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LEXICAL AND POSTLEXICAL RULE APPLICATION:
VOWEL DELETION IN YORUBA

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This paper¹ re-examines the vowel deletion processes in verb plus noun derivations (with or without prefix), and in noun plus noun compounds from the viewpoint of lexical phonology and morphology. In this regard, the deletions are classed into Lexical and Postlexical. The paper therefore sheds some light on some of what may come to be known as characteristics of lexical and postlexical components in Yoruba, and the interaction of lexical and postlexical processes. At the end, questions regarding whether or not items from the postlexical component can be input to the lexical component are raised.

Nous commençons par examiner de nouveau les procédés par lesquels s'effectue la suppression des voyelles de dérivés composés de verbe et substantif (sans ou avec préfixe) ainsi que celle d'autres dérivés dont l'origine se trouve dans une combinaison des substantifs. Les suppressions dont il s'agit se classent en lexicales et post-lexicales, tel que la description réussit à en faire ressortir certains de traits qui peuvent se dire caractéristiques non seulement de deux types de dérivés en Yoruba, mais aussi de leur action réciproque. L'étude se termine par l'examen de la question de savoir si les éléments dits post-lexicaux peuvent ou non servir d'élément de base des composées lexicales.

1. INTRODUCTION

When two vowels come together across morpheme boundaries in Yoruba, a number of possibilities exist of what may happen. These possibilities are shown in the examples below²:

- | | | | | | | |
|--------|------|------------------|----------|---------|-----------|--------------------|
| 1. (a) | gbé | + | esè | ----> | gbésè | |
| | lift | | leg/foot | | 'to die' | |
| | (b) | iyá | + | okò | ----> | iyakò |
| | | mother | | husband | | 'in-law (female)' |
| 2. (a) | kú | + | isí | ----> | kúusé | |
| | | verb of greeting | | 'work' | | 'well done' |
| | (b) | bàbá | + | okò | ----> | bàbòokò |
| | | father | | husband | | 'husband's father' |
| | | | | | | (male in-law) |
| 3. (a) | pa | + | iró | ----> | puró/paró | |
| | kill | | lie | | 'to lie' | |

(b) **abà** + **ilé** ----> **abúlé³**
 farm house 'village'
 shack

Broadly speaking, the processes in (1) - (3) have been referred to respectively in the literature as deletion, assimilation and coalescence. The subject of this paper covers only the type in (1). The types in (2) and (3) will be left for a work of wider scope, possibly a work that treats Yoruba lexical phonology and morphology together. Such endeavours are presently being undertaken by a number of scholars including Akinlabi (1986), Folorain (in prog.). In particular, the process in (3) is the subject of a controversy between two schools of thought dating back to Crowther's grammar of 1852. One of the two schools holds the view that the process here is that of vowel coalescence while the other believes that it is vowel deletion. Recently, the arguments of each of the two schools received full exposition in the works of Awobuluyi (1983) who holds the coalescence view and Bamgboṣe (1984) who provides evidence for the vowel deletion analysis. Bamgboṣe will, for instance, see the forms in 3(a) and (b) derived from 4(a) and (b) respectively.

4. (a) **pa** + **uró** ----> **puró/paró**
 kill lie 'to lie'
 (b) **abé** + **ulé** ----> **abúlé**
 below/ house 'village'
 underneath

The indepth research and weighty arguments in these works make it difficult to regard either view as less plausible than the other. If present day forms of such individual items in the standard variety of Yoruba are considered, then one is forced to hold the coalescence view. But then, there is no a priori reason to believe that such present day forms are not from those so-called dialectal forms as in 4(a) and (b).

In spite of the fact that we shall not discuss such examples, we believe that similar analysis given for the type of data in (1) can be given for those in (2) and (3). That is, vowel assimilation and 'coalescence' in Yoruba are characterised by lexical and postlexical distinctions. In fact, we believe that there is some interaction between all the three and other morphological processes, some of which we shall discuss in the course of this paper. We believe, for instance, that there is the possibility that where lexical vowel elision is expected but in which it is absent, the language employs lexical vowel assimilation and so forth. Why such a thing happens we cannot as of now explain.

2. VOWEL DELETION IN YORUBA

The process of vowel deletion in Yoruba is well documented in the literature. Among scholars who have discussed this phenomenon are Ward (1952), Rowlands (1954), Bamgboṣe (1965), Oyelaran (1972) and Awobuluyi (1981). Recently, Awoyale (1985) has examined the same process.

The type of proposed solutions have varied with scholars, but generally we can say that there are two types: phonological and syntactic. While Ward and Bamgboṣe suggest phonological rules in their attempts to account for the process, Oyelaran proposes a syntactic solution. Awobuluyi has pointed out some flaws in any attempt at proposing syntactic rules for the process of vowel deletion. He notes (and this is a generally held view) that phonological rules are inadequate, and finally proposes that the process might well be morphologically conditioned. The problem with such a solution is obvious, as conceded by Awobuluyi in assessing a similar proposal by Rowlands; such a solution will have the undesirable consequence of making learning the language more complex. In his words, '...it would be extremely impracticable to list all the morphemes of the language and indicate the specific morphological context in which each of them can have its initial or final vowel deleted, as the case may be' (Awobuluyi, 1981:3)

Rowlands (1954), Bamgboṣe (1965), Oyelaran (1972) and lately Awoyale (1985) see the problem of vowel deletion as one which shows close interaction between both phonology and syntax. In this paper, we take another look at the process of vowel deletion. While we do not claim to have found a solution to the whole problem we will make certain proposals which we hope might resolve the enigma in a class of constructions which have also been problematic.

