in Edo. Similarly, the pronunciation of the words [*èbó*], [*àkó*], and [*ùdó*] by FR_2 was considered partially accepted because the direction of change of the F_0 realization on the first syllabic peak is the same as that of the second syllabic peak, i.e. F_0f is > F_0i in each syllabic peak in most cases, and F_0f of V_1 is the same or very close to the F_0i of V_2. This is probably what gave the perceptual impression of a V́CV́ tone sequence, thus rendering the words pronounced "unnatural" in the ears of the native listeners.

2.4. ṲCṲ words. As noted earlier, for a pitch contour to be an acceptable realization of a /V́CṲ/ word in Edo, i.e. tonetically [V́CV̂] , the F_0i of V_2 should, ideally, be equal to or more than the F_0f of V_1 but not less than it by more than 3/4 of a musical tone.

The non-Edo speakers' repetition of this tone pattern was generally better than that of the other tone patterns recorded since they made fewer "mistakes" in its production. All the repetitions of three out of the eight non-Edo speakers were considered acceptable pronunciations of the stimuli presented. The repetition of the word */íbà/* by CH_2, the word */ázà/* by HS and FR_3, and the word */ákò/* by HS were considered "partially accepted" by the native speakers/hearers. A close observation of the F_0 realization of these tokens pronounced by the non-Edo speakers reveals that the F_0 contour of the Low tone on the second syllabic peak is "not properly realized" the way it should be in Edo, i.e. F_0i of V_2 should be in the same perceptual range as the F_0f of V_1.

Let us consider the word */íbà/* for instance. In the speech of the Edo native speaker recorded, F_0i of V_2 is less than F_0f of V_1 by 1/4 of a musical tone. This is also true of the repetitions of the same word by IK and FR_2 speakers. F_0i of V_2 is equal to F_0f of V_1 in the repetitions of YB, FR_1, and CH_1 speakers for the same word. The difference between the F_0i of V_2 and the F_0f of V_1 is 1/2 of a musical tone in the repetition of the FR_3 speaker, and this was accepted by the native speakers/hearers. In the case of the repetition of the same word by the HS speaker, this value is *one* musical tone. Six out of the ten native listeners rejected this pronunciation whereas the remaining four responded that the pronunciation was par-

tially acceptable "at least from a non-native speaker". Similarly the repetition of the word */ákò/* by the HS speaker was partially accepted by the native listeners even though "the pronunciation sounds unnatural". It could be noted from the F_0 realization of this word by HS that the tone on the first syllabic peak was realized as a Rising tone. The result is that */ákò/* is perceived as [*ǎkò*]. However, the difference between the F_0f of V_1 and the F_0i of V_2 for this word pronounced by this speaker (HS) is 1/4 of a musical tone, i.e. F_0i of V_2 is more than the F_0f of V_1 by a quarter of a musical tone. Thus, this may not have been responsible for its partial acceptability. Compare the F_0 realization of the word */ázà/* by this same speaker. This was also partially accepted by the native listeners. In this word, the High tone on the first syllabic peak was not only realized as a Rising tone but also the difference between the F_0i of V_2 and the F_0f of V_1 is five quarters of a tone.

Finally, five out of the ten native speakers/hearers were undecided on whether the pronunciation of the words */ákò/* by FR_2 and */údè/* by FR_2 and CH_2 were fully acceptable or partially acceptable whereas the remaining five listeners felt that the repetitions were partially acceptable. The difference between the F_0i of V_2 and the F_0f of V_1 is one musical tone (cf. the realization of */íbà/* by the HS speaker as analysed above). It might be that *one* musical tone difference between the F_0i of V_2 and the F_0f of V_1 serves as the perceptual threshold for the perception of a /ÝCỲ/ tone pattern in Edo, i.e. if F_0i of V_2 is less than F_0f of V_1. The perception of this tone pattern is distorted if this value is more than a musical tone. Words with such a /ÝCỲ/ tone pattern will therefore sound "unnatural" or like the pronunciation of similar words in the neighbouring Esan language. Synthesized materials would be required in order to be able to manipulate the various variables highlighted in this study with a view to determining the acoustic cue(s) and the perceptual threshhold for the perception of the four tone patterns in Edo disyllabic nouns.

3. Conclusion

This study which is based on acoustic and perceptual analyses reveals that certain acoustic cues are indispensable for an Edo speaker/hearer in the perception of tones of disylabic nouns:

(a) The acoustic cue for the perception of a sequence of High tones on a ÝCÝ word is the upward movement of F_0 in the same frequency zone intra syllabic or inter syllabic. These tones can also be realized as level tones in such words, i.e. F_0 variation from the beginning to the end of the F_0 realization is nil.

(b) In a sequence of Low tones the acoustic cue is a decrease in F_0 values from the beginning to the end of the F_0 realization on each of the syllabic peaks even though in some cases the F_0 values are the same from the beginning to the end of the F_0 realization on the first syllabic peak. A Low tone is perceived globally from the beginning of the first syllabic peak to the end of the second syllabic peak in both cases.

(c) The F_0 difference which must not be less than 1/4 of a musical tone between the end point of the F_0 realization of the Low tone on the first syllabic peak and the High tone on the second syllabic peak in a V̀CV́ sequence is the major acoustic cue for the perception of these contrastive tones in such sequence.

(d) In a V́CV̀ sequence, the Low tone on the second syllabic peak is realized as a High-falling tone since it has its origin from the frequency zone of the preceding High tone, a case of tonal assimilation.

Results of this investigation show that the form and direction of change of F_0 variation are the most important acoustic cues for the perception of tones in Edo. This can be realized in different ways depending on the tone pattern as well as the frequency zone characteristic of each of the two tonemes (cf. similar perceptual studies in Yoruba by Hombert [1976], Dojio [1978]).

This investigation equally reveals that a phonologically Low tone is realized differently in physical terms depending on its position in a word, i.e. whether or not it is preceding or following a High tone and/or whether or not it is following another Low tone.

It can be inferred from results of this study that the mother tongue of a listener influences his/her perception/repetition of the tone melody of the words of a given tone language: the more closely related the languages are, the higher the performance of such non-native listeners. Moreover, a trained phonetician and/or musicologist (whose language is non-tonal) who is used to manipulating musical pitch differences is likely to have a greater ability in the perception/repetition of pitch variations in a tone language than his counterpart who has not received such training.

It would appear from results of this study that the ears of a native speaker accommodate a wide range of pitch variations in his acceptability/non-acceptability of a given tone melody produced by a non-native speaker, especially if the word bearing such a tone melody is not in minimal contrast with another word having a different tone melody.

More investigations need to be carried out to verify these claims, especially in the areas of speech synthesis and automatic recognition of speech.

APPENDIX I

EDO ÚCÚ WORDS

	Words	Phonetic Realization	Gloss
1.	*úkó*	[*úkó*]	'gourd'
2.	*ágó*	[*ágó*]	'can'
3.	*úkú*	[*úkú*]	'praise name for Edo king'
4.	*úgú*	[*úgú*]	'name of a clan'
5.	*ádá*	[*ádá*]	'sceptre'
6.	*íbá*	[*íbá*]	'mischief'
7.	*ágá*	[ágá]	'chair'

EDO ÙCÙ WORDS

	Words	Phonetic Realization	Gloss
1.	*ùgò*	[*ùgò*]	'name of a village'
2.	*ìdìn*	[*ìdì*]	'grave'
3.	*àdà*	[*àdà*]	'crossroad'
4.	*òkò*	[*òkò*]	'parcel'
5.	*ùdù*	[*ùdù*]	'heart'
6.	*ùdè*	[*ùdè*]	'advice'
7.	*òdò*	[*òdò*]	'yellow fever'

EDO ÙCÚ WORDS

	Words	Phonetic Realization	Gloss
1.	*èdó*	[*èdó*]	'Edo (language)'
2.	*èbó*	[*èbó*]	'charm'
3.	*èkó*	[*èkó*]	'Lagos'
4.	*àkó*	[*àkó*]	'portion'
5.	*òkó*	[*òkó*]	'nest'
6.	*ùgó*	[*ùgó*]	'a plant'
7.	*ùdó*	[*ùdó*]	'name of a village'

EDO ÝCÙ WORDS

	Words	Phonetic Realization	Gloss
1.	*íbà*	[*íbà*]	'mud bed'
2.	*ókò*	[*ókò*]	'a flute'
3.	*údè*	[*údè*]	'spleen ailment'
4.	*ázà*	[*ázà*]	'treasury'
5.	*ókà*	[*ɔ́kà*]	'maize'
6.	*ákò*	[*ákò*]	'a fruit'
7.	*ébò*	[*ébò*]	'white man'

APPENDIX II

Tables of Results

Table 1a: F_0 and duration values for seven Edo ÝCÝ words pronounced by a female Edo speaker

SER. No.	WORDS	FIRST SYLLABLE				DURA -TION	SECOND SYLABLE				DURA -TION
		F_0i	$F_0$2/3	F_0f	F_0m		F_0i	$F_0$2/3	F_0f	F_0m	
1.	[*úkó*][1]	252	252	252	252	80	252	252	252	252	150
2.	[*ágó*]	260	260	260	260	120	260	260	260	260	210
3.	[*úkú*]	275	275	275	275	120	275	275	275	275	160
4.	[*úgú*]	245	260	260	255	100	260	260	260	260	120
5.	[*ádá*]	212	238	238	229	150	238	238	238	238	190
6.	[*íbá*]	245	252	252	250	120	245	245	245	245	220
7.	[*ágá*]	252	260	260	257	130	260	275	275	270	170

[1] F_0i for the first syllabic peak for the words [*ádá*] and [*íbá*] as realized by ED were 212Hz and 245Hz respectively for the first 40ms, after which it rose to 238Hz and 252Hz respectively for each of the two words. FR_1 also realized F_0i of the first syllabic peak of the word [*íbá*] as 225Hz for 40ms before it rose to 252Hz. For the same syllabic peak and for the same word, F_0 value for HS was 178Hz realized for 70ms before it rose to 200Hz. It is probably as a result of the nature of F_0 realization on this syllabic peak that the High tone was perceived as a Rising tone thereby resulting in its unacceptabilty by the Edo native speakers/hearers.

Table 1b: F_0 and duration values for seven Edo ṾCṾ words pronounced by eight non-Edo speakers in a listening task[2]

SER. NO.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA-TION	SECOND SYLABLE				DURA-TION
			F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
1.	[úkó]	YB	130	126	123	126	120	130	130	130	130	140
		IK	126	138	142	135	110	146	146	150	147	170
	*	HS	178	200	200	193	80	200	200	200	200	200
		FR_1	252	275	275	267	60	275	275	275	275	110
	**	FR_2	225	200	189	205	90	245	245	275	255	200
	**	FR_3	146	146	126	139	80	159	159	159	159	80
		CH_1	126	126	126	126	140	130	134	134	133	170
		CH_2	189	195	200	195	120	195	195	195	195	150

SER. NO.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA-TION	SECOND SYLABLE				DURA-TION
			F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
2.	[ágó]	YB	123	126	126	125	120	126	126	126	126	160
		IK	112	126	130	123	110	123	138	142	134	150
	*	HS	146	184	200	177	170	200	212	212	208	240
		FR_1	252	252	252	252	160	252	252	245	250	150
		FR_2	206	225	231	221	70	252	252	252	252	220
		FR_3	142	146	150	146	60	146	154	159	153	130
		CH_1	134	134	134	134	130	138	138	138	138	160
		CH_2	164	168	168	167	180	164	168	184	172	200

SER. NO.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA-TION	SECOND SYLABLE				DURA-TION
			F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
3.	[úkú]	YB	138	138	138	138	140	138	138	138	138	160
		IK	134	146	146	142	130	138	142	150	143	160
	*	HS	206	225	231	221	130	231	231	231	231	190
		FR_1	252	260	267	260	140	275	275	275	275	150
	*	FR_2	231	275	300	269	100	300	300	300	300	150
	**	FR_3	142	154	142	146	110	159	178	178	172	120
		CH_1	146	146	146	146	100	146	146	146	146	160
		CH_2	189	195	200	195	160	195	195	195	195	220

[2]The following symbols were used for the acceptability judgement:

* (for partially accepted tokens)
** (for rejected tokens)
? (for borderline cases)

SER. NO.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA-TION	SECOND SYLABLE				DURA-TION
			F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
4.	[úgú]	YB	130	130	130	130	140	126	126	126	126	120
		IK	134	142	142	139	80	138	146	150	145	130
	*	HS	173	206	212	197	180	212	212	212	212	180
		FR_1	252	252	252	252	110	260	260	260	260	100
		FR_2	212	231	252	232	100	275	275	283	278	90
		FR_3	146	154	154	151	80	146	159	164	156	100
		CH_1	134	134	134	134	120	138	138	134	137	150
		CH_2	189	195	200	195	150	195	195	195	195	160

SER. NO.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA-TION	SECOND SYLABLE				DURA-TION
			F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
5.	[ádá]	YB	123	123	123	123	160	123	123	123	123	220
		IK	126	126	126	126	160	126	126	150	134	130
	*	HS	123	154	159	145	160	159	159	159	159	240
		FR_1	245	245	245	245	150	245	245	245	245	150
		FR_2	225	231	252	236	160	245	245	245	245	190
		FR_3	142	142	142	142	110	142	142	146	143	100
	?	CH_1	130	123	123	125	120	123	123	126	124	170
		CH_2	164	173	173	170	180	173	178	178	176	180

