/-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) /li-ar-nga/  →  liaraanga
    cl.5 SM-split-T(ense)  'it splits'

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

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

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

__2__A vowel copy rule applies to insert a in these forms of the present tense. See Dalgish [1976].
(3) /βa-iβ-nga/  cl.2 SM-steal-T  →  βeeβaanga  'they steal'
/kα-eleel-nga/  cl.6 SM-dangle-T  →  keeleelaanga  'they dangle'
/βa-um-nga/  cl.2 SM-dry-T  →  βoomaanga  'they dry'
/βa-or-nga/  cl.2 SM-bask-T  →  βooraanga  'they bask'

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

(4) /li-i-el-nga/  cl.5 SM-R-select-T  →  liiyelaanga  'it selects itself'
/xu-i-ir-nga/  lpl. SM-R-kill-T  →  xwiyiiraanga  'we kill ourselves'
/βa-i-ononi-nga/  cl.2 SM-R-spoil-T  →  βeeyononiinjia³  'they spoil themselves'

The examples below show that a rule inserting γ- 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 γ-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:

(5) /a-ar-nga/  
    Cl.1 SM-split-T  \(\rightarrow\) yaaraanga  
    's/he splits'

/a-um-nga/  
   cl.1 SM-dry-T  \(\rightarrow\) yoomaanga  
    's/he dries'

/a-i-ar-nga/  
   cl.1 SM-R-split-T  \(\rightarrow\) yeeyaraanga  
    's/he splits her/him-self'

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-flimb-a/  
    cl.5 SM-a-cover-T/A  \(\rightarrow\) lyaflimba  
    'it covered'

/βa-a-flimb-a/  
   cl.2 SM-a-cover-T/A  \(\rightarrow\) βaflimba  
    'they covered'

/xu-a-lum-a/  
   1pl SM-a-bite-T/A  \(\rightarrow\) 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>(8) Underlying</th>
<th>/li-a-fiimba/</th>
<th>/βa-a-fiimba/</th>
<th>/xu-a-luma/</th>
<th>/a-a-lasa/</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glide Form. &amp; Comp. Length.</td>
<td>ly-aa-fiimba</td>
<td>---</td>
<td>xw-aa-luma</td>
<td>---</td>
</tr>
<tr>
<td>Ø → y /#VV</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>y-a-a-lasa</td>
</tr>
<tr>
<td>/-a-/ Reduct.</td>
<td>ly-a-fiimba</td>
<td>βa-fiimba</td>
<td>xw-a-luma</td>
<td>ya-lasa</td>
</tr>
<tr>
<td>Surface</td>
<td>[lyafiimba]</td>
<td>[%βafiimba]</td>
<td>[xwaluma]</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) /βa-a-ar-a/ + 13aara
   cl.2 SM-a-split-T/A
   'they split'

/ka-a-or-a/
   + koora
   cl.6 SM-a-bask-T/A
   'they basked'

/βa-a-i-lum-a/
   + 13eeluma
   cl.2 SM-a-refl-bite-T/A
   'they bit themselves'

If we consider first /βa-a-ar-a/ + 13aara '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, /βa-a-i-lum-a/ + 13eeluma '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/ tc produce superficial -ee- . Another possibility is that Coalescence applies iteratively to produce an intermediate sequence of /βe-e-e-lum-a/, which is subsequently shortened by /-a-/ Reduction to 13eeluma . 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) /li-a-ar-a/
    cl.5 SM-a-split-T/A
    '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/   → xwaara
     1pl. SM-a-split-T/A 'we split'

/mu-a-or-a/   → mwoora
     2pl. SM-a-bask-T/A 'you basked'

/liu-a-i-fiimb-a/   → lweefiimba
     cl.11 SM-a-refl-cover-T/A '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 /βa-a-i-lum-a/ /li-a-ar-a/ /mw-a-or-a/
Glide Form. & --- --- mw-aa-or-a
Comp. Length.
Coalescence βe-ee-lum-a --- mw-oo-or-a
/-a/- Reduct. βe-e-lum-a li-ar-a mw-o-or-a
Surface [βeluma] [liara] [mwoora]