We differ from earlier writers in that we believe that the mechanisms of morphological/ phonological components are adequate enough to handle the problem of vowel deletion in Yoruba.

The general assumption amongst Yoruba scholars (and this is true) is that the more common process that holds between a verb and a noun (verb + noun) is vowel deletion as we have in 1(a) while vowel assimilation holds in noun + noun collocation as we have in 2(b), except, of course, if the second noun is consonant initial. Thus scholars have given the most attention to vowel deletion between a verb and a noun. But vowel deletion also takes place between two nouns. Until recently (Awoyale, 1985), this type, though discussed in Rowlands (1954) and Siertsema (1959), has been relatively neglected by other scholars, therefore this paper also takes a look at the deletion process in such constructions, as exemplified in (5) below:

- | | | | | | |
|----|----------|---|----------------------|-------|-------------------|
| 5. | iyá | + | ọkọ | ----> | iyako |
| | mother | | husband | | 'in-law' (female) |
| | ọmọ | + | obìnrin ⁴ | ----> | omòbìnrin |
| | child | | female | | 'young female' |
| | ojú | + | òde | ----> | ojúde |
| | eye/face | | outside | | verandah |

In this analysis, we employ the theory of lexical phonology and morphology. Since this theory, like any other theory still at a developmental stage has its facts scattered here and there, we endeavour to give a sketch as relevant to our discussion in the following section.

3. LEXICAL PHONOLOGY AND MORPHOLOGY

Lexical phonology and morphology can be seen as a theory that highlights the relations between the lexicon and phonological rules. The theory developed out of a series of studies (Pesetsky, 1979; Mohanan, 1982; Kiparsky, 1982; Pulleyblank, 1983; Halle and Mohanan, 1985, etc.). It has been applied to Yoruba in Pulleyblank (1983), and in Akinlabi (1985).

Since there is presently no exposition that represents a detailed consensus amongst its practitioners, the sketch given below represents the relevant part of the theory as we understand it. This sketch leans on Pulleyblank (1983), and Halle and Mohanan (1985). Our proposed modifications depend on our study of the data from Yoruba agentive nominalizations.

The theory proposes that there are two types of phonological rule applications: (a) those that apply within the lexicon (lexical rules) (b) those that apply to the output of the lexical component (postlexical rules). Therefore, lexical phonology recognises three levels of representation: underlying, lexical and postlexical. It is observed that rules that apply at the lexical level (i.e. in the lexicon) manifest different properties from those that apply postlexically. The same rules may, however, apply both lexically and postlexically, but with different properties.

The application of certain phonological rules in Yoruba support this proposal. A very well known phonological rule in Yoruba is $n \rightarrow l$ (cf. Oyelaran, 1971). This rule applies both lexically and postlexically, and manifests different properties in its applications. Consider the data in (6) in which the nominalising prefix *oní* 'owner of/seller of' is employed in noun formation:

6.	<i>oní</i>	+	<i>ilé</i> house	---->	<i>onilé</i> 'owner of house'
	<i>oní</i>	+	<i>bàtà</i> shoe(s)	---->	<i>onibàtà</i> 'seller of shoes'
	<i>oní</i>	+	<i>epo</i> oil	---->	<i>elépo</i> 'seller of oil'
	<i>oní</i>	+	<i>eja</i> fish	---->	<i>eléja</i> 'seller of fish'
	<i>oní</i>	+	<i>aṣo</i> cloth	---->	<i>aláṣo</i> 'seller of cloth'
	<i>oní</i>	+	<i>ọbẹ</i> stew/soup	---->	<i>olóbì</i> 'seller of stew/soup (also a place name in Ibadan City)
	<i>oní</i>	+	<i>owó</i> money	---->	<i>olówó</i> 'owner of money' (rich person)

The first two examples reveal that the $n \rightarrow l$ rule does not apply either when vowel [i] or a consonant begins the following morpheme.⁵ In the remaining examples which actually show its lexical application, we observe that the process is accompanied by two other processes. The first is the deletion of vowel [i] of *oní* and the second and more crucial process is the assimilation of [o] in *oní* to the initial vowel of the following morpheme. [i] gets deleted before $n \rightarrow l$ and [o] assimilation takes place after the $n \rightarrow l$ rule. These two other processes apply obligatorily in the lexical application of the $n \rightarrow l$ rule.

Crucially, the last process of [o] assimilation or the assimilation of any vowel for that matter, does not accompany the postlexical (phrasal) application of $n \rightarrow l$. The examples in (7) demonstrate this: (o 2nd singular, *ní* 'to have')

7.	<i>o ní ilé</i>	$\rightarrow$	<i>o nílé</i>
	house		'you have (a) house'
	<i>o ní epo</i>	$\rightarrow$	<i>o lépo</i>
	oil		'you have oil'
	<i>o ní eja</i>	$\rightarrow$	<i>o léja</i>
	fish		'you have fish'
	<i>o ní aṣo</i>	$\rightarrow$	<i>o láṣo</i>
	cloth		'you have (a) cloth'
	<i>o ní obẹ</i>	$\rightarrow$	<i>o lóbẹ</i>
	soup/stew		'you have soup/stew'
	<i>o ní owó</i>	$\rightarrow$	<i>o lówó</i>
	money		'you have money'

In the light of the above, we hope to be able to demonstrate that vowel deletion which applies both lexically and postlexically manifests different properties in its applications.