SER. NO.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA-TION	SECOND SYLABLE				DURA-TION
			F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
6.	[íbá]	YB	126	126	126	126	90	123	123	123	123	160
		IK	126	142	142	137	150	126	134	142	134	150
	*	HS	178	200	200	193	160	200	200	200	200	180
		FR_1	225	252	252	243	180	252	252	252	252	170
		FR_2	238	245	252	245	90	245	245	252	247	200
		FR_3	134	138	142	138	80	142	146	150	146	110
		CH_1	134	134	134	134	80	134	134	134	134	160
		CH_2	173	195	195	188	180	195	195	178	189	170

SER. NO.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA-TION	SECOND SYLABLE				DURA-TION
			F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
7.	[ágá]	YB	126	126	126	126	160	126	126	126	126	190
		IK	123	126	138	129	140	126	126	142	131	190
	*	HS	159	184	195	179	160	195	195	195	195	210
		FR_1	267	260	252	260	200	252	252	252	252	160
		FR_2	206	225	260	230	160	275	245	252	257	190
		CH_1	126	126	126	126	120	126	126	123	125	200
		CH_2	164	168	173	168	240	178	178	178	178	80

Table 2a: F_0 and duration values for seven Edo ṾCṾ words pronounced by a female Edo speaker

SER. NO.	WORDS	FIRST SYLLABLE				DURA -TION	SECOND SYLABLE				DURA -TION
		F_0i	$F_0$2/3	F_0f	F_0m		F_0i	$F_0$2/3	F_0f	F_0m	
1.	[*ùgò*]	231	238	231	233	80	231	189	146	189	170
2.	[*ìdì*]	252	245	238	245	170	231	189	150	190	200
3.	[*ùdù*]	252	252	245	250	130	231	189	173	198	180
4.	[*ùdè*]	245	252	245	247	80	238	200	173	204	170
5	[*àdà*]	212	212	206	210	130	200	184	150	178	180
6.	[*òkò*]	245	238	231	238	140	245	184	173	201	180
7.	[*òdò*]	231	212	206	216	160	206	178	159	181	160

Table 2b: F_0 and duration values for seven Edo ṾCṾ words pronounced by eight non-Edo speakers in a listening task

SER. NO.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA -TION	SECOND SYLABLE				DURA -TION
			F_0i	$F_0$2/3	F_0f	F_0m		F_0i	$F_0$2/3	F_0f	F_0m	
1.	[*ùgò*]	YB	119	119	119	119	90	112	103	89	101	130
		IK	134	134	119	129	120	116	103	94	104	120
		HS	189	189	195	191	140	173	138	103	138	270
		FR_1	231	231	231	231	80	225	200	178	201	130
	*	FR_2	212	231	252	232	80	195	146	138	160	150
	*	FR_3	138	159	164	154	80	154	138	109	134	80
		CH_1	138	134	134	135	120	130	103	97	110	110
		CH_2	195	189	184	189	120	164	159	126	150	90

SER. NO.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA -TION	SECOND SYLABLE				DURA -TION
			F_0i	$F_0$2/3	F_0f	F_0m		F_0i	$F_0$2/3	F_0f	F_0m	
2.	[*ìdì*]	YB	126	126	116	123	90	116	103	100	106	180
		IK	138	138	134	137	130	126	106	103	112	120
	*	HS	146	206	212	188	130	189	106	97	131	260
		FR_1	267	260	260	262	120	212	184	159	185	160
	*	FR_2	206	225	212	228	80	173	146	134	151	120
	*	FR_3	134	154	154	147	60	150	154	130	145	90
		CH_1	138	138	134	137	120	123	103	97	108	90
	*	CH_2	178	195	164	179	120	164	138	126	143	90

SER. No.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA-TION	SECOND SYLABLE				DURA-TION
			F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
3.	[ùdù]	YB	138	130	126	131	140	126	116	97	113	140
		IK	138	138	134	137	160	126	116	89	110	190
	*	HS	189	206	218	204	160	178	119	103	133	280
		FR_1	245	245	238	243	120	231	200	173	201	180
	*	FR_2	231	238	238	236	140	206	168	138	171	190
	*	FR_3	138	150	164	151	100	159	159	154	157	90
		CH_1	150	146	138	145	160	138	123	106	122	160
	*	CH_2	178	195	195	189	200	195	150	126	157	180

SER. No.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA-TION	SECOND SYLABLE				DURA-TION
			F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
4.	[ùdè]	YB	126	123	119	123	90	116	109	97	107	150
		IK	126	126	126	126	80	123	116	94	111	170
	*	HS	173	206	212	197	150	189	126	94	136	270
		FR_1	252	252	252	252	130	225	178	164	189	200
		FR_2	225	231	231	229	80	195	159	134	163	140
		FR_3	150	150	150	150	80	146	126	97	123	170
		CH_1	138	142	126	135	150	126	119	106	117	150
		CH_2	212	206	173	197	170	164	146	138	149	80

SER. No.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA-TION	SECOND SYLABLE				DURA-TION
			F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
5.	[àdà]	YB	106	106	103	105	130	109	97	92	99	130
		IK	123	119	116	119	160	106	94	89	96	180
	*	HS	116	134	138	129	140	138	106	97	114	240
		FR_1	212	212	212	212	120	195	184	150	176	160
		FR_2	195	195	195	195	80	195	134	116	148	190
		FR_3	150	150	150	150	80	146	123	94	121	150
		CH_1	126	130	126	127	110	126	106	97	110	150
		CH_2	164	164	164	164	200	159	134	116	136	160

SER. No.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA-TION	SECOND SYLABLE				DURA-TION
			F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
6.	[òkò]	YB	116	116	109	114	110	116	112	100	109	90
		IK	126	123	116	122	140	126	103	89	106	150
		HS	178	178	178	178	160	178	138	106	141	290
		FR_1	231	231	231	231	120	231	189	159	193	200
	*	FR_2	195	231	252	226	100	231	150	138	173	170
	*	FR_3	150	159	164	158	80	138	123	97	119	160
		CH_1	134	126	126	129	120	126	103	97	109	120
		CH_2	178	164	138	160	230	159	134	119	137	150

SER. NO.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA-TION	SECOND SYLABLE				DURA-TION
			F_0i	$F_0$2/3	F_0f	F_0m		F_0i	$F_0$2/3	F_0f	F_0m	
7.	[òdò]	YB	116	112	106	111	160	109	103	94	102	120
		IK	119	116	116	117	160	112	97	82	97	140
		HS	138	142	142	141	120	138	119	97	118	280
		FR_1	218	212	212	214	160	212	178	159	183	220
		FR_2	212	212	212	212	140	189	134	112	145	160
	*	FR_3	142	150	154	149	100	138	119	97	118	120
		CH_1	138	138	126	134	130	126	116	103	115	130
		CH_2	164	168	164	165	170	159	134	123	139	100

Table 3a: F_0 and duration values for seven Edo ỲCV́ words pronounced by a female Edo speaker

SER. NO.	WORDS	FIRST SYLLABLE				DURA-TION	SECOND SYLABLE				DURA-TION
		F_0i	$F_0$2/3	F_0f	F_0m		F_0i	$F_0$2/3	F_0f	F_0m	
1.	[èdó]	218	218	218	218	110	231	231	231	231	180
2.	[èbó]	212	212	212	212	100	231	231	231	231	190
3.	[èkó]	231	231	231	231	80	267	267	267	267	200
4.	[àkó]	218	218	218	218	80	245	245	245	245	120
5.	[òkó]	218	218	218	218	90	238	238	231	236	190
6.	[ùgó]	231	231	231	231	100	252	252	252	252	200
7.	[ùdó]	231	231	231	231	130	252	252	252	252	240

Table 3b: F_0 and duration values for seven Edo ỲCV́ words pronounced by eight non-Edo speakers in a listening task

SER. NO.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA-TION	SECOND SYLABLE				DURA-TION
			F_0i	$F_0$2/3	F_0f	F_0m		F_0i	$F_0$2/3	F_0f	F_0m	
1.	[èdó]	YB	109	109	109	109	140	126	126	126	126	160
		IK	119	119	119	119	90	126	138	142	135	130
	*	HS	138	150	150	146	140	164	164	164	164	240
	**	FR_1	225	231	231	229	150	231	231	225	229	120
	*	FR_2	206	206	206	206	120	218	245	275	246	210
	*	FR_3	138	138	142	139	80	142	154	142	146	110
	*	CH_1	134	138	138	137	120	138	138	138	138	120
	*	CH_2	150	164	164	159	120	168	168	168	168	160

SER. No.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA -TION	SECOND SYLABLE				DURA -TION
			F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
2.	[èbó]	YB	116	116	116	116	80	126	126	126	126	120
		IK	116	116	116	116	130	123	138	150	137	140
	*	HS	173	184	184	180	200	200	212	245	219	200
	**	FR_1	231	231	231	231	160	231	231	231	231	200
	**	FR_2	206	225	238	223	120	238	260	245	248	210
		FR_3	138	138	134	137	60	134	150	150	145	100
		CH_1	123	119	116	119	120	130	130	126	129	160
		CH_2	159	164	164	162	220	178	195	195	189	180

SER. No.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA -TION	SECOND SYLABLE				DURA -TION
			F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
3.	[èkó]	YB	126	126	126	126	110	138	138	138	138	160
		IK	126	126	126	126	120	138	138	164	147	140
	***	HS	173	173	173	173	160	178	178	178	178	220
	**	FR_1	252	252	252	252	130	260	260	260	260	140
	**	FR_2	206	225	238	223	100	238	275	252	255	170
		FR_3	154	154	154	154	70	154	173	173	167	100
		CH_1	112	112	112	112	80	134	134	134	134	160
		CH_2	150	168	164	161	80	195	195	195	195	190

SER. No.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA -TION	SECOND SYLABLE				DURA -TION
			F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
4.	[àkó]	YB	112	112	116	113	90	126	126	123	125	120
		IK	106	106	119	110	150	126	130	126	127	170
	**	HS	142	178	189	170	200	206	206	206	206	220
		FR_1	225	225	218	223	140	275	252	245	257	190
	**	FR_2	200	225	231	219	90	238	267	267	257	170
		FR_3	138	138	138	138	50	138	154	159	150	120
		CH_1	119	119	119	119	120	123	130	123	125	120
		CH_2	154	154	154	154	130	173	178	184	178	170

SER. No.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA -TION	SECOND SYLABLE				DURA -TION
			F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
5.	[òkó]	YB	116	116	116	116	100	126	126	126	126	160
		IK	119	119	119	119	140	138	142	142	141	140
		HS	164	195	200	186	190	225	231	225	227	240
		FR_1	212	231	206	216	130	275	245	245	255	140
		FR_2	173	206	212	197	90	245	252	245	247	200
		FR_3	138	150	126	138	90	150	168	173	164	100
		CH_1	126	119	112	119	110	134	134	134	134	120
		CH_2	164	164	164	164	150	189	195	195	193	160

SER. NO.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA -TION	SECOND SYLABLE				DURA -TION
			F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
6.	[*ùgó*]	YB	116	116	116	116	100	138	138	138	138	140
		IK	119	119	119	119	120	138	138	142	139	160
		HS	173	178	178	176	130	206	206	206	206	240
		FR_1	231	231	231	231	110	252	252	245	250	200
		FR_2	206	231	231	223	90	252	252	252	252	280
	**	FR_3	138	142	138	139	100	142	150	150	147	120
		CH_1	126	126	126	126	80	138	138	138	138	140
		CH_2	164	164	164	164	160	189	189	189	189	240

SER. NO.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA -TION	SECOND SYLABLE				DURA -TION
			F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
7.	[*ùdó*]	YB	119	119	119	119	140	134	134	134	134	200
		IK	116	116	116	116	120	123	126	142	130	200
		HS	173	178	178	176	160	189	206	206	200	250
		FR_1	231	231	231	231	140	245	245	245	245	200
	**	FR_2	195	225	231	217	90	231	267	275	258	200
	**	FR_3	138	138	142	139	70	142	142	146	143	120
		CH_1	116	116	116	116	100	134	134	134	134	160
		CH_2	164	164	164	164	180	189	189	189	189	240

Table 4a: F_0 and duration values for seven Edo ṼCṼ words pronounced by a female Edo speaker

SER. NO.	WORDS	FIRST SYLLABLE				DURA -TION	SECOND SYLABLE				DURA -TION
		F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
1.	[*íbà*]	267	275	275	272	120	267	195	164	209	160
2.	[*ókò*]	245	252	252	250	120	275	212	189	225	120
3.	[*údè*]	275	275	275	275	90	267	225	178	223	150
4.	[*ázà*]	252	252	252	252	110	252	206	173	210	150
5	[*ɔ́kà*]	245	275	275	265	120	275	245	206	242	120
6.	[*ákò*]	245	245	245	245	80	275	225	173	224	100
7.	[*é'bò*][3]	267	275	275	272	180	231	206	206	214	150

[3]The low tone on the second syllabic peak of this word is not realized as a Falling tone. It is realized more or less as a level Low tone after a High tone in the neighbouring Esan language; or as a downstepped Low tone. It might be necessary to find out the origin of this word, i.e. whether or not it is a borrowed word.

