CONTRAST PRESERVATION IN YORUBA

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1. Introduction

An area of functional generative phonology in which considerable in-
terest has recently been shown is that of contrast preservation, or avoid-
ance of derived homonymy. Wilkinson [1974], Kisseberth [1973a] and vari-
ous other recent articles demonstrate that the application and sequencing
of phonological rules can be constrained by the need to preserve system-
atic phonemic contrasts which would otherwise be obliterated. In this
paper it is shown that several tonological rules of Yoruba work together
to maintain tonemic contrasts in altered form on the surface. Since the
tonemic contrasts in question serve to distinguish relatively large num-
bers of roots in the Yoruba lexicon, their tonetic preservation can plau-
sibly be ascribed to a functional "minimization of homonymy" principle
(MHP), deemed to have cross-linguistic validity and thus a status in pho-
nological theory as a constraint on rule application and ordering. Of
particular importance in the preservation of the contrasts are rules de-
riving downstepped tones after underlying low tones and contour tones
after either high or low tones. The downstep rule often interacts with
vowel and tone deletion rules in a phonologically unexpected manner to
render underlying tonal distinctions recoverable from the surface, though
in altered form. The fact that this unexpected rule interaction obtains
can be accounted for only in terms of the MHP; a demonstration of this,
with reference to certain interesting peculiarities of the Yoruba tonal
system, is the subject of sections 2 - 5. In particular, an ordering
paradox involving the application of downstep and tone elision in both
phonologically expected and unexpected orders provides strong evidence
for the MHP. It is shown in section 6 that the rule for contour tones
also interacts with the downstep and tone elision rules in a fashion which
avoids the loss of tonemic contrast when this could occur. Again, tone
elision and the contour tone rule apply in both phonologically expected
and unexpected orders, and this paradox can only be explained by recourse

to the MHP. Finally, in section 7 several other homonymy-avoiding phono-
logical processes in Yoruba are discussed.

2. Low Tone Assimilation in Yoruba

     Yoruba has phonemic high, mid and low level tones (henceforth H, M
and L respectively). As reported in Bamgboṣe [1966a, b] and elsewhere,
these three tones show allotonic variants when a low tone syllable imme-
diately precedes. The variant of H (henceforth H') is a low-rising tone,
the variant of M (henceforth M') is a slightly lowered level tone in the
mid range, and the variant of L (L') is a low level tone. L' differs
from L in that the latter often begins on a low pitch and falls slightly.
Minimal pairs of VCV nouns differing by H and H', M and M' or L and L' on
their second syllables are common in Yoruba, some examples being Iṣẹ́
'job' / ìṣẹ̌ 'poverty', awo 'cult' / àwó 'plate' and ọwọ̀ 'broom' /
ọ̀wọ̀ 'respect'.[1] In each case, of course, the distinction between un-
primed and primed tones is conditioned by preceding M.vs. preceding L.
(Yoruba nouns of VCV form never show H initial syllables.)

     The derivation of primed tones after L is viewed by Courtenay [1969]
and others as a case of downstepping, since the primed tones remain even
if the underlying conditioning L is deleted and occasion a slight lowering
of subsequent tones. Ward [1952] discusses downdrift in Yoruba and gives
an example of interaction between downdrift and the derivation of primed
tones where more modern terminology would speak of "downstep": a surface
HM' sequence followed by a sequence appearing as HHM in isolation would
appear as HM'H''H''M'. Here H'' is not H', but rather a slightly lowered
variant of H, just as M' is a slightly lower variation of M. The downstep
here is conditioned by an L deleted from the surface sequence HM', which
underlyingly would be HLM. Since H'' and M' tones which appear as a re-
sult of natural downdrift (using Ward's terminology) after an instance of

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[1]In this paper   ′ indicates high tone, ˋ low tone, ˇ low-rising
tone, ǃ lowered mid tone, and ˙ low level tone. Mid tone is unmarked.
Later ˜ will be used to indicate ML falling tone and ^ to indicate HL
falling tone. Also, I use ọ to represent ɔ, ẹ to represent ɛ, n
following a vowel to represent nasalization, and ṣ to represent the
voiceless palatal fricative.

downstepping (derivation of a primed tone after a subsequently deleted L)
are never contrastive, however, general terracing in Yoruba is not rele-
vant to this paper. Only the derivation of primed tones immediately fol-
lowing an underlying L need be considered.

The preceding discussion brings out the nonautomatic character of
primed tones. Yoruba has rules for deleting tones and vowels when the
latter are juxtaposed. In the case of verb (CV) plus VCV noun combina-
tions, the rule for tone elision is easy to state: if the verb is H, the
M or L on the initial noun syllable is deleted, and if the verb is M or L,
it is deleted in favor of the tone (M or L) on the initial syllable of the
noun. These tone elisions occur independently of which vowel, that of the
verb or of the initial noun syllable, is deleted (in general, the rules for
vowel elision per se are difficult to formulate, and for some combinations
of verb plus noun there may be no general rule at all). I will assume a
rule of tone elision here (call it TE) which is independent of vowel elision.
Assuming also for the time being that Yoruba has a rule deriving primed tones
after an immediately preceding L (call it the "primed tone rule", or PT), the
nonautomatic nature of primed tones results because TE is often ordered after
PT. Consider cases where the above nouns follow the H verb /rí/ 'to see,
find' as objects, thus bringing about a deletion of the initial noun tones:

(1)   a.   ó rí̩ṣé̩   'he found a job' from   /ó rí i̩ṣé̩/
       b.   ó rí̩ṣě̩   'he experienced poverty' from /ó rí ì̩ṣé̩/
(2)   a.   ó ráwo   'he saw a cult' from   /ó rí awo/
       b.   ó ráwò   'he found a plate' from   /ó rí àwo/
(3)   a.   ó ró̩wò̩   'he found a broom' from   /ó rí o̩wò̩/
       b.   ó ró̩wò̩   'he found respect' from   /ó rí ò̩wò̩/

The (b) examples in each pair show that TE must follow PT. The un-
derlying contrast between /i̩ṣé̩/ and /ì̩ṣé̩/ etc., which is carried by the
initial syllable tone, is shifted as a result of this order to the final
noun syllables on the surface. Thus the order PT-TE, which is opaque,
since primed tones appear phonetically after H rather than L, serves to
maintain underlying contrasts among morphemes. In combinations of M or L
verb plus such nouns as /i̩ṣé̩/ and /ì̩ṣé̩/ the initial noun tones remain

after vowel elision and hence the underlying contrast is still carried by
these tones on the surface, the primed H being purely allotonic.

3. The Homonymy-Avoiding Nature of the Order PT-TE

Bamgboṣe [1966b] explicitly notes the homonymy-avoiding nature of
this nonautomatic character of primed tones. In cases where the initial
syllable tone of a VCV noun is elided after an H verb, homonymy avoidance
is certainly a result of the opaque order PT-TE, due to the comparatively
large number of nouns which are minimal tonal pairs in their first sylla-
bles in the Yoruba lexicon. Likewise, homonymy avoidance can result from
this order when initial noun tones are deleted after such morphemes as
/ṣé/ (question-former) and /tí/ 'where' or after H verbs in nominalizations
such as ìdáwọ́ 'naming ceremony' from /ì+dá+ìwọ́/ (lit. 'cutting of umbil-
icus'). Another case of homonymy avoidance is shown by ìṣẹ́ kọn 'work
(is) hard' from /ìṣẹ́ kọn/ and ìṣẹ́ kọ́n 'a piece of work' from /ìṣẹ́ ọ̀kọn/
(lit. 'one work'), where the deletion of the initial tone of /ọ̀kọn/
'one', probably by a rule other than TE, follows the application of PT
and thus renders M' contrastive.

