

SPEECH TEMPO, CONSONANT DELETION, AND TONES IN EDO NOUNS¹

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Speech tempo, vowel contraction/elision, and consonant deletion are common phonetic features of the Edo language spoken in Oredo, Orhionmwo, and Ovia Local Government Areas of Bendel State, Nigeria. Vowel contraction/elision in rapid speech usually occurs in word boundaries in larger constructions and often results in tonal modifications of such utterances. This paper focuses on speech tempo as it affects consonant deletion in Edo nouns. Two speech tempos, slow and rapid, will be used in explaining the presence or absence of consonant deletion in the language. Consonant deletion in rapid speech occurs exclusively in nouns. The tonal melody, the number of syllables, and the meanings of such nouns are not affected by consonant deletion. Consonant deletion in Edo nouns follows a regular pattern depending on the articulatory properties of the consonants in a given sequence.

0. Introduction

Speech tempo, vowel elision, and consonant deletion are common phonetic features of the Edo language spoken as a mother tongue in Oredo, Orhionmwon, and Ovia Local Government Areas (LGA's) of Bendel State, Nigeria. It is pertinent to note that these three LGA's (coterminous with the Benin Division of the former Mid-Western State of Nigeria [Agheyisi 1982:v], now Bendel State, constituted the core of what used to be the ancient Benin Kingdom/Empire. The Edo spoken in these three LGA's is "a core member of a larger group of genetically related languages and dialect clusters usually referred to as the Edoid group of languages ..." [Agheyisi 1982:vi]. This group of genetically related languages is

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what some writers refer to as the “Edo speaking peoples [Melzian 1937:vii, Wescott 1965:182].

The Edo language under discussion is the same language Wescott referred to as Bini, and it is generally homogeneous [Agheyisi 1982:vi], characterized by the absence of dialectal variations due to the highly centralized nature of the sociopolitical structure of the ancient Benin Kingdom [Melzian 1937:vii, Omozuwa 1987:16]. However, noticeable peculiarities do exist in the speech of the inhabitants of some of the peripheral communities [Agheyisi 1982:vi].

Vowel elision in rapid speech in Edo usually occurs at word boundaries in larger constructions and often results in tonal modifications of such utterances. Consonant deletion in rapid speech, on the other hand, occurs exclusively in nouns. This paper, which is one of the reports of experimental study of the Edo language, focuses on speech tempo as it relates to consonant deletion and tones in Edo nouns. We shall limit our discussion to a descriptive explanation of the observed phenomenon. It is also our view that two tempos, slow and rapid, are adequate from a pragmatic point of view for explaining the presence or absence of consonant deletion in Edo nouns. Thus all cases where a consonant is not deleted are regarded as the slow speech tempo, whereas rapid speech tempo is used to refer to all cases where there has been consonant deletion.

We will argue in the present study that consonant deletion in rapid speech in Edo does not result perceptually in a modification or alteration of the basic tonal melody, a reduction of the number of syllables, nor a change in the meanings of such nouns in which a consonant has been deleted, as Wescott's analysis of the phenomenon tends to suggest [Wescott 1962, 1965].

Finally, consonant deletion in disyllabic or polysyllabic nouns follows a regular pattern depending on the nature of the consonant(s) in a given sequence, i.e. whether or not the consonant is “weak” or “strong” or whether the deleted consonant is identical or not to the consonant in the following syllable.

We will first give a brief summary of Wescott's [1965] claims regarding speech tempo effects in Edo, with a view to highlighting areas of agreement and disagreement.

1. Speech Tempo, Consonant Deletion, and Tone

1.1. Wescott's [1965] claims. In this brief summary of Wescott's [1965] article, we shall limit our comments to claims relating to “segmental” phonemes, tones, consonant deletion (which was not given prominence in Wescott's analysis), and speech tempo.

Wescott [1965:182] gives a schematic representation of the seven oral vowel phonemes and “24 consonant phonemes” of Edo (Bini). According to him (p. 183), the language “has a co-vocalic phoneme of nasalization, represented by a syllable closing -*n*” However, Omozuwa [1987:70, 161] points out that Edo has

twelve vowel phonemes, seven oral and five nasal, and twenty-five consonant phonemes, the labiodental nasal phoneme /ɱ/ being absent in Wescott's analysis.

Wescott was perfectly right when he said that "one of the phonotactic rules of Bini is that in unaccelerated speech, *e* and *o* are never nasalized." However, it is difficult to defend the claim that "... in accelerated speech, *e*, for example, may become nasalized when the disjunction in the sequence *an'e* is lost, yielding *en*" Wescott 1965:183]. The example given here is certainly not a good one, at least from a native speaker's point of view. As pointed out in Omozuwa [1987:63], the phonemes /e/ and /o/ are *never* nasalized, no matter the speech tempo at which they are realized. The fact is that in larger constructions and in rapid speech with its concomitant vowel deletion and tonal modification processes, whenever /e/ or /o/ are responsible for the elision of a nasal bearing element at word boundary, the nasal bearing element is elided while the nasality lingers on in the surface realization. It is pointed out in Omozuwa [in preparation] that the nasality in such cases is co-articulated with the segment immediately preceding the deleted segment since /e/ and /o/ in such cases maintain, perceptually, their oral qualities, a fact that lends weight to an autosegmental treatment of nasalization, especially in the context described above.

We also disagree with Wescott when he says that "... at certain restricted speech tempos ... some new segmentals appear They are *gyh, gwh, zh, sh, j* and *c*," a fact which runs contrary to the phonetic fact of speech tempo and consonant deletion in Edo, and indeed in languages manifesting the same phenomenon (cf. Abimbola & Oyelaran [1975] for the case of Yoruba) as we shall explain below.

It is also pertinent to remark that some of the "phonemically unitary segmentals" such as *rʷ, ʒ, ʃ, dʒ, tʃ* claimed by Westcott to appear at "restricted speech tempos" do not form part of the phonemic inventory of Edo (no matter the tempo).

On tones, Wescott [1965:183] claimed that "Bini also has six phonemic tones, named and marked as follows (illustrated with the vowel *a*):

1	top	$\overset{1}{a}$	4	low	$\overset{4}{a}$
2	high	$\overset{2}{a}$	5	flat	$\overset{5}{a}$
3	mid	$\overset{3}{a}$	6	bottom	$\overset{6}{a}$

