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This paper examines the effect of [ATR] vowel harmony on low vowels in Okpè, an Ṣdoid language of Nigeria. The relevant facts can be summarized as follows: Low vowel stems condition [-ATR] forms on affixes. Low vowel affixes surface as [+low] in [-ATR] contexts and as [-low] when in [+ATR] contexts. Of particular interest is the additional fact that an underlyingly low vowel surfaces as [-low], [-ATR] in certain [+ATR] environments. To explain these alternations, it will be argued that low vowels are underlyingly unspecified for vocalic features. Redundancy rules, supplied for the most part by Universal Grammar, interact with the vowel harmony system and rules of syllabification to derive the non-low variants of underlyingly low vowels. By positing underpecified forms, it will be shown that no ad hoc rules need to be stipulated.

1. Introduction

The set of vowels that are active in vowel harmony alternations often constitutes only a subset of the complete set of vowels found in a particular language. For example, in Akan [Clements 1981], the vowels affected by [ATR] harmony are the non-low vowels; in Yoruba [Awobuluyi 1967, Bamgbose [1979]...
1967], the vowels affected by [ATR] harmony are the non-low, non-high vowels (that is, mid). Okpê, an Edooid language of Nigeria, is particularly interesting in this regard. Phonetically, only non-low vowels appear in [+ATR]/[−ATR] pairs. Phonologically, however, there is evidence to show that low vowels do indeed participate in the system of vowel harmony. Specifically, the [−ATR] vowel [a] has a [+ATR] variant [e] in certain environments (as in the prefix of (1b)), and a [+ATR] variant [สะอาด]2 in others (such as in the suffix of (1b)):

(1) a. [−ATR] stem: /a+sʉ+a/ → [ˈɑːˈswá] 'we (inclusive) are singing'
   b. [+ATR] stem: /a+rʉ+a/ → [ˈɑːˈrwé] 'we (inclusive) are doing'

The latter fact is particularly surprising since [สะอาด] is a [−ATR] vowel. That is, a situation is created in an example like (1b) where a [−ATR] vowel patterns as the [+ATR] counterpart of a phonologically low vowel.

There are two basic approaches to be taken for this type of problem. On the one hand, one could assume that such facts simply represent an odd idiosyncracy of Okpê. Under such an approach, one would simply formulate two ad hoc rules whose specific functions would be to change an [a] into an [e] and an [a] into an [สะอาด]. Alternatively, one could look for an explanation of the low vowel behaviour by examining the interaction of well-motivated language-particular rules of Okpê with general principles of Universal Grammar, attempting to avoid positing any special ad hoc rules specifically formulated to describe changes such as those observed above.

In this paper, I provide an account of the low vowel behaviour of Okpê that adopts the second strategy, with two sets of assumptions being crucial:

1. The theory of underspecification is adopted, and it is argued that low vowels are underlyingly unspecified for vocalic features in Okpê. The derivation of the particular phonetic form of such an underspecified vowel involves the interaction of a number of factors including the assignment of syllable

2 Orthographic conventions used in this paper include the following: ᅔ = [e], ᅑ = [ɔ], ᅒ = [t], ᅒ = [o], ~ = Nasalization, ' = H-tone, ' = L-tone and ? preceding a syllable = Downstep on that syllable.
structure and specifications of vowel harmony. (2) I assume a process of re-
syllabification for certain cases that violate syllabic constraints of Okpè.
Crucially, such resyllabification involves two stages: (i) deletion of exist-
ing syllabic structure and (ii) reapplication of the regular rules of syllabi-
fication. These assumptions account for the structure-preserving nature of
Okpè resyllabification, that is, for the fact that the syllable types created
by resyllabification are the same as those created by the initial application
of the regular rules.

It seems improbable that a theory of phonology should allow rules as un-
likely as one which supplies a [-ATR] vowel as the [+ATR] counterpart for a
low vowel. The fact that this paper accounts for such a surface alternation
without requiring the positing of such an odd rule is interpreted as support
for the basic assumptions that make such a result possible.

2. Harmony in Okpè: The Problem

With respect to non-low vowels, Okpè has a straightforward system of root-
controlled dominant [ATR] harmony. Stems belong to either the [+ATR] or the
[-ATR] class, while affixes are generally unspecified for the feature [ATR],
receiving their [ATR] specifications from the stem. For example, the infini-
tive prefix [e/e] appears with its [+ATR] variant [e] in combination with
a [+ATR] stem, as in (2), while it appears with its [-ATR] variant [e] in
combination with a [-ATR] stem, as in (3):

(2) a. /i/ tř 'pull!'  ètyó 'to pull'
   b. /e/ sê 'fall!'  èsè 'to fall'

3 In this paper, I sidestep the interesting rule of phonetic neutraliza-
tion that merges [!] with [e] and [u] with [o]. Such neutralization
has been discussed by Hoffmann [1973] and the reader is referred to that pa-
per. Note, however, that in a preliminary acoustic study of Okpè and the
closely related language Uwvie [Omamor 1973] there is some indication of a
phonetic distinction between even the [+high, -ATR] and [-high, +ATR] pairs
(the pairs that undergo neutralization), the distinction being more apparent
in Uwvie. Whatever the precise phonetic facts are, I abstract away from this
issue here. This means that "surface" forms in this paper are one step away
(at least) from phonetic reality.
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101. 'steal!', 'to steal'

122. /o/ só 'steal!' èsó 'to steal'

d. /u/ rú 'do!' èrwó 'to do, make'

177. a. /i/ ri 'eat!' èryò 'to eat'

b. /ø/ dé 'buy!' èdé 'to buy'

c. /o/ lò 'grind!' èlò 'to grind'

d. /u/ sù 'sing!' èswò 'to sing'

Note that in the above examples, a suffix [o/o] appears in addition to the prefix in all cases where the stem vowel is high (see section 4.4.1 below). As with the infinitive prefix, this suffix appears with its [+ATR] variant [o] if the stem belongs to the [+ATR] class and with its [-ATR] variant [o] if the stem belongs to the [-ATR] class.

Turning to the harmonic behaviour of the low vowel [a], the first observation to be made is that stems with the vowel [a] condition [-ATR] harmony:

(4) a. /a/ dá 'drink!' èdá 'to drink'

b. /äu/ dá 'fly!' èdá 'to fly'

In examples such as the above, where the absence of the infinitive suffix is accounted for by the non-high nature of the stem vowel, it is impossible for the [+ATR] variant of the infinitive prefix to appear: *[èdá], *[èdà]. In a related manner, phonetic low vowels in prefixes cooccur only with [-ATR] stems, as in the example à dàrì 'we (inclusive) drank'. When such a prefix occurs with a [+ATR] stem, it appears on the surface as [e], as in the following example: è tírì 'we (inclusive) pulled'. Hence we observe that the [+ATR] variant of [a] in prefixes is [e]. Note moreover that the vowel in such a case must be underlyingly low and not mid. The distinction between the pairs [e/è] and [e/a] is neutralized for the [+ATR] variants; the [-ATR] variants, which remain distinct, show the underlying contrast to involve a [-low]/[+low] distinction.

The pattern just described changes, however, when dealing with a V-initial low vowel suffix. When such a low vowel suffix appears with a [-ATR] stem, e.g. sù 'sing', the suffix is [a], as expected (5a); but when a low vowel suffix combines with a [+ATR] stem, e.g. rú 'do', then the suffix is
Low Vowel Harmony in Okpê

[ε] (5b):

(5) a. á!swá 'we (inclusive) are singing'
    b. é!rwé 'we (inclusive) are doing'

The process of resyllabification that changes the stem vowels in these cases into [w] is discussed in section 4.4.1 below. What is crucial for the present is the harmonic behaviour of the suffix. In (5a), the suffix appears as [ə] because the stem it attaches to is of the [-ATR] class; in (5b), on the other hand, the suffix surfaces as [ε] because the stem is of the [+ATR] class. The essential problem is therefore that such vowels surface as [ə] in [-ATR] contexts, while in [+ATR] contexts, they surface as [e] in a prefix and as [ε] in a suffix.

3. Theoretical Background: Underspecification

To account for the harmonic behaviour of low vowels in Okpê, I adopt the framework of underspecification proposed in Pulleyblank [1983] and Archangeli [1984]. This framework adopts as a point of departure the requirement that all redundancy be eliminated from underlying representations (see, for example, Kiparsky [1982]). In particular, only non-redundant feature values may be included in underlying representations; predictable feature values are filled in by redundancy rules—rules that are of a highly constrained nature.

A central claim of this theory is that most redundancy rules are not language-specific rules; they are either (a) provided by Universal Grammar (DEFAULT RULES) or (b) derived by a general principle of Universal Grammar (COMPLEMENT RULES). It is claimed that Default Rules and Complement Rules do not exhibit language-specific idiosyncracies, their properties being derived by principles of Universal Grammar.

3.1. Default and Complement Rules. Several aspects of this theory are important for the following discussion. First, it is proposed that Universal

4 For detailed discussion of such redundancy rules, and for the motivation of the various properties of redundancy rules discussed below, the reader is referred to Pulleyblank [1983], Archangeli [1984], and Archangeli and Pulleyblank [in prep].
Grammar provides a context-free default rule for every distinctive feature [Kiparsky 1982, Pulleyblank 1983]; such default values may, however, be supplanted by language-specific "complement" values, themselves determined in large measure by principles of Universal Grammar [Archangeli 1984]. As a simple illustration, consider a feature such as [high]. Let us make the substantive assumption that Universal Grammar supplies the value [+high] as the default specification of [high] for vowels. That is, any vowel that does not receive the value [−high], either from an underlying assignment through morphological concatenation or via phonological rule application, is assigned the value [+high] by default. The immediate implication is that the specification [+high] will not appear in underlying representations, since such a specification would be entirely redundant.

A second point concerns the notion of complement rules. Assume that in a given language, one must posit the value of [+high] as an underlying specification, for example because it occurs as a "floating" feature or because phonological rules crucially refer to that value prior to the stage of complete specification. In such a case, a complement rule would be established, assigning [−high] as the redundant value for the language in question and making it impossible for the value [−high] to appear underlyingly in that language. Such a complement rule would take precedence over the default rule otherwise provided by Universal Grammar. Note that the distinction between default rules and complement rules is essentially the distinction between "unmarked" and "marked" redundant specification.

3.2. Default ordering principles. Two potentially contradictory assumptions have been made in the past about the stage in the derivation at which redundancy rules apply. On the one hand, there is presumably no language whose phonology exploits the full set of distinctive features made available by Universal Grammar. Consequently, when features are not used contrastively in a language's phonology, they are often assumed to be assigned only at the stage where a phonological string is phonetically interpreted. For example, a feature such as [suction] [Chomsky and Halle 1968], necessary to distinguish plosives from implosives, plays no role in the phonology of a language like English. It seems fairly safe to assume, therefore, that the value [−suction]
is redundantly assigned to all segments in the phonetic component of English. In fact, this is more than simply a "safe" assumption; it is necessary in order to account for the fact that such a feature is not only absent from underlying specifications, but that in addition, it is never referred to by phonological rules. This would be entirely accidental if the feature value [-suction] were supplied early on in the phonology of English. That is, features used contrastively are more likely to be used by the phonological rules of a language. A principle is required, therefore, that orders redundancy rules (such as the one assigning [-suction] in English) as late as possible in the grammar of a language, assigning them to the phonetic component unless there is evidence for an earlier assignment.° Phrasing this constraint in terms of the morphological and syntactic strata (levels) of lexical phonology, Pulleyblank [1983] makes the following claim:

(6) Redundancy rules begin their application in the latest possible stratum.

This requirement might be thought to contradict a somewhat different assumption about how redundancy rules must operate. Many earlier approaches, although implicitly assuming (6), explicitly require that redundancy rules apply in a block before all other rules of a language's phonology. This requirement, adopted for example in Chomsky and Halle [1968], was largely in answer to problems raised by Lightner [1963] and Stanley [1967] concerning the possible inadvertent development of a ternary feature system. It is not within the scope of this paper to discuss such problems, but the reader is referred to Kiparsky [1982] and Pulleyblank [1983] for a demonstration that the problems raised by Stanley and Lightner do not arise in the type of approach being taken here. Moreover, Pulleyblank [1983] shows that tonal default rules may apply as late as the post-lexical and even phonetic components even in cases where the features concerned do play a role in a language's phonology.

°Halle and Mohanan [1985] propose a general principle that preferentially assigns all phonological rules to the latest stratum possible. The late ordering of redundancy rules can plausibly be seen as a special case of this more general constraint.
What can be retained from the hypothesis of early application appears to be the following [Pulleyblank 1983]:

(7) Redundancy rules apply as early as possible within their stratum.

Because redundancy rules can apply both before phonological rules (as a result of (7)) and after phonological rules (as a result of (6)), it becomes possible for them to interact in a number of interesting ways. It is precisely such an interaction that will be shown to account for the behaviour of low vowels in Okpê.

3.3. The Redundancy Rule Ordering Constraint. In line with the general strategy of disallowing language-specific stipulations from being imposed on redundancy rules, it is argued that the types of interactions possible between redundancy rules and phonological rules are of a highly restricted nature. For example, Pulleyblank [1983] proposes that default rules can never be ordered by extrinsic language-specific stipulations. Where such rules are interspersed with language-specific rules, the relevant orderings involved are determined entirely by general principles. Of importance to this paper are cases involving the interaction of (6) and (7), which I refer to collectively as the Default Ordering Principles, with an additional principle, the Redundancy Rule Ordering Constraint. The Redundancy Rule Ordering Constraint (adapted from Archangeli [1984]) is given in (8):

(8) Redundancy Rule Ordering Constraint: A redundancy rule assigning \([\alpha F]\), where \(\alpha\) is "+" or "-", is automatically assigned to the first component in which there is a rule that refers to \([\alpha F]\) in its structural description.

A basic effect of the Redundancy Rule Ordering Constraint is to divide derivations involving any given feature into two stages: (a) an initial, underspecified stage where phonological rules can distinguish between non-redundant specifications and the absence of specification and (b) a subsequent, fully specified stage where phonological rules can distinguish between "+" and "-" specifications. The Redundancy Rule Ordering Constraint rules out a stage in the derivation where, for some feature \(F\), it would be possible to re-
fer to a lack of specification for F while also being able to refer to both "+" and "-" values of F. To illustrate, consider the interaction of a redundancy rule such as (9) below (assuming for the sake of concreteness that [-ATR] is the default value assigned by Universal Grammar for [ATR]) with a language-specific rule that refers to [-ATR] in its structural description. Although the clause of the Default Ordering Principles given in (6) would assign the [-ATR] default rule (9) as late as possible, the Redundancy Rule Ordering Constraint would force it to be assigned to any stratum on which a language-specific rule referring to [-ATR] applies.

(9) Default [-ATR] Insertion: Because the representation of [ATR] is autosegmental, the rule formulation in (55) is interpreted as follows (where X indicates a skeletal position unspecified for [ATR]):

\[ X \rightarrow X \]

\[ [-ATR] \]

The autosegmental interpretation of such a rule is an automatic consequence of the representation itself (thereby allowing the representation in (9) in the text); there is therefore no reason to encode such autosegmental properties into the formulation of the rule. This formulation embodies the claim that the redundant specification of a feature that is autosegmentally represented must itself be autosegmental [Pulleyblank 1983, Archangeli and Pulleyblank, in prep].
ing [αF] must therefore begin its application on the first lexical stratum.

3.4. Repeated application. As a final point, it should be noted that once redundancy rules have begun to apply, they apply at all stages of a derivation, whenever they can [Pulleyblank 1983]. This is a necessary assumption if we are to prevent the possibility of phonological rules deriving a representation that includes slots unspecified for F in addition to other slots specified for "+" and "-" values of F (ternary power).

To summarize, the Default Ordering Principles assign redundancy rules to the latest possible stratum, but require that they begin application as early as possible on the stratum to which they are assigned, after which point their application is automatic. The basic ordering determined by the Default Ordering Principles is supplemented by the Redundancy Rule Ordering Constraint, which can force redundancy rules to apply earlier than otherwise determined by the Default Ordering Principles.

Let us now turn to a discussion of how the above principles apply to the analysis of Okpẹ.

4. Analysis

4.1. [ATR] harmony. To begin with, I consider the lexical representation of the feature [ATR] and the basic account of [ATR] harmony. It is clear, of course, that there is an [ATR] contrast. Stems such as those in (2) above belong to the [+ATR] class while stems such as those in (3) belong to the [-ATR] class. In principle, the specified value could be either [+ATR] or [-ATR], with the unspecified value supplied by default. In fact, there is both language-internal and cross-linguistic evidence in favour of positing [+ATR] as the underlyingly specified value. For reasons of exposition, I postpone the presentation of such evidence until section 4.2.1 and proceed here with the analysis that follows from the decision to choose [+ATR] as the feature value represented underlyingly. The first implication is that the appropriate redundancy rule for [ATR] is as given in (9) above, that is, a rule assigning unspecified segments the value [-ATR].

8 I assume that (9) is in fact the default rule provided for the feature
of spreading an underlyingly present [+ATR] autosegment onto unspecified [ATR]-
bearing units to its left or right. This can be formalized as follows: 9

(10) [ATR] Harmony:  

\[
\begin{array}{c}
\text{Conditions:} \\
1. \ X = \text{rime} \\
2. \ \text{mirror image}
\end{array}
\]

The first condition on (10), that the slots relevant to the rule must be 
rime slots, encodes the fact that ATR Harmony affects vowels, not consonants.

Vowels are straightforwardly distinguished from consonants in Okpę because all
syllables are open and only vowels occupy rime positions. Hence if some seg-
ment X is in a rime, then X is a vowel. Note that without information about
syllable structure, the distinctive feature composition of a skeletal slot is
insufficient to identify a slot as a vowel and therefore insufficient to de-
termine whether the slot is an [ATR]-bearing unit. Vowels and their corres-
ponding glides share general feature specifications as can be determined by
the fact that vowels and glides alternate with each other in syllabically de-
 fined contexts (see below). The two segment types differ; however, in that
vowels alone bear contrastive values for [ATR], that is, vowels alone are
[ATR]-bearing units.

The second condition on [ATR] Harmony (10) serves to specify the bidirec-
tional nature of [ATR] spreading in Okpę. That is, a [+ATR] autosegment

\[\text{[ATR]} \text{ by Universal Grammar (see also Kaye et al. [1985]). If this assumption}
\text{is incorrect, however, the analysis presented here is completely compatible}
\text{with (9) being interpreted as a complement rule introduced as a result of}
\text{[+ATR] being the underlyingly assigned value for Okpę.}

\[9\text{As pointed out to me by Russ Schuh, it may well be the case that certain}
\text{aspects of this rule do not need to be stipulated for Okpę, as they may con-
\text{stitute the unmarked case for harmony generally. For example, the bidirec-
\text{tional nature of harmony and the fact that harmony assigns [+ATR] to rimes}
\text{might both be considered general properties of harmony systems. In addition,}
\text{it is a common property of harmony rules that they be root-controlled, this}
\text{point being captured not in the rule but in the underlying representations in}
\text{the present analysis. But note that while these three properties are undoubt-
\text{edly common, they are not required. For example, harmony is autosegmental}
\text{and directional in Yoruba [Archangeli and Pulleyblank, in prep]; it involves}
\text{more than just rime slots in Turkish [Clements and Sezer 1982]; it can be de-
\text{termined by affixes in Maasai [Levergood 1984].}]
} \]
spreads to a free rime slot on either its right or left. Note that spreading is bidirectional but NOT automatic. It will be demonstrated below that spreading does not apply as the result of a general Well-Formedness Condition, as originally proposed by Goldsmith [1976], but applies in a rule-governed fashion at a particular point in the derivation. That is, the facts of harmony in Okpê are shown below to constitute an argument in favour of the version of the Association Conventions argued for in Pulleyblank [1982, 1983] in which autosegmental spreading is not governed by an automatic convention. One-to-one linking is the only automatic aspect of the conventions.