Lexical phonology also proposes that the lexicon consists of ordered strata (or levels) and that each morphological process takes place at a particular stratum. Such processes as affixation, compounding, etc., may belong to different lexical strata. In fact different affixes may belong to different strata. The immediate implication of this is that if affix x is placed at stratum 1 and affix y is placed at stratum 2, once affix y attaches to a stem, affix x may no longer attach to the same stem (except, of course, by a process called looping).

Akinlabi (1968) proposes that word formation processes in the Yoruba lexicon takes place in five lexical strata as follows:

- 8.
- Stratum 1: Prefixation 1 (single Vowel Prefixes)
 - Stratum 2: VCV Reduplication
 - Stratum 3: Gerundive Reduplication
 - Stratum 4: (a) Compounding 1) Full Reduplication
(b) Compounding 2) Affixation of all linkers
 - Stratum 5: Prefixation 2 (o -- ni / o -- ní)

In this paper, we adopt this proposal with a slight modification to be proposed later.

Languages may differ in the number of strata they recognise, but there appear to be always at least two, one lexical and the other postlexical, unless the language has no morphology at all (Halle and Mohanan, 1985:58).

Another proposal of the lexical theory includes the stipulation that phonological rules are assigned specific morphological strata as their domain. Thus the output of each stratum is submitted to phonological rules assigned to the relevant stratum in the lexicon. Halle and Mohanan propose the following principles of domain assignment.

9. Principles of domain assignment (Halle and Mohanan, 1985:58).
 - (a) In the absence of counter-evidence, assign the smallest number of strata as the domain of a rule.
 - (b) In the absence of counter-evidence assign the highest possible stratum as the domain of a rule (where lowest = stratum 1).

The above principles ensure that rules are properly assigned their domain of application. They also make the use of boundary symbols (used in SPE) unnecessary, since rules may apply to certain affixes and not to others purportedly demarcated by the same boundary symbol. Halle and Mohanan also point out that given the above assumptions, all phonological rules apply at the post-lexical stratum (9b) and only at that stratum (9a).

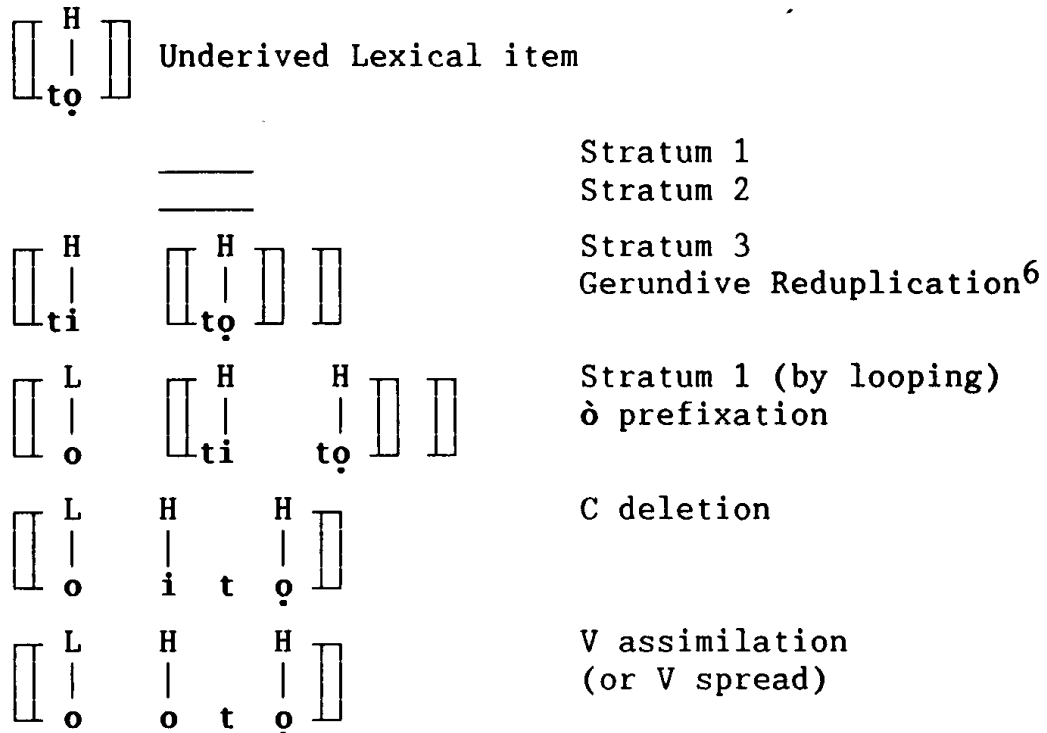
After all the phonological rules of a particular stratum have applied, the item is then moved on to the next stratum for further morphological processes followed by the application of phonological rules for that stratum. This goes on until all word formation processes are ended. The output of the lexical component is then fed into the syntax (postlexical stratum) at which stage the postlexical rules apply. But before a stem is moved to the next stratum, the brackets delimiting two or more constituents of the stem at an earlier stratum are erased by the Bracket Erasure Convention.

10. Bracket Erasure Convention (BEC)

'After the application of all the (phonological A.A. & F.O.) rules at a stratum, the brackets between the morphemes are deleted so that reference to the constituent morphemes become impossible at subsequent strata'. (Halle and Mohanan, 1985:61)

Let us examine the derivation of the item òótó 'truth' in Yoruba, using these proposals. This derivation is from Akinlabi (1986). We follow Akinlabi (1985) in assuming that tones are autonomous segments in Yorùbá.

11. tó 'to be right/straight' òtító 'truth'



(Note: a postlexical tone rule spreads the L to H to give òótó).