Wescott [1965] identified at least seven temporal variations in his "tentative" exploration of speech tempo in Edo. It is the opinion of the present writer that Wescott appeared to be "meticulous" to the point of distorting the phonetic facts of the language. For instance, it is not true that "consonant doubling of the type seen in [$\overset{1}{e}g\overset{1}{g}o$] 'bell', is also a strictly temporal phenomenon: in ceremonious

speech, it can only be pronounced [$\overset{1}{\underset{1}{\underset{1}{\text{égo}}}$] and in slurred speech [$\overset{1}{\underset{1}{\text{égo}}}$] [Wescott 1965:185]. The word $\overset{1}{\underset{1}{\text{égo}}}$ is meaningless in Edo as evidenced by the negative response to such stimulus by a group of Edo native speakers (studying linguistics) in a listening test. Similarly, Wescott's [1965:185] analysis of the different forms of the word "*ihinrlin* 'nine' induced by consecutive tempo changes" is misleading in the sense that the forms in his ceremonious [$\overset{4}{\underset{4}{\underset{4}{\underset{1}{\text{ihinrhinrlin}}}$] and slurred [$\overset{4}{\underset{1}{\text{ihin}}}$] speech tempos are two different lexical items in Edo, viz. the name of an Edo village (the correct tonal melody of the word being 1 4 4 1 following Wescott's notation) and 'catarrh', respectively. A careful examination of some of the items of Wescott's TABLE 4: TEMPORAL TONEME CHANGES reveals similar cases of forms with different meaning or no meaning at all. Such forms are presented in the table below (following Wescott's presentation):

Number	Syllabic tonality	Word at tempo 1	Translation	Same word at tempo 4	Same word at tempo 7
3	TLF	$\overset{1}{\underset{4}{\underset{14}{\text{oghodua}}}$	'the Almighty'	$\overset{1}{\underset{4}{\underset{14}{\text{o'odua}}}$	$\overset{1}{\underset{2}{\text{odwa}}}$?
4	TLR	$\overset{1}{\underset{4}{\underset{41}{\text{igiorlua}}}$	'water-yam'	$\overset{1}{\underset{4}{\underset{1}{\text{igio'a}}}$	$\overset{1}{\underset{2}{\text{ija}}}$?
6	TFL	$\overset{1}{\underset{14}{\underset{4}{\text{ugbaario}}}$	'eyebrow'	$\overset{1}{\underset{1}{\underset{5}{\text{ugba'o}}}$	$\overset{1}{\underset{1}{\text{ugba}}}$?
7	TFF	$\overset{1}{\underset{14}{\underset{14}{\text{ikhiinbhiin}}}$	<i>Newbouldia laevis</i> (a tree)	$\overset{1}{\underset{1}{\underset{24}{\text{ikhibhiin}}}$	$\overset{1}{\underset{1}{\text{ikhin}}}$?
9	TRT	$\overset{1}{\underset{41}{\underset{1}{\text{uhuùkpa}}}$	'suddenness'	$\overset{1}{\underset{2}{\underset{1}{\text{uhukpa}}}$	$\overset{1}{\underset{2}{\text{ukpa}}}$?
10	TRL	$\overset{1}{\underset{41}{\underset{4}{\text{uhuùki}}}$	'evil effect'	$\overset{1}{\underset{2}{\underset{4}{\text{uhuki}}}$	$\overset{1}{\underset{4}{\text{uki}}}$?
12	TRR	$\overset{1}{\underset{41}{\underset{41}{\text{ateeteé}}}$	'grasshopper'	$\overset{1}{\underset{2}{\underset{2}{\text{atete}}}$	$\overset{1}{\underset{2}{\text{ate}}}$?
16	LLR	$\overset{4}{\underset{4}{\underset{41}{\text{omuhèèn}}}$	'a beginning'	$\overset{4}{\underset{4}{\underset{41}{\text{omuhèèn}}}$	$\overset{4}{\underset{1}{\text{omwèn}}}$?
18	LFL	$\overset{4}{\underset{14}{\underset{4}{\text{esòòsi}}}$	'church'	$\overset{4}{\underset{1}{\underset{5}{\text{esòsi}}}$	$\overset{1}{\underset{5}{\text{èsi}}}$?
20	LFR	$\overset{4}{\underset{14}{\underset{41}{\text{èkpòòkpòò}}}$	'bullet'	$\overset{4}{\underset{1}{\underset{3}{\text{èkpòkpo}}}$	$\overset{4}{\underset{1}{\text{èkpo}}}$?

In a footnote on page 188, Wescott states that "? means that this particular pronunciation was unknown to at least one informant." This statement tends to confirm our claim that consonant deletion at a rapid speech tempo does not lead to a distortion of the form, meaning, and tonal melody of such words. We will quickly make a few remarks concerning some of the items in the above table. First, we do not agree with Wescott that there is any form of consonant deletion

and syllable reduction in items 3, 7, and 18, as we shall explain in the present analysis. Secondly, the tonal melodies for each of these words as specified by the author are certainly not correct. With regard to the forms of all the items in the above table in the column "Same word at tempo 7", these are either meaningless or belong to different lexical formatives (with some tonal modifications in some cases). The forms of items 3, 4, 6, 7, 12, and 16 "at tempo 7", for instance, have no linguistic meaning in the language. On the other hand, the forms of items 9, 10, 18, and 20 are different lexical formatives (but with different tonal melodies) meaning 'lamp', 'moon', 'pig', and 'masquerade', respectively. The correct tonal melodies of items 9, 10, 18, and 20 are as follows (using Wescott's notation):

9	¹ ukpa ¹	'lamp'
10	⁴ uki ⁴	'moon'
18	⁴ ési ⁴	'pig'
20	⁴ ekpo ⁴	'masquerade'

1.2. The present analysis: deletion of lax consonants in intervocalic position in Edo nouns. In the present study we will attempt to give a more systematic analysis of consonant deletion in Edo with a view to highlighting some of the phonetic motivations of the phenomenon in specific contexts.

Lax consonants are "often rather weak", especially in intervocalic position [Ward 1952:§255 ff & 275]. They are therefore easily elided in many languages (cf. Ward [1952], Wescott [1965], Fresco [1970], Jeje [1972], Abimbola & Oyelaran [1975]). In Edo, [ɟ]² and [h] are such lax consonants usually deleted in rapid speech in intervocalic position. Of these two consonants, [ɟ] is particularly weak in the sense that it is deleted in rapid speech wherever it occurs in an Edo noun in cooccurrence with other consonants or when it constitutes the only consonantal segments in a polysyllabic noun. We note here that *all* Edo nouns begin with and end in a vowel.

1.2.1. [ɟ] deletion in nouns of more than one syllable. The Edo alveolar voiced frictionless approximant is usually deleted in rapid speech in disyllabic and polysyllabic nouns (without modification of the tonal melody) as can be seen from the following examples:

²The symbol [ɟ] is used in the present study to represent the Edo voiced alveolar frictionless approximant (glide) during whose production the front of the tongue makes a single upward and downward movement (in slow speech) and may or may not strike the alveolar ridge. The symbol [ɟ] has always been used in published materials by linguists who have worked on Edo, e.g. Melzian [1937], Agheyisi [1982], Omozuwa [1987], and Amayo & Elugbe [1983], however, proposed [j] or [ɟ].