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

(13) Underlying /xu-a-lum-a/ /li-a-ar-a/ /li-a-fiimb-a/
Glide Form. & xw-aa-lum-a --- ly-aa-fiimb-a
Comp. Length.
Coalescence --- --- ---
/-a/- Reduct. xw-a-lum-a li-ar-a ly-a-fiimb-a
Surface [xwaluma] [liara] [lyafiimba]

Finally, note that in all these forms, the rule of y Insertion (Ø + y
/VV_V/) never applies. If we order this rule after /-a/- Reduction, the for­
mer will be correctly blocked from applying.

The rule of /-a/- Reduction then will be understood to operate on identi­
cal 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-/.

This morpheme is the only consonant-final subject
prefix in the language (the corresponding first person singular object marker,
/NI/, 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 alterna­
tive 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 excep­
tions 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-flimb-a/ → ndafliimba
    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-flimb-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, ndafliimba 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 *ndaara, *ndoora, and *ndefiimba 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 /li-a-flimb-a/ surface as lyafiimba 'it covered', /βa-a-flimb-a/ appearing as βafiimba 'they covered', and /xu-a-
164 Studies in African Linguistics 17(2), 1986

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-fiim-a/ → ndefiimba '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 γ Insertion, Glide Formation, and Coalescence take place as well:

<table>
<thead>
<tr>
<th>(15)</th>
<th>Underlying</th>
<th>/βa-a-i-ar-a/</th>
<th>/xu-a-i-ar-a/</th>
<th>/li-a-i-ar-a/</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coalescence</td>
<td>βe-ee-ara</td>
<td>xu-ee-ara</td>
<td>li-ee-ara</td>
</tr>
<tr>
<td></td>
<td>Glide Formation &amp; Comp. Length.</td>
<td>---</td>
<td>xuw-ee-ara</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>/-a-/ Reduction</td>
<td>βe-e-ara</td>
<td>xw-ee-ara</td>
<td>li-e-ara</td>
</tr>
<tr>
<td></td>
<td>γ Insertion</td>
<td>βee-y-ara</td>
<td>xw-ee-y-ara</td>
<td>li-e-y-ara</td>
</tr>
<tr>
<td></td>
<td>(φ → γ /VV-V)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Surface</td>
<td>[βeeyara]</td>
<td>[xweeyara]</td>
<td>[lieyara]</td>
</tr>
<tr>
<td></td>
<td>'they split'</td>
<td>'we split'</td>
<td>'it split'</td>
<td></td>
</tr>
<tr>
<td></td>
<td>themselves'</td>
<td>ourselves'</td>
<td>itself'</td>
<td></td>
</tr>
</tbody>
</table>

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:

\[
\begin{align*}
(16) \quad /\beta a-a-N-\beta aamb-a/ & \quad + \quad /\beta aambaamba/ \\
\text{cl.2 SM-a-lsg OM-sacrifice-T} & \quad 'they sacrificed me' \\
/l-i-a-N-rama/ & \quad + \quad /liandama/ \\
\text{cl.1 SM-a-lsg OM-defeat-T} & \quad 'it defeats me' \\
/ku-a-N-chiing-a/ & \quad + \quad /kwaanjiinga/ \\
\text{cl.3 SM-a-lsg OM-carry-T} & \quad 'it carried me'
\end{align*}
\]

