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NEUTRALIZATION OF CONTRAST IN THE VOWEL SYSTEM OF URHOBO*

Rose O. Aziza
Delta State University

Urhobo, a South Western Edoid language of the Niger-Congo family, is spoken in Delta State, Nigeria. In the synchronic phonology of the language, there are seven surface vowels: [i, e, ε, a, ɔ, o, u], but the behavior of some vowels, especially e, ɔ, ε, is sometimes at variance with their expected vowel behavior, indicating that there may be abstract underlying vowels */ɜ, ʊ, ʌ/ which have merged with /ɛ, o, e/. The result, when compared with sister languages such as Degema and Isoko, is that the Urhobo system appears quite complex. The focus of this paper is showing that abstract underlying */ɜ, ʊ, ʌ/, which are Proto Edoid vowels, still have an effect in the synchronic phonology: thus, /ɜ, e/ become [ɛ], /ʊ, ɔ/ become [o], and /ʌ, e/ become [ɛ] and possibly [a]. When we account for the ‘awkward’ behavior of apparent /ɛ, o, e/, the Urhobo vowel system is clear and straightforward.

The Edoid languages make up a sub-branch of the West Benue-Congo branch of Niger-Congo, and are spoken in the southern part of Nigeria. They are classified into four co-ordinate groups, namely Delta Edoid (DE), North Central Edoid (NCE), North Western Edoid (NWE), and South Western Edoid (SWE) (Elugbe 1973, 1989). The languages have vowel systems consisting of between seven and ten vowels. The Proto-Edoid (PE) vowels are */i, ɪ, e, ɛ, ə, a, ɔ, o, u, u/. Languages which have fewer than ten vowels are said to have reduced their systems through the merging of certain vowels with others. Lindau (1975), using acoustic

* This paper has benefited from the various reviewers’ comments and I am immensely grateful. All uncorrected errors are those of the author.
perturbation theory, identifies two common patterns of vowel merging, namely /i/ merging with /e/ for acoustic reasons, and /u/ merging with /o/ for reasons of structural pressure, resulting in an earlier nine-vowel system becoming reduced to a seven-vowel system. Williamson (1983) has also reported that PE */ə/ has merged with /e, e, a/ in a number of languages within the Niger-Congo family, and that where */ə/ has merged with /a/, the vowel becomes neutral if the language maintains a harmony system.

Of the Edoid languages, only Degema, a DE language, still has contrasts involving all ten vowels (Fulop, Kari & Ladefoged 1998). Elugbe (1989) reports that the other languages have reduced their systems in one of three ways:

a. in nine-vowel systems, there is no /ə/; e.g. Isoko (a SWE language);

b. in eight-vowel systems, there are no /ə, i/, e.g. Ibilo (a NWE language);

c. in seven-vowel systems, there are no /ə, i, u/, e.g. Urhobo (a SWE language).

Vowel harmony is a very common phenomenon in Edoid languages and the feature advanced tongue root, i.e., [+ATR] or retracted tongue root, i.e., [-ATR] is a common label used to describe it. The PE vowel patterns divide into the following two sets:

(1) Proto Edoid (PE) Vowels

\[
\begin{array}{c|c|c|c|c}
\text{[-ATR]} & \text{[+ATR]} \\
\hline
i & u & i & u \\
\hline
e & o & e & o \\
\hline
\text{ə} & \text{ə} & \text{ə} & \text{ə} \\
\text{a} & \text{a} & \text{a} & \text{a} \\
\end{array}
\]

Our purpose in this paper is to account for vowel behavior in the synchronic grammar of Urhobo.

1. **Previous Studies on the Vowel Systems of SWE Languages.**

SWE is made up of five languages: Ẹruwa, Isoko, Okpẹ, Urhobo, and Uvwie. Urhobo is the largest in the group, and is commonly spoken as a first or second language within the SWE area.