The rules of [ATR] Harmony (10) and Default [-ATR] Insertion (9) derive the basic harmonic properties of the [+ATR] and [-ATR] stem classes as follows: first, at the level of the stem, an underlyingly specified [+ATR] autosegment links to the stem vowel by left-to-right application of the autosegmental Association Conventions immediately after syllabification. In the following examples, èsè 'to fall' is representative of the [+ATR] class while èdè 'to buy' is representative of the [-ATR] class; "+A" and "-A" are used in derivations to represent [+ATR] and [-ATR] respectively, and aspects of the phonological derivation other than those relating to harmony are ignored.

(11) a. +A C V b. -A C V

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>s</td>
<td>e</td>
<td></td>
<td>d</td>
</tr>
</tbody>
</table>

I analyze [ATR] Harmony in Okpê as applying on a non-cyclic stratum [Halle and Mohanan 1985] and assume, following Pulleyblank [in press], that rule application on a non-cyclic stratum consists of two phonological rule applications (the Double Scan Hypothesis), one at the level of the stem and a second after all affixation has taken place. Hence after affixation has taken place, syllabification and [ATR] Harmony apply to derive the following:¹⁰

¹⁰Affixation in these examples would actually involve the addition of both a prefix and a suffix. The suffix, however, does not surface because of a process of vowel deletion that is discussed in section 4.4.1.
(12) a. +A b. 
\[ \begin{array}{c}
\text{C V} \\
\text{t i r i} \\
\end{array} \]
Application of Default [-ATR] Insertion in the [-ATR] case then completes the pair of derivations:

(13) b. -A 
\[ \begin{array}{c}
\text{C V} \\
\text{z e r i} \\
\end{array} \]
As two additional examples, consider the derivations of tîrî 'pulled' and zêrî 'ran', examples that illustrate stems of both harmonic classes in conjunction with a -CV suffix. In such examples, syllabification and the Association Conventions apply at the level of the stem:

(14) a. +A b. 
\[ \begin{array}{c}
\text{C V} \\
\text{t i} \\
\end{array} \]
After suffixation, syllabification and [ATR] Harmony (10) apply:

(15) a. +A b. 
\[ \begin{array}{c}
\text{C V + C V} \\
\text{t i r i} \\
\end{array} \]
Finally, Default [-ATR] Insertion applies to assign the redundant specification [-ATR] to all unspecified vowels:

(16) b. 
\[ \begin{array}{c}
\text{C V + C V} \\
\text{z e r i} \\
\end{array} \]
4.2. Feature representations. Given the above outline of the paradigm cases of harmony, I now turn to a detailed consideration of the feature composition
of Okpę vowels in order to explain the special properties of low vowels in harmonic contexts. In (17) below, I give the values of the features [back], [round], [high], [low], and [ATR] that are appropriate for fully specified (pre-neutralization) representations of the nine Okpę vowels:

(17) Fully specified feature values for vowels:

<table>
<thead>
<tr>
<th>Feature</th>
<th>i</th>
<th>ì</th>
<th>e</th>
<th>ø</th>
<th>a</th>
<th>O</th>
<th>ø</th>
<th>U</th>
</tr>
</thead>
<tbody>
<tr>
<td>BACK</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>ROUND</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>HIGH</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>LOW</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ATR</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Given the theory of underspecification sketched out in section 3 above, it is impossible to posit the representations given in (17) as underlying representations since they contain considerable redundancy. Redundant specifications must therefore be eliminated from such representations, to be filled in by redundancy rules (default rules and complement rules) at the appropriate point during the phonological derivation. To begin with, I assume the following context-free redundancy rules, where (18a, b, d) are default rules and (18c) is a complement rule:

(18) a. [ ] → [-back]
b. [ ] → [-round]
c. [ ] → [-high]
d. [ ] → [-ATR]

Eliminating such redundant specifications from the representations in (17) gives the following:

(19) i ì e ø ø a ø U

<table>
<thead>
<tr>
<th>Feature</th>
<th>BACK</th>
<th>ROUND</th>
<th>HIGH</th>
<th>LOW</th>
<th>ATR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>

The question of how to eliminate the redundancy in [low] specifications will be discussed shortly. Before addressing that question, however, I briefly motivate those aspects of the underspecified representation already given in (19).
4.2.1. [ATR]. Cross-linguistically, there is evidence to suggest that [+ATR] takes precedence over [-ATR]. For example, in Maasai [Levergood 1984], both stems and affixes may be dominant, in the sense that the ATR specification of a dominant morpheme prevails over the specification of a recessive morpheme. In such a case, it is the value [+ATR] that is associated with such dominant morphemes, with [-ATR] assigned only in cases having neither a [+ATR] stem nor a [+ATR] affix (that is, by default).\textsuperscript{11}

With respect to Okpê, there are a couple of reasons other than cross-linguistic ones for positing [-ATR] as the redundant specification. First, this assumption allows the general redundancy rule assigning [-ATR] to apply to both low and non-low vowels; if [+ATR] were the redundant value, then a context-sensitive redundancy rule assigning [-ATR] to low vowels would have to be posited in addition to the general rule. The second reason has to do with the behaviour of mid and low vowels in [+ATR] harmonic contexts, behaviour that will be dealt with in detail in sections 4.3 and 4.4 below.

4.2.2. [back]/[round]. Two points are relevant here, namely which feature is selected for inclusion in underlying representations, and which value of that feature is selected. Examination of the feature specifications in either (17) or (19) shows that only one of the two features [back] and [round] is necessary to contrast the various vowels of Okpê, and in line with underspecification theory, only one value of the selected feature needs to be included underlingly. I will first demonstrate below that the non-redundant value for [back] would have to be [+back], and the non-redundant value for [round] would have to be [+round]. Of these two, it will then be suggested in the section dealing with [low] (section 4.2.4) that the non-redundant feature for Okpê is [round].\textsuperscript{12}

\textsuperscript{11}See also Kaye et al. [1985] who propose [-ATR] as the unmarked value for [ATR] and develop a theory which (among other things) provides for the dominant nature of [+ATR] specifications.

\textsuperscript{12}In adopting the proposal for the selection of [round] over [back], I incorporate certain suggestions made to me by Morris Halle and Moira Yip.
Consider examples such as the following, which involve suffixation of the past tense morpheme:

(20) a. tʃ-rʃ "pulled"
b. sɛ-rʃ "fell"
c. sɔ-rʃ "stole"
d. zɛ-rʃ "ran"
e. dá-rʃ "drank"
f. wɔ-rʃ "took a bath"

In the examples in (20), the past tense suffix harmonizes with the stem with respect to the feature [ATR] as expected. But if the stem vowel is [+high], then the suffix also agrees in backness and rounding with the stem:

(21) a. sʊ-rʊ "sang"
b. rʊ-rʊ "did"

If the redundant values for [back]/[round] are [-back]/[-round], then the above distribution is straightforwardly accounted for. The [+back]/[+round] variants of the suffix are derived by a rule spreading the [+back]/[+round] specification of the stem if the stem is [+high]; if the stem is not [+high], then the suffix receives the default values [-back]/[-round]. If, on the other hand, one were to assume the redundant values to be [+back]/[+round], then the cases in (20) could only be accounted for by a non-assimilatory rule assigning the value [-back] in the following disjunctive environment: (i) after a [+high, -back/-round] vowel; (ii) after any [-high] vowel. Hence regardless of cross-linguistic considerations, the values [-back]/[-round] must be redundant in Okpɛ, with the values [+back]/[+round] appearing underlyingly and undergoing spreading.

Having motivated the feature values for [back]/[round] given in (19), the question remaining concerns which feature of the two should be included in underlying representations. I will return to this question immediately after considering the underlying representations of [high] and [low].

4.2.3. [high]. With respect to [high], there are two basic reasons for positing [+high] as the non-redundant value. First, as seen in (20) and (21)
above, the rule of round assimilation crucially refers to the value [+high]. Second, the behaviour of vowels under glide formation (resyllabification—see section 4.4.1 below) also provides evidence for the presence of the specification [+high]. When a high vowel and a non-high vowel are adjacent and subject to glide formation, the loss of syllabic status for the high vowel does not result in the disappearance of the feature [+high]. On the contrary, the [+high] specification survives as a glide. The presence of rules crucially referring to [+high] and the absence of rules referring to [-high] suggest that [+high] is the underlingly specified value.

4.2.4. [low]. Finally, turning to the feature [low], we observe in Okpø that the low vowel is particularly malleable. That is, it is particularly subject to environmental influences, surfacing as [e] or [ə] in particular contexts. It is only vowels that are phonologically low that manifest variation with respect to their specification for [low], as noted above in section 2. Such malleability is straightforwardly accounted for if the feature in question is not specified at the point in the derivation where the processes creating contextual variants apply. In other words, such surface variation in underlingly low vowels suggests that the value [+low] is not present at the stage in the phonological derivation where rules such as ATR Harmony take place. I propose therefore that [a] is underlingly unspecified for [low], receiving its [+low] specification by a context-free redundancy rule: 13

(22) [ ] → [+low]

As it stands, however, this analysis would apparently require that all vowels except [a] be underlingly specified as [-low]. But this is clearly unnecessary since many of the [-low] specifications on mid and high vowels are predictable, and therefore amenable to context-sensitive redundancy rules.

Three points are relevant. First, if a vowel is [+high], then it cannot be other than [-low] by virtue of the inherent content of the two features:

13 The analysis presented in this section for redundancy rules involving the feature [low] owes much to discussion with Diana Archangeli.
(23) \([+\text{high}] \rightarrow [-\text{low}]\)

Second, if a segment is \([+\text{ATR}]\), then it is \([-\text{low}]\):

(24) \([+\text{ATR}] \rightarrow [-\text{low}]\)

Kaye et al. [1985] proposes this as a universal constraint at the phonetic level; that is, no phonetically low vowel can be \([+\text{ATR}]\). Even if that claim should prove to be incorrect, (24) appears to express a correct markedness relation between the two features. The third type of case where a \([-\text{low}]\) specification can be redundant is contingent on selecting \([\text{round}]\) over \([\text{back}]\) for inclusion in underlying representations. If \([\text{round}]\) (specifically \([+\text{round}]\)) is underlyingly specified, then the \([-\text{low}]\) specification on \([\text{o}]\) and \([\text{ơ}]\) is redundant: \(^{14}\)

(25) \([+\text{round}] \rightarrow [-\text{low}]\)

Apart from the fact that (25) is a correct generalization about Okpè, it is supported by the fact that round vowels being non-low seems to be the unmarked property for vowel systems in general.

With the adoption of the three rules in (23-25), the final set of underlying vowels in Okpè is as follows: \(^{15}\)

(26) Minimal Vowel Specifications

<table>
<thead>
<tr>
<th></th>
<th>(\text{i} )</th>
<th>(\text{j} )</th>
<th>(\text{ɛ} )</th>
<th>(\text{ɛ} )</th>
<th>(\text{a} )</th>
<th>(\text{o} )</th>
<th>(\text{o} )</th>
<th>(u )</th>
<th>(u )</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\text{ROUND} )</td>
<td>()</td>
<td>()</td>
<td>()</td>
<td>()</td>
<td>()</td>
<td>()</td>
<td>()</td>
<td>()</td>
<td>()</td>
</tr>
<tr>
<td>(\text{HIGH} )</td>
<td>(+)</td>
<td>(+)</td>
<td>(+)</td>
<td>(+)</td>
<td>(+)</td>
<td>(+)</td>
<td>(+)</td>
<td>(+)</td>
<td>(+)</td>
</tr>
<tr>
<td>(\text{LOW} )</td>
<td>(+)</td>
<td>(+)</td>
<td>(+)</td>
<td>(+)</td>
<td>(+)</td>
<td>(+)</td>
<td>(+)</td>
<td>(+)</td>
<td>(+)</td>
</tr>
<tr>
<td>(\text{ATR} )</td>
<td>(+)</td>
<td>(+)</td>
<td>(+)</td>
<td>(+)</td>
<td>(+)</td>
<td>(+)</td>
<td>(+)</td>
<td>(+)</td>
<td>(+)</td>
</tr>
</tbody>
</table>

\(^{14}\)The feature value \([-\text{low}]\) is doubly redundant in \([\text{o}]\) because of both \([+\text{round}]\) and \([+\text{ATR}]\) specifications.

\(^{15}\)It would be possible to obtain the same feature representations as in (26) by using a rule like \([-\text{round}, -\text{high}, -\text{ATR}] \rightarrow [+\text{low}]\) in conjunction with a context-free rule inserting \([-\text{low}]\) (a suggestion made to me by Morris Halle) Following a suggestion by Diana Archangeli, I adopt the analysis given in the text because the rules proposed there all appear to constitute implications of an absolute or unmarked cross-linguistic character, unlike the rule for \([+\text{low}]\) just mentioned.
Note that because [round] is used contrastively, [ø] does not require a [-low] specification because it is [+round] (whereas [œ] must be underly­ingly marked [-low]). If the feature [back] were used underlyingly instead of [round], an additional specification would be needed for [ø], namely [-low]. Such a feature would be necessary since a redundancy rule for [-low] involving [back] (but not [round], e.g. a rule like [+back] → [-low]) could not be formulated so as to apply to [ø] but not to [a]. Hence a final representa­tion for Okpê vowels is selected that utilizes the features [high], [low], [round], and [ATR], with the feature values given in (26).

4.3. The [a]/[e] alternation. In this section, I consider how the propos­als so far developed account for the problem of why the low vowel [a] takes [e] as its [+ATR] counterpart in prefixes. It is proposed that the occur­rence of [e] is an automatic consequence of the application of the redun­dancy rules in conjunction with the independently motivated rule of ATR Harmony (10). Consider the derivation of forms such as à dár¡ 'we (inclusive) drank' and è t¡r¡ 'we (inclusive) pulled'. Underlyingly, the two stems appear as follows:

(27) a. d X
    b. t X
      +hi
      +A
d a

The vowel [a] in (27a) has no specifications at all underlyingly while [i] is underlyingly assigned [+high] and belongs to a stem with a [+ATR] autoseg­ment. Syllabification followed by application of the Association Conventions results in the following (where "ε" indicates 'syllable' and "R" indicates 'Rime'):

---

16 For simplicity of exposition, I omit tone in the following examples and represent consonants by consonantal symbols as a short-hand for the actual autosegmental representation involving skeletal slots linked to distinctive feature matrices.
Affixation of the morphemes a 'we (inclusive)' and rı 'past tense' derives the following:

Syllabification then feeds the application of [ATR] Harmony (10):

Consider now how the various redundancy rules apply to the two representations in (30), where for convenience of reference, the relevant rules have been reproduced below:

Note that the [+ATR] specification does not cross an association line in the derivation of (30b) because [ATR] and [high] are on different planes [Archangeli 1985].
c. [+ATR] → [-low]
d. [ ] → [+low]
e. [ ] → [-round]
f. [ ] → [-high]
g. [ ] → [-ATR]

The three rules in (31a-c) must apply lexically for the following reason: [-low] specifications occur in underlying representations (see (26) above); by the Redundancy Rule Ordering Constraint (section 3.3 above), this means that any redundancy rule assigning [-low] must be assigned to the first lexical stratum. As regards the other redundancy rules (31d-g), however, no phonological rules have been posited that refer to the values that they insert. Hence the Redundancy Rule Ordering Constraint is not relevant, and (31d-g) begin their application as late as possible, i.e. post-lexically or phonetically, by virtue of the Default Ordering Principles (section 3.2 above).

Consider therefore the application of the redundancy rules to the forms given in (30) above, where for expository purposes, syllable structure has been suppressed. Lexically, of the rules in (31a-c), (31b) and (31c) are applicable, applying as follows:

(32) a.

\[
\begin{array}{c}
X + d & X + r & X \\
 & +hi & -lo \\
a & d & a & r & i
\end{array}
\]

b.

\[
\begin{array}{c}
X + t & X + r & X \\
 & +hi & +hi & +hi & -lo & -lo \\
e & t & i & r & i
\end{array}
\]

Post-lexically, all rules in (31) become applicable, filling out the above forms as follows:\textsuperscript{18}

\textsuperscript{18}As before, I assume that a single autosegment is inserted wherever possible (as in (33a)) because of the Obligatory Contour Principle, although nothing hinges here on that assumption. Two identical autosegments occur in (33b) because they are heteromorphemic. See McCarthy [1986].
The crucial aspect of these derivations concerns the applicability of the redundancy rules for [low]. The prefix of (33a), underlingly low, does not meet the structural description of any of rules (31a-c) and is therefore assigned [+low] by the context-free rule (31d). The same underlying prefix in (33b), however, satisfies the structural description of (31c) because of its [+ATR] specification, the result of ATR Harmony. As a consequence, the prefix in (33b) receives a [-low] specification, thereby blocking the general redundancy rule (31d) and causing its vowel to surface as [e].

To conclude this section, it has been argued that the change from [a] to [e] in [+ATR] contexts is the direct result of the interaction of the redundancy rules of Okpọ with the rule of [ATR] Harmony. Application of the redundancy rules for [low] to a representation including the value [+ATR] results in the assignment of [-low], deriving [e]; application of the same rules to a representation including the value [-ATR] results in the assignment of [+low], deriving [a]. No special rule is required to account for the "change" from [a] to [e]; the apparent change simply falls out from the applicability or lack of applicability of particular redundancy rules.

4.4. The [a]/[e] alternation. I propose to treat the alternation between [a] and [e] in a manner basically analogous to that described above for [a]/[e], where the appearance of a low vowel vs. a mid vowel depends on the redundant assignment of particular feature values. I argue that such a position is correct, in spite of an immediate problem: the reason that the phonologically low vowel surfaces as non-low in the cases discussed in the last section is specifically because such vowels are in [+ATR] contexts. The assignment of [+ATR] by [ATR] Harmony feeds the redundancy rule that assigns [-low]. The problem for the [a]/[e] alternation is apparent. To become
non-low, the vowel must be in a [+ATR] context; but the vowel which surfaces is [-ATR]. This paradox is resolved by an analysis which posits a derivation where V-initial low vowel suffixes of the type under discussion first undergo [ATR] Harmony (deriving the [+ATR] context needed to trigger the assignment of [-low]) and then undergo a rule of resyllabification, which has the result of removing the [+ATR] specification of the suffix. In the discussion that follows, I begin by looking at the process of resyllabification and then go on to demonstrate its interaction with the rules of harmony and redundancy already laid out above.