Table 4b: F_0 and duration values for seven Edo ÝCÈ words pronounced by eight non-Edo speakers in a listening task

SER. NO.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA-TION	SECOND SYLABLE				DURA-TION
			F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
1.	[íbà]	YB	134	134	134	134	120	134	116	103	118	130
		IK	138	142	142	141	140	138	112	97	116	150
	*	HS	164	200	200	188	120	178	138	106	141	140
		FR_1	231	252	260	248	140	260	218	173	217	130
		FR_2	206	245	252	234	120	245	206	173	208	150
		FR_3	146	168	168	161	100	159	126	97	127	190
		CH_1	146	146	146	146	110	146	123	112	127	140
	**	CH_2	178	195	195	189	200	164	150	138	151	100

SER. NO.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA-TION	SECOND SYLABLE				DURA-TION
			F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
2.	[ókò]	YB	112	116	116	115	100	116	109	103	109	100
	*	IK	138	146	164	149	100	138	109	87	111	130
		HS	154	159	164	159	100	164	119	112	132	180
		FR_1	231	252	231	238	110	252	195	138	195	180
		FR_2	206	267	275	249	120	267	173	146	195	180
		FR_3	159	159	164	161	80	159	134	106	133	160
		CH_1	130	130	130	130	80	126	119	97	114	120
		CH_2	189	195	189	191	120	195	164	126	162	130

SER. NO.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA-TION	SECOND SYLABLE				DURA-TION
			F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
3.	[údè]	YB	138	142	142	141	80	142	123	103	123	120
		IK	138	154	164	152	90	164	123	97	128	160
	*	HS	178	231	238	216	130	206	146	112	155	220
		FR_1	231	260	260	250	120	245	189	173	202	170
	?	FR_2	252	267	283	267	110	245	173	134	184	200
		FR_3	150	154	154	153	80	150	112	94	119	180
		CH_1	134	138	138	137	80	138	123	112	124	150
	?	CH_2	195	195	195	195	160	173	159	138	157	110

SER. NO.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA-TION	SECOND SYLABLE				DURA-TION
			F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
4.	[ázà]	YB	126	134	138	133	150	126	116	103	115	160
		IK	123	130	138	130	120	126	112	87	108	130
	*	HS	134	189	189	171	210	164	116	103	128	200
		FR_1	245	252	252	250	150	245	189	173	202	190
		FR_2	189	225	231	215	140	238	146	123	169	130
	*	FR_3	150	150	150	150	80	138	126	109	124	120
		CH_1	126	138	138	134	100	126	109	97	111	160
		CH_2	173	178	178	176	160	178	164	146	163	80

SER. No.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA -TION	SECOND SYLABLE				DURA -TION
			F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
5.	[*ɔ́kà*]	YB	123	123	126	124	120	126	112	103	114	110
		IK	103	130	130	121	120	130	116	89	112	80
		HS	150	189	195	178	130	200	142	123	155	200
		FR_1	245	267	275	262	110	275	206	189	223	80
	*	FR_2	206	245	260	237	110	225	138	134	166	150
		FR_3	138	150	150	146	60	138	112	97	116	170
		CH_1	138	138	138	138	110	134	116	94	115	130
	*	CH_2	178	178	184	180	80	159	142	116	139	110

SER. No.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA -TION	SECOND SYLABLE				DURA -TION
			F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
6.	[*ákɔ̀*]	YB	116	126	116	119	140	126	116	103	115	110
		IK	123	130	130	128	100	126	97	87	103	120
	*	HS	142	184	195	174	160	200	159	126	162	170
		FR_1	231	238	238	236	120	238	189	130	192	130
	?	FR_2	195	225	238	219	80	212	150	146	169	120
		FR_3	126	138	134	133	80	134	126	116	125	100
		CH_1	126	126	130	127	80	138	116	97	117	140
		CH_2	164	168	168	167	110	200	150	123	158	140

SER. No.	WORDS	SPEAK-ERS	FIRST SYLLABLE				DURA -TION	SECOND SYLABLE				DURA -TION
			F_0i	$F_02/3$	F_0f	F_0m		F_0i	$F_02/3$	F_0f	F_0m	
7.	[*é'bɔ̀*]	YB	126	130	130	129	120	116	103	97	105	160
	*	IK	146	154	154	151	190	119	119	123	120	160
		HS	146	178	178	167	120	150	119	103	124	180
	*	FR_1	245	252	267	255	160	212	212	206	210	190
	*	FR_2	225	252	275	251	170	245	189	146	193	250
		FR_3	173	195	195	188	110	189	154	112	152	120
		CH_1	123	126	123	124	130	138	123	116	126	210
		CH_2	195	195	195	195	200	146	138	138	141	120

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VOWEL HARMONY IN IGEDE*

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Igede is a language that operates a nine vowel system. It displays harmony system constraint by pharyngeal constriction. Vowels fall into two harmonic sets of [+ATR] and [-ATR] with no overlap. Where we have disharmonic morphemes, our analysis shows that the harmony constraint remains unviolated.

0. Introduction

Ever since Clements [1976a] proposed the analysis of vowel harmony within the autosegmental theory, there have been a number of scholarly articles on different languages that offered analysis within the framework—Clements [1981, 1984] on Akan, Chumbow [1982] on Ogori, Van der Hulst [1985] on Hungarian among others. The basic tenet of a theory will continue to be subjected to test, as its validity depends largely on "empirical evidence involving the extent to which the theory accounts for a wider range of data than the initial set of data on which it was based " [Chumbow 1982:62-63]. Our effort in this paper is to show how much the autosegmental theory accounts for a set of facts relating to the harmony constraint in Igede, an Idomoid language of the Benue-Congo family.[1]

In §1 of our paper we present the vowels of Igede, in §2 we present the facts of vowel harmony, and in §3 we account for these facts.

* This paper has benefited from comments made at the Departmental Seminar of the Department of Linguistics and Nigerian Languages, University of Ilọrin. Whatever error remains in the article, however, is in spite of the comments.

[1]Igede is spoken in the Oju Local Government Area of Benue State in Nigeria.

1. Igede Vowel System

Igede has nine phonetic oral and seven phonetic nasal vowels. There is no marked difference in the behaviour of the oral and the nasal vowels in relation to the harmony constraint. The vowels are shown in (1) below:[2]

(1)

i	*ĩ*		*ũ*	*u*
ɪ	*ɪ̃*		*ʊ̃*	*ʊ*
e				*o*
ɛ	*ɛ̃*		*ɔ̃*	*ɔ*
		a *ã*		

Clements' [1974:281] claim in relation to vowel harmony in African languages is true of Igede. He notes "the role of tongue root advancing in the so-called 'horizontal' vowel harmony systems found widely in African and elsewhere." He goes further to say that

> In such systems, vowels are classified into two sets (with possible overlap) such that only members of a single set may co-occur within the domain of harmony; the primary phonetic characteristic distinguishing the two sets...is the position of the tongue root.

We distinguish the [+ATR] and the [-ATR] in (2) below:

(2)

[+ATR]				[-ATR]			
i	*ĩ*	*ũ*	*u*	*ɪ*	*ɪ̃*	*ʊ̃*	*ʊ*
e			*o*	*ɛ*	*ɛ̃*	*ɔ̃*	*ɔ*
				a	*ã*		

[2]The following symbols are used: *ɪ* = lower high front unrounded vowel, *ʊ* = lower high back rounded vowel, *ɛ* = lower mid front unrounded vowel, *ɔ* = lower mid back rounded vowel, *ạ* = lower mid central unrounded vowel (schwa), *dž* = voiced alveopalatal affricate, *tš* = voiceless alveopalatal affricate. The symbol *ạ*, with a dot, represents the schwa [ə], which does not occur at the surface level and therefore does not appear in (1) and (2).

We present in the table below the feature matrices of the vowels:

	i	*u*	*i̱*	*u̱*	*e*	*o*	*ẹ*	*ọ*	*a*	*ĩ*	*ũ*	*ɪ̃*	*ʊ̃*	*ẽ*	*õ*	*ã*
Syllabic	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
High	+	+	+	+	-	-	-	-	-	+	+	+	+	-	-	-
Back	-	+	-	+	-	+	-	+	+	-	+	-	+	-	+	+
Low	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	+
ATR	+	+	-	-	+	+	-	-	-	+	+	-	-	-	-	-
Nasal	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+

2. Evidence for Harmony

As a mark of the harmony constraint the [+ATR] vowels on the one hand and the [-ATR] ones on the other do not normally co-occur with each other within a phonological word. In the subsections below we present data to reflect both root and prefix harmony constraints.

2.1. Root Harmony. Within a root there is harmony constraint to the effect that [+ATR] and [-ATR] vowels do not occur together. Words illustrating this constraint are seen in (3):

(3)

[-ATR] roots		[+ATR] roots	
i̱tšá	'arrow'	*ĩdẽ*	'saliva'
i̱tẹ̄	'pepper'	*ígo*	'calabash'
i̱dž^{w}ọ̄	'stones'	*mĩle*	'to swallow'
ú̱tẹ	'root'	*ókùɲ̃ĩ̃*	'nose'
ú̱vọ́hí̱	'cat'	*òp^{j}èkpō*	'kite'
ọba	'mat'	*róné*	'to run'
kọ́nɪ̃́dzí	'to vomit'	*egbedžu*	'head'
ẹ̄ɟi̱rɪ̄	'teeth'	*ēnɪ̃̄*	'water'
ẹmã̃	'salt'	*edže*	'song'
džẹ̀rụ	'to walk'	*égbòdù*	'okro'
mọ̀ọ̀nẹ̃̄	'to taste'	*ùbè*	'room'
àgbū	'ashes'	*úgbōdžī*	'orange'
ádi̱dà	'father'	*ūdō*	'basket'
falẹ	'to refuse'		

2.2. Prefix harmony. Igede has prefixes but no suffixes or infixes. The vowels of the prefixes harmonise with the [ATR] feature of the vowel(s) of the root morpheme. We discuss and illustrate the prefixes in §§2.2.1-5 below.

2.2.1. Genitive marker *ọlị/oli*

(4) a. [-ATR] roots

ẹmã̄	'salt'	*ọlẹmã̄*	'owner of salt'
ẹ́rū	'farm'	*ọ́lẹ́rū*	'owner of farm'
úvọ́hị́	'cat'	*ọ́lúvọ́hị́*	'owner of cat'
ụtẹ	'root'	*ọlụtẹ*	'owner of root'
ọ̀dž̧i	'mortar'	*ọ̀lọ̀dž̧i*	'owner of mortar'
ọba	'mat'	*ọlọba*	'owner of mat'
ịtẹ̄	'pepper'	*ọlịtẹ̄*	'owner of pepper'
ịtšá	'arrow'	*ọlịtsá*	'owner of arrow'
àgbṵ́	'ashes'	*ọ̀làgbṵ́*	'owner of ashes'

b. [+ATR] roots

ēnī̄	'water'	*ōlēnī̄*	'owner of water'
edže	'song'	*oledže*	'owner of song (singer)'
īdžū	'yam'	*oīdžū*	'owner of yam'
ígo	'calabash'	*ólígo*	'owner of calabash'
ówú	'cotton'	*ólówú*	'owner of cotton'
ògbì	'guinea corn'	*òlògbì*	'owner of guinea corn'
ùbè	'room'	*òlùbè*	'owner of room'
úgbōdžī	'orange'	*ólúgbōdžī*	'owner of orange'

2.2.2. Verbal nouns. The derivation here involves the reduplication of the initial syllable of the root verb and the prefixation of the nominalising prefix *ọ/o*:

(5) a. [-ATR] roots

rụ̀	'to come'	*ọ̀rụ̀rụ̀*	'coming'
dž̧ẹ́	'to know'	*ọ́dž̧ẹ́dzẹ́*	'knowing'
rọ	'to buy'	*ọrọrọ*	'buying'
dị́	'to beat'	*ọ́dị́dị́*	'beating'
wà	'to count'	*ọ̀wàwà*	'counting'
dž̧ẹrụ	'to walk'	*ọdž̧ẹdž̧ẹrụ*	'walking'

b. [+ATR] roots

gbú	'to die'	*ógbúgbú*	'dying'
hò	'to fly'	*òhòhò*	'flying'
je	'to get'	*ojeje*	'getting'

bi	'to loose'	*obibi*	'loosing'
róné	'to run'	*órórónè*	'running'

2.2.3. Plural prefixes. Plurality is effected in Igede by substituting the singular noun prefix with an appropriate vowel. The substitution is constrained by the harmony system:[3]

(6)

	Singular	Plural	
a.	[-ATR] roots		
	ụ́-rụ̄	*á-rụ̄*	'ear'
	ụ̄-lẹ̄	*ā-lẹ̄*	'hoe'
	ọ̄-ɲụ̄rẹ̀	*ì-ɲụ̄rẹ̀*	'stone'
	ẹ-ba	*i-ba*	'mat'
	ẹ́-rụ̄	*á-rụ̄*	'farm'
	ẹ́-tā	*á-tā*	'leg'
b.	[+ATR] roots		
	ū-dō	*ē-dō*	'basket'
	ù-bè	*è-bè*	'room'
	ō-lōhī	*ī-lōhī*	'thief'
	ō-b^{w}ē	*ī-b^{w}ē*	'door'

2.2.4. Concord prefixes. Igede operates a concord system whereby each noun modifier in a grammatical construction takes a concord prefix. The verb in a verb phrase also takes a concord prefix. The concord prefixes are *ọ/o* for singular nouns, and *i/i* for plural nouns (see Abiodun [1989]).