	Orthography	Gloss	Slow Speech	Rapid Speech
(1)	àrò	'eye'	[àɹò]	[àò]
(2)	ìrò	'thought'	[ìɹò]	[ìò]
(3)	òrú	'thread'	[òɹú]	[òú]
(4)	òré	'mat'	[òɹé]	[òé]
(5)	óré	'outside'	[óɹé]	[óé]
(6)	ẹrọ	name of an Edo chief	[ẹɹọ]	[ẹọ]
(7)	ùrí	'200'	[ùɹí]	[ùí]
(8)	íràn	'they'	[íɹà]	[íà]
(9)	èvbàré	'food'	[èβàɹé]	[èβàé]
(10)	òròkà	'ring'	[òɹòkà]	[òòkà]
(11)	ẹrọkhi n	'chameleon'	[ẹɹòkɬi]	[ẹóɬi]
(12)	úgbá' rò	'eyelashes'	[úgbá'ɹò]	[úgbá'ò]
(13)	íkóró	type of brass armband	[íkóɹó]	[íkóó]
(14)	úrùvbà	a disease of the spleen	[úrùβà]	[úùβà]
(15)	òkàrò	'first'	[òkàɹò]	[òkàò]
(16)	òrókè	'horse-tail whisk'	[òɹókè]	[òókè]
(17)	íkóróbá	'pail'	[íkóɹóbá]	[íkóóbá]
(18)	òrùkhò	'sin'	[òɹùxò]	[òùxò]
(19)	ùkpáramwè	'coated tongue'	[ùkpáɹámwè]	[ùkpáámwè]
(20)	ìròrìnmwì	'funeral service'	[ìɹòrìmɹì]	[ìòrìmɹì]
(21)	úrósá'mè	'gutter'	[úrósá'mè]	[úrósá'mè]
(22)	òròghòdó	name of an Eka village	[òɹòɣhòdó]	[òòɣhòdó]
(23)	ùkòròbòzò	variety of wild fowl	[ùkòɹòbòzò]	[ùkòòbòzò]
(24)	ìranmwí' ràn	species of water plant	[ìɹámwí'ɹà]	[ìámwí'á]
(25)	ìrògbètín	a name	[ìɹògbètín]	[ìògbètín]

Following Abimbola & Oyelaran [1975:49], the following [ɹ] deletion rule specifies the contexts in which [ɹ] deletion applies:

R1 [ɹ] → Ø / [(VC)₀ V__V (CV(CV))₀]_{Formative}

1.2.2. [h] deletion in nouns of more than one syllable. Like [ɟ], the Edo glottal fricative [h] (intervocalic breathy voice) is usually deleted in rapid speech as can be seen from the following nouns.

(26)	<i>èhá</i>	'three'	[èhá]	[èá]
(27)	<i>èhó</i>	'neck'	[èhó]	[èó]
(28)	<i>ì hín</i>	'catarrh'	[ì hí]	[í fí]
(29)	<i>ì hàn</i>	'wrong side'	[ì hǎ]	[ì ǎ]
(30)	<i>ì hà</i>	'divination'	[ì hà]	[ì à]
(31)	<i>ùhé</i>	'vagina'	[ùhé]	[ùé]
(32)	<i>ùhè</i>	'Ife'	[ùhè]	[ùè]
(33)	<i>ùhí</i>	an Edo village	[ùhí]	[ùí]
(34)	<i>ùhì</i>	'law'	[ùhì]	[ùì]
(35)	<i>úháé'só</i>	'swallow'	[úháé'só]	[úáé'só]
(36)	<i>òhó'ghè</i>	'lie'	[òhó'ɣè]	[òó'ɣè]
(37)	<i>úhùkpá</i>	'once'	[úhùkpá]	[ùùkpà]
(38)	<i>úhúkì</i>	'evil spirit'	[úhúkì]	[úúkì]
(39)	<i>òvbió'há</i>	'bride'	[òβjɔ'há]	[òβjɔ'á]
(40)	<i>òmùhén</i>	'a beginning'	[òmùhén]	[òmùén]
(41)	<i>ùgbì hàn</i>	'blind side'	[ùgbì hà]	[ùgbì ǎ]
(42)	<i>ó bá hí á gb ọ̀ n</i>	a name	[ó bá hí á gb ọ̀ n]	[ó bá á gb ọ̀ n]

The following rule specifies the contexts in which [h] deletes in Edo:

R2 [h] → Ø / [(VC)₀ VCV___(C)₀ V (CV)₀]_{Formative}

The parenthesized (C) following the environment bar is illustrated in (42).

R2 is blocked if [h] and [ɟ] are present in the same formative of three or more syllables (whether or not in contiguous syllables). In such cases [ɟ] is usually deleted since it is weaker than [h], as can be seen in the following examples:

(43)	<i>ì hòrì</i>	'nothing'	[ì hòɾì]	[ì hòì]
(44)	<i>úhó'rò</i>	'pawpaw'	[úhó'ɾò]	[úhó'ò]
(45)	<i>ì hì nrí</i>	'nine'	[ì hì nrí]	[ì hífí]
(46)	<i>ìhì ọ̀ nr ọ̀ n</i>	'small snails'	[ìhǐ ọ̀ nr ọ̀ n]	[ìhǐ ọ̀ n]

(47)	<i>úhá'̀rò</i>	'forehead'	[úhá'̀ɾò]	[úhá'̀ò]
(48)	<i>ùhùnrún</i>	'the ninth day'	[ùhùɲú]	[ùhùú]
(49)	<i>óhíó'̀rò</i>	'loneliness'	[óhǰó'̀ɾò]	[óhǰó'̀ò]
(50)	<i>ìhùàrò</i>	'being inquisitive'	[ì hwàɾò]	[ì hwàò]
(51)	<i>úròhà</i>	name of an Edo village	[úɾòhà]	[úòhà]
(52)	<i>íhì nmwírín</i>	name of an Edo village	[íhì ɲíɾí]	[íhì ɲíí]

1.2.3. [m], [ɲ],³ and [n] deletion. These nasal consonants, which equally are lax consonants, are sometimes deleted in trisyllabic and polysyllabic nouns but never in disyllabic nouns.

(53)	<i>è m à</i>	'pounded yam'	[è m à]	[è m à]
(54)	<i>è m é</i>	'monkey'	[è m é]	[è m é]
(55)	<i>ò m ó</i>	'child'	[ò m ó]	[ò m ó]
(56)	<i>è m wí</i>	'something'	[è ɲí]	[è ɲí]
(57)	<i>ò m wá</i>	'someone'	[ò ɲá]	[ò ɲá]
(58)	<i>è m wè</i>	'trouble'	[è ɲè]	[è ɲè]
(59)	<i>à m wè</i>	'female'	[à ɲè]	[à ɲè]
(60)	<i>è ní</i>	'elephant'	[è ní]	[è ní]
(61)	<i>è n é</i>	'four'	[è n é]	[è n é]
(62)	<i>è n ì</i>	'name'	[è n ì]	[è n ì]
(63)	<i>ò n à</i>	'slander'	[ò n à]	[ò n à]

In cases where these consonants are deleted in trisyllabic and polysyllabic nouns, they have to constitute the lax consonants in the sequence. They usually do not occur in C₁ position except in cases where C₁ and C₂ are identical, in which case C₁ is deleted (cf. §1.2.4) and the surrounding vowels are usually identical, as can be seen from the following examples:

(64)	<i>èkpàmá'̀kù</i>	'zinc'	[èkpàmá'̀kù]	[èkpàá'̀kù]
(65)	<i>úhúnmwù</i>	'head'	[ùhúɲù]	[ùhúɲù]
(66)	<i>ùkhùnmwù</i>	'medicine'	[ùxùɲù]	[ùxùù]
(67)	<i>ùkhúnmwù</i>	'famine'	[ùxúɲù]	[ùxúù]

³The symbol [ɲ] (orthographic *mw*) represents a labio-dental frictionless nasal approximant produced with the approximation of the lower lip and the upper teeth and a lowering of the velum.