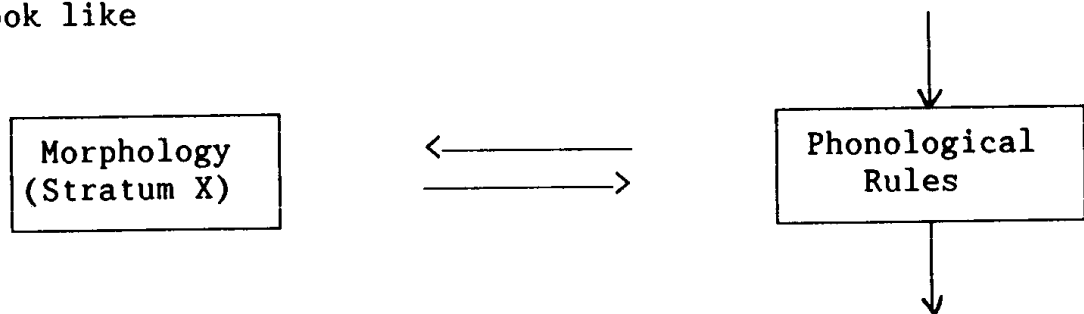
The underived lexical item is tó 'to be straight/right'. At stratum 3, gerundive reduplication takes place affixing tí copied from the stem (Marantz, 1982; Clements, 1985). Following the strata ordering proposed in Akinlabi (1986), the underived lexical item tó skipped prefixation 1 at stratum 1 and VCV reduplication at stratum 2 to undergo gerundive reduplication at stratum 3. Note that if the item had undergone prefixation at stratum 1, we would have had an ill-formed item *òtító⁷. The item tó could however have taken another prefix to become ètó 'a right'. Note however that ètó can no longer undergo gerundive reduplication, thus our assumption of strata ordering is correct. No phonological rule is applicable at stratum 3 and so none applies.

Lexical phonology also allows a device called the loop, which is provided to allow a stratum distinction for the purposes of phonology without imposing a corresponding distinction in morphological distribution. The loop is used when morphemes of a later stratum undergo morphological processes which are independently motivated for an earlier stratum (See Halle and Mohanan, 1985:64, for details).

The item *tító* derived on stratum 3 above is then looped to stratum 1 to undergo *ò* prefixation. After prefixation the new item *òtító* undergoes consonant deletion and progressive vowel assimilation, both of which are stratum 1 processes. The two processes apply in that order (see Akinlabi, 1986, for details). And finally as seen in (11) bracket erasure takes place between one stratum and another.

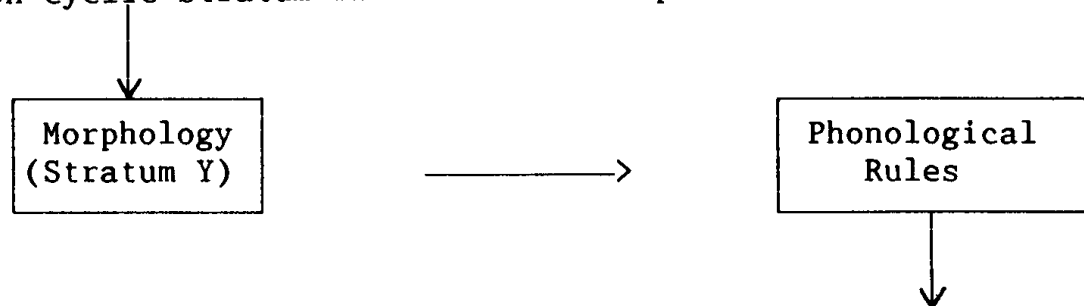
Though the original proposal of lexical phonology and morphology was that the lexical component is cyclic (e.g. Kiparsky, 1982; Mohanan, 1982), Halle and Mohanan have shown that certain strata even within the lexical component may not be cyclic. In this type of stratum (e.g. Halle and Mohanan's English stratum 2) all morphological processes apply en bloc followed by the phonological rules of that stratum. Thus while a cyclic stratum⁸ will look like

12.



a non-cyclic stratum will have the shape

13.



In section 5 we make a proposal that items in the postlexical component may in fact re-enter in lexicon giving a picture similar to (12) above.

4. VOWEL DELETION: A LEXICAL MODEL

We now turn to the details of vowel deletion in noun + noun compounds and verb + noun derivations. In our discussions, *V*₁ represents the last vowel of the first morpheme and *V*₂ represents the first vowel of the second morpheme. We will discuss the noun + noun compounds before turning to the verb + noun derivations.

4.1 NOUN + NOUN COMPOUNDS

The data on noun + noun compounds to be discussed include the following (some are drawn from Awoyale, 1985):

- 14.
- | | | | | |
|------------|---|------------|-------|------------------|
| <i>iwá</i> | + | <i>ojú</i> | ----> | <i>iwájú</i> |
| fron | | eye/face | | 'forehead/front' |
| <i>ojú</i> | + | <i>ilé</i> | ----> | <i>ojúlé</i> |
| eye/face | | house | | 'household' |
| <i>ojú</i> | + | <i>òde</i> | ----> | <i>ojúde</i> |
| eye/face | | outside | | 'verandah' |