(7) a. Noun modifier concord

i.	*ūdō*	*ọ̀tụ́kà*	*òjéńwé*	*òkpókpó*	'one new big basket'
	basket	big	new	one	
ii.	*ēdō*	*ì̀tụ́kà*	*ì̀jéńwé*	*ímíjé*	'two new big baskets'
	baskets	big	new	two	
iii.	*ógo*	*ọ̀tụ́kà*	*òjéńwé*	*òkpókpó*	'one new big calabash'
	calabash	big	new	one	

[3]There is also the cross height constraint, but this has been fully discussed in Abiodun [1989].

iv.	*ígo*	*ìtṵ́kà*	*ìjéńwé*	*ítā*	'three new big calabashes'
	calabashes	big	new	three	
v.	*ọba*	*ọ̀tṵ́kà*	*ọ̀jéńwé*	*ọ̀kpókpó*	'one new big mat'
	mat	big	new	one	
vi.	*ìba*	*ìtṵ́kà*	*ìjéńwé*	*ìrụ*	'five new big mats'
	mats	big	new	five	

b. Verbal concord

i.	*obú*	*ògbú*			'the dog died'
	dog	die			
ii.	*ibú*	*ìgbú*			'the dogs died'
	dogs	die			
iii.	*obú*	*ọ̀hụ*	*ìtẹ̄*		'the dog scattered (the) pepper'
	dog	scatter	pepper		
iv.	*ibú*	*ìhụ*	*ìtẹ̄*		'the dogs scattered (the) pepper'
	dogs	scatter	pepper		

2.2.5. Subject Pronouns. The subject pronouns (except the first person singular) provide evidence for harmony. The pronouns exhibit allomorphic variation, and the form of the pronoun in a grammatical construction depends on the vowel(s) of the verb that follows the pronoun. The subject pronouns are shown in (8) below:

(8)

	Singular	Plural
1st person	*m*	*āhí/āhị́*
2nd person	*ō/ọ̄*	*ānṹ́/ānụ́*
3rd person	*ó/á*	*i/ị*

Note that [*ahí*] and [*anṹ*] are disharmonic, and note further that we have *o/a* alternation in the 3rd person singular. We shall have more to say on these in §2.3 below. In the meantime we present data to show the harmonic nature of the pronouns and the verbs.

(9) a. [-ATR] verbal roots

ọ̄	*hú*	*áfù*	'you washed cloth'
ọ̄	*ŋʷà*	*ēnī̄*	'you drank water'
a	*rʲi*	*īdžū*	'he ate yam'
a	*rọ*	*ílō*	'he bought a snake'
i	*rú*		'they came'
i	*kẹ*		'they went'
āhí	*gụ*	*olojí*	'we caught a thief'
anu	*họ*	*áḍìdà*	'you (pl) saw my father'

b. [+ATR] verbal roots

ō	*hò*		'you flew'
ō	*je*	*áfù*	'you got (the) cloth'
ó	*wū*	*īdžū*	'he planted yam'
ó	*mĩle*	*īdē*	'he swallowed saliva'
i	*tú*	*èdži*	'they swept (the) floor'
ānű́	*wū*	*edže*	'you (pl) planted seed'
āhí	*wo*	*úgbōdžī*	'we peel orange'

2.3. Mixed vowel morphemes. Despite the harmony constraint illustrated in our data above, we still have a few lexical items where both [+ATR] and [-ATR] vowels mix. These items are few but we need to present them. They are:

(10)	*ùkpẹ̀dži*	'navel'
	ọtākomū	'cassava'
	ēvùnằ	'groundnut'
	úcẹ́gba	'mountain'
	ūgbẹ́mā̄	'matchet'
	āhí	'we'
	ānű́	'you (pl)'

We observe that we do not have verbs with mixed vowels. In fact, verbs in Igede are mainly monosyllabic. The few that have more than one syllable do not violate harmony constraint.

3. Accounting for Harmony

One basic assumption of the autosegmental theory is that certain features of the phonological representation are represented on independent levels parallel to the segmental level. Such features that include tone, nasality, vowel harmony, stress, etc. have autosegments that are "related to the segmental level by a set of conventions that preserve well-formedness" [Chumbow 1982:78].

There are normally two levels in the discussion of vowel harmony [Clements 1981]: the level at which the harmony autosegment [ATR] is represented and the level at which the vowels (and intervening consonants) are represented. We have these two levels in Igede, and they are associated subject to the well-formedness condition in (11) below:

(11) Well-Formedness Condition (WFC)

i. Link harmony autosegment to harmony bearing units through spreading from right to left.

ii. Association lines do not cross.

We recognize five vowels at the underlying level. These underlying vowels are not bound to the harmonic features. Their surface realizations will be determined by the association convention. The vowels are:

I
U
E
O
A

From what we have said so far in this section, we can proceed to account for the data in §2.

3.1. Regular harmony. We mean by "regular harmony" cases where [+ATR] and [-ATR] vowels do not mix within a root as contained in (3) above. They are derived as shown in (12) below:

(12) a. [-ATR] → [-ATR]
U v O h I — *ụvọhị* 'cat'

b. [-ATR] → [-ATR]
dž E r U — *džẹrụ* 'to walk'

c. [-ATR] → [-ATR]
A gb U — *agbụ* 'ashes'

d. [+ATR] → [+ATR]
E gb O d U — *egbodu* 'okra'

e. [+ATR] → [+ATR]
r O n E — *rone* 'to run'

The prefixes also harmonise with the root as illustrated in (4-8) (we disregard the case of [*ānű́*] and [*āhí*] for the meantime). The root and prefix harmony is accounted for in the same vein as in (12) above.

(13) a. [-ATR] → [-ATR]
OlI + UvOhI — *ọlị ụvọhị* 'owner of cafe'

b. [-ATR] → [-ATR]
O + tUKA — *ọtụka* 'big'

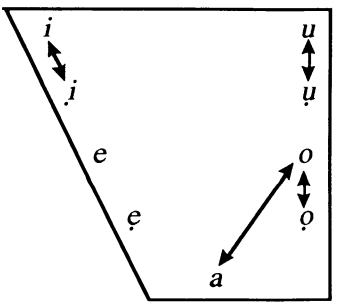
c. [+ATR] → [+ATR]
OlI + EnI — *oli eni* 'owner of water'

d. [+ATR] → [+ATR]
O + JEnwE — *ojenwe* 'new'

3.2. Mixed vowel morphemes. In §2.3 we draw attention to morphemes that mix [+ATR] and [-ATR] vowels (see (10) above). As we shall show below, the analysis of the clitics [*ānű́*] and [*āhí*] differs from that of the other items in (10).

For the clitics, we posit that the [*a*] in both cases is derived from an underlying schwa [*ạ*]. The schwa as we shall argue undergoes absolute neutralization to become [*a*]. At the surface level, the pairing of the [+ATR] and the [-ATR] vowels is assymetrical as shown in (14).

(14)



Our pairing in (14) is explained in (15).[4]

(15) *o* ~ *ọ* pairing in the Genitive marker, verbal noun and singular concord prefix

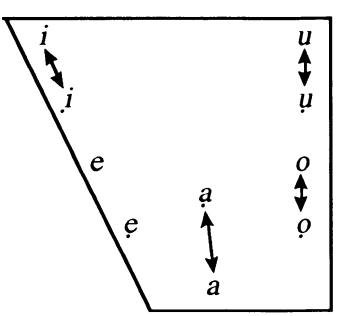
i ~ *i̱* pairing in the 1st and 3rd persons plural subject pronouns and in the plural concord prefix

u ~ *u̱* pairing in the 2nd person plural subject pronoun

o ~ *a* pairing in the 3rd person singular subject pronoun

Despite this surface assymetrical pairing however, we propose a symetrical pairing at the underlying level. This we present in (16).

(16)



[4]The vowels *e* and *ẹ* do not occur as any of the prefixal morphemes. It is logical to assume that they too are paired against each other as [+ATR] and [-ATR].

We believe that the surface realizations of *o* ~ *a* in the 3rd person singular subject pronoun and the *a*~*a* of [*āhí/āhị́*] and [*ānű́/anű́*] are derived from the same underlying source of *a*~*ạ*. The schwa becomes [*o*] in the 3rd person singular subject pronoun and [*a*] in the 1st and 2nd persons plural subject pronouns through the application of an absolute neutralization rule:

(17) $\begin{bmatrix} \text{+syll} \\ \text{-high} \\ \text{-back} \\ \text{-round} \\ \text{-ATR} \end{bmatrix} \rightarrow \left\{ \begin{array}{l} \text{[+low]} \\ \text{1st \& 2nd pl. sub. pro.} \\ \\ \begin{bmatrix} \text{+round} \\ \text{-low} \end{bmatrix} \\ \text{3rd sg. sub. pro.} \end{array} \right\}$

Following our explanation so far we believe that at the more abstract level the derivation of the 1st and 2nd persons plural subject pronouns takes the form:

(18) a. [+ATR] [-ATR] [+ATR] [+ATR]

Ahi wU ## IdzU[5] → *ạhi wu* *idžu*

b. [+ATR] [+ATR] [+ATR] [+ATR]

AnU + mIlE ## IdE → *ạnu mile* *ide*

These abstract derivations undergo the first part of our phonological rule in (17) so that /*ạ*/ becomes [*a*]. The application of the rule however triggers yet another phonological process, i.e. delinking the output of our rule from its association to the autosegmental tier. However, no segment can occur unassociated at the surface level. There is therefore a constraint that relinks the [*a*]. The constraint can be stated as:

(19) Link an unassociated vowel to an autosegment opposite in value to an adjacent autosegment.

Since *ạ* does not occur at the surface level, it undergoes rule (17) thereby becoming *a*. The output of (18) will therefore appear at the surface level as:

(20) a. [-ATR] [+ATR] [+ATR]

ahi *wu* *idžu*

[5]Vowel harmony does not operate across word boundaries. The object in this and other such constructions must have their own autosegment.

b.

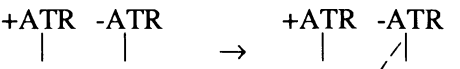
The case of the other mixed morphemes differ from the pronouns treated above. The vowels in these items (roots) are opaque because they "influence vowel harmony in that they impose their harmonic category upon other vowels" [Clements 1976b:54]. That they impose their harmonic category is clear from the genitive construction below:

(21) *ọtākomū* *ọlọtākomū* 'owner of cassava'

évùnà *ólévùnà̀* 'owner of groundnut'

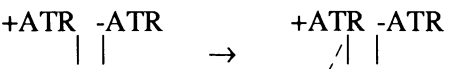
The genitive marker *oli/ọlị* is determined by the initial vowels of the root. To account for the disharmonic surface realization we posit that the high and low vowels in these roots are lexically associated. The vowels that are not lexically associated, however, link to the autosegment from right to left as constrained by the WFC. The derivation is shown in (22).

(22) a.



'navel'

b.



'groundnut'

c.

'owner of cassava'

By assuming that certain vowels are lexically linked we are able to account for the surface forms of these items without any cost to the grammar.

4. Conclusion

The autosegmental theory readily accounts for the facts of harmony in Igede without cost to the grammar. We do not have harmony rules and neither do we need separate and unrelated statements to account for root and affix (prefix) harmony. In all we only have a universal well-formedness condition.

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THE ORGANIZATION OF REPAIR IN YORUBA CONVERSATION

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In any conversational event, co-participants are guided by rules which ensure a smooth conversation. According to Sacks et al. [1974:700] some of these rules are that "one party speaks at a time" and also that "speaker-change recurs, or at least occurs." Quite often these rules are broken as was found in Schegloff et al. [1977] for American English conversation and confirmed by Moerman [1977] for Thai conversation. I argue, therefore, in this paper following Schegloff et al. [1977:381] that if conversation is composed of systems of rules which are integrated, then it will have a source of "trouble" related to the modes of their integration. And if it has intrinsic sources of trouble, then it will have a mechanism for dealing with them intrinsically. I further argue that an adequate theory of the organisation of conversation in natural language in general, as proposed by Schegloff et al. [1977], and in Yoruba specifically, will need an account of the organisation of repair. I suggest that repair mechanisms in Yoruba will include those suggested by Schegloff et al. [1977] and supported by Moerman [1977], namely: self-repair which can issue from self-initiation or other initiation and other repair which arises from self-initiation or other initiation. I conclude that these repair mechanisms are indices of participants' orientation to the making of Yoruba conversational interaction.

1. Introduction

The structural organisation of conversational interaction and the rules which govern such organisation in English has exercised linguists and ethnomethodologists for some time, e.g. Sacks [1972, 1974, 1975], Schegloff [1972, 1976], Sacks et al. [1974], Burton [1981]. Recently, too, the subject has inspired studies in the organisation of conversation in Thai [Moerman 1988] and in Yoruba [Akindele 1989, 1990]. The main strength of these studies is that they have established that conversation is organised on a turn-by-turn basis. That is, one participant talks,

stops, and another starts, talks, and stops. But very often conversation does not proceed as smoothly as it seems. There may be a breakdown in the smooth flow of conversation as a result of a broad range of troubles which include those concerned with speaking, hearing and understanding talk. Such may lead to errors, violations, and troubles being made in the process of interaction. These troubles are not allowed to pass without necessary steps being taken to rectify, convert, or repair them if meaningful conversation is to be achieved. An adequate theory of the organisation of conversation in natural language in general, [Schegloff et al. 1977] and in Yoruba specifically will need an account of the organisation of repair.

This paper, therefore, sets out to examine the notion of "repair", types of repair mechanisms and their organisation in Yoruba conversation. Further, it seeks to find out the extent to which the organisatin of repair in Yoruba can be compared to that of American English or Thai and some other languages of the world. In dealing with this problem of repair, the approach taken is purely ethnomethodological and is modeled upon the theoretical framework of Schegloff et al. [1977] in "Preference for self-correction in the organization of repair in conversation."

2. Data for the Study

The data for this study derives from audio recording of conversational interaction in different sociolinguistic situations ranging over markets, bars/clubs, parties, the family, and car parks. The group of participants that took part in the conversations were males whose ages range between 20-40 years and females ages 22-40 years. There was no particular reason for making use of these categories of participants except that they happened to be involved in the conversational events that the researcher was interested in at that juncture. All the conversations were recorded with a mini recorder and were done surreptitiously. This is with a view to making the interactions very natural, as experiences have shown that the presence of tape recorders in Yoruba conversational events makes co-participants very uncomfortable and consequently very unnatural in their discourse. The participants were informed about the recordings and the purpose for which they were meant, and they allowed the tapes to be used for the research. Excerpts from the conversational interaction are used to illustrate organisation of repair in Yoruba conversation.