4.4.1. Resyllabification. The basic facts to be accounted for in this section concern configurations that result from the juxtaposition of vowels. Relevant data has already been seen in cases like (2) and (3) above, which I repeat below in a reorganized form:

(34) a. /e/ sē 'fall!' èsē 'to fall'
    b. /ɔ/ sō 'steal!' èsō 'to steal'
    c. /ɛ/ ċē 'buy!' èdē 'to buy'
    d. /o/ lō 'grind!' èlō 'to grind'

(35) a. /i/ tī 'pull!' ètyō 'to pull'
    b. /u/ rū 'do!' èrū 'to do, make'
    c. /i/ rī 'eat!' èrī 'to eat'
    d. /u/ sū 'sing!' èswū 'to sing'

In these examples, the vowel of the infinitive suffix is deleted if it immediately follows a non-high vowel (34); but if the suffix vowel immediately follows a high vowel, then the high vowel becomes a glide and the suffix vowel survives. While it is clearly possible to produce such facts by positing two rules (one of deletion and one of glide formation), such an approach misses certain generalizations. First, the essential point seems to be that sequences of adjacent vowels are not desirable in Okpê. Such sequences are rearranged, but in a manner that depends on the segmental characterization of the vowels concerned. One point to be captured is that the undesirability of the sequence is independent of its segmental composition, and this point is completely missed in an approach that simply posits two indepen-
dent rules. Second, it appears to be the case that the rules always apply together, i.e. one rule does not apply in certain environments to the exclusion of the other.

The relation between vowel deletion and glide formation can be straightforwardly captured in an account where unsyllabified skeletal positions are not pronounced. To determine the type of conditions that result in unsyllabified slots, let us first consider the types of slots that get syllabified. In Okpê, this is a fairly simple matter. All syllables are open; onsets consist of an optional consonant followed by an optional glide or \([r]\). Basic syllabification can be expressed by the following rule, where \(\times\) indicates an unsyllabified slot:

(36) Syllabification:

\[
\begin{array}{c}
\sigma \\
R \\
X_0 \times \rightarrow X_0 X
\end{array}
\]

An unsyllabified slot is assigned a rime node, with preceding slots incorporated as an onset. I assume that independent constraints determine precisely which segment types can occupy particular syllabic positions. That is, I assume constraints such as the following:

(37) a. Only slots specified for at least one of the vowel features \([\text{round}]\), \([\text{high}]\), and \([\text{low}]\) are eligible to be made into a rime.

b. Consonant clusters are possible only if the second segment in the cluster is \([+\text{high}]\) or \([r]\)\(^{20}\)

As illustration, consider the derivation of \(\ddot{e}\dot{d}\dot{e} \) 'to buy' and \(\ddot{e}\dot{s}\dot{w}\dot{o} \) 'to sing'.

\(^{19}\)The precise details of the theory of syllabic structure are not crucial for the points being made about Okpê. Here and throughout, I follow Kaye and Lowenstamm [1984], Levin [1983], Archangeli [1984], etc. in assuming that the syllabic content of the skeletal ("CV") tier is derivative. See Archangeli for some discussion of the formalism I adopt here.

\(^{20}\)Some examples of clusters involving \([r]\) are: \(\ddot{i}m\dot{r}\dot{f} \) 'fat', \(\ddot{e}\dot{v}\dot{r}\dot{o} \) 'to lose (something)', \(\ddot{e}\dot{h}\dot{r}\dot{\dot{a}} \) 'to split up', \(\ddot{o}\ddot{s}\ddot{o}\ddot{l}\ddot{\dot{b}}\ddot{\dot{\dot{r}}}\ddot{\dot{\dot{h}}\ddot{w}} \) 'God'. I will not go into the feature specification of \([r]\) (or other consonants) here, and therefore leave a more general statement of the restriction on clusters open.
At the level of the stem, syllabification produces the following:

(38) a. \[
\begin{array}{c}
\sigma \\
R \\
X X \\
\sigma \\
d\epsilon \\
\end{array}
\]

b. \[
\begin{array}{c}
\sigma \\
R \\
X X \\
\sigma \\
s\upsilon \\
\end{array}
\]

If the forms being derived were imperative, such syllabifications would be complete: \(d\epsilon 'buy!', s\upsilon 'sing!'\). But for the infinitive forms, further affixation would derive the following:

(39) a. \[
\begin{array}{c}
\sigma \\
R \\
X + X X + X \\
\sigma \\
\sigma \\
\sigma \\
ed\epsilon \epsilon \emptyset \\
\end{array}
\]

b. \[
\begin{array}{c}
\sigma \\
R \\
X + X X + X \\
\sigma \\
s\upsilon \emptyset \emptyset \\
\end{array}
\]

In (39a), when a rime is built on the suffix vowel, preceding material cannot be incorporated into the existing syllable since \([\epsilon]\) is not a possible onset; in (39b), on the other hand, the suffix vowel can form a single syllable with the two preceding segments since onsets can include a consonant plus glide sequence:

(40) a. \[
\begin{array}{c}
\sigma \sigma \sigma \\
R R R \\
X + X X + X \\
\sigma \\
ed\epsilon \epsilon \emptyset \\
\end{array}
\]

b. \[
\begin{array}{c}
\sigma \\
R R \\
X + X X + X \\
\sigma \\
s\upsilon \emptyset \emptyset \emptyset \\
\end{array}
\]

The representation in (40b) now gives the correct surface form \(\acute{\epsilon}sw\emptyset\). But as it stands, the structure in (40a) predicts the incorrect form \(*\acute{\epsilon}d\emptyset\emptyset\). The problem with such a structure involves the vowel sequence \(\epsilon\emptyset\), ruled out since sequences of vowels are only possible in Okpe under quite restricted circumstances. Basically, a sequence of V-slots is possible only if linked to the same vowel matrix or if the first vowel is high; in both types of cases, there
is a tonal requirement that the two vowels be on different tones:

(41) a. miá 'dá  'I am drinking'
b. àriè 'rwé  'you are doing'
c. ísågweg 'groundnuts'
d. ígyínī  'locally made gin'

Notice that whatever the precise factors are that allow a vowel sequence to persist, they do not exist in a case like (40a). As a consequence, a rule desyllabifies the second of the two vowels in contact, deriving the following:

(42) a. σ σ
   /   /
   R R
   X + X X + X
   e d e o

Because the unsyllabified vowel cannot be syllabified into an existing syllable and because it cannot be syllabified by itself, it remains unsyllabified and does not surface phonetically.21

Consider now cases involving the underlyingly unspecified vowel, [a], such as èdá 'to drink' and á 'swá 'we (inclusive) are singing'. Prior to syllabification, such cases would appear as follows:

(43) a. X + X X + X
    | | | |
    e d o
    e d a o

These cases pose a problem for syllabification—precisely because of the unspecified segments. It was proposed in (37) that a rime can be built on a skeletal slot in Okpē only if that slot dominates a specification of [high], [round], or [low], correctly allowing the syllabification of all cases except

21No problem would result if some rule were assumed to actually delete such an unsyllabified segment. The cases involving [a] (discussed below) demonstrate that such deletion could not replace the stage of desyllabification, however.
In order to also allow the syllabification of [a], there are two basic alternatives: (1) low vowels could be underlyingly syllabified; (2) the requirement just mentioned could be relaxed to the following:

(44) A slot is eligible for rime status provided that it NOT specified for any feature other than [high], [round], or [low].

This revised requirement would allow the syllabification of [a] in cases like those in (43) because the vowels in question have no consonantal specifications.

Although either assumption would allow the correct syllabification of examples such as those in (43), I choose the first formulation (37) for two reasons. First, relaxing the condition on the configurations that allow rime construction has an undesirable effect, to be discussed directly. Second, assuming that low vowels are underlyingly syllabified (precisely because of their underspecified status) accounts automatically for their harmonic behaviour.

Consider first the problem with relaxing the condition on rimes. As mentioned above, branching onsets are possible in Okpe only if the second member of the onset is [+high] or [r], as in an example like (40b) above. If conditions on syllable structure are to be formulated along the lines of the revised rime condition just given, then the onset condition (37) should presumably be formulated as follows (where (45) does not take into consideration the onsets with [r] as second member):

(45) Consonant clusters are possible if the second segment in the cluster is NOT specified for any feature value other than [+high].

Unlike the revised requirement for rimes in (44), (45) provides incorrect results when involving [a]. Consider the syllabification for forms such as

[22] Actually, [e] would also require underlying representation of syllable structure (as pointed out to me by Diana Archangeli), since [+ATR] (the only marker of [e]) only associates to rimes. This is entirely consistent with the distinction between [a] and [e] being simply the presence vs. absence of a [+ATR] specification, as argued here.

[23] For discussion of a comparable problem (and a comparable solution) involving completely unspecified segments in Japanese, see Grignon [1984].
èdá and á !swá given in (43), where the revised conditions on syllabification (44) and (45) are assumed. On the stem cycle, syllabification would apply in both cases:

(46) a. \( \sigma \)
\[
\begin{array}{c}
R \\
X X \\
d \\
d a
\end{array}
\]

b. \( \sigma \)
\[
\begin{array}{c}
R \\
X X \\
s s
\end{array}
\]

After affixation, and assuming the revised condition on clusters given in (45), syllabification would apply as follows:

(47) a. \( \sigma \)
\[
\begin{array}{c}
R \\
X X X X \\
è d ò
è d a ò
\end{array}
\]

b. \( \sigma \)
\[
\begin{array}{c}
R \\
X X X X \\
s s w a
\end{array}
\]

While application of the redundancy rules would correctly derive á !swá in the second case, an incorrect surface form would be derived in the first case. Although there is some question as to how the configuration in (47a) would actually surface, it is clear that it would not be èdá without some ad hoc rule of adjustment. The problem in this case is a direct result of reformulating the condition on consonant clusters as in (45). With the version of the condition given in (37), and if low vowels are underlyingly syllabified, then resyllabification of èdá would have proceeded in a manner entirely analogous to èdè (40), producing correct results.

In conclusion, I adopt the requirements for syllabification in (37). The condition in (37b) must be as formulated so as not to produce incorrect results such as those just considered, and the condition in (37a) is adopted in the interests of uniformity. That is, given the analysis here, conditions on syllable structure involving underspecification refer only to specified values, not to their absence.
4.4.2. **Automatic Dissociation.** The examples seen in the preceding section all involve [-ATR] stems and are therefore relatively uninteresting as far as the application of the redundancy rules are concerned. In all cases, redundant values simply assign the feature values expected, given the underlying representation of the vowels in question. The assignment of redundant values becomes more interesting, however, when we consider cases where stems are [+ATR]. It is proposed here that the [-low], [-ATR] specification of an underlyingly low vowel in a case like 'we (inclusive) are doing' results from the following sequence of rule applications: (1) [ATR] Harmony takes place, (2) the rule assigning [-low] to a [+ATR] vowel applies, (3) resyllabification takes place, triggering (4) a loss of [ATR]-bearing status.

To illustrate this chain of events, I will contrast the derivation of 'to pull' (where a non-low suffix surfaces as [+ATR] as expected in a [+ATR] context) with 'we (inclusive) are doing' (where a V-initial low suffix surfaces as [-ATR] in a [+ATR] context). At the level of the stem, two things happen: (i) syllabification takes place in a straightforward fashion in both cases, and (ii) the [+ATR] autosegment links to the newly created rimes. (Recall that it is rimes that constitute ATR-bearing units.)

\[(48)\]

\begin{align*}
\text{a.} & \quad \sigma \quad +A \quad R \\
& \quad X \quad X \quad t \quad i \\
\text{b.} & \quad \sigma \quad +A \quad R \\
& \quad X \quad X \quad r \quad u
\end{align*}

Affixation then creates the following configurations:

\[(49)\]

\begin{align*}
\text{a.} & \quad \sigma \quad +A \quad R \\
& \quad X \quad X \quad X \quad t \quad i \quad q \\
\text{b.} & \quad \sigma \quad \sigma \quad \sigma \quad R \quad +A \quad R \\
& \quad X \quad X \quad X \quad r \quad u \quad a
\end{align*}

The crucial difference between the two cases involves the presence of underlying syllabification in (49b) because of the low-vowel affixes and the absence
of underlying syllabification in the affixes of (49a). Since (49b) is completely syllabified, the syllabification rule in (36) is inapplicable; with (49a), on the other hand, syllabification derives the following:

(50) a. 

ATR Harmony applies in both cases to derive:

(51) a. 

Recall from sections 3.2 and 3.4 that redundancy rules begin their application as early as possible on the stratum to which they are assigned, and they apply whenever they can from the point at which they begin to apply. This means that one of the times that the rule assigning [-low] to [+ATR] vowels (31c) is applicable (as well as the other rules assigning [-low]) is immediately after the rule of ATR Harmony. In cases like (51), this means the following (where for reasons of exposition only vowel specifications are indicated):

(52) a. 

Since all the vowels in (52) are [+ATR] as a result of [ATR] Harmony, all vowels receive [-low] by the redundancy rule (31c) (Of course, they may also receive [-low] by virtue of being [+round] or [+high]).
But there is a problem with the syllabification of (52b). Just as in (40a) above, (52b) contains an unacceptable sequence of adjacent vowels. As a result, the second rime must be deleted (just as in (40a)):

(53)

Loss of the second rime in (53), however, produces a situation where an [ATR] autosegment is associated to a skeletal position that is NOT a rime, that is, the final segment above. I assume, following Haraguchi [1977:290], that an autosegment is automatically delinked if the slot it is linked to ceases to be P-bearing. Since the final segment in (53) is no longer ATR-bearing, this means that the [+ATR] autosegment delinks:

(54)

The parallel that has been drawn between a case such as that in (54) and a case such as ędę (40a) now breaks down in one important sense. After loss of rime status, the suffix -q in ędę cannot be resyllabified and therefore is not pronounced; in the case of Ṛrwė, however, loss of rime status in (54) feeds the reapplication of the regular syllabification rules producing

24 Haraguchi actually formulates the constraint with respect to tone, hence the interpretation here is slightly generalized.
the well-formed configuration below:\textsuperscript{25}

\begin{equation}
(55)
\end{equation}

\begin{equation}
\begin{array}{cccc}
\sigma & \sigma \\
R+ & A \\
X+X & X+X \\
-\text{lo} & -\text{lo} \\
\text{+hi} & \text{+hi} \\
\text{+rnd} & \text{+rnd} \\
e & r \\
w & w \\
\hat{e} & \hat{e} \\
\end{array}
\end{equation}

At this point in the derivation, one additional assumption guarantees the correct surface result, namely the assumption that spreading of autosegments is NOT automatic [Pulleyblank 1983]. If automatic spreading were assumed, as in Goldsmith [1976], then the [+ATR] autosegment present in (55) would be re-assigned to the final vowel after resyllabification, producing the incorrect surface form \textit{e!rwe}. If spreading is rule-governed rather than automatic, then it is inapplicable in (55) provided that ATR Harmony is ordered before resyllabification.\textsuperscript{26} And if spreading does not take place, then the value [-ATR] is redundantly assigned to the final vowel in (55) producing the correct surface form \textit{e!rwe}.

To summarize, this analysis makes crucial use of the following assumptions: (i) low vowels in Okp\text{e} are underlyingly unspecified, therefore requiring underlying syllabification to identify them as vowels; (ii) redundancy rules apply according to the general principles outlined in section 3; (iii) [ATR] autosegments are automatically dissociated from any skeletal position that ceases

\textsuperscript{25}Note that in both (55) and (50), glide formation would (by Automatic Dissociation) cause the [+ATR] autosegment to delink. In (50), such delinking would be followed by reassociation by the automatic application of the Association Conventions (one-to-one linking), followed by [ATR] Harmony (since delinking in (50) is caused by initial syllabification). In (55), delinking would trigger no further rules since the [+ATR] autosegment would not be floating, and since [ATR] Harmony would already have applied (delinking being triggered by resyllabification).

\textsuperscript{26}See Steriade [1982] for cases where rules adjusting syllabification are non-initial.
to be [ATR]-bearing; (iv) spreading of autosegments is not automatic. Given these assumptions, the surface manifestation of an underlyingly low vowel as [ə] in an appropriate [+ATR] context is derived without the postulation of any special rules.

5. Conclusion

This paper has argued that the changes observed when low vowels appear in [+ATR] harmonic contexts can be accounted for without positing special, ad hoc feature-changing rules. Cases where a low vowel surfaces as [e] have been shown to result automatically from the interaction of the redundancy rules with a general rule of [ATR] Harmony; cases where a low vowel surfaces as [ə] result from a comparable interaction of harmony and underspecification, in conjunction with an independently motivated rule of desyllabification.

It is to be expected that the various principles of a modular grammar (cf. Chomsky [1981]) will interact to produce a rich variety of surface representation. This has been argued to be the case for low vowel alternations in Okpê.
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/-a/- REDUCTION PHENOMENA IN LUYIA

Gerard M. Dalgish
Baruch College, CUNY

A discussion of the complex segmental morphophonemics of the distant past tense marker /-a-/ in OluTsootso. Its interaction with other rules and conditions in the language is placed in the perspective of unifying disparate data, demonstrating the power of the paradigm, and avoiding homophony.

1. Introduction

This paper is a discussion of the alternations involving the morpheme /-a-/ , a distant past tense marker in the OluTsootso dialect of Luyia, a Bantu language of Kenya.¹ This morpheme appears before the verbal root in certain past tense constructions, and also as the so-called "associative -a-" in relative clause and possessive constructions. The more complex and therefore interesting alternations surround its use in the verbal paradigm, so only occasional mention of the relative and possessive constructions will be made.

While there has been much discussion of segmental alternations in Bantu languages of root-final segments when followed by the past tense suffix -ile (see Kisseberth [1976] and Dalgish [1977] among many others), there has not been much attention to segmental alternations involving root-initial non-nasal elements and the prefixes causing such alternations. As this paper will show, the alternations on that side of the root are every bit as complex and interesting as root-final changes, especially when taken in the context of the entire phonology of the language.

¹Guthrie classifies Luyia as E. 32. The data herein were collected under an NDFL Title VI Fellowship for a period of over three years consulting with Mr. O. Tsuma, a native speaker of OluTsootso.
This paper will therefore attempt to provide a unified account of the data involving /-a-/ , unified in the sense that all the alternations involving /-a-/ will be treated together, while maintaining the integrity of the other rules and meta-conditions found to function in the rest of the phonology. In addition, the role of the paradigm, in a sense to be discussed later, turns out to be of crucial importance in understanding the motivation for the complexities of the /-a-/ rules. Finally, there will be an appeal to the principle of avoidance of homophony to account for the language's insistence on exceptions to some of the /-a-/ rules.

2. Background Rules

To appreciate the /-a-/ reduction rules, a brief look at contexts not involving this morpheme must precede. The alternations and rules for these data are motivated more fully in Dalgish [1976]; a few examples and a brief discussion and formulation should suffice for our purposes.