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

\[
\begin{align*}
(17) \quad \text{Underlying} & \quad /\beta a-a-N-\beta aamba/ \quad /l-i-a-N-rama/ \quad /ku-a-N-chiinga/ \\
\text{PNCL} & \quad /\beta a-aa-N-\beta aamba\quad /l-i-aa-N-rama\quad /ku-aa-N-chiinga \\
\text{Glide Formation & Comp. Length.} & \quad ---\quad ---\quad kw-aaaN-chiinga \\
\text{/-a-/ Reduction} & \quad /\beta a-a-N-\beta aamba\quad /l-i-a-N-rama\quad kw-aa-N-chiinga \\
\text{γ Insertion} & \quad ---\quad ---\quad ---
\end{align*}
\]
Nasal Rules \( \betaa-a-m-baamba \) \( l\i-a-n-dama \) \( kw\-aa-n-jiinga \)
Surface \([\betaambamba]\) \([\liandama]\) \([kwaanjingga]\)

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 \(\text{/nd-}/\) prefixed forms were to appear before \(\text{/N}/\). Since both elements refer to first person singular, the reflexivization rule would spell \(\text{/N}/\) 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 \(\text{/nd-}/\) prefixed forms, which, as it were, start off with fewer underlying vowel morae, because \(\text{/nd-}/\) 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 \(\text{/nd-}/\) 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 \(\text{/li-a-fiimba/}\), because there would have been no sequences of identical vowels formed from \(-a/-\) to reduce. The resulting surface form
*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 homonymns 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 homophony 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'6

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

/xu-aa-βaamb-a/ → xwaαβaamba  
     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 lyayeefiimba 'it has a. covered itself'. This form and other related forms

---

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:

<table>
<thead>
<tr>
<th>Underlying</th>
<th>Glide Formation</th>
<th>Comp. Length</th>
<th>/-a-/ Reduction</th>
<th>y Insertion</th>
<th>Surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>/li-aa-fiimb-a/</td>
<td>---</td>
<td>---</td>
<td>li-a-fiimb-a</td>
<td>---</td>
<td>[liafiimba]</td>
</tr>
<tr>
<td>/βa-aa-lum-a/</td>
<td>---</td>
<td>---</td>
<td>βa-a-luma</td>
<td>---</td>
<td>[βaaluma]</td>
</tr>
<tr>
<td>/xu-aa-βaamb-a/</td>
<td>---</td>
<td>---</td>
<td>xw-aa-βaamba</td>
<td>---</td>
<td>[xwaaluma]</td>
</tr>
</tbody>
</table>

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-/: 

| /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/ → iyayefiimba
   cl.5 SM-aa-R-cover-T
   'it has a. covered itself'

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

/xu-aa-i-lum-a/ → xwayeeluma
   lpl SM-aa-R-bite-T
   '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 iyayefiimba, 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 γ Insertion (Ø → γ /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 γ 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 γ Insertion is not even met.

We must invoke a special rule of γ 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/ /li-aa-i-fiimba/ /βa-aa-i-luma/ /xu-aa-i-luma/

Special γ Insertion

nd-a-γ-a-i-fiimba li-a-γ-a-i-fiimba βa-aya-i-luma xu-aya-luma

Coalescence

nd-a-yee-fiimba li-a-yee-fiimba βa-a-yee-luma xu-a-yee-luma

Glide formation & Comp. Length.

--- ly-aa-yee-fiimba --- xw-aa-yee-luma

/-a-/ Reduction

--- ly-aa-yee-fiimba βa-γee-luma xwa-yee-luma

γ Insertion

--- --- --- ---

Surface

[ndayeefiimba] [lyayeefiimba] [βayeeluma] [xwayeeluma]

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

Lest it be thought that Special γ 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:
Reduction phenomena in Luyia

(23) /nd-aa-i-ira/  
1sg SM-aa-R-kill  
→ ndayeeyira  
'I have a. killed myself'

/li-aa-i-ira/  
cl.5 SM-aa-R-kill  
→ lyayeeyira  
'it has a. killed itself'

/xu-aa-i-osia/  
1pl SM-aa-R-warm  
→ xwayeeosia  
'we have a. warmed ourselves'

/βa-aa-i-umia/  
cl.2 SM-aa-R-dry  
→ bayeeyumia  
'they have a. dried themselves'

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], [xwayeeosia], and [bayeeyumia].