Hoffman (1973) examines the vowel system of Okpẹ and, based on vowel harmony patterns displayed in various grammatical structures derived from verb root vowels, recognizes nine phonemic vowels, i.e., /i, ɨ, e, ɛ, a, ə, o, u, u/, al-
though there are only seven surface vowels, i.e., [i, e, ɛ, a, ɔ, o, u]. The two vowels /i, u/ are said to have become surface [e, o] respectively. Following Hoffman, Omamor (1973) reports a similar occurrence in Uvwię, and Omamor (1988) compares the vowel systems of both Okpê and Uvwię, suggesting a regrouping of Okpê and Uvwię vowels on the basis of two overriding features: (i) the “advanced” (our [+ATR]) or “unadvanced” (our [-ATR]) harmony set to which they inherently belong and (ii) the height feature which separates them into a “high” set and a “low” set. However, although both linguists rightly observe that /ɛ/, a member of the “unadvanced” set, sometimes alternates with /a/ as its “advanced” counterpart suffix in certain constructions, no attempt is made to explain the apparent violation of the co-occurrence restriction.

Donwa-Ifode (1989) examines vowel behavior in nouns in Ėruwa and Isoko and reports that the languages have nine vowels each. She also suggests that PE */œ/ has merged with /a/ and /ɛ/ in both languages because /a/, a typical [-ATR] vowel, sometimes occurs in prefix position where a [+ATR] vowel is expected and /ɛ/, another [-ATR] vowel, sometimes occurs in stem position where a [+ATR] vowel is expected.

Studies of Urhobo vowels also exist in the literature, among which are Kelly (1969), Welmers (1969), Elugbe (1973, 1989,1991), Aziza (1994, 1997). Kelly (1969) examines vowel patterning in the Urhobo noun and, based on the quality of the plural marker, he recognizes two sets of vowels: those that form their plural by changing the initial vowel to [e] which belong to Group 1, and those that change to [i] which belong to Group 2. The vowels in his Group 1 are /a, ɔ, ɛ, o, e/ while those in Group 2 are /o, e, u, i/. He also recognizes three degrees of height for each group as follows:

(2) Group 1 Group 2
Top: e, o i, u
Middle: ɛ, ɔ e, o
Bottom: a ɛ, ɔ

All linguists who have worked on Urhobo vowels recognize the presence of [ATR] harmony particularly in the verbal system.

In this work, we attempt a proper account of Urhobo vowels in both the verb and in the noun, as well as in their phrasal combinations. In particular, we examine the behavior of e, o, ɛ in the synchronic grammar, seeking to determine whether there are abstract underlying vowels */i, u, ɔ/ which may be responsible for the unpredictable behavior of the surface vowels in certain positions. We note
that synchronic vowels e, o which one would suppose to be mid [+ATR] vowels sometimes behave as high [-ATR] vowels, while the synchronic vowel ε which one would suppose to be a mid [-ATR] vowel sometimes occurs where a [+ATR] vowel is expected. The study will show that although the surface merging of vowels is complete and there is absolute neutralization of contrast between the merged vowels in the synchronic system, the underlying features of the lost vowels come into play in the phonological patterning of surface vowels, thereby making the vowel system appear complex.

Urhobo has the following syllables: V, CV, and CCV. Tone is significant both lexically and grammatically (cf. Elugbe 1973, 1989, Aziza 1997, 2003). Only vowels bear tones and they are marked in our examples as follows: [ ] = Low tone (L), [´] = High tone (H) while the contour tones are a combination of these. The downstepped H (Mid) is left unmarked.

2. The Vowel System of Urhobo.

At the phonetic level, Urhobo has the following seven vowels [i, e, ε, a, ɔ, o, u]. The orthographic equivalents i, e, ε, a, ɔ, o, u are used for writing the language. All seven vowels have nasal counterparts: [ɪ, ɛ, ɛ, ɑ, ɔ, ɔ, ʊ]. Both oral and nasal vowels pattern alike in the various grammatical structures and so are not given separate treatments. In addition, every vowel in the environment of a nasal segment is automatically nasalized, and such is not reflected in our examples. For a fuller discussion of nasality in Urhobo see Aziza (2002).