In certain contexts, a sequence of two underlying vowels surfaces unchanged:

(1) /i-ar-nga/  
    cl.5 SM-split-T(ense)  →  liaraanga\(^2\)  
    'it splits'

/βa-asamul-nga/  
    Cl.2 SM-sneeze-T  →  baasamulaanga  
    'they sneeze'

/oxu-um-a/  
    Cl.15-dry-T  →  oxuuma  
    'to dry'

Glide Formation and Compensatory Lengthening occurs regularly for sequences of /u-V/ (but not for /i-V/ as (1) shows), except when V is itself /u/:

(2) /oxu-iβ-a/  
    Cl.15-steal-T  →  oxwiβa  
    'to steal'

/βu-akam-nga/  
    cl.14 SM-come to an end-T  →  βwaakamaanga  
    'it comes to an end'

\(^2\)A vowel copy rule applies to insert a in these forms of the present tense. See Dalgish [1976].
Vowel Coalescence occurs when underlying sequences of /a-V/ surface (note that we are not discussing the past tense /-a/- here yet). If V is non-low, it becomes mid, and the preceding /-a/- becomes mid as well. Contrast the second example in (1) with the examples below:

(3) /βa-β-nga/ → βeeβaanga
cl.2 SM-steal-T 'they steal'

/ka-eleel-nga/ → keeleelaanga
cl.6 SM-dangle-T 'they dangle'

/βa-um-nga/ → βoomaanga
cl.2 SM-dry-T 'they dry'

/βa-or-nga/ → βooranga
cl.2 SM-bask-T 'they bask'

A y is inserted to break up sequences of three vowels, as the following data with the reflexive (R) morpheme /-i-/ show.

(4) /i-i-el-nga/ → liiyelaanga
cl.5 SM-R-select-T 'it selects itself'

/xu-i-ir-nga/ → xwiixiraanga
lpl. SM-R-kill-T 'we kill ourselves'

/βa-i-ononi-nga/ → βeeyononiinja³
cl.2 SM-R-spoil-T 'they spoil themselves'

The examples below show that a rule inserting y- in initial position must be posited. This has been discussed elsewhere in Dalgish [1976] as part of a general condition to prevent sequences of word-initial VV from appearing. This will have significance in later discussion, but for now please note that both y-insertion rules may sometimes apply:

³A vowel copy rule related to the one mentioned in footnote 2 applies to these forms as well. See Dalgish [1976].
Before a nasal cluster, vowels are lengthened. Note that once a vowel is lengthened word-initially, γ-Insertion must apply:

(6) /βa-N-βaamb-nga/ → βaambaambaanga
   cl.2 SM-lsg OM-sacrifice-T  'they sacrifice me'
/a-N-ram-nga/ → yaandamaanga
   cl.1 SM-lsg OM-defeat-T  's/he defeats me'

The following points emerge from this brief overview of the regular alternations of vowel sequences. Generally, when a vowel is deleted (as in Glide Formation) or its color changed (as in Coalescence), the number of underlying vowel morae is superficially preserved (by Compensatory Lengthening in Glide Formation and by allowing two morae to surface in Coalescence). When γ is inserted, there is no change in vowel morae quantity. Up to now, only in Pre-nasal Cluster Lengthening (PNCL) does the number of vowel morae change from underlying to surface forms.

3. **Alternations with /-a-/ .**

We are now in a position to examine actual alternations with the morpheme /-a-/ as past tense marker.

3.1. **/-a-/ + Consonant.** We will begin the discussion with forms in which root-initial consonant is preceded by /-a-/ . Note the following alternations:

(7) /li-a-fimb-a/
   cl.5 SM-a-cover-T/A  →  lyafimba
   'it covered'
/βa-a-fimb-a/
   cl.2 SM-a-cover-T/A  →  βafimba
   'they covered'
/xu-a-lum-a/
   lpl SM-a-bite-T/A   →  xwaluma
   'we bit'
The first example in this set illustrates a pattern for all i-final prefixes. Instead of the normal nondevocalization of i before a vowel (compare (1)), a special devocalization of this vowel takes place before the /-a-/ past tense marker when a consonant follows /-a-/ . In addition, Vowel Reduction must take place, as the second example /βafiimba shows (compare (1) again). Third, note that although devocalization of u takes place, there is no apparent compensatory lengthening of the following /-a-/ (compare (2)). Finally, the last example shows that y is inserted initially even though two vowels do not surface, as long as the second underlying vowel is the past tense /-a-/ (compare (5) and (6)).

These data indicate that we need special rules for the vowel sequences arising with /-a-/: special devocalization of i and a more general reduction of vowel sequences arising from V+/-a-/. Since in so many other contexts certain generalizations concerning vowel sequences seem to hold up, it seems more desirable to maintain as much as we can of the substance of these generalizations in the formulation of any of the special rules needed by this /-a-/ data. Thus, the special devocalization of i before /-a-/ will be assumed to have Compensatory Lengthening accompanying it, since u is compensatorily lengthened whenever it is devocalized. Since the examples with a-final prefixes necessitate an /-a-/ Reduction rule, it will be assumed that the same rule applies to any vowel sequences arising from V+/-a-/. The rules are stated below and listed in the order guaranteeing correct output:

<table>
<thead>
<tr>
<th>Underlying</th>
<th>Glide Form. &amp; Comp. Length.</th>
<th>/-a-/- Reduct.</th>
<th>Surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>/li-a-fiimba/</td>
<td>ly-a-a-fiimba</td>
<td>ly-a-fiimba</td>
<td>[lyafiimba]</td>
</tr>
<tr>
<td>/βa-a-fiimba/</td>
<td>---</td>
<td>βa-fiimba</td>
<td>[βafiimba]</td>
</tr>
<tr>
<td>/xu-a-luma/</td>
<td>xw-aa-luma</td>
<td>xw-a-luma</td>
<td>[xwaluma]</td>
</tr>
<tr>
<td>/a-a-lasa/</td>
<td>---</td>
<td>ya-lasa</td>
<td>[yalasa]</td>
</tr>
</tbody>
</table>

\[Dalgish [1976] provides extensive documentation of the extent to which devocalization is accompanied by compensatory lengthening.\]
Note that it is impossible to determine from these data which of the two underlying vowels have been deleted in sequences of \( V + /-a/ \). As the data become more complex, so does this question.

3.2. /-a-/ + Vowel. We now turn to cases where /-a-/ is followed by a vowel-initial morpheme, which in OluTsootso comprise two sets: /-a-/ followed by a vowel-initial root or /-a-/ followed by the reflexive marker, /-i-/.

We begin this section in turn with the simplest cases, in which a-final prefixes precede /-a-/ followed by vowel-initial roots or the reflexive marker /-i-/.

(9) \[ /\beta a-a-ar-a  \]
\[ + 13aara  \]
cl.2 SM-a-split-T/A
'\( \text{they split} \)'

\[ /ka-a-or-a/  \]
\[ + koora  \]
cl.6 SM-a-bask-T/A
'\( \text{they basked} \)'

\[ /\beta a-a-i-lum-a/  \]
\[ + \beta e\ell u\text{ma}  \]
cl.2 SM-a-refl-bite-T/A
'\( \text{they bit themselves} \)'

If we consider first /\( \beta a-a-ar-a/ \) \( + \beta aara \) 'they split', we note that /-a-/ Reduction has taken place, but it is impossible to determine which vowel has in fact been deleted. The last form, /\( \beta a-a-i-lum-a/ \) \( + \beta e\ell u\text{ma} \) 'they bit themselves', shows that Coalescence applies, but it is not clear again which vowel has been deleted.

One possibility is that the /-a-/ morpheme first triggers Coalescence with the following /-i-/ , changing /i/ to intermediate /e/ while /-a-/ retains its height. Then, /-a-/ is deleted, leaving the a of the subject marker to coalesce with the newly created /e/ to produce superficial -ee-. Another possibility is that Coalescence applies iteratively to produce an intermediate sequence of /\( \beta e-e-e-lum-a/ \) , which is subsequently shortened by /-a-/ Reduction to \( \beta e\ell u\text{ma} \). We cannot yet determine which of these alternatives is correct.

Another set of alternations are those in which i-final subject prefixes precede /-a-/.

(10) \[ /i\i a-a-ar-a/ \]
\[ + liara  \]
cl.5 SM-a-split-T/A
'\( \text{it split} \)'
Recall our earlier statement about the devocalization of \( i \) before \(-a-/\) and a consonant (see the data in (7) and the following discussion.) That itself was a special situation, since \( i \) does not devocalize unless surrounded by vowels. The examples here in (10) do not show devocalization of \( i \), yet there has been \(-a-/\) Reduction. This special devocalization of \( /i/ \) before \(-a-/\) and a consonant would be correctly blocked in the forms in (10) if the rule is stipulated to apply before \(-a-/\) Reduction, since at that point a consonant does not follow \(-a-/\). It will be recalled that Glide Formation of both \(/u/ \) and \(/i/ \) was posited as applying before \(-a-/\) Reduction for the forms of (8) as well, thus allowing us to maintain the same rule ordering for different data.

Glide formation and \(-a-/\) Reduction appear in data where \(-a-/\) is preceded by \( u \)-final prefixes and followed by a vowel-initial root or by the reflexive marker.

(11) \(/xu-a-ar-a/\)  
  1pl. SM-a-split-T/A  
  \( \rightarrow \) xwaara  
  'we split'

\(/mu-a-or-a/\)  
  2pl. SM-a-bask-T/A  
  \( \rightarrow \) mwoora  
  'you basked'

\(/lu-a-i-fiimb-a/\)  
  c1.11 SM-a-refl-cover-T/A  
  \( \rightarrow \) lweefiimba  
  'it covered itself'

In keeping with previous findings, it should be proposed that Glide Formation (with Compensatory Lengthening) and Coalescence apply before \(-a-/\) Reduction.

We may now summarize our discussion of the forms in 3.2 by proposing the following rule-orderings and derivations:
(12) Underlying $\beta a-a-i-lu-m-a / li-a-ar-a / mw-a-or-a$
Glide Form. & --- --- $mw-aa-or-a$
Comp. Length.
Coalescence $\beta e-e-e-lu-m-a$ --- $mw-o-o-or-a$
/-a/- Reduct. $\beta e-e-lu-m-a$ $li-ar-a$ $mw-o-or-a$
Surface $[\beta e l u m a]$ $[li a r a]$ $[m w o o r a ]$

Note that similar rule-orderings will account for the data of 3.1 as well:

(13) Underlying $xu-a-lu-m-a / li-a-ar-a / li-a-fiilmb-a$
Glide Form. & $xw-a-a-lu-m-a$ --- $ly-a-a-fiilm-b-a$
Comp. Length.
Coalescence --- --- ---
/-a/- Reduct. $xw-a-lu-m-a$ $li-ar-a$ $ly-a-fiilm-b-a$
Surface $[xw a l u m a]$ $[li a r a]$ $[l y a f i l m b a ]$

Finally, note that in all these forms, the rule of $\gamma$ Insertion ($\emptyset + \gamma /VV_V$) never applies. If we order this rule after /-a/- Reduction, the former will be correctly blocked from applying.

The rule of /-a/- Reduction then will be understood to operate on identical sequences formed with /-a/-, reducing such sequences by one vowel mora.

3.3. /nd-/ prefixed forms and /-a/- Reduction. At this point it will be useful to present some data involving first person singular subject prefixes followed by /-a/- . I consider the first person singular subject marker to be underlying /nd-/ .5 This morpheme is the only consonant-final subject prefix in the language (the corresponding first person singular object marker, /N/, is the only consonant-final object marker). As we shall see, this is a significant factor.

5Another possibility is that this morpheme is /ndi-/ , which does in fact surface in other paradigms. The language is, however, riddled with alternative forms for first person singular subject, among them /ndi-/ , /eN/ , /e/ , so one more alternate isn't too unlikely. And even if /ndi-/ were to be posited underlingly, we would still need special rules and conditions that would be peculiar to first person singular forms, the area in which exceptions proliferate. For the purposes of this paper, the postulation of /nd-/ or /ndi-/ makes very little difference.
The alternations with this morpheme and /-a-/ will seem surprising:

(14) /nd-a-fiimb-a/ → ndafiimba
    lsg SM-a-cover-T/A 'I covered'

/nd-a-lum-a/ → ndaluma
    lsg SM-a-bite-T/A 'I bit'

/nd-a-ar-a/ → ndaara
    lsg SM-a-split-T/A 'I split'

/nd-a-or-a/ → ndoora
    lsg SM-a-bask-T/A 'I basked'

/nd-a-i-fiimb-a/ → ndeefiimba
    lsg SM-a-refl-cover-T/A 'I covered myself'

These forms indicate that /-a-/ Reduction has not applied, since the underlying number of vowel morae surface unchanged. Of course, the first two forms, ndafiimba and ndaluma would not be expected to reduce their vowels, since there is only one vowel, the /-a-/ itself, and we had formulated the rule of /-a-/ Reduction to apply to identical vowel sequences formed with /-a-/ . It is the last three forms that provide the puzzling results, since they might be expected to produce *ndara , *ndora , and *ndeefiimba respectively. Note that Coalescence applies as expected in the last two forms but that there is no reduction of the vowels.

Since these forms are the only exceptions to the rule of /-a-/ Reduction, and since they are, nevertheless, a significant set of exceptions (the first person singular form occurs so frequently in discourse), they merit some discussion. It is here that we shall introduce the notion of the role of paradigm pressure in forcing exceptions to /-a-/ Reduction.

If we compare the /nd-/ prefixed forms with corresponding forms of the same paradigmatic type—and by this we mean that /-a-/ is followed by the same type of element, C-initial root or V-initial morpheme—we see that there is good reason for /nd-/ prefixed forms to be exceptions to /-a-/ Reduction.

Consider first instances in which consonants followed /-a-/ , as in (7) earlier. There we saw forms like /1i-a-fiimb-a/ surface as lyafiimba 'it covered', /βa-a-fiimb-a/ appearing as βafiimba 'they covered', and /xu-a-
lum-a/ as xwaluma 'we bit'. In this paradigm, one vowel surfaces when 
/-a-/ is followed by a consonant. /nd-a-fiimba/ then fits right in when it surfaces as ndafiimba 'I covered' since only one vowel mora surfaces here, too.

Then, when /-a-/ is followed by a vowel, as in (9), we saw that /βa-a-ar-a/ appeared as βaara 'they split', while /ka-a-or-a/ surfaced as koora 'they basked', and /βa-a-i-lum-a/ became βeeluma 'they bit themselves'. In this paradigm, two vowels surface when /-a-/ is followed by a vowel. Again, forms like /nd-a-ar-a/ → ndaara 'I split', /nd-a-or-a/ → ndoora 'I basked', and /nd-a-i-fiimb-a/ → ndeefiimba 'I covered myself' fit in, since they surface with two vowels as well. With such complicated sequences of underlying vowels, there would seem to be good reason to maintain superficial similarity in the number of vowel morae, even at the cost of creating an (important) set of exceptions to the rule of /-a-/ Reduction.

We will see that /nd-/ prefixed forms are exceptions throughout the /-a-/ Reduction forms, but in all cases, the power of the paradigm would seem to be a reasonable justification for such exceptions.

3.4. Sequences of /-a-/ followed by two vowels. When the underlying sequence of subject marker /-a-/ , reflexive marker /-i-/ , and a vowel-initial root occur, we find evidence that /-a-/ Reduction occurs, and y Insertion, Glide Formation, and Coalescence take place as well:

(15) Underlying /βa-a-i-ar-a/ /xu-a-i-ar-a/ /li-a-i-ar-a/
Coalescence βe-ee-ara xu-ee-ara li-ee-ara
Glide Formation & Comp. Length.
/-a-/ Reduction βe-e-ara xw-ee-ara li-e-ara
y Insertion βee-y-ara xw-ee-y-ara li-e-y-ara
(Ø → y /VV_V) Surface [βeeyara] [xweeyara] [lieyara]
'they split' 'we split' 'it split themselves' 'ourselves' 'itself'

Note that the special rule of Glide Formation for i- final prefixes that
was necessary earlier for forms in (7), that is, when /-a-/ was followed by a consonant, does not apply here, since /-a-/ is followed by a vowel at the time this special devocalization would apply. The rule orderings posited for earlier data hold up here as well, with Glide Formation and Coalescence preceding /-a-/ Reduction, and γ Insertion following /-a-/ Reduction (cf. 3.2).

Forms with /nd-/ prefixes behave "exceptionally" as expected in this context. From underlying /nd-a-i-ara/ comes surface ndeeeyara, indicating that, as before, /-a-/ Reduction does not apply. But notice again that as with the other prefixes, when two vowels follow /-a-/ in underlying structure, two vowels surface after "a", with γ inserted right where it belongs. If /nd-/ prefixed forms were to "correctly" undergo /-a-/ Reduction, this pattern would be destroyed.

3.5. /-a-/ followed by nasal clusters. We saw in (6) evidence that a rule of Pre-nasal Cluster Lengthening (PNCL) applies. We now turn to the interaction of the reduction rule of /-a-/ and the lengthening rule of PNCL.

The first person singular object marker /N/ appears after /-a-/ and before the root; no other prefix may intervene between them. Consider these underlying and surface forms:

(16) /βa-a-N-βaamb-a/  →  βambaamba
     cl1.2 SM-a-lsg OM-sacrifice-T  'they sacrificed me'

/li-a-N-rama/  →  lianda
     cl1.1 SM-a-lsg OM-defeat-T  'it defeats me'

/ku-a-N-chiing-a/  →  kwaanjiinga
     cl1.3 SM-a-lsg OM-carry-T  'it carried me'

To account for these forms, the following derivations are proposed:

(17) Underlying /βa-a-N-βaamb-a/ /li-a-N-rama/ /ku-a-N-chiing-a/
    PNCL  βa-aa-N-βaamba  li-aa-N-rama  ku-aa-N-chiinga
    Glide Formation & Comp. Length. ---  ---  kw-aaa-N-chiinga
    /-a-/ Reduction  βa-a-N-βaamba  li-a-N-rama  kw-aa-N-chiinga
    γ Insertion  ---  ---  ---
Nasal Rules

βa-a-m-baamba li-a-n-dama kw-aa-n-jiinga

Surface [βaambaamba] [liandama] [kwaanjingga]

We have ordered the rule of Glide Formation to precede /-a-/ Reduction as was done in earlier contexts. Note again that the special devocalization of i is correctly blocked by this ordering, since once PNCL applies, /-a-/ is not directly followed by a consonant.

We have no opportunity to see what would happen if /nd-/ prefixed forms were to appear before /N/. Since both elements refer to first person singular, the reflexivization rule would spell /N/ as /-i-/, and there would be no environment for PNCL. Furthermore, there are no nasal-cluster initial roots before which /-a-/ could appear and interact with the rule of PNCL.

3.6. Summary. To reiterate, the rule of /-a-/ Reduction and the special exceptions that are necessary to accompany it have a unified purpose. /-a-/ Reduction is itself a special, morphologically conditioned rule that is unlike all other rules in the language involving vowel sequences (except PNCL) because it affects the number of vowel morae that surface; it is the only true deletion rule involving vowels. Yet, this rule has exceptions, or triggers the application of an exceptional rule, precisely when such exceptions contribute to a uniform paradigm. First, the exception to the rule of /-a-/ Reduction is all the /nd-/ prefixed forms, which, as it were, start off with fewer underlying vowel morae, because /nd-/ is the only C-final subject prefix in the language (and only subject prefixes and the reflexive marker appear before /-a-/). The failure of /-a-/ Reduction to apply to the /nd-/ prefixed forms ensures that all the forms of the same paradigm (where paradigm is definable in terms of the number of vowel morae following /-a-/) surface with the same number of vowel morae, albeit one less mora when /-a-/ Reduction has applied.