(68)	<i>ùtúkúnmwù</i>	'a stub'	[ùtúkúṃṃù]	[ùtúkúúù]
(69)	<i>ùsúnbúnmwù</i>	'(heap of) palm nuts'	[ùsúbúṃṃù]	[ùsúbúúù]
(70)	<i>ìrhúnmwìrhùn</i>	'nakedness'	[ìrúṃṃìrù]	[ìrúíìrù]
(71)	<i>ómómó</i>	'baby'	[ómómó]	[ómómó]
(72)	<i>éénéà</i>	'these ones'	[éénéà]	[éénéà]

But consider the following examples in which the vowels surrounding the nasal consonant are not identical:⁴

(73)	<i>ùkón¹mwè</i>	'act of being stupid'	[ùk ¹ ṃṃè]	[ùk ¹ ṃṃè]
(74)	<i>ùkhi¹nmwè</i>	'half'	[ùxj ¹ ṃṃè]	[ùxj ¹ ṃṃè]
(75)	<i>àgbànmwè</i>	'jaw'	[àgb ¹ ṃṃè]	[àgb ¹ ṃṃè]
(76)	<i>ùlómwà</i>	'restriction order'	[ùl ¹ ṃṃà]	[ùl ¹ ṃṃà]
(77)	<i>ùvián¹mwè</i>	'act of complaining'	[ùv ¹ ǰ ¹ ṃṃè]	[ùv ¹ ǰ ¹ ṃṃè]
(78)	<i>ùvbé¹mwè</i>	'(act of) being scarce'	[ùb ¹ é ¹ ṃṃè]	[ùb ¹ é ¹ ṃṃè]
(79)	<i>ùtú¹mwè</i>	'act of crying'	[ùtú ¹ ṃṃè]	[ùtú ¹ ṃṃè]
(80)	<i>ìmf¹nà</i>	'dream'	[ìmf ¹ ṃṃà]	[ìmf ¹ ṃṃà]
(81)	<i>ùfú¹mwè</i>	'act of being gentle'	[ùfú ¹ ṃṃè]	[ùfú ¹ ṃṃè]
(82)	<i>èmbàbà</i>	a type of drum	[èmb ¹ àbà]	[èmb ¹ àbà]
(83)	<i>èmá¹tòn</i>	'iron'	[èmá ¹ t ¹ ò]	[èmá ¹ t ¹ ò]
(84)	<i>ènǫfè</i>	a name	[ènǫ ¹ fè]	[ènǫ ¹ fè]
(85)	<i>ènàbúlélè</i>	a name	[ènàbúlélè]	[ènàbúlélè]
(86)	<i>ònàghí¹sè</i>	a name	[ònàghí ¹ sè]	[ònàghí ¹ sè]

In all the cases considered so far, the resultant hiatus is realized with a minor disjuncture which, together with the tonal melody, are the perceptual cues for syllable division in words in which there has been consonant deletion. It should also be noted that in all the examples above, consonant deletion is not conditioned by the vocalic context, i.e. sequences of all Edo vowels can occur in any of the vowel slots as specified above.

It is interesting to note too that where there are minimally contrastive forms of words from which [h] and [j] have been deleted, the context in which such words are used removes any form of ambiguity. Consider the following examples: the form [èó] could be the elided form of [èhó] 'neck' or [èǫó] (name of an Edo

⁴Examples 73, 77, 78, 79, and 81 are all verb based nouns.

chief). In rapid speech, and depending on context, the utterance [ðbí èó] → [ðβjé:ó] could be interpreted as follows:

[ðbí èó] → [ðβjé:ó]

- (a) child Ero 'Ero's child'
 (b) small voice, neck

(cf. also the elided forms of (7), (33)). However, cases of such minimally contrastive forms resulting from consonant deletion are not very common.

1.2.4. Consonant deletion in "reduplicative formatives"⁵ in Edo. In an Edo sequence $V_1C_1V_2C_2V_3(C_3V_4)$, where $C_1 = C_2 \neq C_3$ and $V_2 = V_3$, or where $C_2 = C_3 \neq C_1$ and $V_3 = V_4$, the first of the identical consonants is usually deleted:

(87)	<i>óbóbò</i>	'flower'	[óbóbò]	[óóbò]
(88)	<i>èvbàvba⁶</i>	'father'	[èβàβá]	[èàβá]
(89)	<i>àtètè</i>	'straw tray'	[àtètè]	[àètè]
(90)	<i>átétè</i>	'grasshopper'	[átétè]	[áétè]
(91)	<i>ósísí</i>	'gun'	[ósísí]	[óísí]
(92)	<i>éógógó</i>	'bell, gong'	[éógógó]	[éógó]
(93)	<i>úkòkò</i>	'pipe'	[úkòkò]	[úòkò]
(94)	<i>àkpá'kpà</i>	'spider'	[àkpá'kpà]	[áá'kpà]
(95)	<i>úkpòkpo</i>	'stick'	[úkpòkpo]	[úòkpo]
(96)	<i>ùkpòkpo</i>	'worries'	[ùkpòkpo]	[ùòkpo]
(97)	<i>ìghòghò</i>	'smoke'	[ìγòγò]	[ìòγò]
(98)	<i>òghòghò</i>	'joy'	[òγòγò]	[òòγò]
(99)	<i>òkhòkhò</i>	'hen'	[òxòxò]	[òòxò]
(100)	<i>útètè</i>	'low hill'	[útètè]	[úètè]
(101)	<i>ìhièhiè</i>	a type of beans	[ìhjèhjè]	[ìèhjè]
(102)	<i>ìhiènhìè</i>	'great grandchild'	[ìhjèhjè]	[ìèhjè]
(103)	<i>ìrhòrhò</i>	'chaff'	[ìròrò]	[ìòrò]

⁵The term "reduplicative formative" is used here in a purely descriptive sense and refers to "formatives with a sequence of two identical non-syllabic segments" [Abimbola & Oyelaran [1975:45], each followed by single identical vowels, as distinct from Yoruba as described by Abimbola & Oyelaran [op. cit.], where the vowels need not be identical. Examples such as [ìkàkà] (a village name) and [ìtò'tà] 'the act of sitting' are very rare in Edo.

⁶This could also be pronounced [èbàbá] in slow speech and [èàbá] in rapid speech.