eti	+	odò	---->	etídò	
ear		river		'river bank'	
omọ	+	obìnrin	---->	omọbìnrin	
child		female		'young female'	
iyá	+	okọ	---->	iyakọ	
mother		husband		'in-law (female)'	
idí	+	okọ	---->	idíkọ	
bottom		vehicle		'motor park'	
irun	+	àgbòn	---->	irungbòn ⁹	
hair		chin		'beard'	
eye	+	ilé	---->	eyelé	
bird		house		'pigeon'	
aya	+	ọba	---->	ayaba	
wife		king		'queen'	
orí	+	ìta	---->	oríta	
head		outside		'crossroads'	
àlà	+	òfo	---->	àlàfo	
demarcator		nothing/zero		'a gap'	
ojú	+	odò	---->	ojúdò	
eyes/face		river/sea		'river surface'	
ojú	+	ọgbà	---->	ojúgbà	
eyes/face		peer		'agemate'	
eyin	+	ojú	---->	eyinjú	
egg		eye/face		'eyeballs'	
eran	+	oko	---->	eranko	
animal		farm		'bush animal (used derogatorily for human being)'	
ọgá	+	ogun	---->	ọgágun	
boss		war		'war lord'	
erin	+	odò	---->	erindò	
elephant		sea/river		'sea otter'	
akọ	+	ogun	---->	akọgun	
manliness		war		'warrior'	
ika	+	omọ	+	owọ	---->
finger		child		hand	
				ikamowọ	
				'finger'	
ika	+	omọ	+	esẹ	---->
finger		child		foot	
				ikamosẹ	
				'toe'	

The examples in (14) above demonstrate that the process of vowel deletion in nominal compounding is a productive process in Yoruba, contrary to some earlier beliefs. The examples are quite straightforward. It is important to point out that each one of these compounds is used as a single lexical item in Yoruba, and never as a Noun plus Noun phrase. Thus they are all lexically derived. Certain observations can be made regarding all these

nominal compounds. First, it is the V_2 (first vowel of the second morpheme) that is deleted in all cases. Secondly, the meaning of the nominal compound is not always representative of the sum total of its components. These observations can in fact be taken as characteristics of vowel deletion within the Yoruba lexicon, summed up as follows:

15. (a) The vowel deleted is V_2 .

(b) The semantic interpretation is lexically assigned (i.e. non-compositional, cf. Rubach 1985).

These characteristics would have sufficed but for the existence of the examples in (16):¹⁰

16.(a)	ojú	+	oorun	---->	ojórun
	eye		sleep		'slumber'
	orí	+	omi	---->	orómi
	head		water		'water surface'
	orí	+	òkè	---->	orókè
	head		hill		'top'
	ibi	+	odè	---->	ibodè
	place		toll		'frontier'
	ilú	+	obi	---->	ilóbì
	town/city		kolanut		'place name'
(b)	omo	+	iye	---->	omiye
	child		mother		'siblings'
	ògbó	+	eni	---->	ògbéni
	old		person		'mister'
	omo	+	idan	---->	omidan ¹¹
	child		?		'girl/miss'
	omo	+	esè	---->	emesè
	child		foot		'king's messenger'

It is observable that unlike the data in (14), the compounds listed here have V_1 deleted, and yet the semantic interpretation of the compounds is lexically assigned (i.e. noncompositional). Therefore (15) as it stands cannot represent all the characteristics of vowel deletion within the Yoruba lexicon.

As seen in (8) above, Akinlabi (1986) proposes that compounding is a stratum 4 morphological process. He notes that the type of compounding in (14) and in (16) above are the same, but whereas V_2 is deleted in (14), V_1 is deleted in (16). On the basis of this phonological difference he splits stratum 4 into two, making the domain of V_2 deletion stratum 4(a) and that of V_1 deletion stratum 4(b), thus allowing both V_1 and V_2 deletions in the lexicon. Both of these deletions are further to have their domains as stratum 4 (a) or (b) through the postlexical stratum (i.e. stratum 4(a) or (b), stratum 5 and the postlexical stratum).

We follow him assuming that V_1 deletion has to be allowed in the lexicon because of the evidence in (16) and others in 4.2 below. But we depart from his position by assuming that V_1 has its domain as stratum 5, thus merging the compounds in his stratum 4(b) with other stratum 5 processes.

Based on independent evidence Akinlabi (1986) places *oní* - nominalization, the type examined in (7) above, as a stratum 5 morphological process. Morphologically, *oní* can be prefixed to items derived from any and all of the other strata, and phonologically the across segment vowel assimilation process discussed in the preceding section takes place only in this stratum. We observe that the items in (16) have striking phonological similarities to *oní*, placed in stratum 5. In the first instance, just like the prefix *oní*, the items in (16) delete V_1 . Secondly, the items undergo the across segment regressive vowel assimilation found in *oní* prefixation in form of ATR assimilation. This type is absent in items with V_2 deletion such as in (14). The relevant examples are listed in 16(b), but we believe that this also applies vacuously to the items listed in 16(a). V_1 deletion in these items obligatorily triggers ATR assimilation, and this crucially marks such V_1 deletion as lexical. In one case, the last example in 16(b), the assimilation is complete. We therefore propose that V_2 deletion has its lexical domain as stratum 4 and V_1 deletion has its lexical domain as stratum 5. We give the relevant rules as follows:

17. (a) Lexical Vowel Deletion 1: (Domain: Stratum 5)

$$V \text{ ----} \rightarrow \emptyset \quad / \quad V \begin{array}{|c|} \hline \\ \hline \end{array} \begin{array}{|c|} \hline \\ \hline \end{array} \text{ ---}$$

(b) Lexical Vowel Deletion 2: (Domain: Stratum 5)

$$V \text{ ----} \rightarrow \emptyset \quad / \quad \text{ --- } \begin{array}{|c|} \hline \\ \hline \end{array} \begin{array}{|c|} \hline \\ \hline \end{array} V$$

From the above discussion, it is clear that for V_1 deletion to be regarded as lexical deletion, additional conditions not required for V_2 are needed, i.e. triggering regressive vowel assimilation (partial (ATR) or complete) across segments.