Secondly, the special rule of Devocalization of i when the sequence of /-a-/ + C follows also has the function of ensuring that an equal number of vowel morae surface within a paradigm. /-a-/ Reduction could not have applied to a form like /li-a-fiimba/, because there would have been no sequences of identical vowels formed from /-a-/ to reduce. The resulting surface form
Reduction phenomena in Luyia

*liaflimba* would have two superficial vowel morae, while the rest of the forms of that paradigm have only one. The chaos that would have resulted from such a situation has been avoided by the complication of rules and exceptions we have developed herein.

It turns out that /-a-/ Reduction and its exceptions work together to avoid homophony in certain other contexts. In the next section, we show how the principle of avoidance of homonymy is a factor affecting /-a-/ Reduction and exceptions.

4. Alternations with /-aa-/

This section discusses the morpheme /-aa-/ , a marker of one of the many perfect tenses in OluTsootso. This marker resembles strongly in form, function, and vocalic phenomena the /-a-/ morpheme discussed above. We shall have recourse once again to the notion of paradigm and also to the principle of avoidance of homonymy for forms involving /-a-/ and forms involving /-aa-/

4.1. /-aa-/ + Consonant. In forms like the following, we see that /-aa-/ involves some sort of reduction:

(18) /li-aa-fiimb-a/ → liaflimba
    cl.5 SM-aa-cover-T 'it has already covered'

/βa-aa-lum-a/ → βaaluma
    cl.2 SM-aa-bite-T 'they have a. bit'

/xu-aa-βaamb-a/ → xwaβaamba
    1pl SM-aa-sacrifice-T 'we have a. sacrificed'

It might first be thought that in fact we have simply underlying /-a-/ and no reduction in these forms rather than /-aa-/ and reduction. Two sets of data vitiate this claim. First, /li-aa-i-fiimb-a/ surfaces as lyayeefimba 'it has a. covered itself’. This form and other related forms

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6The morpheme /-aa-/ appears here and in many additional tenses of the past and perfect. The glosses are approximate. I abbreviate "already" as "a." in remaining forms.
show surface a after the first y and show ee that can only have resulted from the underlying sequence of /a+i/. Secondly, /nd-aa-fiimb-a/ surfaces as ndaafiimba 'I have a. covered' without reduction, clearly showing the need for two underlying morae. Both sets of data will be discussed fully below; the important point here is to justify the postulation of /-aa-/ underlyingly.

To account now for the forms of (18), it is proposed that the following derivations apply:

(19) Underlying /li-aa-fiimb-a/ /βa-aa-lum-a/ /xu-aa-βaamb-a/
    Glide Formation & --- --- xw-aa-βaamb-a
    Comp. Length.
    /-a-/ Reduction li-a-fiimb-a βa-a-luma xw-aa-βaamba
    y Insertion --- --- ---
    (Ø + y /VV_V)
    Surface [liafiimba] [βaaluma] [xwaaluma]

Note that we do not see special devocalization of i in liafiimba. We might claim that the first of the two underlying a's is the /-a-/ from the previous section, and so when it is followed by a vowel, in this case the second a, special devocalization is blocked.

Rather than have a new reduction rule apply to forms involving /-aa-/ , it would seem to make more sense to claim that the regular rule of /-a-/ Reduction then applies, affecting sequences of two identical vowels involving underlying /-a-/ . The rule of y Insertion is correctly blocked from applying to these forms, since it is ordered after /-a-/ Reduction.

Note again that a paradigmatic structure of syllable structure emerges from these data. When a consonant follows /-aa-/ , two vowel morae surface.

4.2. /nd-/ and /-aa-/ forms. This pattern emerges again when we consider /nd-/ prefixed forms preceding /-aa-/ :

(20) /nd-aa-fiimb-a/  → ndaafiimba
    lsg SM-aa-cover-T  'I have a. covered'

/nd-aa-lum-a/  → ndaaluma
    lsg SM-aa-bite-T  'I have a. bit'
The expected application of /-a-/ Reduction should no longer be expected in light of our earlier discussion. If /-a-/ Reduction were to apply here, the first person singular forms would be isolated from all the other forms of this paradigm by having only one superficial vowel mora. One motivation then for /-a-/ Reduction not to apply here is the same we saw earlier: the tendency in the language to maintain paradigm uniformity overriding the regular application of rules.

It is worthwhile to mention in passing that a second motivation for disallowing the application of /-a-/ Reduction would be to prevent homophony. If we compare the first two forms of (14) with those in (20), we see that if /-a-/ Reduction had applied in (20), the forms in each set would be identical. Avoidance of homonyms is a factor in many of the other forms in this discussion.

4.3. /-aa-/ + Vowel. The situation becomes a little more complicated when we consider sequences of vowels following the /-aa-/ marker. Consider first the following instances of /-aa-/ followed by the reflexive marker /-i-/ and a C-initial root:

(21) /nd-aa-i-fiimb-a/ → ndayefiimba
    lsg SM-aa-R-cover-T 'I have a. covered myself'

/ii-aa-i-fiimb-a/
cl.5 SM-aa-R-cover-T → liyayefiimba
 'it has a. covered itself'

/βa-aa-i-lum-a/
cl.2 SM-aa-R-bite-T → βayeefiimba
 'they have a. bitten themselves'

/xu-aa-i-lum-a/
1pl SM-aa-R-bite-T → xwayeeluma
 'we have a. bitten ourselves'

The first person singular form shows clearly that the rule of γ Insertion (Ø → γ /VV__V/) invoked earlier is not applicable, yet an extra γ appears. However, true to form, the first person singular forms do not exhibit evidence of /-a-/ Reduction, since we do not have *ndayefiimba, with a single e.

Turning now to the surface form of liyayefiimba, we see that special de-vocalization of i has applied, a γ has been inserted, coalescence and re-
duction have taken place. If we were to order \( y \) Insertion (\( \emptyset \rightarrow y / VV_V \)) before \(-a-/\) Reduction, we could have it apply to the underlying form and produce the right output, but this is not what we have found in earlier contexts, where it was clear that \( y \) Insertion follows \(-a-/\) Reduction (cf. (13), (15), and (17)). And we would still be unable to do anything about the \( /nd-/\) prefixed forms, since the phonetic environment for \( y \) Insertion is not even met.

We must invoke a special rule of \( y \) Insertion to apply to break up sequences involving \(-aa-/\) followed by a vowel. Such a rule is necessary for \( /nd-/\) forms and to maintain the rule orderings we have successfully motivated elsewhere. This rule will then apply very early in the derivation, and will account for all the forms of (21).

(22) Underlying

\[
/nd-aa-i-fiimba/ \quad /li-aa-i-fiimba/ \quad /\beta a-aa-i-luma/ \quad /xu-aa-i-luma/
\]

Special \( y \) Insertion

\[
nd-a-y-a-i-fiimba \quad li-a-y-a-i-fiimba \quad \beta a-a-yee-i-luma \quad xu-a-yeeluma
\]

Coalescence

\[
nd-a-yee-fiimba \quad li-a-yee-fiimba \quad \beta a-a-yee-luma \quad xu-a-yeeluma
\]

Glide formation & Comp. Length.

\[
--- \quad ly-a-yee-fiimba \quad --- \quad xw-aa-yee-luma
\]

\(-a-/\) Reduction

\[
--- \quad ly-a-yee-fiimba \quad \beta a-yee-luma \quad xwa-yee-luma
\]

\( y \) Insertion

\[
--- \quad --- \quad --- \quad ---
\]

Surface

\[
[ndayeefiimba] \quad [lyayeefiimba] \quad [\betaayeeluma] \quad [xwayeeluma]
\]

Note that the special devocalization of \( i \) is properly triggered by the intermediate form \( /li-a-y-a-i-fiimba/\) created by Special \( y \) Insertion for sequences of \(-aa-/\) and a vowel. Once the \( y \) is there, special devocalization and Compensatory Lengthening of the prefixal-final \( i \) can apply.

Lest it be thought that Special \( y \) Insertion is really just the regular rule in disguise, there are forms which indicate that both rules have applied. This occurs when \(-aa-/\) is followed by \(-i-/\) and a vowel-initial root:
The derivations of these forms would follow the same order as we saw earlier. Special γ Insertion for sequences of /-aa-/ applies, yielding intermediate /nd-a-y-a-ira/, /li-a-y-a-i-ira/, /xu-a-y-a-i-osia/, and /βa-a-y-a-i-umia/, respectively. Coalescence applies to all the forms to give us the necessary -ee- sequences, and then glide formation with compensatory lengthening applies to /li-a-yee-ira/ and /xu-a-yee-osia/ to produce /ly-aa-yee-ira/ and /xw-aa-yee-osia/. The rule of /-a-/ Reduction would then apply to all forms except the first person form /nd-a-y-ee-ira/, producing /ly-a-yee-ira/, /xw-a-yee-osia/, and /βa-yee-umia/, respectively. The regular rule of γ Insertion then applies, and we obtain [ndayeeyira], [lyayeeyira], [xwayeeyosia], and [βayeeyumia].

4.4. /-aa-/ and PNCL. When the first person singular object marker /N/ follows /-aa-/ , the environment for PNCL is met, and there is interaction of /-a-/ Reduction, PNCL, and Special γ Insertion:

(24) /li-aa-N-chiinga/  →  liyaanjainga
    cl.5 SM-aa-lsg OM-carry 'it has a. carried me'

/ku-aa-N-chiinga/  →  kwayanjainga
    cl.3 SM-aa-lsg OM-carry 'it has a. carried me'

/βa-aa-N-rama/  →  βayaandama
    x1.2 SM-aa-lsg OM-defeat 'they have a. defeated me'

Derivations are provided in (25):
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(25)
PNCL          li-aa-N-chiinga   ku-aa-N-chiinga   βa-aa-N-rama
Special γ Insertion li-ayaa-N-chiinga ku-ayaa-N-chiinga βa-ayaa-N-rama
Glide Formation & Comp. Length. ly-aayaa-N-chiinga kw-aayaa-N-chiinga ---
/-a-/ Reduction ly-a-yaa-N-chiinga kw-a-yaa-N-chinga βa-yaa-N-ram
nasal interactions; [Iyayaanjiinga] [kwayaanjiinga] [βayaandama]
Surface

With the addition of the Special γ Insertion for /-aa-/ , the data are accounted for, and previously motivated rules and rule orderings have been maintained.

5. /-aa-/ + Vowel-initial Roots

The discussion has deliberately bypassed a set of data that seem most anomalous and exceptional, the cases where /-aa-/ is directly followed by a vowel-initial root. These forms are exceptional, but as we shall see, without this exceptionality, an overwhelming amount of homophony would result.

5.1. Data. Initial data are presented in (26):

(26) /nd-aa-iβa/ 1 sg SM-aa-steal  →  ndayeβa 'I have a. stolen'
    /li-aa-ira/ cl. 5 SM-aa-kill  →  lyayera 'it has a. killed'
    /xu-aa-ula/ lpl SM-aa-arrive →  xwayola 'we have a. arrived'
    /βa-aa-ara/ cl. 2 SM-aa-split →  βayara 'they have a. split'

The first problem is that the first person singular subject forms, like ndayeβa, seem to have undergone some reduction, a clear violation of all that has gone before, where all first person singular subject forms were exceptions to the reduction process. This includes cases where /-a-/ was followed by a vowel-initial root and when both /-a-/ and /-aa-/ were followed
by the reflexive marker /-i-/ (with or without yet another vowel following).

Secondly, there seems to be evidence from the last three examples that two kinds of reduction have taken place, since vowels on both sides of the inserted y are short. This, too, is not in keeping with what we have seen everywhere, since in all other cases reduction involved only one vowel (note (22) and (23)). Given derivations and rule orderings from earlier data, we may propose the following derivation for these forms:

(27)

| Underlying | nd-aa-_/βa/ | /i/-aa-ira/ | /xu-aa-ul/ | /_/βa-aa-ara/ |
| Special y   | nd-aya-_/βa | /i/-aya-ira | xu-aya-ul | /_/βa-aya-ara |
| Insertion   |             |             |           |               |
| Coalescence | nd-aye-e_/βa| /i/-aye-era  | xu-ayo-ola| ---           |
| Glide       | ---         | ly-aye-era   | xw-aayo-ola| ---           |
| Formation & |             |             |           |               |
| Comp. Length. |             |             |           |               |

At this point we see that the rule of /-a-/ Reduction should apply. In previous cases where /-a-/ Reduction applied with the marker /-aa-/ , it was always the first [a] that was involved in the reduction, never the second (cf. (19), (21), (22), and (23)). We can salvage something if that generalization is maintained, as below:

(27) continued

/-a-/ Reduction --- ly-aye-era xw-aayo-ola /_/βa-ya-ara

We see on closer examination that the /nd-/ prefixed form can still be an exception to our "regular" rule of /-a-/ Reduction, but that is at least in keeping with what went before. What remains is to propose a special rule of reduction for sequences involving the second [a] of /-aa-/ when a vowel-initial root directly follows. This rule is special in that it now applies to /nd-/ prefixed forms, but it involves the second [a] of /-aa-/: 

(27) continued

Special Reduction nd-aye_/βa ly-ayera xw-ayola /_/βa-yara

Surface [ndaye_/βa] [lyayera] [xwayola] [_/βayara]

Note that we were able to maintain our regularity about the exceptionality
of /-a-/ Reduction for /nd-/ prefixed forms, because that rule of reduction still does not apply to these forms. Happily, the correct non-application of that rule, combined with the special application of Special Reduction for these forms, maintains a consistent profile for the forms of that paradigm.

5.2. Avoidance of homophony. Two sets of data suggest that an appeal to the avoidance of homophony is appropriate for accounting for much of this exceptionality. The first set of data involves certain i-initial verb roots which are homophonous with consonant-initial roots that are preceded by the reflexive marker /-i-/.

Other such forms are listed in Dalgish [1976]. If we examine some of these verbs in the perfect tense with /-aa-/ , we can see that potentially homophonous forms are kept distinct by Special Reduction, which applies to the verbs in the left column (i-initial verbs), but not to the verbs in the right (when reflexive /-i-/ precedes a consonant-initial root):

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(28) **i-initial root** /-i/ + C-initial root

| /ikul/ | 'open' |
| /ilim/ | 'get dark' |
| /ir/ | 'kill' |
| /i-kul/ | 'buy (for) self' |
| /i-lim/ | 'cultivate self' |
| /i-r/ | 'put self' |

The crucial difference between these forms is the length of the vowel -e-. It is long if it is underlyingly the reflexive marker and short if underlyingly root-initial i. The rule separating these vowels is Special Reduction.

The second set of data pointing toward the principle of avoidance of homophony is certain y-initial roots vs. certain vowel-initial roots. In Olu-
Tsotso, there are a number of $\gamma$-initial roots that differ from vowel-initial roots only in the length of the first vowel. Again, a more exhaustive list is provided in Dalgish [1976], but a few forms are listed in (30):

(30) **$\gamma$-initial roots**

<table>
<thead>
<tr>
<th>Vowel-initial roots</th>
<th>vowel-initial roots</th>
</tr>
</thead>
<tbody>
<tr>
<td>yaanz 'like'</td>
<td>anz 'arrange'</td>
</tr>
<tr>
<td>yeeel 'land, set'</td>
<td>el 'select'</td>
</tr>
<tr>
<td>yeeng 'brew'</td>
<td>eng 'ripen'</td>
</tr>
</tbody>
</table>

Now, compare the $\gamma$-initial verb roots in the distant past tense with the vowel-initial roots in the perfect tense:

(31) **$\gamma$-initials, /-a-/**

<table>
<thead>
<tr>
<th>Vowel-initials, /-aa-/</th>
</tr>
</thead>
<tbody>
<tr>
<td>/li-a-yaanza/ → iyayaanza 'it liked'</td>
</tr>
<tr>
<td>/ku-a-yeela/ → kwayeela 'it set'</td>
</tr>
<tr>
<td>/ba-a-yeenga/ → baayenga 'they brewed'</td>
</tr>
</tbody>
</table>

Without Special Reduction affecting the second vowel of /-aa-/ before a vowel-initial root, the verbs in both columns would surface with long -ee- and be homophonous. In addition, a few other forms are dept distinct by this exceptional rule: compare /nd-a-yeexa/ → ndayeexa 'I leaned' and /nd-aa-ixa/ → ndayexa 'I have a. sat'. The exceptional reduction then has a clear and important function in reducing potential ambiguity resulting from homophony.

6. **Conclusion**

This paper has started with some of the more direct and simpler vocalic alternations, introduced the /-a-/ marker and the reduction rule necessary for its alternations, and concluded with a discussion of certain seemingly ad-hoc additional rules, exceptions, and conditions which turn out to be motivated by two important considerations: the power of the paradigm and the avoidance of homophony. We saw that /nd-/ prefixed forms were consistently exceptional to the rule of /-a-/ Reduction, but with good reason: all related
forms in the paradigm then surface with the same number of vowel morae. And we had need for an additional, special rule of reduction for /-aa-/ and vowel-initial roots, which, it turned out, helped to prevent homophony between forms in the same tense and certain other forms in different tenses. These two forces in the language accompany and in some sense justify exceptions and conditions to otherwise regular and complicated phenomena.

REFERENCES


LEXICALIZING DIRECTIONAL AND NONDIRECTIONAL MOTION
IN EMAI

Ronald P. Schaefer
University of Kansas

Motion expressions in Emai, an Edoid language of Nigeria, are examined within the lexical typology of Talmy [1985]. Both directional and nondirectional motion structures involving the MANNER verb la 'to run' are analyzed, though only the former, syntactically expressed by verbs in continuous series, poses a particular problem for interpretation. Three hypotheses concerning the semantic composition of these serial verbs are considered and evaluated in terms of their distributional constraints. It is concluded that nondirectional motion can be lexicalized by either of two patterns [MOTION+MANNER] PATH or MOTION PATH...MANNER, while directional motion allows only the single lexicalization pattern MANNER [MOTION+PATH]. Typologically, these reflect two of the incorporation patterns Talmy has identified as characteristic in languages of the world.

0. Introduction

This paper examines lexicalization processes in Emai, an Edoid language of Bendel State, Nigeria. It is concerned with the different patterns by which surface level morphemes realize elements common to the semantic structuring of

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1Preparation of this study was supported at different stages by a Faculty Research Grant from the University of Benin, Nigeria, and NICHD Postdoctoral Training Grant #HD07255 administered by the University of Kansas. Special thanks are due my Emai assistants, Francis Egbonhare and Gabriel Egeruan. Additional appreciation is extended to Russell G. Schuh and an anonymous reviewer for their comments identifying failure of exposition and illustration in an earlier draft.

2Emai constitutes one third of the Emai-Ora-Iuleha dialect cluster spoken in Owan Local Government Area of Bendel State, Nigeria. It is classified within the Kwa family as North Central Edoid by Hansford, Bendor-Samuel, and Stanford [1976].
motion situations. Narrowing analysis in this fashion reveals some of the more salient properties of structurally significant lexical items in the field of motion and, in addition, affords an opportunity to explore interrelationships between lexicalization processes and sentence structure.

In order to carry out this task, the theoretical framework of Talmy [1972, 1975, 1985] is employed. This model, arising from analysis of the motion domain in a number of unrelated natural languages, has delineated a typology of relevant lexicalization processes. As applied here they allow the specific patterns in Emai to be placed in a wider perspective, enhancing our appreciation of their potentially universal properties. A brief overview of the Talmy model follows.