However, there are a few instances where the order PT-TE applies but
avoidance of derived homonymy would seem not to be a problem, due to the
structure of inputs. An example is nominalizations with the "infix" /kí/,
cited in Bamgboṣe [1966b]. From nouns like /ìwé/ 'book' and /àgbo/ 'in-
fusion' nominals of the form ìwěkíwě 'any book' and àgbókágbò 'any
infusion' can be formed, apparently by reduplication of the base noun
around the element /kí/. The initial base-noun tone is deleted in these
forms, but not until PT has applied to derive a primed tone on the final
syllable of the base-noun. Derived homonymy seemingly could never arise
in such constructions, since the base noun remains intact to the left of
/kí/. (Even if the initial tone of this leftmost occurrence of the base
noun were deleted after an H verb, for instance, the order PT-TE would
still preserve underlying contrasts.) If homonymy avoidance is not a
factor here, one might expect the phonologically unmarked (transparent)
order TE-PT to apply to these reduplicated nominals. Since TE-PT doesn't
apply, the homonymy avoidance seen in the verb+object combinations etc.
may be only an accidental result of, not a cause for, the phonologically

unexpected order PT-TE. The next four sections of this paper will be de-
voted to a demonstration that the order PT-TE is to be explained via a
minimization of homonymy principle (MHP) and that the few apparent coun-
terexamples one can find, such as that just cited, are not really coun-
terexamples at all.

4. Evidence from Surface Consonant-Initial Nouns

Rowlands [1954] argues that surface consonant-initial nouns in Yoruba,
such as pápá 'field', jagunjagun 'soldier' and Látúndé (proper name),
reduplicated adjectives such as kékeré 'small' and dúdú 'dark', and
miscellaneous words such as the numerals méjì 'two' etc., are to be an-
alyzed with an underlying initial M on a zero vowel segment.[2] Such an
analysis is least abstract in the case of proper names like Látúndé,
composed of M-initial noun + verb + verb (/Olá+tún+dé/ 'honor again comes')
or similar components. Rowlands is led to this analysis because surface
consonant-initial nouns require that an immediately preceding noun end on
a mid tone vowel in certain constructions. Thus we find ìléé Látúndé
'Latunde's house' from /ìle ØLátúndé/ and ẹrùu méjì 'load of two (of
them)' from /ẹrù Øméjì/; the latter construction, which is genitival,
contrasts with ẹrù méjì 'two loads'. Rowlands' interpretation of these
data is that the mid tone vowel mora identical to the final vowel of the
first noun is a surface reflection of the underlying "floating" initial
M of the second noun. Ward (p.55) believes that the added phonetic mid
tone supplies a prefix for the so-called consonant-initial nouns, bringing
them into surface conformity in these constructions with most other Yoru-
ba nouns, which are of the form VCV. Thus, the above examples really
ought to be written ìlé elátúndé and ẹrù uméjì according to this
analysis.

Courtenay [1969] also argues that surface consonant-initial nouns
have an initial mid tone underlyingly, but she goes on to supply an ab-
stract vowel prefix, /u/, to support this tone. This device permits her

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[2]méjì and other numerals are analyzed by Bamgboṣe [1966b] and Abraham
[1958] as ultimately bimorphemic: they are represented as /Ømá+èjì/ etc.
by Abraham. The initial L of the second morpheme accounts for the L' on
the second surface syllable of méjì.

to fill a gap in the system of underlying noun prefixes, since all but
/u/ occur phonetically in standard Yoruba, and also permits a generali-
zation about the canonical form of nouns: all are vowel-initial. Fresco
[1970] criticizes this analysis, partly on the grounds that Courtenay's
choice of mid tone for the /u/ prefix is ad hoc. However, Rowlands' data
would indicate that if an underlying prefix for surface consonant-initial
nouns can be set up at all, it should have mid tone. Here I will follow
Rowlands, and assume an underlying initial floating M for these nouns.[3]

This done, an argument that an MHP figures in the sequencing of Yoru-
ba rules emerges. The supporting vowel inserted for the floating M pre-
fix in ẹrùu méjì above and ọkọọ dúdú 'husband of dark ones' actually
has a contrastive function, for when méjì and dúdú appear as modi-
fying adjectives, the supporting vowel does not appear and the M prefix
is deleted: cf. ẹrù méjì and ọkọ dúdú 'dark husband'. The rule in-
serting the supporting vowel (identical to the final vowel of the pre-
ceding noun) is syntactically conditioned, applying only to genitival
constructions. When this rule does not apply, the same rule that deletes
the initial tone of /ọ̀kọn/ 'one' to derive kọ̀n after nouns can probably
be used to delete the floating prefix M of /Øméjì/ etc. (this rule may
also be syntactically conditioned). Calling this special deletion rule
TE', for constructions like /ọ̀rọ̀ Ømé jì/ 'two words' the order of rules
must be TE'-PT (the vowel-support rule fails to apply) to derive the cor-
rect output, ọ̀rọ̀ méjì. This is a transparent order, since the final L'

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[3]Rowlands [1954] argues that initial floating M is supported by the
fact that M and L verb roots show M before a consonant-initial noun com-
plement. If such nouns have floating M prefix, this tonal change can be
considered a replacement of the verb tone by that of the prefix. In gen-
eral, L and M verbs lose their tones in favor of the initial tone of a
VCV noun complement. However, L verb roots show M before VCV complements
if contraction doesn't occur, so it appears that a rule raising verb L to
M must be recognized anyway: this could also apply before consonant-
initial complements. Rowlands attempts to account for this raising of
verb L to M by supposing that the VCV nouns are treated in cases of non-
contraction "as if they have zero consonant initial" (p. 385), and thus
have an added floating M prefix, but such an analysis seems highly im-
probable. It is not even clear how to state it formally.

of ọ̀rọ̀, which stands directly before the initial syllable of měji on
the surface, conditions a primed H on this syllable.[4]

What is crucial here is that the transparent order TE'-PT could not
possibly lead to surface homonymy, since no surface consonant-initial
nouns give evidence of having a floating L prefix or no prefix under-
lyingly. In other words, there are no words /Ødúdú/, /Ǿméji/ etc. which
contrast with /Ødúdú/, /Øméji/ etc. in prefixes and thus threaten to
merge phonetically with the latter in constructions where the order
TE'-PT applies. On the other hand, /ọ̀kọn/, with a real vowel prefix,
contrasts with /kọn/ 'to be sour' ('to be hard' by extension), and thus
requires the order PT-TE' when its initial vowel is deleted in certain
adjectival constructions. Other words like /ọ̀kọn/ are yẹ́n 'that' (de-
monstrative adjective) from /ìyẹn/ 'that one' and wò 'which' (inter-
rogative adjective) from /èwo/ 'which one'. A minor ordering paradox thus
arises between PT and TE', which can be explained in terms of the MHP, if
it is indeed TE' which accounts both for the deletion of the floating M
prefix from /Øméji/ etc. and the deletion of the vocalic prefix and tone
from /òkon/ etc.[5]