- (104) *èkpékpéyé* 'duck' [èkpékpéjé] [èékpéjé]
 (105) *èkpárhúrhù*⁷ 'wasp' [èkpáɾúɾù] [èkpáɾúɾù]
 (106) *éíléégúmàzà* 'hunchback' [éíléégúmàzà] [ééíléégúmàzà]
]

In their account of consonant deletion in “reduplicative formatives” in Yoruba, Abimbola & Oyelaran ([1975:46] proposed the following rule to account for the data below:

P3 Reduplicative formative consonant deletion

$$[-\text{syll}] \rightarrow \emptyset / \left[\begin{array}{l} [+ \text{syll}] \\ [- \text{high}] \end{array} \right] \text{---} \left[\begin{array}{l} + \text{syll} \\ [+ \text{high}] \\ [\alpha 1 F 1] \\ : \\ [\alpha n F n] \end{array} \right] \left[\begin{array}{l} [- \text{syll}] \\ \left\langle \begin{array}{l} [+ \text{syll}] \\ [\alpha 1 F 1] \\ : \\ [\alpha n F n] \end{array} \right\rangle \end{array} \right] 2$$

Condition: 1 = 2

Yoruba	Underlying	After P3	
	<i>òkáká</i>	[òáká]	'open view'
	<i>òítɔ</i>	[òítɔ]	'truth'
	<i>óídè</i>	[óídè]	'parrot'
	<i>egúgú</i>	[eúgú]	'masque'
	<i>èúsú</i>	[èúsú]	'collection'
	<i>agogo</i>	[aogo]	'gong, bell'
	<i>òdèdè</i>	[òèdè]	'hallway'
	<i>èdí dí</i>	[èì dí]	'enchantment'

According to them, this rule deletes the first consonant “when the formative is a noun, and the two consonants are identical. The initial vowel is non-high, and, when the second is not high, the last two vowels must be identical” [Abimbola & Oyelaran 1975:46]. This rule does not seem to fit the Edo material since in the first place there is no restriction as to what vowel can occur in V₁. Seconding, in Edo for C₁ to be deleted, C₁ has to be identical to C₂ and V₂ identical to V₃ in the case of trisyllabic nouns. Thus, the following consonant deletion rule is pro-

⁷Other examples of Edo nouns with three consonants where the second and third consonants are identical are not readily available to us. Similar, we have not been able to get Edo nouns with three identical consonants.

posed to account for the fact that the vowels surrounding the second consonant C_2 or C_3 (in the case of formatives with more than three syllables—cf. 105) must be identical for C_1 to be deleted in the former and C_2 in the latter.⁸ In a linear rule, this is stated as

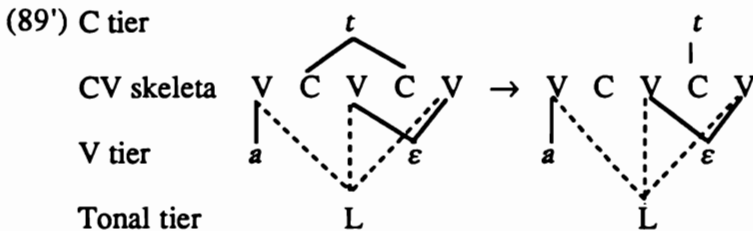
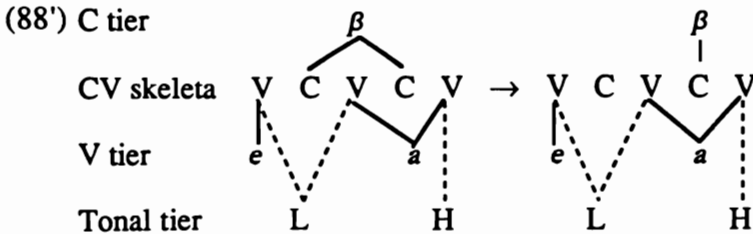
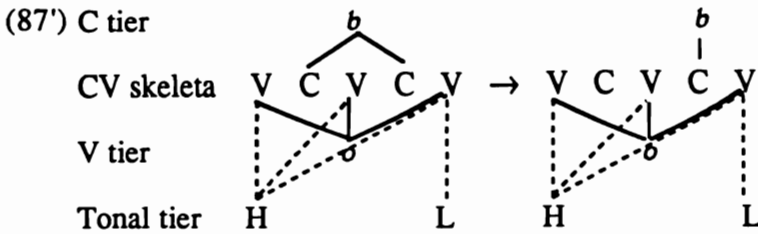
R3 ... V C_i V_j C_i V_j ... → ... V V_j C_i V_j ...

where “...” contains no word boundaries and V_j may or may not vary only with respect to tonal features.

The Edo data presented in §1.2.4 seem to provide further support for phonological models in which vowels and consonants are represented on separate tiers [Halle & Vergnaud 1980, 1982; McCarthy 1981; Pulleyblank 1983]. We will assume, as suggested by McCarthy [1981] that “the consonantal and vocalic patterns are to be considered as autosegmental levels and that the CV skeleta ... be given the theoretical status of the basic autosegmental tier ...” [Van der Hulst & Smith 1982:25]. Another basic assumption, following Halle & Vergnaud [1982:68-69], is that consonant deletion in reduplicative formatives in Edo involves copying the whole word melody from left to right or vice versa and that segments that are left over, i.e. not associated, (in rapid speech) do not receive any phonetic realization “and forever remain in a phonetic limbo condemned never to see the bright light of phonetic reality” [Halle & Vergnaud 1982:69]. R3 is more or less a formalisation of this phenomenon. Consequently, vocalic elements are to be associated with the V-tier while the consonantal elements are to be associated with the C-tier in the C V skeleta. Furthermore, the tonal tier will be linked directly to the C V skeleta in the present study (to make for a neater representation using broken lines) since according to Pulleyblank [1983:37], the special nature of the skeletal tier is that “autosegmental tiers can only link slots in the skeletal tier”, thus allowing “tiers to radiate out from a central skeletal tier ...”. Using the examples of trisyllabic reduplicative formatives in Edo in (87-89) respectively, this can be illustrated as shown below:⁹

⁸We are highly grateful to R.G. Schuh for his useful suggestion regarding the formulation of this rule.

⁹As stated in Melzian [1937], Amayo [1976], and experimental evidence contained in Omozuwa [1987], a Low tone immediately following a High tone is realized as a Falling tone, i.e. a /H.L/ sequence is realized as a [H.HL] sequence. This language specific rule is required in order to obtain the correct phonetic realization in the mapping convention.



The mapping conventions adopted in the present study are open to further research.

1.2.5. Absence of consonant deletion. In an Edo trisyllabic or polysyllabic noun there is absence of consonant deletion in rapid speech in the contexts given under §§1.2.5.1-3 below.

1.2.5.1. The consonants in the sequence have different points of articulation but the same mode of production irrespective of the nature of V_2 and V_3 .