1. Talmy's Model

Analysis could not begin without a consensus, however tentative and inexact, about what constitutes a motion event and how it is delineated at the semantic level. For Talmy [1975, 1985] a motion event is basically viewed as one object moving or located with respect to another. At the semantic level this configuration is codified by the components FIGURE, MOTION, PATH, GROUND, and MANNER, with MOTION being further specified as either MOVE, i.e. directional motion, or BE LOCATED, i.e. nondirectional motion.

Each of these principal components, especially MOTION, PATH, and MANNER, will be briefly identified and illustrated so that their role in different patterns of lexicalization become more familiar. To achieve this goal, our attention will focus on surface level verb roots with respect to their incorporation of motion components. A priori, a number of incorporation types are possible, e.g. FIGURE+PATH, MOTION+GROUND, MOTION+PATH, etc., but cross-linguistic evidence gathered by Talmy [1985] argues that only three predominate in natural language, each involving the element MOTION and one of the remaining components except GROUND. Two of these lexicalization patterns, MOTION+MANNER and MOTION+PATH, are relevant for the present study.

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3A similarly broad use of the term "motion" is found in Langacker [1982, 1985].
To clarify our understanding of Talmy's framework, let us consider examples in English where no incorporation takes place, the directional and nondirectional sentences below.

(1) a. The man moved into the house.
   b. The man was in the house.

In each of these man functions as the FIGURE, the moving object in the directional structure (la) as well as the object to be located in the nondirectional (lb). The object with respect to which the FIGURE moves or is located, the GROUND, is indicated by house. As for PATH, which refers to the course followed or site occupied by the FIGURE, it is realized by the preposition into in (la) and in in (lb). Finally, the component MOTION, further specified as MOVE or BE-LOCATED, indicates that reference is being made to the movement or location of an object. It is registered in the sentences of (1) by the verbs moved and was. To this point, however, our analysis is hardly more than a reinterpretation of traditional parts of speech.

A minimally specified motion event as seen above can be augmented through the expression of MANNER. As an example of how this component can be realized among surface level verb roots, consider the ensuing English constructions.

(2) a. The man is running into the house.
   b. The man is running in the house.

Here the functions of FIGURE and GROUND are realized, as in (1), by man and house, respectively, and similarly PATH is realized by into and in. As for the fact of MOTION, it is expressed in (2) by the verb running. More pertinent is this verb's incorporation of how the event takes place, i.e. running, thereby establishing a MOTION+MANNER lexicalization type. It is through such analysis that the characteristic pattern for specifying MANNER in English, Chinese, and most Indo-European languages has been identified by Talmy [1985]. As highlighted below, this pattern is not characteristic for all languages.

A second pattern allowing for the specification of MANNER is characteristic of Romance, Samoan and Semitic languages. By way of borrowing through French [Talmy 1972, 1985], it can be illustrated with the English example in
(3), where again the main verb root is the focus of attention.

(3) The man entered the house (by) running.

For ease of analysis the FIGURE and GROUND elements maintain agreement with the earlier sentences, leaving us to identify the placement of MOTION, PATH, and MANNER among surface level morphemes. Of these, MOTION and the directional PATH are incorporated in the main verb entered, more analytically rendered as 'move into'. Lexicalizing MOTION+PATH in the verb root, it should be noticed, contrasts with the MOTION+MANNER pattern established by (2), and as for MANNER in (3), it is specified at the surface level by the adjunct running. Our attention therefore rests on the verb of the main clause which does not incorporate MANNER and the adjunct which does not incorporate MOTION.

Though perhaps too briefly outlined, the preceding sentences reveal typological patterns of semantic incorporation. One pattern, e.g., the man is running into the house, employs a main verb incorporating both the fact of MOTION and its MANNER of occurrence, but expresses PATH through a separate lexical item, i.e. into. A contrasting pattern, e.g. the man entered the house running, relies on the coalescence of both MOTION and PATH concepts in the main clause verb root, but expresses MANNER in a separate phrase, running. Still a third pattern is evident among Hokan languages of California, but its non-occurrence in Emai allows us to set it aside for the present.4

2. MOTION in Emai

It is obvious that the entire range of sentences used to express motion in Emai cannot be examined herein. In fact, discussion will be limited to MANNER specifying constructions and attendant lexicalization patterns involving the verb la 'to run' as in the following.5

4 An English sentence like it is snowing into the attic illustrates the third pattern, where FIGURE+MOTION are incorporated in the verb root, snow. Its more analytic paraphrase snow moved into the attic lays out the semantic elements in a preincorporated fashion.

5 Emai data are presented in an orthographic form along lines suggested in Schaefer (n.d.), which follows the general conventions for Edoid suggested in the Edo Orthography Report by using "vb" for a voiced bilabial approximant
(4) a. qli ={`${}m`he la vbi oa  
the man run at house  
'the man ran in the house'
b. qli ={`${}m`he la vbi isao isi oa  
the man run at front of house  
'the man ran in front of the house'
c. qli ={`${}m`he la vbi uokho isi oa  
the man run at back of house  
'the man ran in back of the house'

A factor common to the meaning of these sentences is their reference to nondirectional motion or positional location. That is, the movement of the FIGURE object, ={`${}m`he, is confined to a location defined by the GROUND, oā, i.e. the running event is confined to the inside of the house or a specified area adjacent to the house.

A second type of motion structure is illustrated in (5a) and (5c). In contrast to (4), the movement of the FIGURE object ={`${}m`he is not circumscribed by the GROUND location; rather, the FIGURE's movement is directed through space in a fashion relative to the GROUND: the movement of ={`${}m`he is directed into or out of the location specified by oā. Continuing to assign motion components to the remaining morphemes of (5a) and (5c), however, illustrates a dilemma whose solution sheds some light on the intimate relationship between lexicalization processes and grammatical structure in serial verb configurations.

(5) a. qli ={`${}m`he la o vbi oā  
the man at house  
'the man ran into the house'  
b. qli ={`${}m`he o vbi oā  
the man enter at house  
'the man entered the house'
c. qli ={`${}m`he la shọ vbi oā re  
the man at house  
'the man ran out of the house'
d. qli ={`${}m`he shọ vbi oā re  
the man leave at house  
'the man left the house'

and by marking tone only to avoid potential ambiguity.

6The blank space in the literal translation of MANNER conveying sentences is employed, since it is the goal of the present paper to determine what elements of meaning are incorporated in each of the morphemes la and oā.

7The verb in this and the preceding sentence consists of the mutually dependent forms shọ and re. They behave as a discontinuous unit.
What then is the dilemma? Basically the problem involves the semantic composition of the verb roots la and o in directional sentences expressing MANNER relative to the composition of la in nondirectionals of MANNER and of o in directionals without MANNER. In languages thus far considered by the Talmy model, a single verb root in a main clause, i.e. main verb, has consistently incorporated MOTION and one other element, either MANNER, PATH, or FIGURE. However, a Kwa language like Emai, where serial verb structures abound, raises a dilemma by not holding to the assumptions of this model, since in serial structures two verbs in a single surface level clause are used to refer to a motion event [Welmers 1973].

At first glance the dilemma appears to involve a decision as to which verb in series one should assign main verb status. Careful analysis in the past has revealed that strict adherence to the category arrangements of traditional grammar may preclude insight into the grammatical structure of serials [Bamgbose 1973, 1974; Awobuluyi 1973]. Agreeing with this criticism, the present analysis contends that a measure of insight may be gained by considering how lexicalization patterns pertaining to types of events may reveal the semantic composition of each verb in series. How then do we proceed?

For purposes of discussion, let us compare the first sentence in each of our earlier lists, (4a) and (5a). Examining the nondirectional sentence (4a) (shown as (6a) below) within the Talmy framework, one would conclude that the form la incorporates the elements MOTION+MANNER. Supporting this contention is the assignment of the functions FIGURE and GROUND to the forms omòhe and oà, respectively. Then to the form vbi, which obligatorily occurs in such locative complexes, the function of PATH is assigned. It remains, therefore, for the verb la to incorporate the fact of MOTION and the MANNER in which it is portrayed. This point is established more forcefully by examining (6b), which differs in meaning from (6a) to the extent that sìo 'crawl' differs from la 'run'.

(6) a. ọli ömòhe la vbi oà 'the man ran in the house'
    the man run at house

b. ọli ömòhe sìo vbi oà 'the man crawled in the house'
    the man crawl at house
Turning now to (5a) and others of its kind, the dilemma begins to unfold. More specifically, it involves the allocation of the elements MOTION, PATH, and MANNER among the surface level forms la and o, given MANNERless sentences like (5b) where the meaning of o 'to enter, more into' suggests that it lexicalizes MOTION+PATH. When la, particularly in view of its MOTION+MANNER composition in nondirectional sentences, is then combined with o, three hypotheses concerning their lexicalization of a directional motion event can be identified.

An initial interpretation, labelled Hypothesis I, is to assume that in (5a) la expresses the fact of MOTION and its running MANNER, as was postulated for (4a). It would remain for the form o to convey the directional PATH 'into', contrary to its meaning in (5b). Assuming this to be the case, lexicalization across nondirectional and directional structures, (4a) and (5a), would consistently include the incorporation of MOTION+MANNER in la. This hypothesis adheres to the Talmy model and places Emai's MANNER conveying directional expressions within the typological set exemplified by English and most of Indo-European.

An alternative, Hypothesis II, advances the proposition that the element MOTION is expressed twice at the surface level, thus building on the serial nature of la and o. In this case, the form la would specify MOTION+MANNER and o, also incorporating MOTION, would specify MOTION+PATH. Such a double specification of MOTION is not consistent with Talmy's semantic coding of a motion event, though assuming a multi-clause, hence multi-main verb analysis for serial structures would lessen this inconsistency. As will be shown, a potentially favorable aspect of this hypothesis is the compositional stability of la across directional and nondirectional sentences and of the verb o across MANNER and MANNERless directional expressions.

As a final hypothesis, one might assume that la in (5a) specifies only

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8As for the form vbi, markers similar to it have been referred to elsewhere as Secondary PATHs [Schaefer 1985], and in the case of directional motion, it marks a particular type of PATH, one which other grammatical analyses identify with the terms Source and Goal.
MANNER and that the form 0 incorporates MOTION+PATH. This third analysis, Hypothesis III, differs from the previous two by not recognizing a constant semantic make up for la in nondirectional and directional sentences, i.e. (4a) and (5a). It also fails to recognize for the main clause a single verb root which, simultaneously, incorporates the component MOTION and functions as the main verb of that clause. The merits of each of these hypotheses will now be considered in more detail.

2.1. Hypothesis I. The first hypothesis under consideration proposes that in a directional structure like (5a) la specifies the fact of MOTION and its MANNER 'running', and 0 specifies PATH, 'into'. It is not difficult to recognize that under this hypothesis la is a verb and 0 a preposition, at least in terms of traditional parts of speech and the kind of semantic information each conveys. Schematically this first position is outlined in the following:

la
'MANNER+MOTION'

0
'into'

PATH

Hypothesis I, however, is not tenable, since the form 0 exhibits grammatical properties typical of Emai verbs. It occurs in a focus structure where a verb in its gerundive form is copied in the leftmost position of the clause and followed by the marker li. For example, a nonmotion verb like e 'to eat' in (7a) is copied in the fashion of (7b). Likewise, the form 0 in the directional structure (7c) is focused in (7d). A nonverb constituent such as the Locative marker vbi, however, cannot assume the gerundive copy form in (7e).

(7) a. qli ɔmɓe e eami
the man eat meat
'the man ate meat'

b. uemi li qli ɔmɓe e eami
eating F the man eat meat
'eating is what the man did to the meat'
A second argument for rejecting Hypothesis I lies in the potential ambiguity of negative directional structures. Negatives in Emai employ the form *i in Third Person Singular, which precedes the verb and any of its auxiliaries and follows the grammatical subject. (8a), which is the negative corresponding to the directional sentence (7c), has three possible readings. On one interpretation, the entire proposition, both *la and *o, are negated, and on the other two, either *la or *o, but not both, are negated, as in (8b) and (8c), respectively. Since only verbs attract the negative marker *i, the form *o cannot be a preposition conveying only 'into'.

(8) a. *omohe *la o vbi *oa
    the man not at house
    'the man did not run into the house'

b. *omohe o vbi *oa bi khi * o *la
    the man enter at house with that he not run
    'the man entered the house without running'

c. *omohe *la bi khi * o * o vbi *oa
    the man run with that he not enter at house
    'the man ran without entering the house'

A third argument for rejecting Hypothesis I is the occurrence of o as the only verb in a simple directional sentence, i.e. one where MANNER is not expressed. As we have already witnessed, alongside the MANNER specifying directional (9a) there is the MANNERless (9b). With respect to the last of these, it is important to point out that o does indeed behave as a verb, for it can be focused in its gerundive form, as illustrated in (9c).
A final argument leading to the rejection of Hypothesis I is the tonal identity of the two forms la and o in (9a). If Completive Aspect is referred to, both must be high, if Continuous Aspect, both low.\(^9\)

Reviewing the above facts within the limitations imposed by Talmy's interpretive framework, one would conclude that the form o incorporates more than the PATH notion 'into'. It must incorporate semantic elements sufficient for it to assume the verb status which will permit operation of the various verb-sensitive grammatical processes. A semantic component likely to provide this condition is the concept MOTION. If this position can be maintained, the form o would incorporate the elements MOTION+PATH and only the semantic composition of la would remain to be determined. Being confined to the semantic elements advanced by Talmy, it follows that in directional structures la would incorporate only MANNER. There is, however, a troubling fact which delays acceptance of this conclusion and leads to Hypothesis II.

2.2. Hypothesis II. A fact pertinent to the directional structure in (10a) is that not only can form o be focused, as in (10b), but la can also be focused, as in (10c).

(10) a. qli qm\(\overline{\text{o}}\)he la o vbi oa
   the man at house
   'the man ran into the house'

\(^9\)In conjunction with the low tone of the verb or verbs in the sentence, Continuous Aspect is marked by the presence of q with low tone in a position preceding the leftmost verb.
b. uomi 1l; ol 1i 1m 1e la o vbi oa
entering F the man at house
'entering is what the man did by running at the house'

The verb-like behavior of la and o in these structures, as well as the negation structures viewed earlier in (8), leads to another possible analysis, especially within the serial verb nature of Emai. It may be that (10a) reflects a conjoined structure where la and o each incorporate a semantic component sufficient to exhibit verb status. Borrowing from Hypothesis I where MOTION was postulated as a component of o in order to account for its verbal properties, one could generalize this condition to la and have it incorporate MOTION+MANNER. Schematically this second hypothesis is outlined below:

<table>
<thead>
<tr>
<th>la</th>
<th>o</th>
</tr>
</thead>
<tbody>
<tr>
<td>'by running move'</td>
<td>'move into'</td>
</tr>
<tr>
<td>MOTION+MANNER</td>
<td>MOTION+PATH</td>
</tr>
</tbody>
</table>

Assuming a conjoined structure for (10a) there would be two underlying clauses and thus two main verbs, la and o, which are juxtaposed. An interpretation in which MOTION is expressed twice does not square with the number of semantic elements Talmy employs to delineate a single motion event. On the other hand, he sets no limitation on the number of different PATH notions which may be expressed in a single motion event, so for the sake of argument, let us assume there is no constraint on the number of times MOTION can occur. Should this second hypothesis prove acceptable, verbs like la would exhibit a constant semantic composition across directional and nondirectional structures, i.e. MOTION+MANNER, as would verbs like o across MANNER and MANNER-less constructions, i.e. MOTION+PATH. Unfortunately, there are reasons for

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10 Talmy relies on sentences like *Come back down from up there*, with four consecutive PATH markers, to support his position.
rejecting this second hypothesis.

Let us consider conjoined sentences in Emai more carefully, in particular those with another set of intransitive verbs. The verbs dia 'sit, stay' and vię 'cry' occur in simple structures such as (11a) and (11b) and in structures like (11c), (11d), and (11e) where they are conjoined in various ways.

(11) a. ọlì ọmọhe dia vbi ukpa-ọdẹ
the man sit at road
'the man sat on the road'

b. ọlì ọmọhe vię vbi ukpa-ọdẹ
the man cry at road
'the man cried on the road'

c. ọlì ọmọhe dia vię vbi ukpa-ọdẹ
the man sit cry at road
'the man sat and cried on the road'

d. ọlì ọmọhe dia vbi ukpa-ọdẹ vię
the man sit at road cry
'the man sat on the road and cried'

e. ọlì ọmọhe dia vbi ukpa-ọdẹ vię vbi ọ 
the man sit at road cry at it
'the man sat on the road and cried'

These sentences will act as the basis for comparison with motion counterparts, beginning with (11c). Recall first that our directional sentence (10a) is superficially similar to (11c), with la corresponding to dia and o to vię. If a parallel grammatical structure for (10a) is assumed, then there is reason to anticipate that corresponding to (11a) and (11b) there is (12a) and (12b).

(12) a. ọlì ọmọhe la vbi ọa
the man ran at house
'the man ran into the house'

b. ọlì ọmọhe o vbi ọa
the man enter at house
'the man entered the house'
c. *qoli ọmọhe la vbi ọa o vbi ọa
   the man run at house enter at house
   'the man ran in the house and entered the house'

d. *qoli ọmọhe la vbi ọa o
   the man run at house enter
   'the man ran at the house and entered'

e. *qoli ọmọhe la vbi ọa o vbi o
   the man run at house enter at it
   'the man ran at the house and entered it'

Following this lead, it might also be expected that a more explicit con­
joined structure along the lines of (12c) would occur. However, (12c) is un­
grammatical. Countering this, it may be that its ungrammaticality is due to
redundancy caused by the twin occurrence of vbi ọa and that deletion of one
of the Locative complements through a process of conjunction reduction would
remedy the situation. As suggested by (11d), one might delete the complement
following the form o. There is, however, no corresponding sentence from the
motion domain, since in (12d) the o constituent cannot occur in a postcomple­
ment position.

On the other hand, the supposed redundancy of (12c) might be remedied by a
copy pronoun process along the lines of (11e). Unfortunately, the resulting
directional structure in (12e) is also ungrammatical, leading one to postulate
that in directional expressions la and o cannot accept identical comple­
ments. A final alternative, suggested by (11c), is to have conjunction reduc­
tion operate on the first of two identical Locative complements. But this,
too, ignores a principal semantic fact about (12c): it is a contradiction so
long as the two occurrences of ọa exhibit identity of reference, for one cannot
first be running inside the house and then run into that same house.

Wishing to maintain the conjunction hypothesis, we might look to other
available conjoined structure types involving verbs of motion. In doing so
one encounters sentences like (13).

(13) a. qoli ọmọhe la vbi ẹvbo o vbi ọa
   the man run at village enter at house
   'the man ran in the village and entered the house'
Sentence (13a) shows that la can accept a locative complement and still precede o and its locative complement, and (13b) supports the possible disassociation of la and o in the same sentence by placing siq 'crawl' in collocation with o. The crucial aspect of (13a) which argues that its underlying form cannot be similar to that of the motion sentence (10a) is the nonidentity of the locative complements. Assuming that identity of locative complements would be a condition for the supposed conjunction reduction rule, there is no basis for positing a conjoined structure for (10a) upon which this process might act. A further argument against the conjoined clause hypothesis rests with the placement of time adverbials. If individual clauses each containing a locative complement underlie a directional sentence, then one would expect each to allow adverbials of the type odë 'yesterday' or qëna 'today'. For instance, a conjoined structure with the verbs de 'buy' and e 'eat', (14a), can occur with odë and qëna as in (14b) or odë alone as in (14c).