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[4]Pairs of lexical representations like /Øméji/ (noun) and /méji/ (ad-
jective) would avoid the need to delete the initial floating M of nouns
in adjectival constructions. However, there is evidence that the Yoruba
numerals, at least, are to be considered as basically nouns. Thus kọ́n
'one' is derived from /òkọn/, which is a noun, appearing in its full form
in mo rí òkọ̀n 'I saw one' (something previously named). Likewise méji
'two', mẹ́tà 'three' etc. can be used as pronominal complements in sen-
tences: mo rí mẹ́tà 'I saw three' and so on [Abraham 1958:xxxii]. Like-
wise, Yoruba demonstrative and interrogative adjectives are derived from
nouns (see text below). It seems reasonable to also consider qualitative
adjectives, which are mainly derived from verbs of state by reduplication,
as underlying nouns. Note that reduplicated nonstative verbs are often
used as verbal nouns (cf. jíjó 'dancing' from /jó/ 'to dance' and fífâ
'pulling' from /fà/ 'to pull'), so that the adjectives títọ́ 'straight'
from /tọ́/ 'to be straight' etc. can be considered as stative verbal nouns
('being straight' etc.)

[5]Courtenay [1969] takes another view of ẹrùu méji etc., supposing
that an underlying "associative morpheme" /Ø/, which takes on the quality
of the final vowel of the possessed noun, is present here. Thus she would
presumably analyze ilé kékeré 'small house' as /ilé kékeré/ and ilée
kékeré 'house of a small one' as /ilé Ø ukékeré/· If the adjective
kékeré derives from the noun /Økékeré/ or even /ukékeré/, however, the
rule TE' must still figure in the derivation of the surface form and the

5. Vowel/Tone Elision in Nominals

The rules governing elision of tones in CV verb plus VCV noun comple-
ment constructions generally hold for nominalizations composed of nomi-
nalizing prefix + verb + noun as well. Thus from /ì/ (nominalizing prefix)
plus /sìn/ 'cover over' plus /òkú/ 'corpse' the nominal ìsìnkŭ 'burial'
is formed by application of PT to the noun and deletion of the mid tone
of the verb in favor of the initial L of the noun. Another example is
ìròrí 'reflection, cogitation' from /ì/ plus /rò/ 'think' plus /orí/
'head', where the L of the verb is deleted in favor of the initial M of
the noun. Since ìsìnkŭ and ìròrí presumably have L' and M' respec-
tively on their second syllables, due to the surface presence of the L
prefix, they require that PT apply after the verb tone is deleted and the
tone of the noun prefix brought into position immediately following the L
prefix. Assuming the order PT-TE for these nominals, this can be accom-
plished by setting up a cyclical application for PT, so that, in effect,
the order PT-TE-PT is available.

An example forcing the order PT-TE for nominals is given by ìtŭlŭ
'subversive activities' from /ì/ + /tú/ 'dig up' + /ìlú/ 'town', where PT
must derive H' on the second syllable of /ìlú/ before the first syllable
L is replaced by the H of the verb.[6] There are also cases like ìdawŏ
'naming ceremony' mentioned above, where the underlying verb H is idio-
syncratically changed to M after replacing the initial noun L. The primed
tones on the second syllables of ìdàwŏ and ìtŭlŭ can also be derived
by assuming that PT is cyclic. Derivations of ìtŭlŭ and ìdàwŏ are
shown under (4):

(4)   a. /ì+(tú ìlú)/

                 ìlŭ   PT
                 lŭ   TE (vowel elision assumed)
           tŭ   PT
         ìtŭlŭ

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argument for the expectedness of the transparent order TE'-PT in the case
of /òrò Øméjì/ etc. still holds.

   [6] Abraham [1958] gives ìtúùlŭ for this form. In general, he does

b. /ì+(dá ìwó)/

        ìwǒ   PT

        wǒ   TE

    da   lowering of verb H

    dá   PT

  ìdáwǒ

    The freedom with which nominals are formed from verbs and noun comple-
ments [Ward 1952:179] by the addition of various prefixes makes it under-
standable that the order PT-TE should apply to the verb+noun combinations,
since minimal tonal pairs of nouns can figure in them. An example is
ìjǒgbó '(act of) burning bush' from /ì/ + /jó/ + /ìgbó/ and ìjǒgbǒ
'act of) burning vegetable' from /ì/ + /jó/ + /ìgbó/; we may also form
agentive nouns ajógbó 'bush-burner' and ajógbǒ 'vegetable-burner'
from the same verb and noun plus the agentive prefix /a/.[7] It seems that
virtually any semantically acceptable verb plus object combination can be
nominalized with /ì-/ to refer to the act of state involved, and many
such combinations also allow agentive nominalization with /a-/ and other
sorts of nominalizations as well.

    It is reasonable to assume that these freely formed nominalizations
meaning 'act of doing X' etc. are transformationally derived or, in a
lexicalist theory, represented somehow as open syntactic classes in the
lexicon. There are other types of nominals, also formed with /ì-/ in
some cases, which are relatable to verb plus object combinations but have
rather idiosyncratic meanings given the meanings of their components.
The degrees of idiosyncrasy involved are various. Of nominals already
given, ìsìnkǔ 'burial' has a meaning clearly related to its components
and is no doubt transformationally derived, ìròrí is slightly more

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not recognize a tone deletion when preceding H vowel and following L vow-
els are juxtaposed, but rather a vowel assimilation with retention of
both tones. This appears to be dialectism.

    [7]My thanks to Anthony Obilade of Northwestern University for con-
firming these examples. In his speech, at least, H' on the second syl-
lable does not seem to be as clear as on the third syllables.

opaque semantically and perhaps should be related to a lexical unit
[rò+orí], though a transformational derivation is also a possibility,
while ìtŭlŭ is even more opaque semantically and probably must be listed
in the lexicon as a unit [ì+tú+ìlú]. There is evidence that a compound
lexical verbal underlies ìtŭlŭ, however, since ó ń túlŭ 'he is an agi-
tator', where túlŭ is the main verb, is a well-formed sentence.

Many of the mildly idiosyncratic nominals, and even some highly idio-
syncratic ones, show the order PT-TE: some, like ìdàwǒ, show subsequent
lowering of a second syllable H as well. But what is interesting about
Yoruba "idiosyncratic" (ie. derived from lexical compound verbals) nomi-
nals is that not all of them show this order. Abraham [1959] separately
lists about ten nominals (p. xx) which consist of L verb plus MH noun but
do not show the usual tonal pattern of such nominals. Some of these are

(5) ìtìjŭ   'modesty, shame' /tì + ojú/ 'shut' + 'eye'
     ìrètí   'hope'   /re + etí/ 'lose' (?) + 'ear'
     ìròrí   'pillow'   /rọ̀ + orí/ 'support' + 'head'
     àlàwẹ̌   'fragment'   /là + awẹ́/ 'split' + 'segment'
     ọ̀mọ̀nlě   'builder'   /mọn + ìlé/ 'build' + 'house'

For example, the rather idiosyncratic ìtìjŭ can be analyzed as /ì/ +
/tì/ 'to (be) shut' + /ojú/ 'eye' (cf. (5)); as in the case of ìtŭlŭ
above, there is a lexical compound verb tìjú 'to feel shame' which can
appear independently in sentences (cf. ó tìjú ìṣẹ́ ẹrẹ̀ 'he is ashamed of
his work' or (lit.) 'he shuts eye work his'). Note that in the sentence
just given the compound verb [tì+ojú] undergoes the normal rule of tone
elision, whereby the M of the noun prefix replaces the L of the verb. In
the nominal, however, a different sort of tone elision occurs, for the
verb L remains and the prefix M of the noun is deleted. After the verb L
is thus brought into the syllable immediately preceding the final H of
the noun, this H is converted to H' by PT.