4.2 VERB + NOUN COMBINATIONS

Unlike the case in Noun + Noun compounds discussed above, vowel deletion in verb + noun derivations is admittedly more complicated. This is because apart from such formal considerations of syntax and phonology, factors including dialectal considerations and stylistic differences may also influence the deletions.¹² Along the lines of V_1 or V_2 deletion and semantic interpretation suggested in 4.1 above the verb + noun combinations can be broadly subcategorized as follows:

- 18.(a) V_2 deletion with lexical (noncompositional) semantic interpretation.
- (b) V_1 deletion with lexical (noncompositional) semantic interpretation.
- (c) V_1 deletion with phrasal (compositional) semantic interpretation.

(d) V₂ deletion with lexical/phrasal semantic interpretation.

(e) Doublets (i.e. either V₁ or V₂) with lexical semantic interpretation.

(f) Doublets with phrasal semantic interpretation¹³.

Examples illustrating 18(a)-(f) are given in 19(a)-(f) respectively below:

19.(a)	dá cease	+	ojú eye/face	---->	dájú 'be callous'
	ṣí open/lift	+	etí ear	---->	ṣítí 'advise'
	ṣí open/life	+	owó hand	---->	ṣíwó 'stop doing something' (close from work)
	gbé lift/carry	+	esè leg	---->	gbésè 'die'
	yọ 'appear'	+	ojú eye/face	---->	yọjú 'peep'
(b)	jẹ eat	+	ogún inheritance	---->	jogún 'inherit'
	gbọ hear	+	adùn sweetness	---->	gbádùn 'enjoy'
	dó copulate	+	okọ husband	---->	dókọ 'fornicate'
	kó collect	+	eran meat	---->	kéran 'be in trouble'
	jẹ eat	+	ayé world	---->	jayé 'enjoy'
	jẹ eat	+	owú jealousy	---->	jowú 'be jealous'
(c)	gbé lift	+	esè leg	---->	gbésè 'lift leg'
	yí turn	+	owó hand	---->	yówó 'turn hand'
	fé desire	+	owó hand	---->	fówó 'want a hand'
	gbé lift	+	ara body	---->	gbára 'lift body'
	jẹ win	+	owó money	---->	jowó 'win money'
(d)	là open	+	ojú eye	---->	lajú 'be sophisticated'/ 'open (your) eyes'

	là open	+	owó hand	---->	lawó 'be generous' / 'open (your) hand'
	wò look	+	ilẹ̀ floor/ground	---->	wolẹ̀ 'greetings! / look at the floor'
(e)	gbà accept	+	iná fire/light	---->	gbiná/gbaná 'catch fire'
	dà turn	+	orí head	---->	dorí (kọ)/darí (kọ) 'face'
(f)	bù take out	+	ọ̀bẹ̀ soup	---->	bubẹ̀/bọ̀bẹ̀ 'take out soup'
	dá cast	+	ifá oracle	---->	dáfá/dífá 'cast oracle'
	jẹ eat	+	iyán pounded yam	---->	jẹyán/jiyán eat pounded yam
	mì shake	+	epo oil	---->	mipo/mepo 'shake oil'

The data in 19(a) with V_2 deletion and noncompositional semantic interpretation are similar to those in (14), and are therefore regarded as lexical compounds derived in stratum 4. Though their internal constituents comprise verbs and nouns they become what has traditionally been referred to as 'complex verbs' (Awobuluyi, 1978), thus functioning as single lexical items. Those in 19(b) can be seen as similar to those in (16). However, there are at least two ways of treating such data. First, it is possible to treat the V_1 deletion here as postlexical (as done for 19(c)) and regard the product as listed in the lexicon for lexical (noncompositional) semantic interpretation (cf. Rubach, 1985:166, for Polish). The second possibility is to treat the V_1 deletion as stratum 5 deletion in line with the data in 16, such that both deletion and semantic interpretation take place in the lexicon.

We adopt the second view for the following reasons. First, apart from the fact that V_1 deletion takes place on stratum 5, some of the examples here undergo further lexical processes including prefixation, and in such cases they exhibit ATR regressive vowel assimilation similar to that proposed for stratum 5.

20. **òdọ̀kọ** 'one who fornicates'
 òjòwú 'jealous person'

Deriving them in the lexicon makes it easier to loop the items **dọ̀kọ** and **jowú** to stratum 1 where prefixation takes place. Secondly, no other postlexical phonological rule has applied to these items, as is the case, for instance, with 19(d) discussed below. We therefore propose that such items be derived on stratum 5, the last lexical stratum.

Apart from deleting V_1 , the data in 19(c) all have phrasal (compositional) semantic interpretation. We see such examples as clear cases of postlexical vowel deletion, parallel to the clear cases in (14) and 19(a) of lexical vowel deletion. Such data hardly ever reenter the lexicon for any further lexical processes (see section 5 below).

The examples in 19(d) delete V_2 like the clear cases of lexical vowel deletion. Notice that V_2 deletion in this case is, in fact, obligatory as (21) consists of ill-formed 'compounds':

21. *lojú, *lowó, *wilè

Furthermore they are capable of having either lexical (noncompositional) or phrasal (compositional) semantic interpretation.