3. On Repair Mechanisms in Conversation

There are quite a few studes carried out on repair mechanisms in conversations. These are the studies represented in Schegloff et al. [1977] on American English conversation and in Moerman [1977, 1988] on Thai conversation.

In their discussion in "The preference for self-correction in the organisation of repair in conversation", Schegloff et al. [1977:361-362] observe that there are ways by which organisation of repair is carried out in conversation and that these repair

mechanisms are addressed to problems which recur in speaking, learning, and understanding. They discuss some of their findings about several aspects of repair organisation. This is with a view to making clear the distinctions between what they describe as "self-correction and other-correction" [Schegloff et al. 1977:362].

Schegloff et al. [1977] also distinguish between the notions of *correction* and *repair*. Correction is said to refer to the replacement of an "error" or "mistake" by what is "correct". However, "repairs" are neither contingent upon "error" nor limited to replacement. That is, some occurrences of repair do not involve the replacement of one item by another [Schegloff et al. 1977:363]. I shall show this later with the Yoruba conversation corpus.

Two broad types of repair have been proposed by Schegloff et al., [1977]. The first is self-repair. This can arise from self-initiation or other-initiation. The second type is referred to as other-repair, which can arise from self-initiation or other initiation. They contend that although self-initiation and other-initiation of repair in conversation are of different types, nevertheless, they are not independent possibilities. In other words, the two are related and their relatedness is organised in the sense that they operate on the same domains and that their respective domains can be characterized not only as distinct but as ordered relative to each other [Schegloff 1977:370]. It is this type of organization that demonstrates the fact that co-participants really orientate to each other in the process of conversational interaction, namely, that when "errors' are made they are not just allowed to go unnoticed. Rather, such errors are noticed and necessary steps are also taken to "repair" them to enable smooth and efficient communication.

In summarising the notion of repair mechanism, it will be suggested that the tendency for an utterance to attend to those immediately prior to it in conversation provides, following Schegloff et al. [1977], for both analysts and participants, a "proof procedure" for checking how those turns were understood. This would be of little use if there were no device for the correction of misunderstandings, mishearings, and, indeed, non-hearings which repair encompasses. One can, therefore, exemplify the two types of repair mechanisms proposed by Schegloff et al. [1977] by stating that self-repair is the repair done by a speaker without prompting or repair done by the speaker of the problem. On the other hand, other-repair can be considered as repair done by another party or repair after prompting. The following examples illustrate the concepts:

(1) *Self-repair*

N:		She was givin me a:ll the people that
	→	were go:ne this yea:r I mean this
	→	quarter y' // know
J:		Yeah

[Schegloff et al. 1977:364]

(2) *Other-repair*

A:		Have you ever tried a clinic?
B:	→	What?
A:		Have you ever tried a clinic?

[Schegloff et al. 1977:367]

As I shall try to show presently, the range of the phenomena observed under the concept of repair in Yoruba conversation corpus is wide. These include word recovery problems, self-editings, where no discernible error occured, and error proper.

Moerman [1977, 1988] observed similar repair mechanisms in the Thai conversation corpus which he examined. He concluded that the principles of repair in American English conversation are the same as those which operate in Thai conversation. It will also be interesting to find that the same can be claimed for Yoruba conversation.

4. Organization of Repair in Yoruba Conversation

I have indicated above that repair is organized into self-repair and other-repair. There are, however, certain mechanisms on which the two distinct but related repair types operate. I will discuss each of them in this section and show how they operate in Yoruba conversation. It is, nevertheless, important to show the conventions used in pointing out the repairs in the Yoruba corpus.

a. → arrow indicates the trouble source or error source

b. →* arrow with an asterisk points to repair that has been carried out

c. [indicates simultaneous utterances

To begin with, self-repair that issues from self-initiation can be illustrated as follows:[1]

(3) K: *Ǹjẹ́ o ti rí ohun tí o nwá?*
Q you Pf find thing that you looking for
'Have you found what you have been looking for?'

[1]In interlinear glossing, "Q" is a clause initial question marker, "Pf" is a morpheme called "Perfect" by some Yoruba scholars, and "Neg" is a negative marker. "1, 2, 3" refer to first, second, and third person respectively.

L: *Nkò ti rí i.*
1-neg Pf find it
'I haven't found it.'

→ K: *Ṣé o ti ríí ẹ̀wù ẹ ẹẹm ṣé o ti*
Q you Pf see shirt your erm Q you Pf
'Have you found the shirt...your erm...have you

→* *ẹ ẹm ṣé o ti ríí ṣòtòkò ẹ ton ṣọ nù?*
your erm Q you Pf see trousers your which be lose
your erm have you found your lost pair of trousers?'

L: *Bẹ́ẹ̀ ni o ṣé.*
yes you thank
'Yes, thank you.'

[Ifẹ̀, 1988, recorded conversation in a home between two 23 year old male friends.]

In turn 3, there occurred the trouble-source where participant K started by saying *ẹ̀wù* 'shirt' but quickly changed to *ṣòkòtò* 'trousers' in turn 4, where the repair takes place.

An instance of self-repair which arises from other-initiation is illustrated by example (4).

(4) B: *Ǹjẹ́ o ti rí Ayọ̀ ló'ní?*
have you Pf see Ayo today
'Have you seen Ayo today?'

F: *Rárá.*
no
'No.'

→ B: *Ọ̀rẹ́ mi yii fẹ́ jẹ gbèsè.*
friend my this want eat debt
'My friend wants to run into debt.'

→* F: *Rárá, Ayò fẹ́ kú.*
no Ayo wants death
'No, Ayo wants to die.'

[Ifẹ 1988, recorded conversation between two colleagues aged 30/32 in a club]

In the example, participant B initiates the interaction which F responds to. In turn 3, there occurred the trouble source where B says that Ayo wants to run into debt, and F, who is the other participant, quickly changes to 'to die'. The other-correction is an indication that Ayo's problem is heavier than what B conceives it to be.

Just as occurs in American English [Schegloff et al. 1977], other-repair can issue from self-initiaition in Yoruba conversation as shown in the following example:

(5) T: *Mí ò mo orúkọ ilé iṣẹ́ rẹ gaan,*
I Neg know name house business his exactly
'I don't know his business name,

→ *ó ǹjẹ́ kìí ṣe* ***Ògo Olúwa*** *ni*?
it Q not is Glory God is-it
is it not **God's Glory**?'

→ G: *Rárá,* ***Ìbùkún Olúwa*** *ni.*
no blessing God is
'No, it's **Blessing of God**.'

T: *O ṣeun,* ***Ìbùkún Olúwa*** *ni.*
you thank Blessing God is
'Thank you, it's Blessing of God.'

[Ibadan 1987, recorded conversation between two relations ages 35/40 at a party]

In the example, speaker T commits an "error" of an uncertainty about the name of a business he is talking about in turn 1. In turn 2, his co-participant G "corrects" the error by stating the right name of the business in question.

Other-repair that arises from self-initiation can be exemplified as follows:

(6) D: *Lati ìgbàtí a ti dé ńwá àwọ́n*
from time-that we Pf come looking for they

ọmọdé yẹn kiri ọgbà.
children those about garden

'Since we came we've been looking for those children in the garden.'

R: *Bẹ́ẹ̀ni, a kòsì ti ri wọn.*
yes we Neg Pf find them

'Yes, we've not found them.'

D: *A sì ti ńwáa yín kiri lati ìgbà yẹn.*
we also Pf looking for you about from time that

'We've been looking for you since.'

→ R: *Hun uh, a ńṣe re kiri.*
mhun mn we doing playing about

'We've been playing around.'

→* D: *Uh huh, a ńṣe ranù kiri látàárọ̀ ni.*
uh huh we doing playing about from-morning it-is

'We were just messing around since morning.'

[Ife 1988, recorded conversation between friends ages 20-22 in a family]

The two broad types of repair mechanisms, namely, self-repair and other-repair illustrated above are each manifested in various ways in Yoruba conversation. In other words, there are several markers of each of the mechanisms observable in Yoruba interaction. I will discuss and exemplify these markers in the following section.

5. Markers/Features of Self-initiated Repairs in Yoruba Conversation

Schegloff et al. [1977] observe that self-initiated repairs can be identified by the position of their initiations in conversations. In the case of the Yoruba corpus, self-initiated repairs have their initiations placed in three main types of positions. First, they may be placed within the same turn as their trouble source. Second, they can be placed at the turn's transition place. Third, they may be placed in the third turn after the trouble-source turn. These placements are illustrated as follows:

5.1. Occurrence at the same turn as trouble-source

(7) T: *Ṣe wa duro dèmí nílé?*
Q you wait for me at home

Mi ò ni lòju ìṣéjú má'rún.
I Neg be present minutes five
'Can you wait for me at home? I'll be back in five minutes.'

K: *Ó dára.*
it good
'Okay.'

T: *Ẹr ẹẹm ó ti ẹ lè ma to bẹẹ.*
er erm it Pf ? may Neg equal thus
'Er erm it may not be up to that.'

K: *Ṣe ẹẹ ṣe' **a** lè ẹẹ ẹm*
Q er Q we may er erm

→ *Ṣe **mo** le maa mu ọtí mi?*
Q I can fut. drink drink my
'Can I go and be having my drink?'

T: *Bẹ́ẹ̀ni.*
'Yes.'

[Ife 1987, recorded conversation between a guest and a host ages 35/40 in a family setting]

In turn 3 in the example, participant K commits an error in his initiation and the source is the plural form *a* 'we' instead of the singular pronoun *mo* 'I'. Realising this, he quickly corrects himself, hence in the same turn the use of the singular *mo* 'I'.

5.2. Occurrence at turn's transition space/place.

(8) M: *Wọ́n sì ẹr wọn si kun gbobgo 'lẹ̀kùn wọ̀n yẹn.*
they did er they did paint all door pl. those
'They er they painted all the doors.'

→ M: *Ohun tí mò nsọ́ ni-pé, wọ́n fi ọ̀dà kun gbogbo wọn*
thing that I say is-that they use paint paint all them
'What I'm saying is that, they painted all of them.'

→* *Wọn f-ọ̀dà funfun kùn wọ́n.*
they use-paint white to paint them
'They painted all of them white.'

D: *Bẹ́ẹ̀ni.*
'Yes.'

[Akure 1987, recorded conversation between friends ages 28-30 at a bar]

Turn 2 in the example is the transition relevance place or the grammatical boundary where the next speaker is expected to take over the talk. but at that juncture occurs an error of lack of specificity in the type of paint used for the doors. The error is immediately corrected by the production of *ọ̀dà funfun* 'white paint' which is a more specific term.

5.3. Occurrence at third turn to the trouble-source turn.

(9) → S: *Olórí oko náà yoo si gba ẹ̀tọ́ tirẹ̀.*
boss farm the enrich also take share his
'The boss will take his own share.'

N: *Mun whm.*
'Uh huh.'

→* S: *Mo ní, ohun ti mo nsọ ni pe yóò gba owó tirẹ̀.*
I say thing that I say is that he will take money his
'I said, the point I'm making is that he will take his own share of the money.'

N: *Òótọ́ ni.*
truth is
'That's true.'

[Ife 1987, recorded conversation between two colleagues ages 30/34 at a car park]

Turn 3 is the trouble-source turn and that is where the correction of the error has been effected. The error is made in turn 1 by referring to *ẹ̀tọ́* 'share', a general term, rather than the specific term *owó* 'money'.

Apart from these, self-initiations within the same turn (which contains the trouble-source) use a variety of non-lexical speech perturbations such as *hẹn ẹn, uh huh, mm hun, ẹ ẹm,* and so on, to signal the possibility of repair initiation immediately following as in (10).

(10) T: *Ǹjẹ́ o ti rí ọkùnrin tí mo júwe fun ọ́?*
Q you Pf see man that I describe for you
'Have you seen the man that I described for you?'

→ B: *Nkò iti ri **obìrin,** hẹn ẹn **ọkùnrin** ti o nwi yẹn.*
I-Neg Pf see woman er erm man that you talk that
'I've not seen the **woman,** er erm the **man** whom you described.'

T: *Ta ló ba mi ri àjákọ mi?*
who is-he with me see writing pad my
'Who has seen my writing pad?'

→* B: *Èmi kò mọ ibi tí o fi ìwé er-er àjakọ rẹ sí.*
I Neg know place that you put book er-er writing pad your it
'I didn't know where you ever placed your book er-erm your writing pad.'

[Abeokuta 1987, recorded conversation between two sisters ages 21-24 at a family lunch]

6. Markers/Features of Other-initiated Repair in Yoruba Conversation

Other-initiated repairs in Yoruba conversation use a group of turn-constructional devices which are themselves linguistic. These include *huhn, ẹn hẹn, kílódé, kí ló wí,* as in the following:

(11) J: *Ṣé wà tún jà?*
Q you do-again fight
'Will you fight again?'

→ L: *Hu'hn*?
huh
'Huh?'

J: *Ṣé wà tún bá yen jà*?
Q you do-again with him fight
'Will you fight with him again?'

L: *Rárá.*
'No.'

J: *Ǹjẹ́ o ti rí egúngún yẹn*?
Q you Pf see masquerade that
'Have you seen that masquerade?'

→ L: *Kíni*?
'What?'

J: *Ṣe o ti rí egúngún yẹn*?
Q you Pf see masquerade that
'Have you seen that masquerade?'

L: *Rárá.*
'No.'

[Ife, 1987, recorded conversation between two sisters ages 21-28 in a family setting]

Another type consists of the question-oriented words such as *níbo?*, *táni?*, *nígbàwo?*, used to initiate repair, e.g.