If tone elision in verb+noun constructions is brought about by first
raising a verb L to M before a noun (call this "low tone raising", or LTR),
the order TE-PT can apply to ìtìjŭ etc. Specifically, the TE rule will
delete a verb M before any noun prefix tone, whether this M is underlying

or derived by LTR, but will delete a noun prefix tone after a verb extreme
tone, ie. H or L. Using the tone features suggested in Wang [1967] for
Yoruba, the tone class consisting of H and L can be referred to as
[-central], and such a TE rule can be formulated quite simply. Nominals
like ìtíjǔ, which are not transformationally derived, are then marked as
exceptions to LTR: LTR fails to apply to them, TE subsequently deletes
the noun prefix tone after the unaltered verb L, just as it deletes the
noun prefix tone after the verb H in ìtǔlǔ, and PT then applies to derive
H' on the final noun syllable. The same subrule of TE applies both to
ìtíjǔ and ìtǔlǔ (neither undergoes LTR), but this subrule applies in
different orders with PT in the two cases. In transformational nominal-
izations like ìrórí, as well as in the case of [tì+ojú] when used as a
verb in sentences, LTR applies to the low tone verb, making it impossible
for PT to apply after TE.

A negative exception feature [-LTR] will have to be associated with
entire nominals rather than just the compound verbs on which they are
based, since we have tìjú as a verb (LTR applies) and ìtíjǔ (no LTR).
I will assume that lexical units [ì+[tì+ojú]] etc. exist which are marked
[-LTR] and are related to [tì+ojú] etc. by lexical redundancy rules.
Thus the nominals which don't undergo LTR are not morphologically derived
by prefixation, whereas nominals which do undergo LTR, like ìrórí and
all transformationally derived nominals, are derived by prefixation.
There are a few nominals, such as ọ̀mọ̀nlĕ 'builder' and ìrètí (see (5)),
which show idiosyncratic lowering of the tone on the verb, the resulting
L then replacing the initial M of the noun and permitting PT to apply to
the final H. Such a nominal, although semantically transparent, must be
listed in the lexicon as a unit [ọ̀+[mọn+ìlé]] in order to be marked for this
idiosyncratic verb tone lowering. There is independent evidence that
such a unit is needed, however, since /ọ̀/ appears here as the agentive
prefix, rather than the usual /a/. When /mọn/ plus /ìlé/ appear in a
nominal with the latter prefix, we get the expected amọnlé 'builder',
with no lowering of the verb tone.

In general, the question may be raised as to whether nominals like
ọ̀mọ̀nlĕ amd the non-LTR forms discussed in the text, which are claimed to

derive from lexical compound verbals [V+N], are really analyzable into
noun plus verb parts. If verb units /tìjǔ/, /mǫ̀nlě/ etc. are set up,
with no attempt at further analysis, and the nominals ìtijǔ etc. formed
from them by addition of prefixes, TE and vowel elision do not even have
to apply to derive the nominals and no ordering paradox involving TE and
PT arises. However, there is good evidence that tìjǔ must be analyzed
into /tì+ojú/ and so forth. In the case of tìjǔ, proof of analyzability
comes from the separability of /ojú/ from /tì/ with retention of the id-
iomatic meaning: ojú tì mìí 'I am ashamed' (lit. 'eye has closed (to)
me') is found as well as ó tì mìí lójú 'I am ashamed' (lit. 'it (ie.
shame) has closed my eye'). Likewise we find ojú tì mìí láti ṣèé 'I'm
ashamed to do it'. (Abraham's transcription is used in these examples.)
In the case of other non-LTR nominals and also of mǫ̀nlě separability
of verbs and nouns with retention of the nominals' meanings similarly
demonstrates that true compounds are at hand. Indeed, Courtenay [1969]
represents verbals with far less semantic and syntactic evidence for com-
pounding, such as jókǒ 'to sit down' (see below), as lexical compounds
(with highly abstract components).

It remains to be explained why the transparent order TE-PT applies to
the non-LTR nominals, but not to any of those derived by prefixation.
The answer seems to lie in the MHP. The number of non-LTR nominals is
not negligible--others not listed separately by Abraham are scattered
through his dictionary, such as ìlájǔ 'civilization' [ì+[là+ojú]], lit-
erally 'to open the eye'. However, these "nonderived" nominals are much
less numerous than the derived nominals of various sorts. The components
of non-LTR nominals are necessarily L verbs and MH, MM or ML nouns, for
otherwise the effect of the nonapplication of LTR is vacuous. Thus a
non-LTR nominal /V̀+[CV̀+VCV́]/ can only contrast underlyingly with a de-
rived nominal /V̀+CV̀+VCV́/ (for which the effect of LTR is nullified by
tone elision). However, since non-LTR nominals are restricted in number,
few if any of them contrast underlyingly with derived nominals in the
relevant way, due to the absence of appropriate nouns to appear in the
latter. For example, Abraham lists no noun /òjú/ contrasting with /ojú/,
so that nominals /ì+tì+òjú/ or /ì+là+òjú/ which contrast with /ì+[tì+ojú]/

or /ì+[là+ojú]/ cannot be formed; in other cases a VCV noun might exist
but be semantically incompatible with the CV verb in the non-LTR nominal.
Therefore the opaque order PT-TE is not needed to prevent phonetic merger
with derived nominals, and the phonologically expected, transparent order
TE-PT is able to apply. The non-LTR nominals differ here from the derived
/V̀+CV́+V̀CV́/ nominals, where the opaque order PT-TE must apply to prevent
phonetic merger with derived /V̀+CV́+VCV́/ nominals.

An interesting case of homonymy-avoidance due to the application vs.
nonapplication of LTR comes from the LTR nominal ìrórí 'reflection'
(/ì-/ + /rò/ 'think' + /orí/ 'head') above and the non-LTR nominal ìrórì
'pillow' from (/ì-/ + /rọ̀/ 'support' + /orí/ 'head'). Since the vowel of
/rọ̀/ is deleted, surface homonymy would result were it not for the vari-
able application of LTR. Another such pair, cited by Abraham, is ìgbọ̀wọ̌
'acting as guarantor' (non-LTR) and ìgbọ́wọ́ 'shaking hands' (LTR): here
the component morphemes are /gbà/ 'receive' plus /ọwọ́/ 'hand', and the
surface tonal difference comes about because [gbà+ọwọ́] 'act as guarantor'
is a verbal unit marked [-LTR] whereas the collocation /gbà/+/ọwọ́/ 're-
ceive (shake) hand' arises through ordinary syntactic processes.