(107)	<i>ágbádá</i>	'flowing gown'	[ágbádá]	[ágbádá]
(108)	<i>òbàdàn</i>	' <i>Ficus vogellii</i> '	[òbàdà]	[òbàdà]
(109)	<i>ògó'bò</i>	'left hand'	[àgó'bò]	[àgó'bò]
(110)	<i>èdógún</i>	a name	[èdógú]	[èdógú]

(111)	<i>èkhérré</i>	'small, little'	[èxéré]	[èxéré]
(112)	<i>àguóbé'gbé</i>	'harmony'	[àgʷóbé'gʷbé]	[àgʷóbé'gʷbé]
(113)	<i>ìkpòtòkí</i>	'Portuguese'	[ìkpòtòkí]	[ìkpòtòkí]
(114)	<i>ìgòdòmígòdò</i>	an old name for Bini Kingdom	[ìgòdòmígòdò]	[ìgòdòmígòdò]

1.2.5.2. The consonants in the sequence have different points and modes of articulation irrespective of the nature of V_2 and V_3 .

(115)	<i>òkpàghà</i>	'oil-bean tree'	[òkpàɣà]	[òkpàɣà]
(116)	<i>ítábà</i>	'tobacco'	[ítábà]	[ítábà]
(117)	<i>ùkòní</i>	'kitchen'	[ùkòní]	[ùkòní]
(118)	<i>àgbá'kà</i>	'crocodile'	[àgbá'kà]	[àgbá'kà]
(119)	<i>àdésè</i>	'middle'	[àdésè]	[àdésè]
(120)	<i>àsá'kà</i>	'black ant'	[àsá'kà]	[àsá'kà]
(121)	<i>èkàlá'kà</i>	'wine glass'	[èkàlá'kà]	[èkàlá'kà]
(122)	<i>àtàlàkpà</i>	'leopard'	[àtàlàkpà]	[àtàlàkpà]
(123)	<i>ékpó'xùrù</i>	'stomach'	[ékpó'xùrù]	[ékpó'xùrù]

1.2.5.3. The consonants in the sequence have the same point of articulation but different modes of production, even in cases where V_2 and V_3 are identical, i.e. the consonants in the sequence differ in at least one feature.

(124)	<i>àgbá'kpàn</i>	'bald man'	[àgbá'kpà]	[àgbá'kpà]
(125)	<i>ágbá'kpà</i>	a name	[ágbá'kpà]	[ágbá'kpà]
(126)	<i>ìvbàbò</i>	'empty-handedness'	[ìbàbò]	[ìbàbò]
(127)	<i>àtòrí</i>	'gonorrhoea'	[àtòrí]	[àtòrí]
(128)	<i>ùfú'mwè</i>	'gentleness'	[ùfú'mè]	[ùfú'mè]
(129)	<i>òmó'bo</i>	'little child'	[òmó'bo]	[òmó'bo]
(130)	<i>èmàbà</i>	type of drum	[èmàbà]	[èmàbà]

2. Experimental Investigation¹⁰

A preliminary electroglottographic study of consonant deletion in Edo nouns was undertaken with a view to verifying our claims that there is neither an alteration of the tonal melody nor a reduction of the number of syllables in nouns where there has been consonant deletion as the preliminary analysis by Wescott [1962, 1965] seems to suggest. It is therefore not intended to be a detailed acoustic analysis of the phenomenon. The acoustic results are presented to provide an easy means of comparing tokens at both the slow and rapid speech-tempos. Thus, the recorded items in the present paper, i.e. one repetition of nine Edo nouns at both the slow and rapid speech tempos by one Edo speaker, will serve as a basis for such verification. Consequently, the relative pitches of contiguous syllables at the slow speech tempo will be compared with corresponding syllables at the rapid speech tempo with a view to determining whether or not there has been syllable reduction and/or a change in the direction of pitch contour which, incidentally, should lead to a change in meaning of such tokens, or whether or not there is a substantial difference in duration between tokens uttered in slow speech and the same tokens uttered in rapid speech.

2.1. Procedure. A corpus of nine Edo trisyllabic nouns (see Tables 1 and 2 below) translated into English was presented to a female speaker of Edo. The corpus was present in English in order to avoid any possible influence or difficulty the informant might have in reading the Edo orthography, especially with tone markings.

Two electrodes mounted on an elastic band and placed one on each side of the informant's larynx were connected to a melody analyser which was in turn coupled to an oscillograph (oscillomink). A microphone placed a few centimeters in front of the informant was equally connected to the oscillograph (see Figure 1 below for experimental set up). The informant was asked to pronounce each of the nine tokens in Edo, first in slow speech, then in rapid speech. The phonogram and the tonal contour for each token were thus obtained graphically at two different speech tempos.

2.2. Results and discussion. Statistical results of the oscillographic tracings are shown in Tables 1 and 2. In interpreting the acoustic tracings for each token pronounced in slow and rapid speech, the following parameters were taken into consideration: the fundamental frequency value (F_0) at the beginning and end of each syllable, the total duration of each word, and the reduction of the number

¹⁰This experimental investigation was carried out in the Phonetics Laboratory of the Université de Franche-Comté, Besançon, France. Many thanks to Professor E. Lhote for her useful comments and suggestions.

Table 1. Speech tempo and tonal realizations

WORDS	SLOW SPEECH						RAPID SPEECH					
	Syllable 1		Syllable 2		Syllable 3		Syllable 1		Syllable 2		Syllable 3	
	F ₀ ⁱ	F ₀ ^f	F ₀ ⁱ	F ₀ ^f	F ₀ ⁱ	F ₀ ^f	F ₀ ⁱ	F ₀ ^f	F ₀ ⁱ	F ₀ ^f	F ₀ ⁱ	F ₀ ^f
1. [égógó]	31	31	31	31	32	31	34	32	32	32	32	32
2. [úkòkò]	31	27	26	31	37	44	30	30	30	34	36	48
3. [úkṛòkṛò]	27	27	26	32	34	48	31	31	31	37	38	48
4. [íkèkè]	33	32	26	35	35	38	30	30	30	34	33	39
5. [àxáxà]	36	36	31	31	31	42	35	32	32	30	30	49
6. [ì hǐ́ ǎ́]	29	29	29	29	28	25	32	32	32	32	32	25
7. [úhùkṛá]	27	27	28	37	31	31	31	30	30	36	32	33
8. [úhúki]	29	27	28	29	30	51	30	27	27	30	30	49
9. [ðhó'ɣè]	34	35	30	30	31	48	33	33	33	27	30	45

(F₀ values expressed in quarters of a tone below reference frequency of 600 HZ)

Table 2. Speech tempo and word duration

SLOW SPEECH		RAPID SPEECH	
Words	Duration	Words	Duration
1. [égógó]	530 ms	[éógó]	520 ms
2. [úkòkò]	530 ms	[úòkò]	500 ms
3. [úkṛòkṛò]	520 ms	[úòkṛò]	400 ms
4. [íkèkè]	610 ms	[ìèkè]	490 ms
5. [àxáxà]	440 ms	[àóxà]	500 ms
6. [ì hǐ́ ǎ́]	570 ms	[ì hǐ́ ǎ́]	520 ms
7. [úhùkṛá]	620 ms	[úòkṛá]	560 ms
8. [úhúki]	560 ms	[úúki]	560 ms
9. [ðhó'ɣè]	470 ms	[ðò'ɣè]	440 ms