(12) a. M: *Mo fẹ́ lọ jẹun.*
I want go eat
'I want to go and eat.'

→ P: *Níbo*?
'Where?'

M: *Ní Shilos.*

at Shilo's
'At Shilo's Canteen.'

[Ife 1988, recorded conversation between students ages 22/23 at a car park]

b. A: *Ọ̀kan nínú àwọn ọ̀rẹ́ yin bere ẹ.*
one among plural friend your asked you
'One of your friends asked of you.'

→ N: *Táni?*
'Who?'

B: *Rẹ̀mí ni.*
R. it's
'It's Remi.'

c. D: *Adé berè yin délé.*
A. ask you at home
'Ade asked of you.'

→ T: *Nígbàwo?*
'When?'

D: *láàrọ̀ lágogo mẹwa.*
in morning at hour ten
'Ten o'clock in the morning.'

[Akure 1987, recorded conversation between a brother and sister ages 30/24 at home]

There is also a partial repeat of the trouble source turn, plus a question word such as *mo tani?*, *gogbo kini?*, *ki lo tun ku?*, as illustrated below.

(13) A: *Ǹjẹ́ o mọ olórí àwọn olè yẹn?*
Q you know leader plural robbers those
'Do you recognize the leader of the gang of robbers?'

→ F: *Mọ tani?*
know who
'Know whom?'

A: *Olórí àwọn olè tó fọ́ báńkì nàà.*
leader pl. robbers who broke bank the
'The leader of the robbers who robbed the bank.'

F: *Rárá o.*
no emp.
'Not at all.'

A: *Ǹjẹ́ wọ́n ti ẹ rí gbogbo owó tí wọ́n jí?*
Q they Pf ? find all money that they stole
'Did they recover all the money stolen?'

→ F: *Gbogbo kíni?*
all what
'All of what?'

A: *Gbogbo owó tí wọ́n jí.*
all money that they stole
'All the money stolen.'

F: *Ò tì o.*
it not-be emp.
'Not at all.'

[Ibadan 1988, recorded conversation between colleagues ages 40/30 at a club house]

There can also be another type of other-repair initiation. This is signified by such expressions as *ohun ti o fe so ni...?* 'thing that you want to say is...?' plus a possible understanding of prior turn, as in (14) below:

(14) F: *Kí ló dé tóo fi gbé epo yẹn sílẹ̀?*
what is-it happen that-you do carry palm oil that on ground
'Why did you put down the palm oil?'

→ A: *Ṣé òróró lo fẹ́ wí?*
Q vegetable oil you want say
'Do you mean vegetable oil?'

F: *Bẹ́ẹ̀ni òróró.*
Yes vegetable oil
'Yes, vegetable oil.'

[Ife 1987, recorded conversation between mother and daughter ages 40/15 at home]

In discussing further the features of repair mechanism in Yoruba conversational corpus, three types of trouble sources can serve to display that the trouble sources, as in American English conversation, [Schegloff et al. 1977], do have repair initiated from each of the set positions previously mentioned. These are word replacement, repairs on person-reference, and repairs on next-speaker selection.

Word replacement is defined by Schegloff et al. [1977] as the replacement of an item with another in the trouble source turn. It is initiated at several locations in the conversation. These include replacement within the same turn as trouble source for self-initiated repair as in (15), at transition space following trouble source as in (15b), and at next turn for other-initiated repair as in (15c).

(15) a. K: *Ẹ̀gbọ́n mí si míbá miwí fún ohun tó ṣẹlẹ̀.*
brother my also blame me for thing that happen
'My brother blamed me for what had happened.'

A: *Hun mn, nítorí kini?*
huh mn because what
'Why?'

→ K: *Nítorí ìwà ìṣe, hẹn ẹm **àisédéédé** wọn.*
because conduct doing er erm bad behaviour them
'Because of the behaviour, er erm their **misbehaviour**.'

A: *Uh huh.*
'Uh huh.'

[Abeokuta 1987, recorded conversation between friends ages 30/34 at a bus stop]

b. D: *Mó ti lọ rí ọ̀gá mi.*
I Pf go see boss my
'I've gone to see my boss.'

T: *ẹ̀h hẹn, kí ló ní kóo ṣe?*
er hem what is-it-he say that-you do
'What did he ask you to do?'

→ D: *Wọ́n ní ki nlọ ra ***ìwé*** ***miran,***
they say that I-go buy book another

ìwé yẹn kan náà
book that same the
'He said I should go and buy another book, the same book.'

[Ife 1988, recorded conversation between colleagues ages 28/30 at a car park]

c. H: *Ọjà tí mo kówá pọ̀ púpọ̀.*
goods that I bring very many
'The goods that I brought were very many.'

M: *Bẹ́ẹ̀ni.*
'Yes.'

→ H: *Mo ti **ra** ìdajì wọn.*
I Pf buy half them
'I've **bought** half of them.'

→* M: ***ta*** *ìdajì wọn.*
sell half them
'**Sold** half of them.'

H: *Mo ti **ta** ìdajì wọn.*
I Pf sell half them
'I have sold **half** of them.'

[Ibadan 1988, recorded conversation between business associates ages 35/40 at a club house]

It seems clear from the foregoing discussions and illustrations that one important point about the repair mechanism in Yoruba conversation like the English corpus already investigated by Schegloff et al. [1977] is that self-initiated repairs yield self-correction, and opportunities for self-initiation come first. Other-initiated repairs also yield self-correction in Yoruba conversation. The opportunity available to others to initiate repair is used to afford the speaker of a trouble source a further opportunity to self-repair in Yoruba conversation. This supports Schegloff et al.'s [1977:376] observation on American English conversation.

Having explored the repair mechanisms in Yoruba conversation, the other questions that arise are how some of the mechanisms are used in preference to others: who initiated repairs? I will examine these issues in the following section.

7. Preference Organisation of Repairs in Yoruba Conversation

A thorough examination of the Yoruba conversation corpus suggests that there is a preference for self-repair over other repair. The illustrations that have been given above point to this claim. Quantitatively, out of a total of 150 repair mechanisms analysed from the Yoruba conversation corpus, 120 were self-repair while the remaining 30 were other-repair. That is, 80% of the repair mechanisms were self-initiated while 20% were other-initiated repair. This observation corroborates the results of the studies carried out by Schegloff et al. [1977] on American English conversation corpus and Moerman's [1977] work on Thai conversation.

In the case of the category of participants who most often initiate the repairs, it was observed that participants who occupy the higher role in the interactional event as a result of age or achieved status do this in Yoruba conversation corpus. Once they initiate the repairs, they leave them for the speaker of the trouble-source to actually accomplish the repairs. For instance, participants L, T, F in examples (11), (12b), and (13) respectively are occupants of higher social positions as a result of age and achieved status. Indeed, an examination of the Yoruba conversation corpus shows that the occupants of the higher social position initiated 70% of the other-repair while the occupants of the lower social position initiated the remaining 30% in interaction with their equals and persons of higher status.

8. Conclusion

The consideration of the notion of "repair" and its organisation in Yoruba conversation suggests that repair is a phenomenon of talk that is vital to the smooth organisation of conversational structure. First, it clears the source of misunderstanding or mishearing that may likely occur in the conversation. Second, it indicates that co-participants orient to one another in the making of conversation.

The study also suggests that repair may be considered as a kind of discourse universal. It is only the management of it or its structural organisation that may vary from one culture to another.

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A STUDY OF THE STYLISTIC MARKERS OF THE LANGUAGE OF CARTOONS IN NIGERIA

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This paper discusses the stylistic characteristics of the language of cartoons in some Nigerian newspapers. The analysis focuses on printing styles, stylistic registers, and textual features. The author concludes that the informal style (exemplified by the occurrence of Pidgin English, colloquial forms, loan blends, ellipsis, and telegraphic sentences) characterizes the language of the cartoons. Thus, cartoonists use language as an artistic medium in which various options of language are explored for effective communication.

1. Introduction

1.1. Language as a socio-cultural phenomenon. There are over four hundred languages spoken in Nigeria, making it difficult, if not impossible to choose a single indigenous language as the official language throughout the country. Over the years, therefore, English has been, and is the official language, the language of law, business, journalism, and religion in Nigeria. It is also the language of instruction in schools, and hence English is a second language for many Nigerians.

Language functions within a socio-cultural context. Saussure's frequently quoted words, "language is a social fact," attest to this. Thus, the sociologist focuses on explaining as well as predicting how symbolizations are directly related to social variables such as users and context. Anthropologists, on the other hand (Malinowski [1923] for instance), affirm that utterances are meaningful only when they are related to the context of their use. The dimensions of context therefore include the "cultural occupation" and "preoccupation" of the people speaking the language. In a situation like that in Nigeria, the issue of domestication becomes

relevant if English language is to function effectively as a means of communication.

Since language exists or functions within a socio-cultural context, variation in language is an inevitable phenomenon. Halliday [1978] considers variation in language as the expression of some fundamental attributes of the social system. Thus, language users are compelled by different circumstances to use language differently.

1.2. Cartoons. Cartoons are simplified drawings, representational or symbolic, that make humorous points. They are widely used as a means of social satire in Nigeria to comment on political events, domestic or family matters, and undesirable behaviours such as cheating and immorality. In Nigeria today, many newspapers (perhaps all) publish cartoons daily. Therefore, cartooning has become an important aspect of journalism in the country. A major issue raised so far is the relationship between culture and language as well as the question of language varieties. It is against this background that the language of cartoons in Nigerian newspapers is examined. Sample cartoons are drawn from some Nigerian newspapers.[1] The discussion focuses on unique styles of printing, stylistic registers, and textual features.

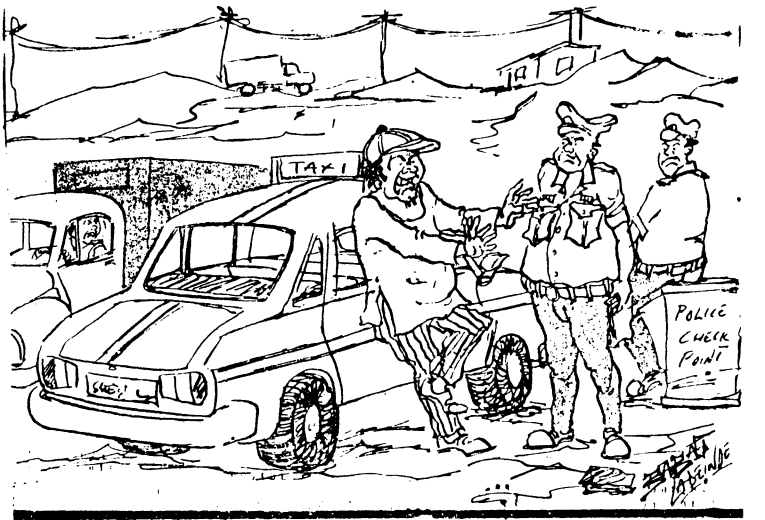
2. Analysis and Discussion

2.1. Styles of printing. Various aspects of printing such as the relative sizes of different portions of letters, positions of dots, capitalisation, italics, and different punctuation devices were found to be stylistically significant in cartoons. The data revealed that the meaning-carrying units in sentences are often capitalised as a way of attracting and sustaining the reader's attention. The use of capitals is also significant because it establishes a contrast between the key items and the less important items in cartoons. The *Daily Sketch* cartoon of September 4, 1985 was a ridicule of the Nigerian Police (see Cartoon 1). The police officer was criticized for demanding "kola" (Yoruba's implicit word for a bribe) from drivers. On this occasion, however, no "KOLA" (capitalised) was offered because the days of offering "kola" had gone. Another illustration is found in a *National Concord* cartoon of July 23, 1985. This cartoon was an oblique swipe at the WAI[2] (War Against Indiscipline) culture: Too much of WAI had an unintended effect of making the Eagles (a Nigerian football team) "QUEUE" (capitalized) for the ball

[1]Sample cartoons used in this study were culled from the *Daily Sketch*, *Nigerian Tribune*, *The Vanguard*, *The Punch*, *National Concord*, and *The Guardian*. The samples were collected between July, 1984 and March, 1986.

[2]War Against Indiscipline (WAI) was the name of a campaign launched against all forms of indiscipline, misconduct, and corruption by the Buhari regime.

Cartoon 1. © 1985 *Daily Sketch*



"Look, those days have gone. No more KOLA."

instead of playing it. Two other illustrations are found in *The Vanguard* cartoons of March 16 and August 6, 1985. In the former, a parent rebukes his son for opting to be a doctor (a profession no longer lucrative because of the economic hardships in the country) and insists that his son must be a "SOLDIER". The latter comments on Nigerian soldiers "who never die but get PREGNANT after retirement" (depicting a rotund apparent former army officer in a gym). In these two examples, "soldier" and "pregnant" respectively are capitalised. In the *Daily Sketch* edition of January 22, 1986, Paddy's (the stock character in *Daily Sketch* fill cartoons) discussion over the telephone with Umaru Dikko, an ex-politician in exile in Britain, goes thus:

(1) *"Hello! Is that UMARU? Got nothing to lose if you come home now. You may turn out to be a SAINT!"*

As in the other examples, "UMARU" and "SAINT" are capitalised to refer implicitly to the lack of fair play that characterised the trial and retrial of some ex-politicians in the country.

Where all items in a cartoon are capitalised, it was observed that the size of the lettering is often varied for contrast. In the *National Concord* of July 4, 1985, the widening gap between the rich and the poor is portrayed not only in terms of the

size of the caricatures of rich man and the poor man but in terms of the size of the letters of "RICHMAN" and "POORMAN".