In Urhobo, both [ATR] harmony and vowel height play important roles in how the vowels of nouns and verbs pattern in various grammatical structures. Based on available data, the seven vowels pattern as in (3) in their harmonic and height behavior. Lowered indices are used after /ε, ε, o/ to reflect the actual phonetic forms in our examples.

(3) Set 1 [+ATR] Set 2 [-ATR]

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>i</td>
<td>u</td>
<td>e2</td>
<td>o2</td>
</tr>
<tr>
<td>Mid</td>
<td>ε1</td>
<td>o1</td>
<td>ε2</td>
<td>ɔ</td>
</tr>
<tr>
<td>Low</td>
<td>ε1</td>
<td>a</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Henceforth, in referring to these vowel sets, we refer to them in terms of [+ATR] and [-ATR], referring to their phonological behavior, not their surface phonetic realisation.
We notice that the vowels /e, o/ which are typical mid [+ATR] vowels sometimes behave as high [-ATR] vowels, i.e., [e₂, o₂], while the typical mid [-ATR] front vowel /e/ sometimes co-occurs with [+ATR] vowels, i.e. [e₁]. One basic characteristic of the vowel system of this language is that vowel sequences are not permitted at the surface level. Therefore, whenever two vowels occur in a sequence, one of the vowels either deletes or becomes a nonsyllabic glide. The typical high vowels /i, u/ do not delete; they become glides: [j] for the front vowel /i/ and [w] for the back vowel /u/. Interestingly, the vowels [e₂, o₂] consistently behave like the obvious high vowels in always becoming nonsyllabic glides [j, w] respectively whenever another vowel follows them. All other vowels including [e₁, o₁] occurring in a sequence can be deleted based on morpho-phonemic considerations. In addition, [e₂, o₂] consistently select [-ATR] affixes instead of the [+ATR] affixes selected by [e₁, o₁]. There are also two different patterns of behavior for /e/: [e₁] consistently occurs in the environment of [+ATR] vowels, and [e₂] consistently selects [-ATR] affixes.

In what follows, we shall examine the behavior of /e, o, e/ in a number of grammatical structures involving verbs and nouns.

3. The Behavior of e, o, e in Verbs.

The basic structure of the Urhobo verb is monosyllabic, i.e., CV or CCV. Urhobo vowels are presented in monosyllabic verb roots in (4) below. Note the occurrence of [e₂, o₂] as phonological [-ATR] verb root vowels and of [e₁] as a [+ATR] verb root vowel.

(4) Verbs

- [+]ATR [ ]
  - sì ‘write, pull’
  - sè ‘call, read’
  - gê ‘be foolish’
  - cò ‘steal’
  - kù ‘pour’

- [-]ATR [ ]
  - ė₂ ‘eat’
  - ĝè ‘sell’
  - cò ‘steal’
  - kpê ‘dry up’
  - sà ‘shoot’

In grammatical constructions, affixes and other clitics such as monosyllabic pronouns that accompany verbs usually have two phonetic shapes, because they have to harmonize with the root vowel. In this section, we shall examine the derivation of the infinitive form, verb + object constructions, and constructions for the present, past and future tense in order to reveal the behavior of Urhobo vow-
els, especially /e, o, e/, as evidence for the existence of abstract underlying vowels */I, u, ə/. As will be noticed in our examples, there is consistency in the behavior of the vowels: [e₁, o₁] as root vowels consistently behave as typical nonhigh [+ATR] vowels while [e₂, o₂] consistently behave as high [-ATR] vowels. Also, [e₁] consistently behaves as a [+ATR] vowel while [e₂] consistently behaves as a [-ATR] vowel.¹

3.1. The infinitive. The verb derives its infinitive form by adding a prefix vowel E- to the root. The variants of this prefix are: E- for [+ATR] verbs and e- for [-ATR] verbs. In addition, if the vowel of the verb is a high vowel, a suffix -O (also in two phonetic shapes: -ô for [+ATR] roots and -o for [-ATR] roots) is also added. The addition of the suffix automatically creates the environment for the high root vowel to become a nonsyllabic glide. In the examples in (5) below, notice that while [e₁, o₁, e₁] select E-, the prefix vowel for [+ATR] roots, [e₂, o₂, e₂] select e-, the prefix vowel for [-ATR] roots. Moreover, [e₂, o₂] take a suffix vowel like the typical high vowels [i, u] and select the variant -ô like the typical [-ATR] vowels. This is an indication that there are underlying vowels */I, u, ə/ which may have become surface [e₂, o₂, e₁] respectively in the system.