(14) a. əli əmọhe de əma e qi
the man buy yam eat it
'the man bought yam and ate it'

b. əli əmọhe de əma odë e qi qëna
the man buy yam yesterday eat it today
'the man bought yam yesterday and ate it today'

c. əli əmọhe de əma odë e qi
the man buy yam yesterday eat it
'the man bought yam yesterday and ate it'

Attempts at constructing comparable motion sentences reveal that similar adverbial placements do not occur. For example, (15a), where the adverbial odë is attached to a hypothetical la clause and qëna to a hypothetical o clause, is ungrammatical. And as comparison of (15b) and (15c) suggests, the unmarked position for a time adverbial is clause final position, arguing that its placement is governed by a clause boundary. Since adverbials can not
Motion in Email

occur between the forms la and o in a directional structure, a clause boundary, and hence a dual clause structure, does not underlie (10a).

(15) a. *əli əmhe ə la o ə vbi əa əəna
    the man run yesterday enter at house today
    'the man ran yesterday and entered the house today'

b. *əli əmhe ə la o ə vbi əa
    the man run yesterday enter at house
    'the man ran yesterday and entered the house'

c. əli əmhe la o vbi əa əə
    the man at house yesterday
    'the man ran into the house yesterday'

A further point of note is that adverbial intrusion is not allowed in aspectual structures which appear akin to what other investigators have called "consecutives" [Hyman 1971, Welmers 1973]. The structures in question most easily translate with 'and then' in English and reflect an aspectual distinction in which the internal time sequence of an event is prolonged. For instance, the Inceptive Aspect (IA) marker ə which can precede the leftmost verb la, as in (16a), can also precede o, as in (16b), but it cannot occur in both positions (16c). If one takes such an overtly consecutive structure and examines it for adverbial intrusion, one still finds that two time adverbials cannot occur, as (16d) attests. It seems reasonable to postulate that the ungrammaticality of (16d) is due to the lack of a clause boundary attracting each of the time adverbials and that (16e), likewise, is ungrammatical, despite its explicit consecutive nature. It is only (16f), where the time adverbial əə is in clause final position, that is grammatical.11

(16) a. əli əmhe ə la o vbi əa
    the man IA at house
    'the man went and ran into the house'

Adverbials may also occur in clause initial position, but only as a focus constituent marked with the form əə.
b. ọlị ọmọhe la o o vbi oa
   the man run IA enter at house
   'the man ran and then entered the house'

c. *ọlị ọmọhe o la o o vbi oa
   the man IA run IA enter at house
   'the man went and ran and then entered the house'

d. *ọlị ọmọhe la odę o o vbi oa ñęna
   the man run yesterday IA enter at house today
   'the man ran yesterday and then entered the house today'

e. *ọlị ọmọhe la odę o o vbi oa
   the man run yesterday IA enter at house
   'the man ran yesterday and then entered the house'

f. ọlị ọmọhe la o o vbi oa odę
   the man run IA enter at house yesterday
   'the man ran and then entered the house yesterday'

The preceding examples suggest that the forms la and o existing in di­
rectional motion sentences cannot derive from an underlying dual clause struc­
ture, particularly one with two identical locative complements. In direction­als, la must exist without a complement. Following up on this, it would be
of interest to examine the distributional properties of la more fully so
that a clearer perspective on its structural relationship with following con­
stituents could be attained.

In pursuit of this goal one can ask whether la exhibits behavior similar
to other intransitive verbs which occur with directional complements. For in­
stance, the form vię seen earlier occurs in (17a), which is superficially
similar to the motion structure (17c). Yet, only (17a) allows the paraphrase
structure (17b), where the left to right order of vię and o is reversed,
since (17d) with la and o similarly transposed is ungrammatical. One in­
terpretation of this constraint is that la exists in a tighter structural
relationship to the following MOTION+PATH constituent o than does vię.

(17) a. ọlị ọmọhe vię o vbi oa
   the man cry enter at house
   'the man cried and entered the house'
b. qoli omqhe o vbi oa viẹ
   the man enter at house cry
   'the man entered the house and cried'

c. qoli omqhe la o vbi oa
   the man at house
   'the man ran into the house'

d. *qoli omqhe o vbi oa la
   the man enter at house run
   'the man entered the house and ran'

The relatively more constrained behavior of form la is not absolute. It
can occur in post-complement position, that is, to the right of the MOTION+PATH
constituent o, but only when it is followed by a directional verb and its
complement or a nondirectional complement, as in (18a) and (18b), respectively.

(18) a. qoli omqhe o vbi oa la ye aza
   the man enter at house run move-toward inner room
   'the man entered the house and ran toward the inner room'

b. qoli omqhe o vbi oa la vbi aza
   the man enter at house run at inner room
   'the man entered the house and ran in the inner room'

Thus, if la does occur to the right of the o complement, it also must take
a complement, and, as shown earlier, the two complements cannot be identical.
This holds for instances of the consecutive construction as well, e.g. (19a)
relative to (19b) and (19c).

(19) a. *qoli omqhe o vbi oa o la
   the man enter at house IA run
   'the man entered the house and then ran'

b. qoli omqhe o vbi oa o la ye aza
   the man enter at house IA run move-toward inner room
   'the man entered the house and then ran toward the inner room'

c. qoli omqhe o vbi oa o la vbi aza
   the man enter at house IA run at inner room
   'the man entered the house and then ran in the inner room'
Restating our point, it is not that la cannot accept locative complements, only that it does not do so when it precedes a MOTION+PATH verb in a directional motion clause.

Constraints on the distribution of the form la in directional structures become more evident when its behavior in nondirectional sentences is considered. In non-directionals an isolated la can assume a post-complement position. A comparison of the paraphrases (20a) and (20b), both of which are non-directional, will show this to be the case.

(20) a. ojì ọmọhe la vbi oli oa
    the man run at the house
    'the man ran in the house'

    b. ojì ọmọhe za vbi oli oa la
    the man be-located at the house running
    'the man ran in the house'

    c. *ojì ọmọhe za vbi oli oa
    the man be-located at the house
    'the man was at the house'

    d. *uzami li ojì ọmọhe za vbi ola la
    being located F the man be-located at house run
    'being located is how the man ran in the house'

    e. *ojì ọmọhe za la vbi ola
    the man be-located run at house
    'the man ran in the house'

    f. ebe ojì ọmọhe za la
    where the man be-located run
    'where did the man run?'

    g. *ebe ojì ọmọhe la
    where the man run
    'where did the man run?'

    h. ojì ola li ojì ọmọhe za la
    the house F the man be-located run
    'it was the house that the man ran in'
The form la in nondirectional structures can thus occur in either pre- or post-complement position. In the latter instance the form za, having the meaning 'be-located', occurs in initial verb position, attracting tonal distinctions of the tense/aspect system and immediately following sentence negation or auxiliary constituents. An interesting property of za is its failure to occur as a main verb in a MANNERless simplex sentence, like (20c), and its failure to undergo verb focusing, as in (20d). Furthermore it is not only sentences like (20b) which require the presence of za and result in the post-complement positioning of la. In nondirectional constructions where the locative constituent is questioned or focused, za is obligatory: the Wh-Question corresponding to (20a) must take the form (20f), not (20g), and similarly, the contrastive focus structure corresponding to (20a) must be (20h), not (20i).

Important for the present investigation is the fact that za never appears in directional sentences. Using (21a) as a base, za occurs in neither its Wh-Question counterpart, compare (21b) and (21c), nor its contrastive focus version, compare (21d) and (21e). Similarly, a paraphrase along the lines of (21f) cannot occur.

(21) a. *q̥li ɔm̥he la o vbi oa
   the house F the man run
   'it was the house that the man ran into'

   b. *ebe q̥li ɔm̥he za la o
      where the man be-located
      'where did the man run into?'

   c. ebe q̥li ɔm̥he la o
      where the man
      'where did the man run into?'

   d. *q̥li oa li q̥li ɔm̥he za la o
      the house F the man be-located
      'it was the house that the man ran into'
From the facts in (20) and (21) it is evident that constraints on the distribution of la in directional and nondirectional expressions vary. What appears to underlie these constraints is a difference in lexicalization pattern. In the instance of nondirectional motion, la may either incorporate the positional element BE-L in a MOTION+MANNER fashion, or it may retain a more analytic, nonincorporated structure, with both the MOTION(BE-L) and MANNER component manifested separately at the surface level, i.e. za...la. By way of contrast, the distribution of la in directional structures is more constrained and as suggested in the next section does not allow incorporation with any other semantic component.