Print contrast (bold and light prints) was also found to be used significantly in cartoons to highlight or play down, as the case may be, words of varying degrees of importance. *The Punch* cartoon of September 5, 1985 featured a desperate minister who visits a "LONDON TRAINED HERBALIST", "**CHIEF JAGBAJANTIS**" in a bid to be retained in the Babangida cabinet. While the name of the herbalist was written in a darker shade, the name of the institution where he was trained was printed in a lighter shade.

Another relevant observation is the symbolic use of print markers. Letterings were used symbolically to communicate a desired meaning. The cracks in the lettering of "OAU" (Organisation of African Unity) in the *Nigerian Tribune* of September 4, 1984 is symbolic of the crisis and the disintegration in the organisation.

The "snaky" lettering of "NSO" (Nigeria Security Organisation) in the *Daily Sketch* of September 10, 1985 could be symbolic of deceit and brutality in the organization. Obviously, therefore, print markers are used in cartoons as a way of foregrounding items considered important to an understanding of issues and persons in the society.

2.2. Stylistic registers. The analysis in this section reveals three types of sentences in the language of cartoons: Pidgin English sentences, colloquial sentences, and standard English sentences.

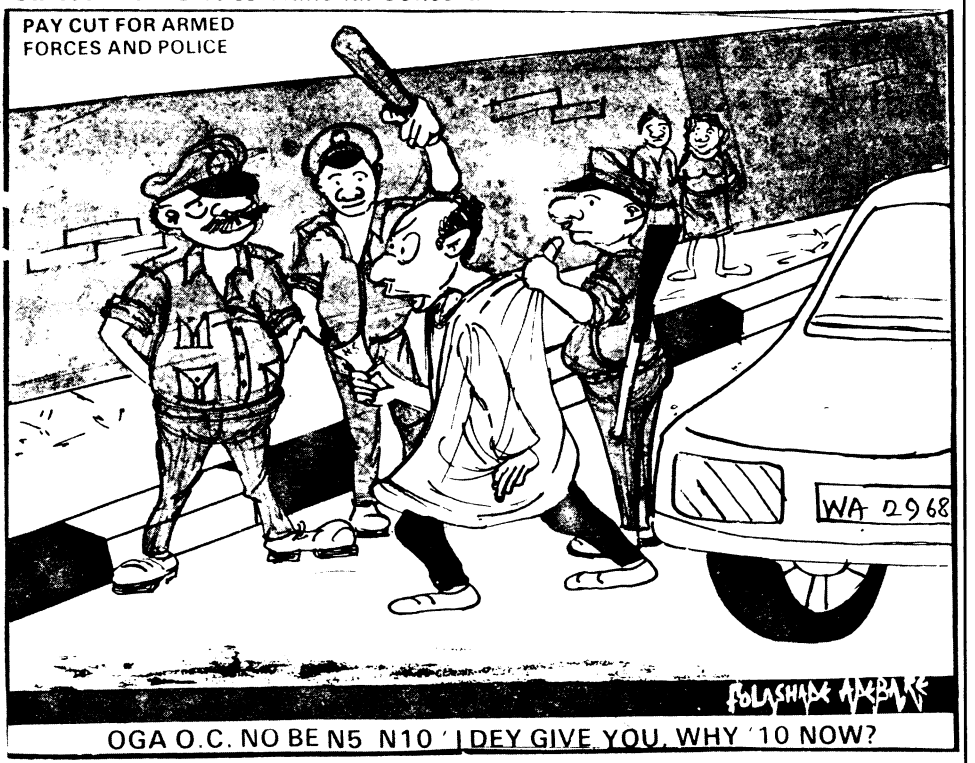
2.2.1. Pidgin English. Although the origin of Pidgin English is associated with the need for a medium of communication between the people along the West African coast and the Portuguese traders, Pidgin English has almost assumed the status of a lingua franca in some parts of Nigeria. In cartoons, Pidgin is found to be the language of identification. Members of the Police Force (usually at police check points), the Customs, and the Army are addressed (or they address members of the public) in Pidgin. A few examples are cited below:

(2) A motorist to a policeman at a check point (*National Concord*, November 12, 1985—see Cartoon 2):

Oga O.C., no be › 5 I dey give you, why › 10 now?

'But Officer, I used to give ›5, why are you now asking for ›10?'

Cartoon 2. © 1985 *National Concord*



(3) Driver of crashed bus to a policeman (*The Punch*, November 4, 1985—see Cartoon 3):

No, O.C., ... I no drink tombo ... na the railing jump in front of my Molue.

'No Officer, I haven't been drinking Tombo (a type of native gin) ... it's the railing that jumped in front of my bus.'

(4) A female motorist to a policeman fondling her at a check point (*The Punch*, September 9, 1985):

I beg O.C., which kind search be this?

'Officer, what type of search are you carrying out?'

Cartoon 3. © 1985 *The Punch*

"No ... O.C. I no drink tombo ... na the railing jump in front of my Molue"

(5) A headmaster sitting alone at a school registration table outside a school (*The Punch*, April 4, 1985):

Just one registration since morning?... E be like say education don get K leg?

'Just one pupil has turned up for registration since morning? It appears education is no longer important.'

(6) Husband to wife at dinner table, as child clamours for more food (*National Concord*, November 5, 1985):

Mama bomboy, warn yar pikin, if I hear am ask for rice again ...!

'Madam, warn your son to stop asking for rice ...!'

(7) One motorist to another in a line of cars approaching a check point in anticipation of the usual demands by police (*National Concord*, March 28, 1985):

Ol' boy, na check point o — you get ›5 change me?

'My friend, it's a check point ahead — could you please change my ›5 bill into small denominations?'

(8) A man to a police officer lying over the front of a car at a check point (*The Punch*, August 14, 1985):

Haba O.C. Na because of pocket money you dey do this kind stunt? Abi you wan die like cockroach?

'What, officer. Just because you want to collect a paltry sum you do this kind of a stunt? Why do you want to die like a cockroach?'

(9) One armed bandit to his compatriot firing from a car as they speed away from the police (*The Punch*, July 30, 1985):

Make you no waste the ***bullets*** *... Dem no fit* ***catch*** *us with that their yeye Land-Rover wey* ***old*** *pass my granny and that dem yeye* ***gun*** *wey resemble* ***toy****!*

'Don't waste your bullets ... They cannot catch up with us with their ragged Landrover which is older than my grandmother and their toy-like, worthless gun!'

As part of the efforts to domesticate English in Nigeria, it appears Pidgin English has emerged as the language of the common man, the down-trodden, and the underdog. Thus, in cartoons, conversation among this group is in the common code as illustrated by the following:

(10) One man speaking about another whom he has just knocked down, as we see money on the ground and electrical wires above (*The Punch*, 1985):

I go teach am sense well well! He wan sell LAND to me under NEPA WIRE.

'I'm going to teach him a good lesson for playing on my intelligence! He wanted to sell me a piece of land under high tension wires.'

(11) One newspaper salesman to another about a paper carrying the news headline "Why we toppled Obote—New Ugandan leaders" (*The Punch*, August 1, 1985):

I no know book but I know say whether di toppled leader good or e no good, somebody is power crazy.

'I don't know whether the toppled leader is good or bad, I would rather say someone is power drunk.'

Pidgin English also provides the medium through which the "ordinary man" expresses his views and disappointments over problems in the society, as in the following examples:

(12) A nearly naked man is hearing the name "Dikko" (Alhaji Umaru Dikko—see example (1)) all around him (*The Punch*, June 11, 1985):

Bo ... this billion naira name don dey tire me o! ... Abi we go begin chop am?

'I'm tired of the noise over the name Umaru Dikko. How can this be a substitute for food?'

(13) A boss and his driver converse as they drive (*The Guardian*, December 17, 1985):

Boss: *... But I see nothing wrong with your sacrificing a mere **1%** of your salary towards the nation's economic recovery.*

Driver: *Oga, the thing be say my sacrifice pass your own.*

'Sir, I think I will be sacrificing more than you.'

Boss: *How? I'm giving a whole 20% of mine ...*

Driver: *Em ... Oga na only one wife and two children you get plus your **fringe benefits**.*

'Sir, you have only one wife and two children. In addition you are entitled to fringe benefits.'

Boss: *What about that?*

Driver: *For me, na my wife, six children and my dead uncle's family with **no fringe benefits.***

'You see, I have my wife, six children, and my dead uncle's family to look after, and I'm not entitled to any fringe benefits.

The implication of the conversation in (13) is that the Economic Emergency Recovery Fund (deducted from workers' salaries by the government) is meaningless because of its adverse effect on the low income earners, who are worse hit since they do not enjoy the privileges which the high class enjoys.

Although the orthography and vocabulary of some of the Pidgin English forms identified in cartoons may not be Pidgin proper (***effective surveillance*** *no dey,* ***fringe benefits****, education no* ***sufficient***), it appears that English has been thoroughly "groomed" to meet the need for pungent ridicule and character leveling in cartoons.

2.2.2. Colloquial forms. The use of colloquial forms is another dimension of domestication in the language of cartoons. Colloquial language is that language which is acceptable in everyday talk but is unacceptable in the standard written form. One characteristic shared by the colloquial forms observed in cartoons is the presence of vernacular forms. A few examples of vernacular forms are reproduced below with the items in question shown in bold and the source of the forms identified:

(14) A landlord speaking to his tenant as he collects rent (*Daily Sketch*, September 29, 1985):

Next month you must pay ***jara*** *or I flush you out.*

(***jara*** from Hausa *gyara* referring to extra or additional money or goods)

(15) A man talking to his wife in their poorly furnished room, as he reads a newspaper with the headline "Bread costs more" (*Daily Sketch*, February 2, 1986—see Cartoon 4):

Is BREAD ***Oyinbo*** *food or our own?*

(***Oyinbo*** = Yoruba word for 'white man')

(16) Man speaking to his wife outside their small house on a wharf (*Daily Sketch*, January 4, 1985):

Rara O*, Don't tell me there is no meat in the pot.*

(***rara*** = Yoruba word for 'no')

Cartoon 4. © 1986 *Daily Sketch*

Is BREAD Oyinbo food or our own?

(17) A perplexed man, under the headline "5,000 may be sacked at NTA stations", after reciting a litany of claimed new government policies against corruption (*The Nigeria Tribune*, January 23, 1985):

***Chineke**, where art thou?*

(***Chineke*** = Igbo word for 'God')

(18) Conversation between a woman working in the kitchen and her husband (*the Punch*, July 16, 1985):

Wife: *Dear, I want a house boy to give me a helping hand.*

Husband: *House boy! Eh, why not a house girl?*

Wife: *Hm-m, why do you prefer a house girl?*

Husband: *You **nkọ**?*

(***nkọ*** from Yoruba 'how about...?', i.e. 'Why do YOU prefer a house BOY?')

One of the results of the use of colloquial forms is code mixing. Thus, certain lexical items such as those boldfaced above are used in standard English sentences. In addition to denoting informality, the use of colloquial forms is also one of the features of Nigerian English observed in cartoons.

2.2.3. Standard English sentences. Standard English sentences are sentences devoid of code mixing and other forms of linguistic interference. Such sentences conform to the grammatical norms of world Standard English. In using Standard English sentences, it appears that cartoonists deliberately go for the simple and compound structures as shown in the following examples:

(19) A gallivanting politician carries a suitcase marked with the names of foreign capitals as his conscience tugs to hold him back (*National Concord*, September 17, 1985):

Ah! I'm not following you down to Nigeria o!

(This sentence is regarded as Standard English in spite of the non-standard use of "following" in place of "accompanying". This usage is considered stylistic or dialectal in this case.)

(20) A sportscaster as the Nigerian team kicks a goal past the Russian goalkeeper (*Vanguard*, September 11, 1985):

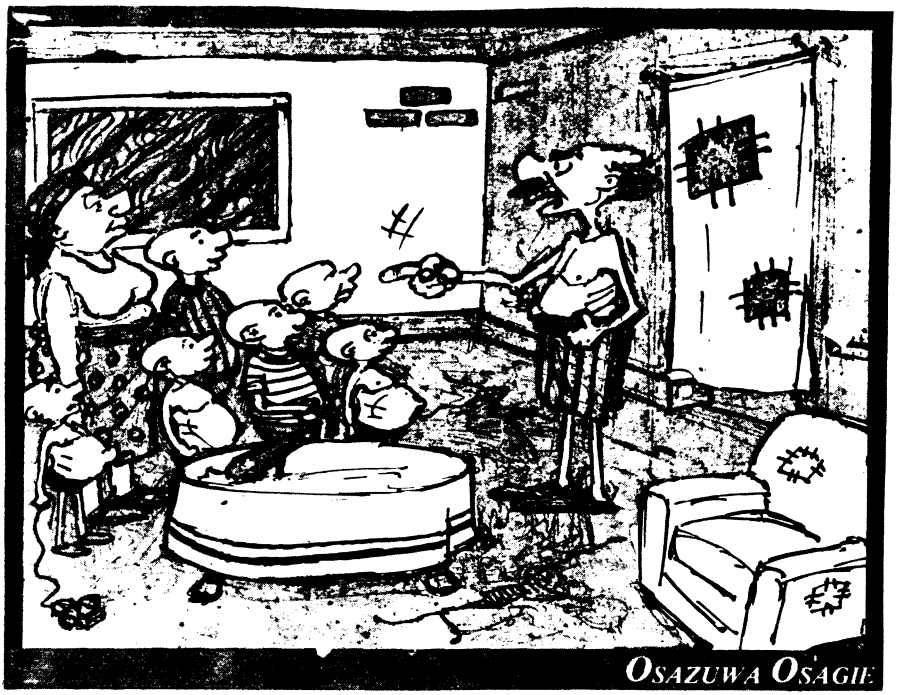
And so, Ladies and Gentlemen, the RUSSIANS have RUSHED themselves out of the game.