(5) a. [+ATR] verb roots

<table>
<thead>
<tr>
<th>Subject Pronouns</th>
<th>Pl</th>
<th>Object Pronouns</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sg</strong></td>
<td></td>
<td><strong>Sg</strong></td>
</tr>
<tr>
<td>[+ATR]</td>
<td>[-ATR]</td>
<td>[+ATR]</td>
</tr>
<tr>
<td>1st Sg mi</td>
<td>me₁</td>
<td>ãvărê/me₁</td>
</tr>
<tr>
<td>2nd Sg wo₁</td>
<td>wo₂</td>
<td>òwâvă/ we₁</td>
</tr>
<tr>
<td>3rd Sg o₁</td>
<td>o₂</td>
<td>ãjê₂</td>
</tr>
</tbody>
</table>

¹ Each monosyllabic subject or object pronoun is realized in two phonetic shapes to agree with the [ATR] harmony requirements of the verb stem vowel. The pronouns are listed below:
Neutralization of Contrast in the Vowel System of Urhobo

3.2. Verb + object. If the verb takes a noun object, since every noun begins with a vowel prefix, the vowel of the verb either becomes a nonsyllabic glide if it is high or it deletes if it is nonhigh. Here again, [e₂, o₂] behave like the typical high vowels [i, u], supporting the claim of the existence of underlying vowels */i, u/ that have become [e₂, o₂] respectively. Note the co-occurrence of [e₁] with [+ATR] vowels in the word for ‘rope’ in (6a). We shall return to this later.

(6) a. [+ATR] verbs

<table>
<thead>
<tr>
<th>Verb</th>
<th>Object</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>sì + úrùhré₁</td>
<td>[ʃjúrùhré]</td>
<td>‘pull a rope’</td>
</tr>
<tr>
<td>kù + ẹ₁vrì</td>
<td>[kwèvrì]</td>
<td>‘pour oil’</td>
</tr>
<tr>
<td>sè₁ + ëjáre₂</td>
<td>[sójáre]</td>
<td>‘call a man’</td>
</tr>
<tr>
<td>cò₁ + ĕkpù</td>
<td>[cékpù]</td>
<td>‘steal a bag’</td>
</tr>
<tr>
<td>üè₁ + òmó</td>
<td>[ʃjómó]</td>
<td>‘give birth to a child’</td>
</tr>
</tbody>
</table>

b. [-ATR] verbs

<table>
<thead>
<tr>
<th>Verb</th>
<th>Object</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>rè₂ + òné₂</td>
<td>[ʃjòné]</td>
<td>‘eat yam’</td>
</tr>
<tr>
<td>sò₂ + une₁</td>
<td>[swùnè]</td>
<td>‘sing a song’</td>
</tr>
<tr>
<td>jè₂ + ëjìmá</td>
<td>[ʃjìmá]</td>
<td>‘sell clothes’</td>
</tr>
<tr>
<td>kò + ìribo₁</td>
<td>[krìbo]</td>
<td>‘plant pepper’</td>
</tr>
<tr>
<td>sà + ò₁huó₁</td>
<td>[sòhwó]</td>
<td>‘shoot a person’</td>
</tr>
</tbody>
</table>