Figure 1. Experimental Set-up for Electroglottographic Method

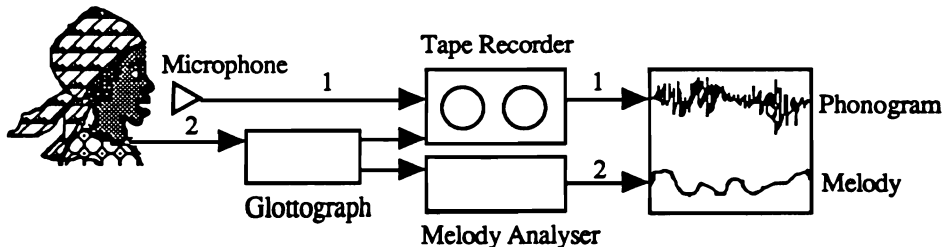
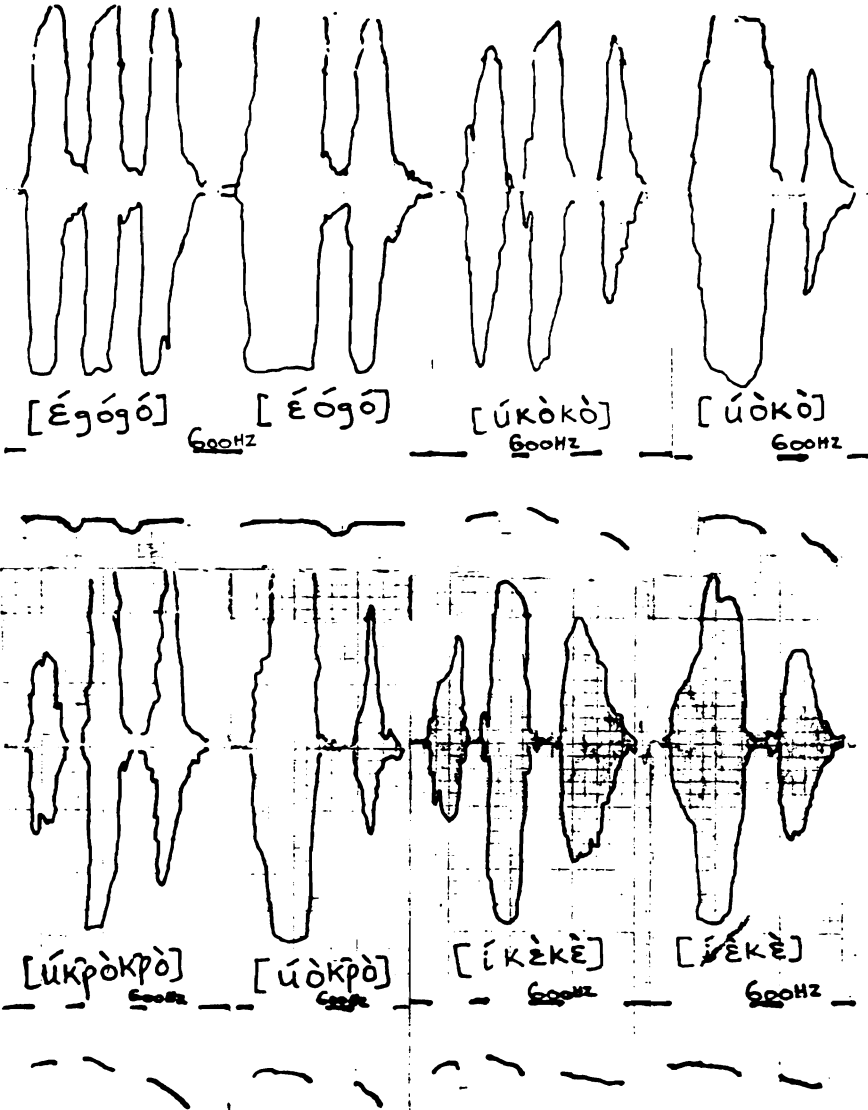
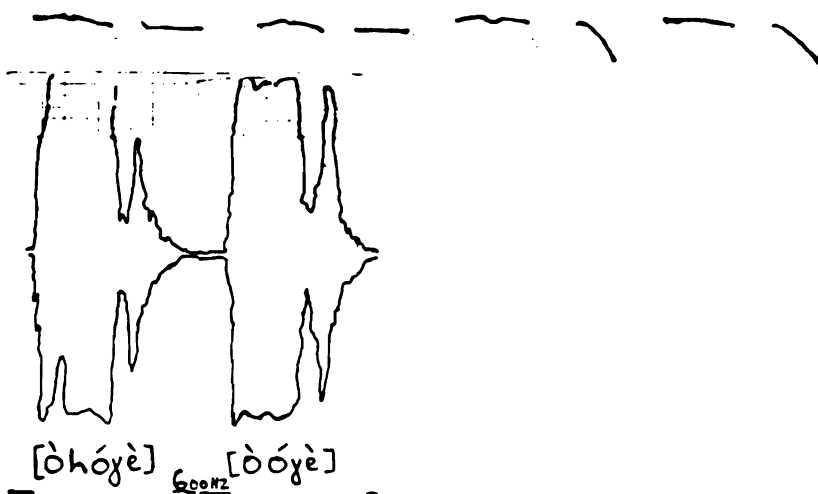
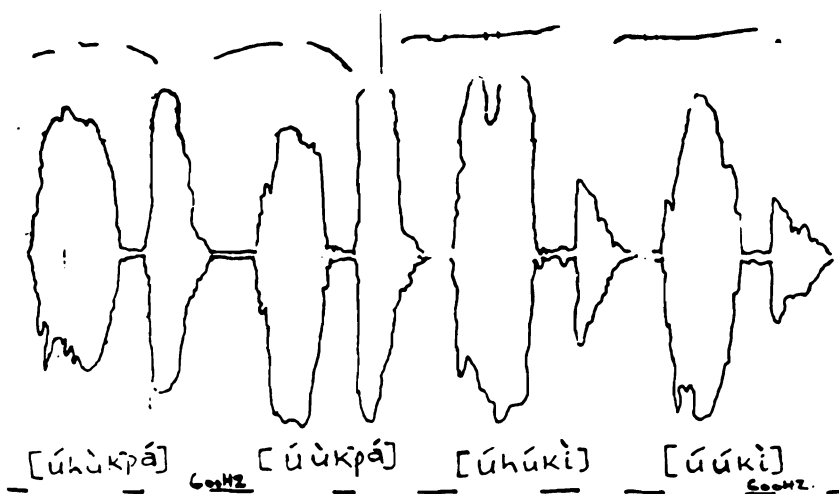
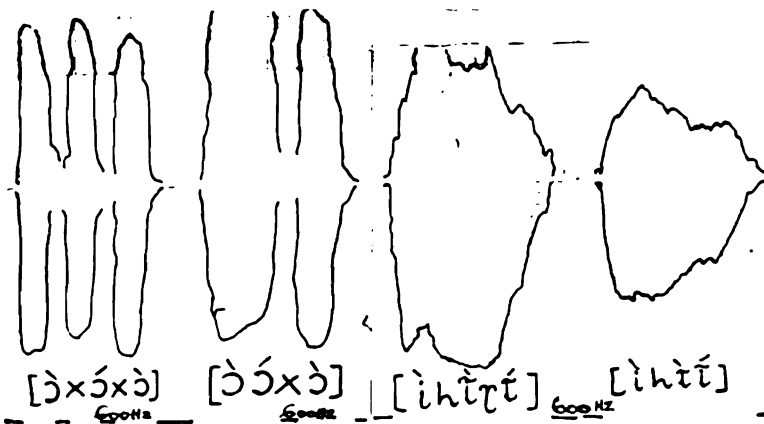