In spite of these facts, however, note that the underlying low tone of the verb has been deleted in the derived forms (Pulleyblank, 1983; Akinlabi; 1985). This low tone deletion is independently motivated as a postlexical process in Akinlabi (1985). In section 5 below, we examine two alternative ways of looking at these examples considering their participation in further morphological processes. At this point, we propose that such V_2 deletions are postlexical deletions because an independently motivated postlexical process precedes the vowel deletion. The lexical semantic interpretation is acquired when they are refeed into the lexicon. Items with such V_2 deletions are capable of being refeed into the lexicon for further lexical processes and for lexical semantic interpretation. When they reenter the lexicon for just semantic interpretation, they enter into stratum 4 where such compounding takes place. If however they are to undergo other morphological processes, they reenter the appropriate strata for such processes (see (8) above). Just as in the case of V_1 deletion needing additional evidence to qualify as lexical deletion in (16) above, for any V_2 deletion to be treated as a postlexical deletion, such compounds must have undergone at least one postlexical phonological rule prior to the vowel deletion in question.

The data in 19(a) and (f) represent the cases of dialectal/stylistic deletions referred to at the beginning of this section. The examples in 19(e), for instance, have older forms of such compounds with V_1 deleted, i.e. gbiná, dorí. It is, however, now common to find both alternatives in 19(e) used side by side, especially among the younger generation. We propose that both forms are postlexically derived in spite of the semantic interpretation. First, the forms with V_1 deletion do not undergo any prefixation, and thus do not trigger any ATR assimilation. Secondly, and more importantly, both forms have undergone a postlexical low tone deletion rule prior to vowel deletion. The lexical (noncompositional) semantic interpretation is derived by refeeding them into stratum 5 or 4 where lexical compounds with V_1 or V_2 deletions are formed respectively.

Finally, the forms in 19(f) are here treated as sporadic postlexical vowel deletions. Their semantic interpretations are

compositional, sometime they have undergone postlexical phonological processes e.g. *bubè*, *mipo*, and lastly they do not trigger any ATR assimilation even when they can undergo further lexical processes.

22. *şíbí* *ibubè* / *şíbí* *ibòbè*¹⁴ 'serving spoon'
 spoon spoon (for soup)

5. POSTLEXICAL DERIVATIONS AS INPUT TO LEXICAL PROCESSES

In this section we examine some nominalized forms of the verb + noun combinations discussed in the preceding section. The nominalizations are formed through the prefixation of a vowel to the stem made from the noun + verb combination. We assume that all of these nominalizations took place in the lexicon since prefixation is a lexical process.

Consider the following examples:

- 23.(a) *là* + *ojú* ----> *lajú* ----> *òlàjú*
 open eye be sophisticated 'sophistication'
 open (your) eyes
- pò* + *inú* ----> *ponú* ----> *òponú*
 mix stomach mix stomach 'idiot'
 be unwise
- (b) *şe* + *işé* ----> *şişé* ----> *òşişé*
 do work (do) work 'worker'
- fò* + *aşo* ----> *fọşo/* ----> *ifọşo*
 wash cloth(es) wash cloth(es) 'instrument
 for washing cloth(es)
- gbà* + *èrò* ----> *gbèrò* ----> *agbèrò*
 take passenger(s) take 'travel
 passenger(s) agent'

23(a) consists of data which are nominalizations of examples similar to the ones in 19(d), and 23(b) are nominalizations of examples of other sorts.

In the preceding section, we have proposed that the vowel deletion at the intermediate stage in all of the cases in (23) above occurred postlexically, and that in 23(a), for instance, such data was re-fed into the lexicon for lexical (noncompositional) semantic interpretation. Notice further that, such items can undergo prefixation, which, as proposed in Akinlabi (1986), is a stratum 1 process (8).

If this is true, the theoretical implication is that items derived postlexically can be re-fed into the lexicon for further lexical processes, i.e. serve as input to lexical processes. We shall try to justify this proposal and show why an alternative one should be rejected.

Evidence for the postlexical application of the vowel deletion here derives from the earlier application of a postlexical low tone deletion rule (Pulleyblank, 1983; Akinlabi, 1985). In Yoruba, a low tone verb loses its tone before a noun object. Consider:

24. ó là ojú ----> ó la ojú
 3rd sg. open eye he opened his eyes

This rule applies only if the noun object directly follows the verb.

25. **ojú** **ni** **ó** **là** it is his eyes he opened
 eye foc. 3rd sg. open

In the above focus construction, the movement of the object noun to the sentence initial position blocks the application of the rule. Observe that in (24) above, even though there is a low tone deletion, no vowel has yet been deleted. Thus low tone deletion, which is a rule that applies at the level of the phrase applies prior to vowel deletion, as in 19(d) and (23).

But suppose we were to take a different stand, i.e. that items derived postlexically cannot be re-fed into the lexicon for further lexical processes. If we assume, for instance, that such nominalizations as *òlàjú*, *òpònú*, and *ìfọṣọ* were entirely carried on in the lexicon without having undergone any postlexical rule, we will be faced with a number of implications. The first is making the wrong prediction about the nature of prefixation and compounding in Yoruba. We will be saying that the derivation of the three items above proceeded as follows:

26.	òlà ?	+	ojú eye	---->	olaju 'sophistication'
	òpò ?	+	inú stomach	---->	òpónú 'idiot'
	ìfò ?	+	asò cloth	---->	ìfòsò 'instrument for washing clothes'

The claim then is that a vowel was prefixed to the verb, forming a noun before compounding the two nouns. Though nouns are generally formed in Yoruba by directly prefixing a vowel to a verb, nouns formed that way do not stand in N₁ position in the way predicted here.