It is worth mentioning that the non-transformational nominal ìtŭlŭ
'subversive activities' above behaves just as though it were transforma-
tionally derived, undergoing PT-TE, even though it derives from a lexical
unit [tú+ìlú] which does not contrast with any other verb plus noun col-
location (there happens to be no noun /ilú/ in the dictionaries I have
seen, so the collocation /tú/ + /ìlú/, whether a lexical unit or not,
could not arise). In general, however, some /CV́/ + /VCV́/ verb-noun lex-
ical units will contrast with /CV́/ + /VCV́/ collocations of some kind, so
PT-TE is necessary for them. This order then, **extends** to all nominals
of the form /V̀+CV́+V̀CV́/. Note that such nominals cannot be exceptions to
any rule, like LTR, which would provide a means of distinguishing those
undergoing PT-TE from those not undergoing it; there are no tone change
rules like LTR which affect them.

6. The Derivation of Falling Low Tones after High Tones

Ward [1952] and Stevick [1963] show phonetic falling tones on lexical
L verbs in constructions like ó kṳ̂ 'it remains' from /ó kù/ and nígbàtí

'when' from /nſ ̀ɡbà tſ/. Lexical HL nouns like páp̀à 'field' (/páp̀à/)
also show phonetic falling L. According to Ward (p. 34), this falling
tone derived from L is tonetically not greater than the interval lower
mid to low, but Stevick (p. 3) refers to a high falling tone. There do
seem to be phonetic differences in various occurrences of this falling
tone, of which at least some can be ascribed to phonological factors
[Bamgboṣe 1966:fn. 19]. I will assume a basic slight phonetic fall,
whose variants will be described below: this basic falling tone will
be denoted by the diacritic ⌐ and the symbol F.

There is a symmetry in the derivation of H' and F, since the former
appears after underlying L and the latter after underlying H. A single
rule for the derivation of H' and F can be stated using Wang's [1967]
feature system:

(6)
$$
\begin{bmatrix} V \\ -\text{central} \\ \alpha\ \text{high} \end{bmatrix} \rightarrow [-\alpha\ \text{high}]\ [\alpha\ \text{high}]\ /\ \begin{bmatrix} V \\ -\text{central} \\ -\alpha\ \text{high} \end{bmatrix} \underline{\hspace{3em}}
$$

Such a rule is stated for Yoruba gliding tones in Fromkin [1972]. Nu-
merical values for the feature "high" are introduced by a rule discussed
below.

As pointed out in section 2 there is a "downstepped" level high
tone in Yoruba (H") which differs from H', according to Ward (p. 39) at
least. It is likely that the level tones H'', M' and L' should all be
derived after underlying L by a rule separate from (4). Courtenay [1971]
states that Yoruba has a rule deriving slightly lowered H and M after an
underlying L and another rule deriving gliding tones from H and L: the
two interact in the case of H', which according to Courtenay is low-rising
and ends on a pitch slightly lower than H in isolation. Ward agrees with
this phonetic interpretation of H'; her data definitely require both a
"downstep" rule and a rule for gliding tones. Henceforth I will assume
that the PT rule of previous sections is simply a downstep rule, which
may apply to a string of tones following an underlying L (cf. Ward's
example whereby phonetic HM', from /HLM/, followed by HHM yields
HM'H''H''M'), and that (6) is also in the grammar, following PT.

Now consider verb+Noun collocations like /dí/ 'to stop up' + /ìpò/ 'place' and /fέ/ 'to want' + /ɔ̀ràn/ 'matter'. When contraction takes place, these yield respectively dípô 'to replace' and fέrân 'to like'. The second syllables of both contractions show a falling tone derived from the underlying final L. This requires an order whereby TE precedes (6), so that the verb H can be brought into the syllable immediately preceding the final noun L to derive F from the latter. TE-(6) also obtains for non-LTR nominals, but it is impossible to have the order TE-(6) for derived nominals, since in e.g. /ì+jó+ìgbó/ first bringing the H of /jó/ into the syllable immediately preceding the final H of /ìgbó/ would incorrectly prevent the application of (6) to the latter by destroying the environment for its application. Thus we must either accept an ordering paradox involving (6) and TE as well as PT and TE or give up deriving F after H by the same rule that derives H' after L.

Two rules for deriving contour tones are stated in Courtenay [1969], but they are placed together in her system of rules and are no doubt considered a single rule. Courtenay looks independently at examples which require tone elision before the derivation of F and examples which require the derivation of H' before tone elision, but does not consider the implications of this. Both TE and (6) are ordered after all phonological and tonological rules in her system, underlying low tones being kept around through derivations by deleting all features of their supporting vowels but [+segment]. TE then deletes only "vowelless" low tones, after (6) has appropriately applied. Applying (6) and TE (as well as PT) late in the context of floating L's may work in avoiding cyclical application of these rules, but it doesn't solve the problem of how they interact with each other. Stahlke [1972] suggests that PT, and presumably other rules dependent on underlying low tones whose vowels are deleted, be made global to avoid cyclical application. (6), of course, could be ordered after TE and made "locally" global with respect to it in those cases where the input to TE must also be the input to (6). This, however, is only a notational variant of the reordering approach and has no explanatory value.

Once again, the MHP can be invoked to account for the ordering para-
dox involving TE and (6) (I assume that (6) is to be left intact and not
split into two rules differently ordered vis-a-vis TE). Consider an ex-
ample like gbéṣ̣ẹ̀ 'to hurry' from /gbé/ 'to lift' plus /ẹṣ̀ẹ̀/ 'foot'. If
Yoruba had a noun like /ẹ́ṣẹ̀/ which could cooccur with /gbé/, the struc-
ture /gbé ẹṣ̀ẹ̀/ would become homonymous with /gbé ẹ́ṣẹ̀/ 'to hurry' by vir-
tue of the transparent order TE-(6), since both nouns would be treated
as though they had H prefixes. The opaque order (6)-TE would maintain
the underlying distinction. In fact, however, Yoruba has no nouns with
initial H vowels, so such derived homonymy is impossible. Now suppose
that a noun /ẹ̀ṣẹ̀/, also compatible with /gbé/ exists. (Such a LL noun
is phonologically permissible.) The structure /gbé ẹṣ̀ẹ̀/ would become
homonymous with /gbé ẹ̀ṣẹ̀/ were it not for a phenomenon cited in Bamgboṣe
[1966:fn. 19], reportedly based on spectrographic data.[8] Note that dípô
and fẹ́ràn above show different falling tones on their final syllables,
that of the former being indicated as H-L and that of the latter as M-L.
Bamgboṣe reports that in general an HL noun-verb contraction derived from
/H ML/ shows a "sharper falling pitch" than an HL noun-verb contraction
from /H LL/. Assuming this is true for some dialects anyway (Ward does
not show it), we thus have no derived homonymy of /gbé ẹṣ̀ẹ̀/ and /gbé ẹ̀ṣẹ̀/
with the order TE-(6).