Figure 2. Speech Tempo and Tonal Realisations

Scale: Vertical axis, 1mm represents 3/4 of a tone.
 Horizontal axis, 1 mm represents 20 milliseconds.





of consonant spaces. The latter provides a very easy basis for identifying words in which there has been consonant deletion.

On the acoustic tracings, fundamental frequency (F_0) values are presented logarithmically on a musical scale in quarters of a tone below a predetermined reference frequency of 600 HZ (cf. Table 1) while duration is presented in milliseconds (ms) (cf. Table 2). Thus, 1mm on the vertical axis represents 3/4 of a tone below the reference frequency, while 1mm on the horizontal axis represents 20ms. For example, the initial F_0 value (F_{0i}) of the [é] of [éǵǵǵ] is 31 quarters of a tone below 600 HZ. The F_0 value at the end point of the same syllabic element is equally 31 quarters of a tone below the reference frequency.

Results of this experiment show that the tonal melodies of words are not affected by speech tempo and consonant deletion even though variations in terms of absolute pitch values might be observed in words produced in slow and in rapid speech. Let us consider, for instance, the word [éǵǵǵ] 'bell'. In slow speech, each syllabic peak of the word carries a High tone realized on the same pitch level characteristic of a sequence of High tones in Edo: 31 quarters of a tone from the beginning to the end of each of the first two syllabic peaks, 32 quarters of a tone at the beginning and 31 at the end of the third syllabic peak.¹¹ Moreover, the micromelody for the voiced consonant [ǵ] of the last two syllables of the word is easily identifiable, showing that no consonant has been deleted. In rapid speech, F_0 initial value of the High tone of the first syllabic peak of the word is 34 quarters of a tone while the end point of the F_0 realization is 32 quarters of a tone below the reference frequency (the positive value of F_0 variation when F_0 variation on a syllabic peak is nil is the perceptual cue for identifying a High tone in Edo). The High tone on the second and third syllabic peak is realized on the same pitch level, 32 quarters of a tone from the beginning to the end of the F_0 realization.

However, the reduction in the number of the micromelody for the voiced consonants from two to one clearly indicates the absence of the first consonant in the $V_1C_1V_2C_2V_3$ word at the rapid speech tempo.

The results of this study further reveal that words tend to have longer duration (cf. Table 2) in slow speech than in rapid speech (with the exception of [ǎxǎxǎ] and [úhúki] where a Low tone follows a High tone in word final position). This is to be expected, especially in cases for which consonant deletion is not compensated in terms of duration, by the minor disjuncture of the resultant hiatus.

¹¹The difference in absolute pitch between the repetition of this word at two speech tempos is not linguistically significant since the same relative pitch range is maintained between contiguous syllables. It is for this reason that Edo listeners perceived the same word, [éǵǵǵ] in this case, irrespective of the difference in speech rate and the individual speaker.

3. Conclusion.

Results of this study suggest that speech tempo and the nature of the consonants in a given sequence are the primary conditions for consonant deletion in Edo nouns. Experimental results confirm our hypothesis that the tonal melody of individual Edo nouns is not affected by speech tempo and consonant deletion.

In places where there has been consonant deletion, there is usually a minor disjuncture between contiguous syllables. This forms the perceptual basis for syllable division in such nouns. Acoustically, consonant deletion is easily identifiable by the reduction in the number of consonant spaces in words pronounced in rapid speech. The process of consonant deletion in Edo nouns neither results in a reduction in the number of syllables or such nouns nor in a meaning difference, contrary to Wescott's [1965] claim.

REFERENCES

- Abimbola, W. & O.O. Oyelaran. 1975. "Consonant deletion in Yoruba." *African Language Studies* 16:37-60.
- Agheyisi, R.N. 1982. *An Edo-English Dictionary*. Benin City: Ethiope Publishing Corporation.
- Amayo, A. 1976. "A generative phonology of Edo-Bini." PhD dissertation, University of Ibadan.
- Amayo, a. & O. Elugbe. 1983. "Edo orthography." In K. Williamson (ed.), *Orthographies of Nigerian Languages*, Manual II. Lagos: National Language Center.
- Fresco, E.M. 1970. *Topics in Yoruba Dialect Phonology*. *Studies in African Linguistics*, Supplement 1.
- Halle, M. & J.R. Vergnaud. 1980. "Three dimensional phonology." *Journal of Linguistic Research* 1:83-105.
- Halle, M. & J.R. Vergnaud. 1982. "On the framework of auto-segmental phonology." In H. Vander Hulst & N. Smith (eds.), *The Structure of Phonological Representations* (Part 1), pp. . Dordrecht: Foris.
- Jeje, M.A. 1972. "A contrastive analysis of Ijesa and the Standard Yoruba." Long essay, University of Ibadan.
- McCarthy, J. 1981. "A prosodic theory of nonconcatenative morphology." *Linguistic Inquiry* 12:373-418.

- Melzian, H. 1937. *A Concise Dictionary of the Bini Language of Southern Nigeria*. London: Paul Kegan, Trench, Trubner & Co., Ltd.
- Omozuwa, V.E. 1987. "L'edo: approches phonologique, acoustique et perceptuelle du système phonémique et du système tonémique." Thèse (Régime 1984), Université de Franche-Comté, Besançon.
- Omozuwa, V.E. In preparation. "Vowel contraction and nasalization in Edo: an autosegmental explanation."
- Pulleyblank, D. 1983. "Tone in lexical phonology." PhD dissertation, MIT.
- Ward, I.C. 1952. *An Introduction to the Yoruba Language*. Cambridge: Heffer and Sons, Ltd.
- Wescott, R.W. 1962. *A Bini Grammar, Part I, Phonology*. East Lansing, MI: African Studies Center, Michigan State University.
- Wescott, R.W. 1965. "Speech tempo and the phonemics of Bini." *Journal of African Languages* 4/3:182-190.
- Van der Hulst, H. & N. Smith. 1982. "Autosegmental and metrical phonology." In H. Van der Hulst & N. Smith (eds.), *The Structure of Phonological Representations* (Part I), pp. 2-45. Dordrecht: Foris.