3.3. Constructions in the present tense. The simple present or habitual tense is marked by a floating high tone that is realized on the final vowel of the subject. If the subject already ends on a low tone, a low-high contour is created, otherwise there is a perceivably lengthened high tone if the subject ended on a high tone. What is of interest to us here is the behavior of the vowels. Both subject and object monosyllabic pronouns must agree in [ATR] with the vowel of the verb root. Where the verb takes a noun object, as mentioned above, the environment is created for either glide formation or vowel elision to take place. In the examples below, note that whereas [e₁, o₁, e₁] as root vowels select [+ATR] affixes, [e₂, o₂, e₂] select [-ATR] affixes and also [e₂, o₂] become nonsyllabic glides rather than un-
dergo vowel elision as \([e_1, o_1]\) do. Note too that the allomorphs of the first person singular subject pronoun, \(mi\), i.e., \(mi\) with [+ATR] verbs and \(me\) with [-ATR] verbs correspond to Isoko \(mi\) and \(mi\) respectively; this is another indication of the merging of */i/ with [e] in Urhobo.

(7) a. [+ATR] verbs

\[
\begin{align*}
si & \quad [mǐ sì wè] \quad \text{‘I pull/ am pulling you’} \\
ku & \quad [wò kwèvù] \quad \text{‘you pour/ are pouring oil’} \\
me_1 & \quad [ò mètò] \quad \text{‘3sg plaits/ is plaiting hair’} \\
se_1 & \quad [wò sè vè] \quad \text{‘you call/ are calling me’} \\
cò_1 & \quad [ò cèkpù] \quad \text{‘3sg steals/ is stealing a bag’} \\
ϕè_1 & \quad [ò ϕè] \quad \text{‘I give birth/ am giving birth (to a child)’} \\
xue_1 & \quad [ò xwè] \quad \text{‘3sg is pouring away’} \\
γè & \quad [wò γè] \quad \text{‘you are being foolish’}
\end{align*}
\]

b. [-ATR] Verbs

\[
\begin{align*}
re_2 & \quad [wò rè vè] \quad \text{‘You are eating me’} \\
sè_2 & \quad [mè sè wè] \quad \text{‘I am rejecting/ denying you’} \\
cò_2 & \quad [wò cwèkì] \quad \text{‘You trade/ are trading’} \\
sò_2 & \quad [ò sò vè] \quad \text{‘3sg is singing (about) me’} \\
je_2 & \quad [ò jèŋmá] \quad \text{‘3sg sells/ is selling clothes’} \\
ϕè_2 & \quad [ò ϕè] \quad \text{‘3sg is urinating’} \\
xue_2 & \quad [ò xwè] \quad \text{‘3sg is laughing’} \\
kò & \quad [ònòmè kèribò] \quad \text{‘Onòmè plants/ is planting pepper’} \\
sa & \quad [àjè nà sà vè] \quad \text{‘the woman is shooting me’}
\end{align*}
\]

If the verb does not have an object, a suffix \(-A\) (with two variants: \(-ɛ\) after [+ATR] roots and \(-a\) after [-ATR] roots) attaches to the verb root only if the root vowel is a high vowel (which becomes a glide). It is interesting to note that [e] is the [+ATR] counterpart of this suffix in Urhobo. In Degema which still has all ten vowels, the variants are [ə] with [+ATR] and [a] with [-ATR] roots. In this construction, we find again that \([e_2, o_2]\) behave like typical [-ATR] vowels by taking the suffix \(-a\) which is the variant selected by [-ATR] roots. The fact that [ɛ] is the [+ATR] variant of this suffix is an indication of the merging of */ə/ with [ɛ].
Neutralization of Contrast in the Vowel System of Urhobo

(8) a. [+ATR] verbs
   sí     mĩ sìè     [mĩ sjè]      ‘I pull/ am pulling’
   fũ     ō fũè      [ō fũè]      ‘3sg extinguishes’
   sè₁    wô sè₁     ‘you call/ are calling’
   cõ₁    mĩ cõ₁     ‘I steal/ am stealing’
   ġé₁    wô ġé₁     ‘you are being foolish’

   b. [-ATR] verbs
   rë₂    mẽ₂ rìà     [mẽ rjà]      ‘I eat/ am eating’
   cõ₂    ǒ cùà      [ǒ cvà]      ‘3sg trades/ is trading’
   ğè₂    wô ğè₂     ‘you sell/ are selling’
   kõ      mẽ₂ kõ      ‘I plant/ am planting’
   sâ      wô sâ      ‘you shoot/ are shooting’

In (9) below, both the pronoun and the auxiliary agree with the [ATR] value of the verb root.