Bamgboṣe [1966:3] states that a LL noun in isolation shows two level
tones whereas a ML noun shows a level mid tone followed by a "falling
pitch starting at a low point" (e.g. low-falling). (Courtenay [1971]
also mentions a difference between "downstepped" and nondownstepped L.)
If the low-falling tone starts at the same pitch as the level low tone
and falls to an even lower pitch, the downstep rule PT can derive a tone
specified as, say, [5 high] from [−central, −high] following another low
toneme and another tonetic rule can specify the nondownstepped low tone

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[8]Ayo Bamgboṣe [personal communication] says that the relevant
spectograms were made by John Kelly at the University of Ibadan. Foot-
note 19 in Bamgboṣe [1966b] mistakenly states that the spectograms are
due to Stevick.

as [5 high][6 high].[9] (Here I follow Fromkin [1972] in treating decreas-
ing pitch as increasing integral values of "high".) It is also possible
to suppose that PT simply leaves downstepped L specified as [-high] and
that the tonetic rule for nondownstepped (falling) L introduces the se-
quence [-high][6 high], with [-high] interpreted as [5 high] by conven-
tion. The same convention would interpret the first L ([-high]) tone of
an LL noun as [5 high]. With such an analysis, the tonetic difference
between dípô and fɛ́ràn can be accounted for using (6) as it stands.
For /dí ìpò/, PT does not apply, the rule for nondownstepped L (NDL) in-
troduces the specification [-high][6 high] for the final L, TE applies,
and finally (6) specifies the [-high] portion of the final L as [+high]
[-high]. Here NDL applies opaquely before TE, just as PT must sometimes
apply before this rule. By a presumably justifiable convention, the
triple sequence [+high][-high][6 high] which results in this derivation
from the underlying final L is reduced to [+high][6 high] (later [1 high]
[6 high]) by "absorption" of the [-high] middle tone (i.e. [1 high]
[5 high][6 high] becomes [1 high][6 high]). For /fɛ́ ɔ̀ràn/, NDL does not
apply, PT leaves the final L specified [-high], TE next applies, and
finally (6) specifies the final L as [+high][-high], later [1 high]
[5 high]. In this manner the tonetic difference between the final fall-
ing glides in dípô and fɛ́ràn is established as [1 high][6 high] and
[1 high][5 high] respectively.

　　　Sample derivations for dípô and fɛ́ràn are shown under (7a) and
a derivation of the derived nominal ìjɔ̌gbɔ̌ 'burning vegetable', which
requires the order PT-(6)-TE, under (7b):

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[9]Downstep or downdrift rules like PT which assign numerical values to
tone features like "high" have been stated by various writers, for ex-
ample Fromkin [1972:56]. PT can assign numerical values to "high" late,
assuming underlying L's are somehow available to it, but must still apply
before TE in cases like /fɛ́ ɔ̀ràn/ since TE obliterates the L on which PT
depends. PT is probably best left distinct from the phonetic rule which
assigns numerical values to falling tones, though it might be possible
to reapply PT after TE and (6) to handle this aspect of assigning numeri-
cal coefficients.

(7)   a.   /dí##ip ò/   /fę́##ǫ̀r àn/
                  L6   NDL   L   PT
                       TE (vowel elision assumed)   Ø   TE
                  HL6 (6)   HL   (6)
                  156 later rule   15   later rule
                  16
             [dípô]   [fę́rȁn]

      b.   /ì+jó+ìgb ó/
                     2 PT
                    L2 (6)
                 Ø   TE
                    52 later rule
             [ìjǒgbǒ]

L in these derivations refers to a tone which is left specified
[-high] and H refers to a [+high] tone. Later L and H are converted to
[5 high], indicated above by "5", and [1 high], indicated above by "1",
respectively. Since PT and NDL leave an underlying low tone [-high],
(6) is able to introduce H before L in (7a); i.e., only assimilation of
plus and minus feature coefficients is involved. In (7b), however, (6)
must introduce L ([-high]) before a tone specified as [2 high] rather
than [+high], due to the prior application of the downstep rule PT.
Since there seems to be no good way of indicating the prior application
of PT and leaving the underlying high tone specified as [+high], it ap-
pears that (6) must be modified to operate on integral feature coeffi-
cients arising from [+high], and PT and NDL can be allowed to introduce
[5 high] in place of L in (7a). A version of (6) operating on integral
coefficients would have to be fairly complex, however, and for expository
purposes in the case of (7a) especially, I leave (6) as it stands and
adopt the analysis outlined in the latter part of the preceding
paragraph.

      The derivations under (7a) show that the orders PT-TE-(6) and NDL-
TE-(6) account for the different final glides in dípô and fę́rȁn and

thus for their surface contrast.[10]   Cases where this contrast avoids de-
rived homonymy are easy to find: actual examples are /gbé ̣ẹsè ̣/ 'to
hurry' and /gbé è ̣sè ̣/ 'to lift provisions' given as a hypothetical case
above, or /rí ọkọ̀/ 'see a boat' and /rí ọ̀kọ̀/ 'see a spear'. The surface
glide contrast is due to the opaque ordering of PT and NDL before TE,
which sets up an initial tonal contrast which (6) can later take advan-
tage of in producing the different glides. Because of this initial tonal
contrast, the order between TE and (6) can be transparent in (7a), there
being no functional purpose which an opaque order (6)-TE would serve.
In (7b), however, the order between TE and (6) is in fact opaque. It
might seem that the prior application of PT would introduce an adequate
indication of the later deleted L noun prefix in the downstepped H on
the noun root, so that the order TE-(6) could subsequently apply as in
(7a). The fact that this does not happen can possibly be attributed to
a sort of paradigm condition on allomorphy of roots: since /ìgbó/
'vegetable' appears as ìgbǒ , with transparent H', in many surface con-
structions, the noun will show final H' even if the prefix is deleted.
In other words, the allomorphs of /ìgbó/ are ìgbǒ and gbǒ rather
than the more divergent ìgbǒ and !gbó, which presumably aids in pro-
per perception of the underlying form from the surface variants. In the
case of underlying LL nouns like /ọ̀ràn/, on the other hand, the surface
allomorphs are ọ̀ràn or ràn if no segment or a low-toned vowel pre-
cede respectively, and ra͞n if a high-toned vowel precedes (the grave
accent is written on both syllables of ọ̀ràn to show the tonetic iden-
tity of "downstepped" L with nonfinal L). Since rà͞n does occur in at
least some phonetic contexts, it is apparently felt that derivation of
ra͞n after H does not represent too much divergence in allomorphy. Note
that /ìgbó/ would invariably appear as !gbó, never as gbǒ, after dele-
tion of the prefix if TE were always ordered before (6).

---

[10]Note that, without prior application of PT, the opaque order (6)-TE
would do nothing to avoid derived homonymy in these examples, assuming
that (6) introduces only the specification that a tone is falling, not
actual numerical values for the fall. With respect to the formulation
of PT, it may be necessary to introduce numerical values for "central"
as well as "high", assuming Wang's features, since M is specified only
as [+central]. If so, the changes needed in the rule are not great.