2.3. **Hypothesis III.** The last hypothesis to be considered, alluded to throughout the preceding, attempts to do justice to the grammatical facts cited against the previous two hypotheses. Schematically this third hypothesis is presented below.

```
lá 'by running'  ó 'move into'
    MANNER          MOTION+PATH
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It postulates that la in a directional structure specifies only MANNER, lacking the MOTION element posited for the synthetic la of nondirectional sentences. With the assumed incorporation of MOTION+PATH in ó, there is the ability to account for its behavior as a verb in MANNER expressions and, by extension, in MANNERless sentences. Under this third hypothesis both la and ó would also be members of the same syntactic class, verb, since they act similarly with respect to the different grammatical processes illustrated earlier. Moreover, constraints on the positioning of locative complements and adverbials between these two forms suggest that a phrase rather than a clause bound-
ary lies at their juncture.

If correct, this lexicalization pattern places Emai directional expressions in the typological set of Romance languages like Spanish, as well as Samoan and Semitic. A principal difference between these languages and Emai remains, however, in that the MANNER constituent is realized by a verb positioned to the left of the MOTION+PATH verb. In fact, closer scrutiny of Talmy's typology shows that the positioning of a MANNER constituent to the left of a MOTION+PATH verb does occur in other languages. For example, Nez Perce, a polysynthetic Amerindian language of the Northwest Coast, employs such a pattern, as in (21) below, where the MANNER constituent -quq- is positioned to the left of the MOTION+PATH verb -láhsa-. But in contrast to the Emai pattern, -quq- itself is a prefix, not a verb.

(21) hi- quq- láhsa-e 'he galloped uphill'
   3rd person-galloping-go up-past

It is therefore Emai's use of a verb to mark MANNER that distinguishes it from other languages in Talmy's MOTION+PATH class. To the extent that a similar pattern is evident in other Kwa langauges, one might be able to specify the characteristics of this subtype and make fruitful comparisons with languages like Nez Perce. Lastly, the typological results of the present study align well with those uncovered for Tswana, a Southeastern Bantu language [Schaefer 1985], and suggest thereby that analysis of the motion field may lead to greater insight into the lexicalization patterns characteristic of Niger-Congo languages.

3. Summary

In the preceding, a small segment of the motion domain in Emai was analyzed in the theoretical framework of Talmy [1972, 1975, 1985]. Both directional and nondirectional structures conveying the MANNER in which a motion event occurs were investigated, though special emphasis was placed on the semantic composition of verb forms in directional expressions. Three hypotheses derived from the Talmy model were advanced and evaluated in terms of distributional constraints governing verbs in serial and nonserial constructions. On the basis of these constraints it was argued that directional and nondirection-
Expressions are characterized by different patterns of lexicalization. For directional structures, verbs in continuous series incorporate MANNER and MOTION+PATH. For nondirectional structures either a single verb incorporates MOTION+MANNER, or that verb in discontinuous series with another lexicalizes MOTION followed by MANNER.

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COMPARISON IN BAMBARA: AN INFINITIVAL VERB PHRASE*

Jan Charles-Luce
Indiana University

An infinitival verb phrase is generated to express comparison in Bambara. In particular, the comparative verb phrase has the structure: INFINITIVE MARKER + INTRANSITIVE VERB + NP + POSTPOSITION. The structural constraints on the comparative verb phrase are not specific to comparison, but are the more general constraints resulting from concatenating verb phrases. However, a special structural and pragmatic relation is established between the head clause and the comparative infinitival verb phrase. This relation has consequences for the structure of the NP in the comparative phrase and for deletion of lexical items within the comparative phrase. In this respect, the comparative infinitival phrase behaves differently from non-comparative infinitival verb phrases.

1. Introduction

To express comparison in English, a specific syntactic structure is generated. (1) and (2) are examples of the comparative construction in English.

(1) Betty is taller than Kent [is tall].
(2) Paul has more cats than [he has] dogs.

In general, every comparative construction in English consists of a head clause, a COMP that marks the comparative clause, and a comparative clause (see Greenberg [1963]; Andersen [1982]; Pinkham [1982]; Bresnan [1972, 1973, 1978]).

*I would like to thank Ladji Sacko and especially Adama Timbo for their time and patience in helping me to understand Bambara comparatives. Both are native Bambara speakers and instructors of Bambara at Indiana University. I would also like to thank Charles Bird, Daniel Dinnsen, Paul Newman, Robert Port, Linda Schwartz, Russell Schuh, and an anonymous reviewer for comments on an earlier version of this paper. Any misrepresentations are, of course, my own. This work was supported, in part, by NIH Training Grant T32 NS-7134.
1975, 1977]; Chomsky [1977]; Napoli [1983] for more complete discussions of English comparatives). The head clause of the comparative construction precedes the COMP (than, as). The comparative clause follows the COMP and must lexically contrast in some way with the head. Thus, the comparative clause contains some lexical items that are non-identical with some lexical items in the head, as well as lexical items that are identical with the head (as indicated by the brackets in (1) and (2)). The non-identical lexical items are the focus of the comparison.

Expressing a comparison in Bambara, a dialect of Mande, a Niger-Congo language, is not unlike that of many other African languages, e.g. Yoruba, Ewe, Shona, Igbo, among others, in which a verb with the general interpretation of 'surpass' is used (c.f. Welmers [1974]). More specifically, the verb phrase generated to express comparison in Bambara is syntactically similar to other infinitival verb phrases in this language. Consequently, the structural constraints on the comparative expression are not specific to comparison, but are the more general constraints resulting from concatenating verb phrases. The following description of Bambara comparatives shows that the comparative infinitival verb phrase is constrained by these general structural properties. However, in some kinds of comparisons, the comparative verb phrase does behave differently from other infinitival phrases, arising from its unique purpose of expressing a comparison.

2. General Properties of Infinitival Verb Phrases

Infinitival verb phrases can be either intransitive or transitive, regardless of the head verb phrase. The infinitival phrase that expresses comparison in Bambara is structurally similar to other intransitive infinitival phrases. For example, compare the following:

(3) Fanta ka bon ka tèmèn Umu kàn¹ 'Fanta is bigger than Umu is' 
Fanta is big and surpass Umu over

¹Bambara words are either high or low in tone. In the present paper, low toned words are marked with a grave accent ('). High toned words are not marked. In addition, the definite article is represented by a low tone follow-
(4) Musa bɛ wuli kà taa sugu’ la
Musa PRES get up and goes market to
'Musa gets up and goes to the market'

In (3), the infinitival verb phrase is kà ŋemèn Umu kän and expresses comparison. In (4), the infinitival verb phrase is kà taa sugu’ la, but it does not express comparison. Nonetheless, the structure of both infinitival phrases is INFINITIVE MARKER + INTRANSITIVE VERB + NP + POSTPOSITION.

The structure is only slightly different for infinitival verb phrases having transitive verbs. In (5), the infinitival verb phrase kà kini sàn sugu’ la has the structure INFINITIVE MARKER + NP + TRANSITIVE VERB + NP + POSTPOSITION.

(5) Musa bɛ sàgàw fèrè kà kini sàn sugu’ la
Musa PRES sheep sell and rice buy market at
'Musa sells sheep and buys rice at the market'

Two fundamental points demonstrate that the comparative infinitival verb phrase is structurally similar to other infinitival phrases. These points refer to (1) the tense and (2) the (non-)negation of infinitival verb phrases.

The head verb phrase in a given series of verb phrases is assigned tense and thereby governs the tense of all coordinate verb phrases. The infinitival marker kà is not inflected for either present or past tense in (6) or (7), respectively.

(6) Musa bɛ dɔːɡɔ̀ tìɡè k’ à fèrè Ali lɔ
Musa PRES wood cut and it sell Ali to
'Musa cuts firewood and sells it to Ali'

(7) Musa ye dɔːɡɔ̀ tìɡè k’ à fèrè Ali lɔ
Musa PAST wood cut and it sell Ali to
'Musa cut firewood and sold it to Ali'

The same is also true for the infinitival verb phrase that expresses comparison, namely, kà ŋemèn Y kän. The head verb phrase governs the tense of the whole

ing a specific noun and any modifiers. The plural marker -w also takes the definite low tone if the preceding noun is specific.
A second point demonstrating the structural similarity between the comparative infinitival phrase and other infinitival phrases involves negation. The head verb phrase also governs the scope of negation for all coordinate verb phrases. Compare the meanings between the (a) and (b) examples in the following non-comparative sentences.

(10) a. Musa ma sàgàw fonèrè kà baw sàñ Musa PAST-NEG sheep sell and goats buy
    'Musa did not sell sheep and [did not] buy goats'

b. Musa ye sàgàw fonèrè nkà à ma baw sàñ Musa PAST-AFF sheep sell but he PAST-NEG goats buy
    'Musa sold sheep but he did not buy goats'

(11) a. Fantà tè wuli kà taa sugu' la Fanta PRES-NEG get up and go market to
    'Fanta does not get up and [does not] go to the market'

b. Fantà bë wuli nkà à tè taa sugu' la Fanta PRES-NEG get up but she PRES-NEG go market to
    'Fanta gets up but she does not go to the market'

In the (a) examples, the scope of negation is the whole sentence. Thus, when the head verb is negated, all verb phrases in the sentence are interpreted as negated. If only the infinitival verb phrase is negated, as in the (b) examples, the result is no longer a series of verb phrases but rather a series of sentences. In this case, the subject of the second sentence is phonetically realized as the pronominal form of the subject of the head sentence and the tense marker is negated in the second sentence. The contrastive sentences are
conjoined by the coordinate conjunction nkà 'but'.

Examples (12a-b) show the comparative verb phrase. Essentially, the same principles apply to kà tèmèn. Again, (12b) shows that negation of only the infinitival comparative phrase results in a series of sentences rather than a series of verb phrases.

12) a. Musa tɛ sàgàw fèèrè kà tèmèn Ali kàn
   Musa not sheep sell and surpass Ali over
   'Musa does not sell more sheep than Ali'

   b. Musa bɛ sàgàw fèèrè nkà ɒ tɛ tèmèn Ali kàn
      Musa PRES sheep sell but he not surpass Ali over
      'Musa sells sheep but he does not surpass Ali'

Infinitival verb phrases, whether or not they express comparison, cannot be negated if their head verb phrase is in the affirmative.

3. Structure of the Comparative Infinitival Verb Phrase

The comparative verb phrase in Bambara, then, is not a unique structure generated to express comparison. Rather, it is an infinitival verb phrase with many structural properties similar to other infinitival phrases. The "comparative" verb phrase in Bambara contains the infinitival verb form kà tèmèn 'and surpass' and a postpositional phrase Y kàn 'Y over'. Y represents the lexical item in the kà tèmèn Y kàn verb phrase that is compared to some lexical item, X, in the head clause. Thus, X and Y are the focus of the comparison.

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2It is also possible to express a comparison with the complex postpositional phrase ni Y ye, which can loosely be translated as 'in-relation-to' [Bird and Kante 1976; Bird et al. 1977]. For example,

(i) Fanta ka jàn (ni) Umu ye
    'Fanta is taller than Umu'
    Fanta is tall (and) Umu in-relation-to

Although the postpositional phrase can often be used interchangeably with the infinitival verb phrase to express comparison, a subtle semantic difference may exist for some Bambara speakers. The postpositional phrase may specify that the comparison is less obvious, whereas the infinitival phrase may specify that the comparison is more observable. In the present study of comparison, only the infinitival verb phrase will be discussed.
In both sentences, the comparative verb phrase consists of the infinitive marker kà and the verb témèn 'surpass', the object of comparison, and the postposition kàn 'over'. In (13), nyò 'millet' is the lexical item in the comparative verb phrase that is being compared to kini 'rice' in the head clause. In (14), Ali is the lexical item in the comparative verb phrase that is being compared to Musa in the head clause.

As is already obvious, the structure of the comparative verb phrase allows for only NPs to be compared. That is, for some X in the head clause and some Y in the kà témèn y kàn comparative verb phrase, X and Y must be NPs. Structurally, Y must be an NP because it is the object of the postposition kàn 'over'. Observe in the following examples that verbs and adjectives that express physical sensations are nominalized.

(15) Umu ka boll' ka telin kà témèn panni' kàn
    'Umu runs faster than she jogs'

(16) sùnògò' be Umu la kà témèn kongo' kàn
    'Umu is more sleepy than hungry'

There is some disagreement as to whether the head verb phrase in (14) is a verbal construction, as I have described it, or whether it is a non-verbal construction [Charles Bird, personal communication]. If it is a non-verbal construction, then the infinitival verb phrase that expresses comparison is conjoined to either a verb phrase, as in (13), or to an adjective phrase, as in (14). According to the non-verbal argument, the comparative infinitival verb phrase is peculiar because all other infinitival verb phrases are conjoined only to verb phrases. Nonetheless, the similarities between the syntactic structure of the comparative and the non-comparative infinitival verb phrases remain.
3.1. The structure of the compared NP. The Y, or object of comparison in the kà tèmèn Y kàn comparative verb phrase, can be either a non-possessive NP, as has been illustrated in the previous examples, or it can be a possessive NP whose structure expresses possession. The use of the non-possessive versus the possessive NP is dependent upon whether the head clause expresses possession. Thus, the structure of the head clause determines the structure of the NP in the comparative verb phrase.

Possessive NPs are illustrated in (17) and (18). The sentences in (17) may be referred to as "locative-possessive comparisons" and those in (18) as "possessor-possessed comparisons". In the head clause of (17), bè...fè is a locative construction expressing possession. In this construction, bè denotes existence, location, or state. The postposition fè acts relationally to locate objects and, in the possessive sense, can be translated as 'with'. The possessive comparisons in (18) are termed "possessor-possessed" because the head noun phrase has the structure NOUN + POSSESSIVE MARKER + NOUN, where kà is the possessive marker. Thus, possession can be expressed in the head clause by either a noun phrase or a locative construction.

(17) Locative-Possessive Comparisons:

a. baw caman bè Ali fè kà tèmèn Musa kà sàgwà kàn
   goats many are Ali with and surpass Musa his sheep over
   'Ali has more goats than Musa has sheep'

b. baw caman bè Ali fè kà tèmèn Musa taw kàn
   goats many are Ali with and surpass Musa his (goats) over
   'Ali has more goats than Musa has'

(18) Possessor-Possessed Comparisons:

a. Ali kà baw ka ca kà tèmèn Musa kà baw kàn
   Ali his goats are many and surpass Musa his goats over
   'Ali has more goats than Musa has'

---

"The possessive marker kà is inserted only when the possessed item is alienable from the possessor [Bird et al. 1977]. That is, the possessed object is neither physically nor familially a part of the possessor. Conversely, inalienable possession signifies that the object is physically or familially a part of the possessor and kà is not inserted."
b. Ali ka ba\w\ ka ca k\à t\ëm\ën Musa t\aw k\àn
Ali his goats are many and surpass Musa his (goats) over
'Ali has more goats than Musa has'

Thus, regardless of how possession is expressed in the head clause of (17)
and (18), the compared items in the comparative verb phrase of both (17) and
(18) are possessive NPs. In (17a) and (18a), the possessive NPs in the compar­
ative phrases have the structure NOUN + POSSESSIVE MARKER (\ka) + NOUN. In
(17b) and (18b), the possessive NPs have the structure NOUN + POSSESSIVE PRO­
NOUN (t\aw 'his').

The examples in (19a–d) are non-possessive comparatives because possession
is not expressed in the head clause. Consequently, non-possessive comparisons
do not generate possessive NPs as the compared item in the comparative verb
phrase.

(19) Non-possessive Comparisons:

a. ù b\e poponiw belebele\ë d\ël\ë k\à t\ëm\ën n\ëg\ës\ëw k\àn
they PRES motorbikes big make and surpass bicycles over
'they make bigger motorbikes than they make bicycles'

b. Mamadou ye d\ë\ë\ë caman t\à k\à t\ëm\ën ji\ë k\àn
Mamadou PAST wood much carry and surpass water over
'Mamadou carried more firewood than water'

c. Musa b\ë dumuni nyuman\ë d\ël\ë k\à t\ëm\ën Fanta k\àn
Musa PRES food good make and surpass Fanta over
'Musa makes better food than Fanta does'

d. Musa b\ë dumuni nyuman\ë d\ël\ë k\à t\ëm\ën m\ënf\ën\ëw k\àn
Musa PRES food good make and surpass drinks over
'Musa makes better food than he makes drinks'

The non-possessive comparison in (20) is ungrammatical because of the pos­
sessive NP in the comparative phrase. To express the same idea, the contrast­
ive coordinated sentence in (21) is generated instead.

(20) *Musa b\ë dumuni nyuman\ë d\ël\ë k\à t\ëm\ën Fanta ka m\ënf\ën\ëw k\àn
Musa PRES food good make and surpass Fanta her drinks over

(21) Musa b\ë dumuni nyuman\ë d\ël\ë k\à t\ëm\ën Fanta k\àn
Musa PRES food good make and surpass Fanta over
'Musa makes better food than Fanta makes'
Comparison in Bambara

(21) Musa bɛ dumuni nyuman dîlə ṇà Fanta tɛ mînfɛnɛ nyuman dîlə Musa PRES food good make but Fanta not drinks good make 'Musa makes good food but Fanta does not make good drinks'

The ungrammaticality of (20) demonstrates that unless the head clause expresses possession, a possessive NP in the comparative infinitival verb phrase results in a comparison that is unacceptable to Bambara speakers.

It is interesting to observe that this kind of relation between the head clause and the comparative infinitival verb phrase does not constrain non-comparative infinitival verb phrases. The following sentences illustrate that possessive NPs can occur in non-comparative infinitival verb phrases without the head clause expressing possession. The non-comparative phrase is interpreted independently of the head clause, with the exception that the subject of the head clause is understood as the subject of the infinitival phrase.

(22) Fanta bɛ mängoro w fèërè kà Sali ka bagi tîgɛ Fanta PRES mangoes sell and Sali her cloth buy 'Fanta sells mangoes and buys Sali's cloth'

(23) Fanta dɔnɔɔ kungo kɔŋɔ k' à den nɔ ni Fanta entered woods into to her child look for 'Fanta entered the woods to look for her child'

It appears, then, that because the NP in the comparative verb phrase is structurally contingent upon the structure of the head clause, a functional relation holds between the head clause and the NP of the comparative infinitival phrase. Moreover, a pragmatic relation also holds because the head clause establishes the context for interpreting the comparative phrase and, therefore, the whole comparison. The same structural and pragmatic relation, however, is not established between head clauses and non-comparative infinitival phrases. The meaning of non-comparative infinitival phrases is independent of the meaning of their head clauses.

These facts suggest that whereas the comparative infinitival phrase is structurally similar to other infinitival phrases, it does have the unique function of expressing a comparison. Together, the pragmatic and structural relation between the head clause and the comparative verb phrase has consequences
3.2. Optional deletion of identical NPs. The possessive NP in the comparative verb phrase of possessive comparisons can undergo optional deletion without changing the intended meaning of the comparison. However, this is true if and only if the deleted noun (or pronoun) in the comparative phrase is identical with a noun in the head clause. Examples (24a) and (25a) illustrate the comparative phrases before deletion, and (24b) and (25b) illustrate the same phrases after deletion has applied.

(24) a. ba\textsuperscript{w} caman be Ali f\textsuperscript{e} k\text{\`a} t\text{\`e}m\text{\`e}n Musa ka ba\textsuperscript{w} k\text{\`a}n
goats many are Ali with and surpass Musa his goats over
'Ali has more goats than Musa has'
b. ba\textsuperscript{w} caman be Ali f\textsuperscript{e} k\text{\`a} t\text{\`e}m\text{\`e}n Musa k\text{\`a}n
goats many are Ali with and surpass Musa over
'Ali has more goats than Musa has'

(25) a. Ali ka ba\textsuperscript{w} ka ca k\text{\`a} t\text{\`e}m\text{\`e}n \text{\`a} ka s\text{\`a}g\text{\`a}w k\text{\`a}n
Ali his goats are many and surpass he his sheep over
'Ali has more goats than sheep'
b. Ali ka ba\textsuperscript{w} ka ca k\text{\`a} t\text{\`e}m\text{\`e}n s\text{\`a}g\text{\`a}w k\text{\`a}n
Ali his goats are many and surpass sheep over
'Ali has more goats than sheep'

Deletion does not disrupt the pragmatic or structural relation between the comparative phrase and head clause. The recoverability of the deleted items allows for the recoverability of their function within the comparative phrase. As a result, the comparison will be correctly interpreted.

Deletion of non-identical nouns obviously results in a change of meaning. This is shown when deletion applies to the comparative phrase in (26). Neither (27) nor (28) mean the same as (26) because their base-structures are not (26).

(26) Ali ka ba\textsuperscript{w} ka ca k\text{\`a} t\text{\`e}m\text{\`e}n Musa ka s\text{\`a}g\text{\`a}w k\text{\`a}n
Ali his goats are many and surpass Musa his sheep over
'Ali has more goats than Musa has sheep'
In (26), the comparison is between the number of goats Ali has and the number of sheep Musa has. If deletion applies and deletes Musa ka as in (27), the meaning becomes 'the number of goats Ali has is more than the number of sheep he [Ali] has'. The base-structure for (27) is (25a) above. Furthermore, if deletion applies and deletes ka sågåw as in (28), the meaning becomes 'the number of goats Ali has is more than the number of goats Musa has'. The possessive pronoun taw 'his' can be inserted optionally in the comparative phrase to communicate this meaning more explicitly, i.e., ... kà tèmèn Musa tàw kàn. Tàw indicates that Musa owns goats and not sheep because its referent is 'goats' in the head clause. The base-structure for (28) is (18a) above.

Likewise, optional deletion is not possible in other non-possessive, non-comparative infinitival verb phrases without changing the intended meaning.

Example (29) means that Ali is looking only for Musa's cows, whereas (30) means that Ali is looking for some cows, but the cows are not (necessarily) Musa's; they may be Ali's, Musa's, or someone else's cows. Thus, the deletion of Musa ka may result in structural ambiguity. Although context may help to disambiguate the meaning of (30), there is no ambiguity in (31). In this case, only Musa is inserted in the base-structure. The NP in the underlying comparative phrase is not possessive.
(31) Ali dónnà kungo` kɔnɔ kà Musa nyini  
Ali entered woods into to Musa look for  
'Ali entered the woods to look for Musa'

Optional deletion is unique to the possessive comparatives. Possessive NPs in the comparative verb phrases are generated to maintain a structural and pragmatic relation between the comparative phrase and head clause. Possessive NPs may or may not contain some lexical items that are identical in the comparative phrase and head clause. However, deletion of items is optional in the comparative phrase if and only if a noun in the comparative verb phrase is identical to some noun in the head clause, and the head clause expresses possession.

4. Summary

The present paper has attempted to show that the construction generated to express comparison in Bambara is an infinitival verb phrase with the same basic syntactic properties as other infinitival verb phrases that do not express comparison. First, the basic structure of the comparative verb phrase is: INFINITIVE MARKER + INTRANSITIVE VERB + NP + POSTPOSITION. This structure is the same as any other infinitival intransitive verb followed by a postpositional phrase. Second, kà cannot be marked for tense or negation without resulting in a series of sentences rather than a series of verb phrases.

With respect to the details of the comparative infinitival phrase, it was shown that the compared items must be NPs. This is a direct consequence of the structure of the postpositional phrase in the comparative verb phrase. Furthermore, the structure of the NP in the comparative phrase is contingent upon the head clause. If the head clause expresses possession, then a possessive NP is generated in the comparative verb phrase. Conversely, if the head clause does not express possession, then the NP in the comparative phrase cannot express possession, and a non-possessive NP is generated in the base-structure. Thus, a structural relation is maintained between the head clause and comparative phrase. Moreover, the comparative verb phrase, unlike other non-comparative infinitival verb phrases, is contextually dependent upon the head
clause for its meaning. The head clause establishes the context for interpreting the comparative phrase and, hence, for interpreting the whole comparison.

Finally, as a result of the special structural and pragmatic relation between the head clause and the comparative phrase, optional deletion may occur in the comparative phrases of possessive comparatives, but if and only if the deleted noun in the comparative verb phrase is lexically identical with some noun in the head clause. This ensures maximal recoverability of the structural and pragmatic function of the deleted items, thus maintaining the correct interpretation for the whole comparison.
REFERENCES


This is a detailed descriptive study of Kesukuma. Following an introduction giving location, classification, previous documentation, and sources for the present study, the descriptive chapters are as follows: Phonologie, Morphophonologie, Derivation, Le Nominal, La Flexion Verbale, L'Inflexion, and Composition. A concluding chapter points out some theoretical considerations of the descriptive portions, pedagogical implications for teaching the language, and implications for Bantu history. An appendix summarizes the "morphotonèmes de base" and the rules for tone realization. The entire text is fully tone-marked.


This is a collection of 13 papers, principally on the languages of Equatorial Guinea. The paper titles are as follows: I. Perfil lingüístico de Guinea Ecuatorial; II. Las lenguas de Guinea Ecuatorial. Materiales bibliográficos para su estudio; III. Fenómenos de interferencia fonética del fang sobre el español de Guinea Ecuatorial. Consonantismo; IV. Un caso de transferencia léxica intercolonial. Cuba-Fernando Poo (Bioko); V. Portuguesismos léxicos en el bubi y el pidgin english de la isla de Bioko (Fernando Poo); VI. Préstamos léxicos de aculturación en dos lenguas bantu de Guinea Ecuatorial; VII. Sociolingüística de un microespacio criollo portugués de Africa (Annobón); VIII. El "vocabulario fundamental" del criollo portugués de Annobón. Rasgos caracterizadores; IX. Expansión léxica en un campo semántico del criollo portugués de Annobón; X. Procesos de aculturación léxica en el criollo portugués de Annobón; XI. Las retenciones léxicas africanas en el criollo portugués de Annobón y sus implicaciones sociohistóricas; XII. Préstamos léxicos del pidgin english en el criollo portugués de Annobón; XIII. Notas sobre el fonetismo del bubí de Moka.


This volume contains 31 papers presented at the Sixth International Conference of Ethiopian Studies, held in Tel-Aviv in April 1980. The papers
cover a variety of topics, including Semitic and Cushitic languages, literature, religion, history, modern politics, and social issues. The papers dealing specifically with languages are the following: D.L. Appleyard, "The radical extension system of the verb in Agaw"; A. Dolgopolosky, "Semitic nomina segolata in Ethiopic"; Y. Gruntfest, "Some remarks on the case system in Semitic languages"; R.J. Hayward, "Some observations on Dirayta (Gidole) pronouns"; O. Kapeliuk, "Pseudo-questions in Amharic"; W. Leslau, "Cushitic loanwords in Gurage"; B. Podolsky, "The system of verbal stems in Amharic"; S. Raz, "Vowel quantity in Tigre"; J. Tubiana, "Modernisation et emprunts lexicaux en amharique"; R.M. Voigt, "A note on SPA, or: A case for a new segment in Amharic"; and A. Zaborski, "Can Omotic be reclassified as West Cushitic?".


This is a descriptive study of Londo. A preface gives the author's opinions on the relation of linguistic theory to language description and acknowledgements, and an introduction presents background material on Londo, a Bantu language (A.l1) of Cameroon, as well as the author's theoretical model, essentially a linear generative phonology. The descriptive chapters are as follows: "Phonology", "Words which Command Concord: Nouns", "Words which Undergo Concord", "Words which Do not Participate in the Concord System", "Derivation and Compounding", and "Summary of Rules and Conditions in General Order of Application". Following these chapters is a 38 page Londo-English word list, and an English-Londo index to the word list, a short text, and a bibliography.

Periodicals


Smolicz, "Valeurs fondamentales et identité culturelle"; André-Marie Despringre, "Langues des chants de fêtes des villes et villages du Westhoek français". There is also a "Notes et Documents" section with the three following contributions: Henry Tourneux, "Petit lexique créole haïtien utilisé dans le domaine de l'électricité"; Maurice Coyaud, "Fêtes de quartiers à Tokyo"; and Jean-Pierre Caprile et Irumu Agozia-Kario, "Documents sur la numération et les mesures en logotí (Zaïre)".

Other Recent Publications


In his introduction the author recalls the historical setting of the social organisation which has conditioned and permitted the use of a French vocabulary in this part of the African continent. A practical, alphabetically listed glossary with analysis of those French lexical items spoken in Rwanda shows a school level knowledge of French. Norms acquired in school persist in the French commonly spoken in this country and check any possibilities of lexical creation. The lexical deviation (less than a thousand) from standard French is similar to that found in any regionally spoken French in France.


La recherche africaniste sur les textes dits de l'oralité n'a guère privilégié leurs aspects proprement linguistiques. En abordant ce domaine sur les plans de la théorie et de la méthode, et dans un souci de documentation cohérente, le présent ouvrage montre que ce sont les éléments redondants, et non ce qui reste après leur élimination, qui fournissent la clef d'une compréhension des opérations constitutives de la référence. Deux outils permettent de donner à cette hypothèse une forme opérationnelle et valable: une syntaxe séquentielle (élaborée par déduction) et l'analyse des variables aspectuelles dans une perspective énonciatiste élargie à la dimension du discours. Tout en voulant être, avant tout, une contribution à une grammaire (hors guillemets) du discours, ce travail intéresse aussi la problématique du style littéraire dans un contexte de l'oralité.
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For information, write to
Isabelle HaIk or Laurie Tuller
Département de Linguistique
UQAM
C.P. 8888 Succ. A
Montréal, Québec H3C 3P8
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Please send a one page abstract of your paper by December 30, 1986. The proceedings of the symposium will be published.

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For further information contact Hana Mukarovsky
Institut für Afrikanistik
Doblhoffgasse 5/9
A-1010 Wien
AUSTRIA