(21) A father in his patched up house addresses his wife and six children (*National Concord*, November 25, 1985—see Cartoon 5):

My pay has been cut. You are all being re-deployed to the village. You stay with my parents there.

Cartoonists' preference therefore for the simple and compound structures might be connected with the need for creation and maintenance of an air of simplicity.

Cartoon 5. © 1985 *National Concord*



MY PAY HAS BEEN CUT. YOU ARE ALL BEING RE-DEPLOYED TO THE VILLAGE. YOU STAY WITH MY PARENTS THERE.

Another interesting feature of the Standard English sentences in cartoons is their elliptical nature. Consider the conversation in (22) from *The Guardian*, December 2, 1985. The parentheses indicate ellipted items:

(22) A: *What are these, Sam?*

B: *(They are) 50 Christmas cards I want to send to some very important people!*

A: *(That's) Incredible!... You are jobless and you want to send cards to 50 people? ... Where did you get the money?*

B: *I borrowed it!*

A: *That doesn't sound sensible to me! Anyway, who are the people you call important?*

B: *(They are) The directors of the 20 companies I applied to!*

The omission of the items in parentheses above might have been deliberate to maintain simplicity and informality. Furthermore, cartoons need to present the written message as if it were a message in the spoken medium, and the use of ellipsis has further enhanced the spoken medium.

2.3. Textual characteristics

2.3.1. Humour in cartoons. Humour is of paramount importance to cartoons, and both the verbal and non-verbal cues in cartoons are fertile grounds for humour. In creating humour, the Nigerian cartoonist explores possible combinations of lexical items. This results in a mismatch between the context of the speech act and the subject matter. The oddity of the situation creates fun for the readers. In the interchange in (23), the increase in the number of accidents is attributed to the "carelessness" and "impatience" of the roads, not of the road users:

(23) Discussion between two men observing a sign "Road Safety Week" (*The Guardian*, March 22, 1985):

A: *Hmm ... Road Safety Week! Campaign to make our roads safe, abi?*

B: *No! ... Campaign to make motorists sit up! The blighters are too careless and impatient!*

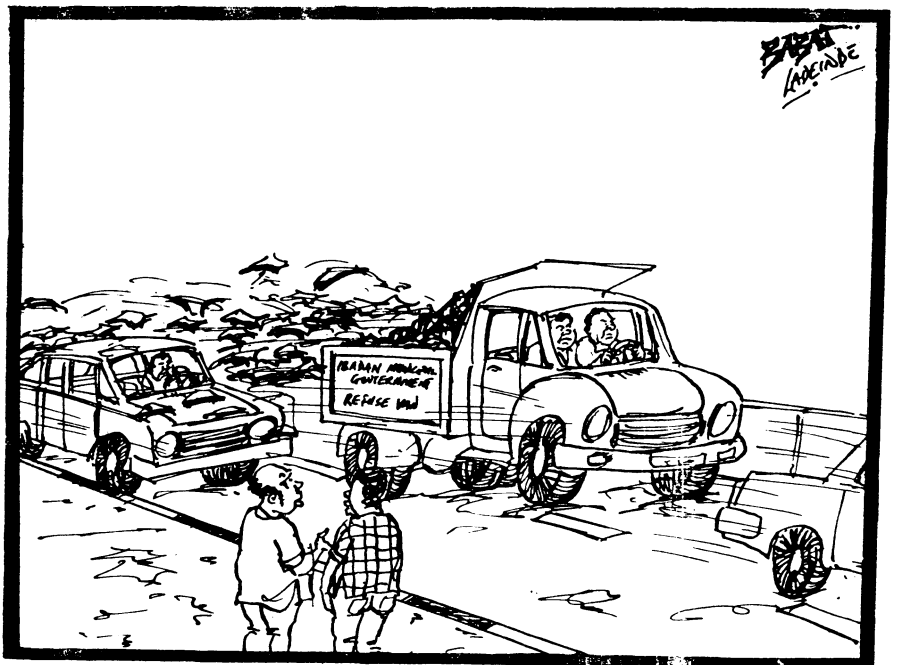
A: *I no gree! ... Our* ***roads*** *are too careless and impatient!*

Another source of humour in Nigerian cartoons is the use of deliberate distortions of speech. This involves misinterpretations of abbreviated forms (names and titles) and expressions (including codes and the National Pledge) to create a new meaning. ECOWAS (Economic Community of West African States) was reinterpreted as "Economic Cowards of West African Sufferheads" (*The Punch*, 1985) to reflect the organisation's incompetence and lack of seriousness in handling matters affecting member states. The Ibadan Refuse Disposal Board was renamed "Ibadan Refuse Dispersal Board" (*Daily Sketch*, July 10, 1985—see Cartoon 6).

The Guardian cartoon of September 3, 1985 had a modified version of the Nigerian National Pledge which worker recites to his boss:

(24) *I pledge to Nigeria our country,*
To be faithful, loyal and honest, ...
When the fugitives are extradited

Cartoon 6. © 1985 *Daily Sketch*



"I think they should be renamed IBADAN REFUSE DISPERSAL BOARD

To serve Nigeria with all my strength
When I'm not hungry,
To defend her unity, ...
When I become a soldier,
And uphold her honour and glory, ...
Like what I did when we won the U-16 World Cup,
So help me God!

The modified version of the National Pledge above was not meant to create just fun, it has a wider application, because when the man who recites the pledge is asked to disclose the source of his version, his reply is, "From my home under the bridge sir!" The implication is that patriotism and nationalism can only be

achieved when certain conditions are met, and it is these conditions (boldfaced in (24)) that have been added to the National Pledge.

Adaptation of serious subjects and styles constitutes another source of humour in cartoons. The *National Concord* of February 15, 1985 published a parody of the Ten Commandments entitled "Commandment of the helpless":

(25) *Thou shall have no job,*
Thou shall not solicit,
Thou shall not give,
Thou shall not take,
Thou shall not complain,
Thou shall see no evil,
Thou shall talk no evil,
Thou shall be heavily taxed,
Thou must be disciplined,
Thou shall earn little,
Thou shall know thy pledge,
Thou shall queue for rice,
Thou shall live by tax clearance,
Thou shall not check out,
Thou shall be patriotic.

The "Commandment of the helpless" is a criticism of some of the policies of the Buhari/Idiagbon regime. It is in fact an exploration of some fundamental problems in the country. The cartoonist does not only elicit the laughter reflex, but he also uses various linguistic devices as a vehicle for the exploration of some of the evils plaguing the nation.

2.2.2. The informal style. Informality in the language of cartoons is reflected in the use of a variety of forms such as Pidgin English and colloquial forms discussed earlier. Apart from its role as the language of identification, Pidgin English is essentially one of the characteristics of the informal style in cartoons. It is one of the features that distinguishes cartoons from the formal components (news, editorials, features) of the newspapers. Informality in cartoons is also exemplified by the use of loan blends. In some cases, lexical items from Nigerian languages are interlarded with English expression to produce new words. In some other situations, two or more English lexical items are mingled harmoniously into compound words for the communication of a desired meaning. In one cartoon from the *National Concord* (November 20, 1984), a doctor gives the following diagnosis to one of his patients:

(26) *My friend, you are sufferin' from hungerneurosis, taxophobia, levymylitis, retrenchomania, etc. There is no known cure on earth ... My consultation fee is › 100 only!*

This is an indirect reference to the prevailing harsh conditions in the country where citizens are perpetually confronted with different kinds of levies and other social ills such as retrenchment and hunger.

In another cartoon from the *National Concord* of June 23, 1985, some of the "Nigerian National Diseases" (NND) were identified as "long-legism" (favouratism) and "V.I.P.-ism" (love for superfluous titles). In a *National Concord* cartoon of March 12, 1986, a politician speaking to a military officer blends *politics* and *tricks*, saying,

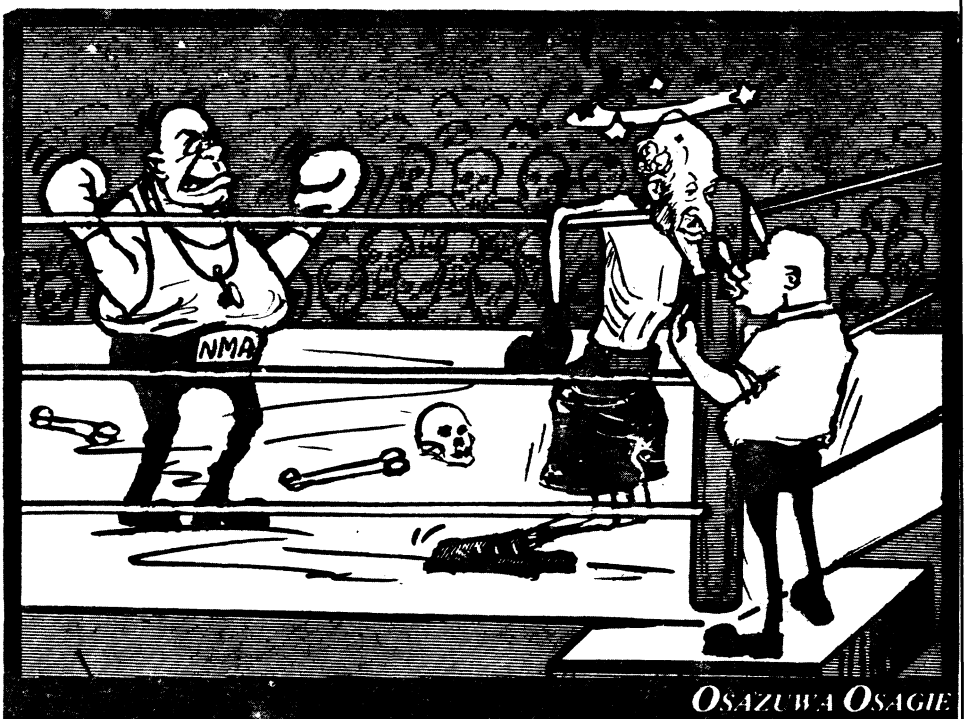
(27) *In four years time, our colleagues studying* ***politricks*** *abroad would have finished their courses ...*

As Nigerians looked forward to 1990 elections, a cartoon in *The Vanguard* of February 28, 1986 referred to one of the emerging political parties as the "Nigerian Dabaruing Party". *Dabaru* is a Yoruba word meaning 'to confuse, to set in disarray, to spoil'. This word is blended with the English *-ing* ending to produce the name of a party. The implication of this name is that it is a party that will stir confusion in the nation. Another cartoon in the *National Concord* of March 10, 1986 described Nigeria as "Naija Wahala". "Naija" is an abbreviated vernacular form of Nigeria, and this is combined with the Hausa/Yoruba word for problem, *wahala*, to imply that Nigeria is a problematic nation. In a cartoon from the *National Concord* of February 22, 1985, *WAI* (War Against Indiscipline) is combined with *-tamin* from *vitamin* to form "WAI-tamin", a pill which was recommended to General Buhari to combat the forces of the Nigeria Medical Association (NMA)—see Cartoon 7. In another cartoon of the *National Concord* (March 12, 1985), General Buhari pleads with Doctor I.M.F. (International Monetary Fund) for his bed-ridden patient, "Naija Economy", saying,

(28) *Hope you aren't going to administer* ***hungering*** *on him like others!*

This implicitly refers to one of the adverse effects of the I.M.F. loan—hunger. The word "Adisco" (an informal nickname for Adisa) has become a household name in cartoons. Although the language of expression in the Nigerian media is English, the variety of English observed in cartoons permits words or expressions which are not English, but are relevant to an understanding of the social, political, economic, and cultural problems in the country.

Cartoon 7. © 1985 *National Concord*



.....WANT SOME WAI-TAMIN PILLS TO GET YOU THROUGH THIS BOUT!

From the foregoing discussion, it is obvious that the language of cartoons is not as direct as the language of news reporting. It is also obvious that the language of cartoons is informal. In fact the style exhibited in cartoons may be described as an amalgam of forms.

3. Conclusion

At the beginning of this paper, the term "domestication" was used in relation to the utility of English in a multilingual society like Nigeria. Our aim in this paper has been to highlight the significant stylistic characteristics of the language of cartoons. It is important to note that the needs of the users of English, including cartoonists, in Nigeria are varied. Nigerian cartoonists have therefore succeeded in using the cartoon, an art form, as a medium of fostering a new language, a new kind of English. Thus, we may conclude that in terms of styles of printing, stylistic

registers, and textual characteristics, English language has been (and still is) suitably adapted or "tamed" to meet the needs of cartoonists to comment on, or reflect the social, cultural, economic, and political events in the country.

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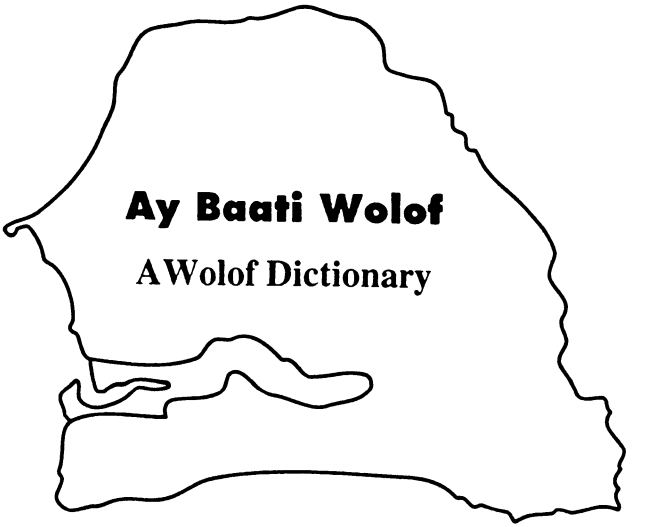

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