It is significant that the rising tone H' is derived on the second
syllable of /ìgbó/ even in isolation, whereas the second syllable of
/ọ̀ràn/ remains L in isolation, a falling tone appearing only in context.
We may suppose that a morpheme whose underlying representation leads
automatically (i.e. in isolation) to a different phonetic representation
will tend to show this phonetic representation in all surface contexts
whereas a morpheme whose surface realization in isolation is the same as
its underlying representation can have a different phonetic representa-
tion in some contexts. Such a principle of allomorphy would leave the
second syllable H' of ìgbǒ inviolate since it differs from the under-
lying second syllable H but would permit replacement of the second syl-
lable L of ọ̀ràn in the appropriate contexts, since this L may be con-
sidered identical to the underlying L. This principle would tend to
render underlying representations more recoverable from the surface,
since if an underlying form is realized on the surface without change
in some contexts (including isolation), additional phonetic forms derived
from it will not obscure its identity, but if it is never realized as
such on the surface, due to automatic alteration, additional allomorphy
might make it all the harder to reconstruct. Thus, the existence of
ọ̀ràn and ràn as allomorphs of /ọ̀ràn/ permit recoverability of the lat-
ter even though ran also exists, whereas if both ìgbǒ and !gbó
were derived from /ìgbó/ the latter would presumably be even more ob-
scure. This view of the principle ties in with the minimization of al-
lomorphy discussed in the preceding paragraph, of course. Also, the
fact that H' is lexicalized in a few Yoruba nominals (see section 7)
is no doubt relevant here (note that falling tones are never lexical-
ized). Finally, partial motivation for this principle in Yoruba may be
that its effect is to maximize the applicability of (6), since (6)-TE
applied to (7a) would counterfeed (6) and TE-(6) applied to (7b) would
bleed (6).

Other analyses of dípǒ and fẹ́ràn can be devised, but all of them
involve peculiarities regarding (6) which seem to be explicable only on
functional grounds. I will consider only one alternative briefly here.

Possibly the above ordering paradox involving TE and (6) could be avoided
if (6) is uniformly ordered before TE and the latter reformulated as a
rule of rightward tone spreading (cf. Hyman and Schuh [1974]) which ap-
plies in a differential fashion around intervening L and M. Specific-
ally, the noun prefix L in /fɛ́ ɔ̀ràn/ might "partially block" spreading
of the preceding H onto the L noun root syllable, whereas the noun pre-
fix M in /dí ìpò/ would not block the spread of H. This "partial block-
ing" due to intervening L would bear a resemblance to the blocking of H
spreading by intervening voiced obstruents discussed by Hyman and Schuh,
since low tone and voiced obstruents at least are deemed to have a phono-
logical relationship in terms of features. The mechanics of the partial
blocking could involve slight lowering of the verb H in /fɛ́ ɔ̀ràn/, with
the lowered H then being allowed to "pass" to the noun root syllable.
However, this scenario runs into an immediate difficulty, for it requires
that H spreading around M and L occur only if the M or L is later
deleted: Yoruba does not show surface sequences of the form HMF or HLF
derived from /HML/ or /HLL/ respectively. Thus H shift would have to
recapitulate the structural description of TE to apply correctly, a
situation which is totally without motivation except on functional
grounds. Furthermore, the lowering of H envisoned here seems to run
counter to the facts in certain idiolects [Bamgboṣe 1966b:fn. 1]), where
the H of a verb is actually higher in pitch if an intervening L noun ob-
ject prefix is deleted than if an M prefix is deleted. The analysis sum-
marized under (7) does not take this peculiarity into account, but is
more consonant with it than a tone shift analysis seems to be.

7. Some Other Yoruba Rules

    So far we have seen that ordering paradoxes involving PT and TE, as
well as TE and (6), can be accounted for by the MHP, which dictates a
phonologically marked order only when derived homonymy in constructions
of similar constituency would result from application of the unmarked
(transparent) order; the transparent interaction between PT and TE' dis-
cussed in section 3 can be similarly accounted for. Some mention of
subsidiary homonymy-avoidance strategies is also in order. These are

generally not as systematic as those discussed in sections 4-6 but the
purpose of homonymy-avoidance is still rather well served. Given the
high functional load of tone in monosyllabic verbs and vowel-initial di-
syllabic nouns, any rule affecting tones poses a potential threat of de-
rived homonymy. Tone elision is only one such rule, others being rules
which change one toneme to another. There are two such rules, both syn-
tactically conditioned, which bear further mention.

The rule (LTR) which raises L verbs to M before noun complements
could theoretically lead to surface homonymy between underlying low and
mid tone verbs. It is obligatory, so such homonymy cannot be obviated
by failure to apply the rule in some cases. Also, there seem to be no
transferred tonetic contrasts on phones of surrounding morphemes to car-
ry an underlying contrast between L and M verbs. Thus /mo gbà ẹran/ 'I
received meat' becomes mo gba ẹran and then mo gbẹran in contraction.
According to Stahlke [1972] there is no derivation of M' on the initial
noun syllable prior to raising of the verb L. If an opaque interaction
between PT and LTR occurred here, the resulting *mo gbẹ́ran would be
phonetically distinct from a hypothetical mo gbẹran from /mo gba ẹran/.
One might expect an opaque homonymy-avoiding interaction here, unless
some other factor is at work to reduce the chances of derived homonymy
in this case.

In fact, it turns out that there is another factor. Oyelaran [1972]
argues that there are comparatively few minimal verbal pairs CV̄ and CV̀
having the same selectional restrictions and thus taking identical noun
complements: thus /rò/ 'to cook' and /ro/ 'to hoe' (his examples) will
not generally take the same objects or other complements. Now Stahlke
[1972] maintains that tones in Yoruba monosyllabic verbs are so distri-
buted that minimal tonal pairs involving L and M are more rare than one
would expect, whereas minimal pairs involving either H and M or H and L
are more common. Stahlke attributes this to an original lack of contrast
between M and L in Yoruba (LTR is then a reflection of this historical
situation). In synchronic terms, the functional load between M and L in
verbs is not yet sufficiently great for the MHP to require an opaque

interaction between PT and LTR applied to /CV̀ VCV/ constructions in order
to distinguish them phonetically from /CV VCV/ constructions. If M–L
contrasts in monosyllabic verbs having identical selectional restrictions
should become greater, one might expect such an opaque interaction to de-
velop, resulting in an ordering paradox like that observed between PT
and TE.

The rule raising the final tones of nouns appearing immediately be-
fore non–future–tense verbs as subjects could also theoretically lead to
derived homonymy in some cases. The rule either adds a high tone copy
of the final vowel of a noun or changes the tone of the final vowel to
H. Derived homonymy is possible only in the second type of change:
minimal tonal pairs of nouns which could be merged are MM and MH, LL and
LM, LL and LH, and LM and LH. Given the high functional load of H vs. M
or H vs. L (also of M vs. L?) on final noun syllables, it is unlikely
that differing selectional restrictions on nouns will do much to reduce
perceived surface homonymy of noun–verb constructions here, any more than
they reduce perceived homonymy sufficiently when noun prefix tones are
deleted after H verbs.[11] Furthermore, the subject tone-raising rule is
obligatory, so that phonetic merger cannot be avoided by selected nonap-
plication of the rule. It thus seems that we have an exception to the
MHP.