27. (tó be right/be straight, fé 'love' bo 'worship')

ètó + ojú ----> *ètójú
 a right eye

ìfẹ́ + ara ----> *ìfẹ́ra
 love body

but

ojú	+	ibọ	---->	ojúbo
eye		worshipping		point of worship
		(?)		(of gods or ancestors)

If, however, one assumes that what we have in (23) represents the correct sequence of derivation for such nouns, while still holding to the view that no postlexical process had taken place, then one violates one of the most important proposals of the lexical theory, that postlexical (and in fact lexical) rules do not refer to the internal structure of stems built at an earlier stratum, since internal brackets are erased at the end of morphological/phonological processes of every stratum. Let us assume, for instance, that the derivation of ọ̀làjú, ọ̀pònú and ifọ̀şọ had the stage in (28) below:

- 28.
- | | | |
|-------------------------|-------|--------|
| [ọ] [làjú] [] [] | ----> | ọ̀làjú |
| [ọ] [pònú] [] [] | ----> | ọ̀pònú |
| [ì] [fọ̀şọ] [] [] | ----> | ifọ̀şọ |

We shall probably have made correct predictions in the first two items, but not in the third. Note that our prediction says that the low tone of the verbs là, pò, and fọ is not deleted since vowel deletion took place lexically! But then after vowel deletion, the boundary is erased and *làjú, *pònú and *fọ̀şọ all become stems which still have their lexical verbal low tone and to which prefixes are attached. Thus what we imply is that after prefixation, a postlexical rule deletes the verbal low tone in the last case before a noun object! This is undesirable. Notice that the verbal compounds in 19(d) and 23(a) which have their low tone deleted are well-formed¹⁵.

Since these two alternative derivations and proposals are undesirable for language specific and for theoretical reasons, we conclude that items postlexically derived can be reentered into the lexicon for further lexical processes and lexical rules.

6. CONCLUSIONS

In the foregoing sections, we have made a number of proposals regarding the nature of vowel deletion in Yoruba. Lexical vowel deletion can take place on strata 4 and 5. If V₂ is deleted and the semantic interpretation is noncompositional, we propose that such deletion took place on stratum 4. However, the deletion of V₁ which triggers a regressive vowel assimilation (in some cases ATR assimilation) and with noncompositional semantic interpretation is a stratum 5 deletion.

The deletion of V₁ with compositional semantic interpretation is a clearcut postlexical vowel deletion. If however a postlexical phonological rule has applied prior to the deletion of V₂, with or without noncompositional semantic interpretation, such V₂ deletion also took place on the postlexical stratum.

Finally, it was proposed that items postlexically derived can reenter the lexicon. This reentry can be for lexical (noncompositional) semantic interpretation only, and/or for further lexical processes.

¹The present version of this paper represents a drastic revision of two earlier versions which we presented at a Departmental seminar at the University of Ilorin and at the 17th West African Languages Congress in Ibadan. We have benefitted from discussions with Professors Oladele Awobuluyi, Ayo Bamgbose and Beban Chumbow, and from comments by an anonymous JUAL reviewer. We have also gained inspiration from Oyelaran's (1972) paper which went in a similar direction. Augusta Omamor supplied us with the French translation of the abstract. We have, however, not been able to utilize every suggestion made by these scholars, and therefore we are accountable for the faults the paper contains.

²Examples are cited in the standard Yoruba orthography.

p = [kp] s = [ʃ] j = [dʒ] y = [j]
 o = [ɔ] e = [ɛ] vn = [ṽ]

Vowels after nasal consonants are nasal. Tones are indicated as follows
 ' = high, ` = low, no mark = toneless (Pulleyblank 1983, Akinlabi 1985) for traditionally mid tone. In derivations, we use ||and|| for brackets associated with morphological structure in order to distinguish them from brackets associated with distinctive features.

³But see 4(b) for a different source of this compound as suggested to us by Ayo Bamgbose.

⁴obìnrin 'female' may not be monomorphemic, Abraham (1958:448) suggests abo + inrin as its source, while Awobuluyi (1983:23) suggests o-bi-irin.

⁵The statement of this exception has been greatly simplified. This has been done for reasons of clarity only.

⁶See Abinlabi (1985) for details on the nature of gerundive reduplication in Yoruba.

⁷This may, however, be due to vowel cooccurrence restrictions in Yoruba.

⁸But see Pulleyblank (1986) for a proposal that a noncyclic stratum has the shape in (12).

⁹This form has other variants irùngbòṇ/irùngbòṇ which have tonal difference. Since this does not affect our discussion here, we shall not go into it.

¹⁰We are indebted to Professors Ayo Bamgbose and Oladele Awobuluyi for the data in (16).

¹¹Omìdan has another (dialectal) form omòdan in which we think V₂ [i] got deleted.

¹²Suggestions along this line were made to us by an anonymous J.W.A.L. reviewer, who also supplied the data in 19(e) - (f).

¹³We have been unable to find instances of V_2 deletions with only phrasal (compositional) semantic interpretation. All instances found can be categorized under 18(f), i.e. they can also delete V_1 . We have also been unable to find examples in which V_1 deletions have lexical/phrasal semantic interpretation which may imply that if a combination deletes V_1 only, it is available for only one semantic interpretation at a time.

¹⁴Archangelli and Pulleyblank (1986) propose that [i] does not trigger ATR harmony, nor does it undergo harmony in Yoruba.

¹⁵The low tone of the vowel [a] of òlājú and the second [o] of òpônú arise from a lexical low spreading rule from the prefix. The same is true for [i] in òsìsé where the verb se has no underlying low tone. See Akinlabi (1985) for details.

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