(9) a. [+ATR] verbs
   sí     mĩ ʒí sìè     [mĩ ʒí sjè]      ‘I am still pulling/ writing’
   fũ     ō ʒí fũè      [ō ʒí fũè]      ‘3sg is still going out’
   sè₁    wô ʒí sè₁     ‘you are still calling/ reading’
   cõ₁    mĩ ʒí cõ₁     ‘I am still a thief’
   ġè₁    wô ʒí ġè₁     ‘you are still having babies’

   b. [-ATR] verbs
   rë₂    mẽ₂ ʒé rìà     [mẽ ʒé rjà]      ‘I am still eating’
   sõ₂    ʒé sùà      [ʒé svà]      ‘3sg is still singing’
   vīè₂   wô ʒé vīè₂     ‘you are still crying’
   kõ      mẽ₂ ʒé kõ      ‘I am still planting’

3.4. Constructions in the past tense. A sentence in the past tense is also marked by a floating high tone which is located on the final vowel of the verb root. Where the verb takes a noun object, the vowel of the verb root either become a nonsyllabic glide or deletes, depending on the first vowel’s height. As a result, the tone which marks tense is realized on the initial vowel of the object. Just as in the present tense forms, verbs in the past tense also select appropriate harmonizing affixes in both subject and object positions where necessary. We note here too that whereas [e₁, o₁] behave as nonhigh [+ATR] vowels, [e₂, o₂] behave as high
[-ATR] vowels. Similarly, [ε₁] behaves as a [+ATR] vowel whereas [ε₂] behaves as a [-ATR] vowel. A few examples are in (10) below:

(10) a. si [mì si wé] ‘I pulled you’  
    ku [wò kwévrì] ‘2sg poured oil’  
    se₁ [ò sé vé] ‘3sg called me’  
    co₁ [àjè nà cékpù] ‘The woman stole a bag’  
    do₁ [wò dò ró] ‘you threw it’  
    viε₁ [mù ujómo] ‘I gave birth to a child’  

    b. re₂ [mè rjóné] ‘I ate yam’  
    co₂ [àjè nà cwékì] ‘the woman traded’  
    so₂ [wò só ró] ‘you sang it’  
    je₂ [ò jé vé] ‘3sg sold me’  
    sa [àjè nà sóhwó] ‘the woman shot someone’

If the verb does not take an object, a suffix -rl (with two phonetic variants: -ri with [+ATR] roots and -re with [-ATR] roots) attaches to the verb root. Here too [e₂, o₂] behave like typical [-ATR] vowels while [ε₁] behaves like a [+ATR] vowel in the selection of the affix. As the examples in (11) show, the suffix attached to high back vowels also agree in backness with the root vowel. These are yet other instances of the merging of */i, u, ə/ with [e₂, o₂, ε₁] respectively in synchronic grammar. (Note that in Isoko, the variants of this morpheme are -ri and -rì respectively.)

(11) a. [+ATR] verbs  
    mì sírì ‘I pulled, I wrote’  
    wò múrù ‘you carried’  
    ò sé₁rì ‘3sg called, 3sg read’  
    mì có₁rì ‘I stole’  
    mì viε₁rì ‘I gave birth’  
    ò φέ₁rì ‘3sg became wide’  
    ò xué₁rì ‘3sg poured away’
b. [-ATR] Verbs