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/  
cl.5 SM-aa-1sg OM-carry  
→ lyayaanjiinga  
'it has a. carried me'

/ku-aa-N-chiinga/  
cl.3 SM-aa-1sg OM-carry  
→ kwayaanjiinga  
'it has a. carried me'

/βa-aa-N-rama/  
x1.2 SM-aa-1sg OM-defeat  
→ βayaandama  
'they have a. defeated me'

Derivations are provided in (25):
Studies in African Linguistics 17(2), 1986

(25)

PNCL li-aaa-N-chiinga ku-aaa-N-chiinga βa-aaa-N-rama
Special y 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-chiinga βa-yaa-N-ram

nasal interactions; [ iyayaanjiinga] [kwayaanjiinga] [byaaandama]

Surface

With the addition of the Special y 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-ɪba/
1 sg SM-aa-steal → ndayeβa 'I have a. stolen'
/lɪ-aa-ira/
cl.5 SM-aa-kill → lyayera 'it has a. killed'
/xu-aa-ula/
1pl SM-aa-arrive → xwayola 'we have a. arrived'
/βa-aa-ara/
cl.2 SM-aa-split → bayara '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)

<table>
<thead>
<tr>
<th>Underlying</th>
<th>Special y</th>
<th>Insertion</th>
<th>Coalescence</th>
<th>Glide Formation &amp;</th>
<th>Comp. Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>/xu-aa-ولا/</td>
<td>li-ya-ira</td>
<td>xb-ya-ولا/</td>
<td>/βa-ya-ولا/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/βa-aa-ara/</td>
<td>xb-ya-ولا/</td>
<td>xb-ya-ولا/</td>
<td>/βa-ya-ولا/</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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-ya-ेे-era  xb-ya-ولا/  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-ya-ेे-ेा  ly-ya-ेे-era  xb-ya-ولا/  βa-ya-ara

Surface                [nd-ya-ेे-ेा] [ly-ya-ेे-era] [xb-ya-ولا/] [βa-ya-ara]

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-/.

(28) /i/-initial root                    /-/ + C-initial root
    /iikul/       'open'                  /i-kul/      'buy (for) self'
    /ilim/        'get dark'               /i-lim/      'cultivate self'
    /ir/          'kill'                    /i-r/        'put self'

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:

(29) a. /b-a-aa-ikula/   +   bayeekula   'they have a. opened'
    /b-a-aa-i-kula/   +   bayeekula   'they have a. bought themselves...

b. /n-d-aa-ilima/   +   ndayelima   'I have a. gotten dark'
    /n-d-aa-i-lima/   +   ndayeelima   'I have a. cultivated myself'

c. /l-i-aa-ira/   +   lyayera   'it has a. killed'
    /l-i-aa-i-ira/   +   lyayeera   'it has a. put itself'

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 /γ/-initial roots vs. certain vowel-initial roots. In Olu-
Tsotso, there are a number of y-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)  
<table>
<thead>
<tr>
<th>y-initial roots</th>
<th>vowel-initial roots</th>
</tr>
</thead>
<tbody>
<tr>
<td>yaanz 'like'</td>
<td>anz 'arrange'</td>
</tr>
<tr>
<td>yeel 'land, set'</td>
<td>el 'select'</td>
</tr>
<tr>
<td>yeeng 'brew'</td>
<td>eng 'ripen'</td>
</tr>
</tbody>
</table>

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

(31)  
<table>
<thead>
<tr>
<th>y-initials, /-a-/</th>
<th>vowel-initials, /-aa-/</th>
</tr>
</thead>
<tbody>
<tr>
<td>/li-a-yaanza/ + lyayaanza</td>
<td>/li-aa-anza/ + lyayanza  'it liked'</td>
</tr>
<tr>
<td>/ku-a-yeela/ + kwayneela</td>
<td>/ku-aa-ela/ + kwayela  'it set'</td>
</tr>
<tr>
<td>/ta-a-yeenga/ + tayeenga</td>
<td>/ta-aa-enga/ + tayenga  '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