However, the tone–raising rule itself has a contrastive function, so
that it also serves the MHP. For example, clauses like aṣó tuntun 'the
cloth is new' are distinguished from noun–adjective nominal groups like
aṣo tuntun 'new cloth' only by virtue of the final H on /aṣo/ 'cloth'
in the former. Secondly, it may be that subject nouns occur with follow-
ing modifiers, which then take the high tone subject marker, more than
they occur alone [Ward 1952:46]; since the modifiers are less likely to
evince derived homonymy through the tone-raising rule, for various

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[11]Some have analyzed the "high tone subject junction" phenomenon as
due to an H subject-marker morpheme whose tone appears on the final vowel
of the subject noun. Derived homonymy of nouns contrasting in different
underlying final tones is still a theoretical possibility in such an
analysis.

reasons, this reduces its total incidence. (Any tendency to cooccur
with following modifiers is obviously irrelevant to the incidence of
derived homonymy in object nouns.) Finally, even nonmodified subject
nouns may show different kinds of raised subject-marker tones. I have
elicited the following from an informant: ẹjá ń wẹ̀ 'the fish is swim-
ming' from /ẹja ń wẹ̀/ and ajá ń wẹ̀ 'the dog is swimming' from /ajá ń
wẹ̀/, compared with ará ń gbọ̀ 'the body is shaken' from /ara ń gbọ̀/ and
ará ń gbọ̀ 'the relative is shaken' from /ará ń gbọ̀/. It seems that
/ará/ and /ń/ in the last example show a raised H, whereas a regular H
occurs in the third, as well as in both the first and second. I have
not been able to check out the generality of this intriguing difference,
but it may represent a restricted sub-process whereby underlying H is
raised higher than underlying M in the subject tone-raising process when
derived homonymy threatens.[12]

  Yoruba vowel elision could also lead to derived homonymy, and in
some cases no doubt does, but here a variety of ancillary strategies for
homonymy-avoidance are also possible. First, vowel elision is optional,
so that it is simply not applied in some cases where homonymy would re-
sult. Bamgboṣe [1966a] gives the examples fokùn 'use the rope' from
/fi okùn/ and fi okùn 'swing the rope' from /fi okùn/, the latter be-
ing characteristically left uncontracted. Secondly, circumlocutions may
be used to avoid homonymy-creating contractions (cf. dè wọ́n lẹ́sẹ̀ 'tie
them in the feet' in preference to dẹsẹ̀ẹ wọn 'tie their feet', based
on /ẹsẹ̀/ 'foot'). Finally, variable contractions may be used to avoid
homonymy: /bá aṣọ/ 'find clothes' leads only to báṣọ, whereas /bọ́ aṣọ/
'remove clothes' leads to bọ́ṣọ. In general, many writers on Yoruba
have recognized that the diverse kinds of vowel elision in verb+noun etc.
combinations may be partially explicable in terms that relate to homonymy-
avoidance. Even seemingly purely phonological rules for vowel elision
may also be a function of the MHP.

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[12]My thanks to Anthony Obilade for these data.

Reduplicated nominals like ìwĕkíwĕ 'any book', mentioned in sec-
tion 2, are not really counterexamples to the MHP. Here, although the
opaque order PT-TE which actually applies is not needed for homonymy-
avoidance, it is still expected phonologically because of the structure
of the form to which it applies. If the transparent order TE-PT applied
to these reduplicated nominals, surface forms like *ìwĕkíwé would re-
sult. Such forms render the reduplication rule opaque, however, in the
sense that the VCV sequence to the right of k could not be a duplicate
in strict phonetic terms of the VCV sequence to the left, nor vice-versa.
In order for phonetically similar allomorphs to appear both left and
right of k, i.e. for as much surface evidence as possible that a re-
duplication has occurred to exist, PT, the only rule to apply to the
left-hand occurrence of the noun, must apply before TE to the right-hand
occurrence. Here, then, we have a trade-off between opacity of PT and
opacity of the reduplication rule, and opacity in the latter is avoided.
(I propose no general principle to account for this.)

   Another problem is posed by a small number of "frozen" forms like
ìkẹ̀wă '(the) tenth' and márŭn 'five' (adjectival), as well as verbs
like jókŏ 'to sit'. These forms are hard to decompose into parts to
which PT and TE could apply: e.g. ìkẹ̀wă is decomposed etymologically
by Bamgboṣe [1966b] into /ì+kó+ẹ̀wá/ 'taking of ten', but in present-day
Yoruba this word never appears uncontracted. A form like jókŏ doesn't
even have a clear etymological decomposition (Courtenay [1968] gives
/jó+ìkó/, presumably 'dance' or 'burn' plus 'a rapping', 'a taking' or
'a plunging', none of which fit very well).[13] In cases like this, H' on
the final syllables has apparently become lexicalized, due not to the
MHP (e.g. ìkẹ̀wă contrasts with no nominal or other word having final H
and a similar syntactic distribution) but rather to the frequency with
which the original components of these forms occurred together, eventual-
ly losing their individual identity. Ancient nominals like ìkẹ̀wă and

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   [13]Courtenay [1969] actually gives no meaning for the noun or the
verb components of jókŏ; one gets the impression that she treats the
noun, but not the verb, as "abstract" (i.e. having no specifiable mean-
ing). It is not clear what theoretical status such an element would
have.

the other ordinals thus stand in stark contrast to non-LTR nominals like
ìlàjǔ 'civilization', which rather than phonemicizing H' etc. by elimi-
nating (opaque) applications of PT and TE have made these primed tones
truly allophonic by switching to a transparent order for these rules.
In the middle are all the verb+noun combinations etc. which clearly call
for rules of tone and vowel elision, due to the existence of uncontracted
forms, but render PT opaque (non-allophonic) by ordering it before the
elision rules. As far as the MHP is concerned, one might expect more
phonemicization of the primed tones in some cases and more "allophonici-
zation" in others, all within the context of contracted forms, perhaps
leading to a correlation of phonemic and allophonic primed tones with
mutually exclusive syntactic or semantic categories [Wilkinson 1974].

8. Conclusion

It has been shown in sections 2-6 that Yoruba rules for deriving sur-
face variants of tonemes and a rule deleting tonemes in conjunction with
vowel deletion frequently apply in opaque orders, contrary to the theory
of rule ordering first outlined in Kiparsky [1971] and developed in
Kisseberth [1973b] and elsewhere, whereby transparent orders are "un-
marked" and therefore should tend to predominate in languages. However,
the Yoruba data does not constitute an unqualified counterexample to a
maximization of transparency principle, for such rules as PT and TE or
(6) and TE interact opaquely only when a functional purpose, that of
maintaining underlying tonal contrasts on the surface or, in somewhat
different terms, keeping the "phonological distance" between a base form
and its allomorphs to a minimum, is thereby served. As we saw, PT and
TE apply in an opaque order in most constructions, since the freedom of
morpheme combination in them would often lead to derived tonal homonymy
along with segmental homonymy under a transparent order, but in a re-
stricted class of nominals whose components could not easily be confused
with other elements, the transparent order TE-PT is able to assert it-
self. Likewise, (6) and TE are opaquely ordered for constructions where
such an order minimizes the distance between base forms and allomorphs
(when a rising tone is derived from H by (6)), but revert to a

transparent order where opacity of (6) would not contribute to such mini-
mization (when a falling tone is derived from L). If a "minimization of
homonymy" principle is made available in linguistic theory, these vari-
able rule interactions can be accounted for: an opaque interaction ob-
tains only when the MHP is thereby served, and not otherwise. In a simi-
lar fashion, the various constraints on rule form and application noted
in section 7 can be explained by the MHP. Thus the Yoruba data provides
rather good justification for this principle. Of course, much work
needs to be done in formulating and elaborating such a functional princi-
ple, in particular supplying a statement of the phonological circum-
stances under which it ought to come into play and an indication of how
it can be formally implemented (e.g. through transderivational con-
straints). These are topics for future research.

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