- mè Ꞓ ré Ꞓ Ꞓ Ꞓ ‘I ate’
- wò só Ꞓ rò ‘2sg sang’
- mè vi Ꞓ Ꞓ Ꞓ Ꞓ Ꞓ ‘I cried’
- ò Ꞓ Ꞓ Ꞓ Ꞓ Ꞓ Ꞓ ‘3sg urinated’
- ò xù Ꞓ Ꞓ Ꞓ Ꞓ Ꞓ Ꞓ ‘3sg laughed’
- mè Ꞓ kò Ꞓ Ꞓ Ꞓ Ꞓ ‘I planted’
- wò sá Ꞓ Ꞓ Ꞓ Ꞓ Ꞓ ‘2sg shot’

3.5. Constructions in the future tense. The future tense is marked by an auxiliary which is also in two phonetic shapes: ce with [+ATR] verb roots and ca with [-ATR] roots. This tense has no suffix; note that auxiliaries and pronouns will harmonize as expected.

(12) a. [+ATR] verbs

- mí cè Ꞓ sì ‘I will write’
- wò ʒí cè Ꞓ mú ‘2sg will still/ also carry’
- ó cè Ꞓ sé Ꞓ ‘3sg will call, read’
- mí ʒí cè Ꞓ có Ꞓ ‘I will still/ also steal’
- wò cè Ꞓ ʒé Ꞓ ‘2sg will be foolish’
- ó ʒí cè Ꞓ vi Ꞓ Ꞓ Ꞓ ‘3sg will still/ also bear (children)’
- ó ʒí cè Ꞓ Ꞓ Ꞓ ‘3sg will still/ also become wide’
- ó cè Ꞓ xù Ꞓ ‘3sg will pour away’

b. [-ATR] verbs

- mè Ꞓ cà rè Ꞓ ‘I will eat’
- wò ʒé Ꞓ cà só Ꞓ Ꞓ ‘2sg will still/ also sing’
- ó ʒé Ꞓ cà vi Ꞓ Ꞓ Ꞓ ‘3sg will still/ also cry’
- ó ʒé Ꞓ cà Ꞓ Ꞓ Ꞓ Ꞓ Ꞓ ‘3sg will still/ also urinate’
- ó ʒé Ꞓ cà xù Ꞓ Ꞓ Ꞓ ‘3sg will also laugh’
- mè Ꞓ cà kò Ꞓ ‘I will plant’
- wò cà sá ‘2sg will shoot’

One other phenomenon that needs to be mentioned about [ɛ] regards its role in surface vowel hiatus. Ordinarily, vowel sequences at the phrase level are eliminated, but such sequences are optionally allowed only if the first vowel is [ɛ], which carries a L tone as though there is a pause between the words. This means that [ɛ] can either attach after a high vowel or replace a nonhigh vowel in
such a structure, irrespective of the [ATR] requirement of the verb. This behavior of [ɛ] is akin to that of [ɔ] as the vowel commonly found in unstressed syllables in languages that have it. We believe that this behavior of [ɛ] in Urhobo is not unconnected with the merging of *ɔ with ɛ. The following are some examples:

(13) a. [+ATR] verbs

<table>
<thead>
<tr>
<th>Verb</th>
<th>Original</th>
<th>Transliteration</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>sí</td>
<td>[mɛ sjɛ ụrùhɛ]</td>
<td>~ [mɛ sjúrùhɛ]</td>
<td>‘I am pulling a rope’</td>
</tr>
<tr>
<td>ku</td>
<td>[wɔ kwɛ èvũři]</td>
<td>~ [wɔ kwévũři]</td>
<td>‘2sg poured oil’</td>
</tr>
<tr>
<td>se₁</td>
<td>[ó cɛ cɛ ñʃarɛ]</td>
<td>~ [ó cɛ sάʃarɛ]</td>
<td>‘3sg will call a man’</td>
</tr>
<tr>
<td>do₁</td>
<td>[wɔ dɛ ùrɛ]</td>
<td>~ [wɔ dúrɛ]</td>
<td>‘2sg threw a stick’</td>
</tr>
<tr>
<td>ùè₁</td>
<td>[mɛ ʒi ọjɛ õmó]</td>
<td>~ [mɛ ʒi ọjɔmó]</td>
<td>‘I am still having babies’</td>
</tr>
</tbody>
</table>

b. [-ATR] verbs

<table>
<thead>
<tr>
<th>Verb</th>
<th>Original</th>
<th>Transliteration</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>re₂</td>
<td>[mɛ ɾjɛ ënɛ]</td>
<td>~ [mɛ rjɔnɛ]</td>
<td>‘I am eating yam’</td>
</tr>
<tr>
<td>so₂</td>
<td>[wɔ swɛ ụnɛ]</td>
<td>~ [wɔ swüŋɛ]</td>
<td>‘2sg sang (a song)’</td>
</tr>
<tr>
<td>jɛ₂</td>
<td>[mɛ ʒɛ jɛ ëmɛjá]</td>
<td>~ [mɛ ʒɛ jɛmɛ́já]</td>
<td>‘I am still selling clothes’</td>
</tr>
<tr>
<td>kɔ</td>
<td>[mɛ ʒɛ cã kɛ́jíbɔ́]</td>
<td>~ [mɛ ʒɛ cã kǐrǐbó]</td>
<td>‘I will also plant pepper’</td>
</tr>
<tr>
<td>sa</td>
<td>[àjɛ nã sɛ òhwɔ́]</td>
<td>~ [àjɛ nà sɔhwó]</td>
<td>‘the woman is shooting someone’</td>
</tr>
</tbody>
</table>

This takes place only before a vowel-initial object, therefore [mɛ sì wè] ‘I am pulling you’, and not *[mɛ sjɛ wè].

From the foregoing, it is clear that there is consistency in the vowel behavior: [ɛ₁, ɔ₁] always behave as nonhigh [+ATR] vowels while ɛ₂, ɔ₂ always behave as high [-ATR] vowels in verb roots as well as in the affixes they select. In addition, [ɛ₁] always behaves as a [+ATR] vowel while [ɛ₂] always behaves as a [-ATR] vowel both as a root vowel and in the affixes it selects. We shall now turn to the noun.

4. **The Behavior of /e, o, ɛ/ in Nouns.**

The basic structure of the Urhobo noun is disyllabic, i.e., it consists of a vowel prefix and a -CV or -CCV root. There are also many trisyllabic and a few polysyllabic nouns. Urhobo vowels are presented in the disyllabic nouns of (14) below. Note the occurrence of [ɛ₂, ɔ₂] as both prefix and root vowels as well as occurrence of [ɛ₁] as a [+ATR] root vowel. This will become clearer in the next section.
Neutralization of Contrast in the Vowel System of Urhobo

(14) Nouns

a. [+ATR] vowels
   i\textgreek{gamma}o\textsubscript{1} ‘money’
   e\textgreek{beta}b\textgreek{omicron}\textsubscript{1} ‘sack’
   o\textgreek{omicron}d\textgreek{o} ‘mortar’
   u\textgreek{upsilon}u ‘louse’
   u\textgreek{kappa}\textgreek{varepsilon} ‘egg’
   u\textgreek{upsilon}g\textgreek{epsilon} ‘fish trap’

b. [-ATR] vowels
   e\textgreek{epsilon}m\textomicron ‘children’
   o\textgreek{omicron}d\textgreek{omicron}\textgreek{epsilon} ‘name’
   e\textgreek{gamma}i\textgreek{alpha} ‘taboo’
   o\textgreek{omicron}m\textomicron ‘child’
   a\textgreek{tau} ‘desert’
   o\textgreek{omicron} ‘lover’

Only a few grammatical processes affect the shape of nouns in Urhobo, the most important one being plural formation. In this section, we shall examine how nouns form their plural and how vowels behave in phrasal combinations affecting nouns. Our main focus is the behavior of /e, o, e/ in these constructions.

4.1. Plural formation. Generally, the process of plural formation in Edoid languages is phonologically predictable from [ATR] harmony rules, with a few exceptions.\footnote{A few nouns which Elugbe (1973) calls “paired body parts” form their plural by changing the singular prefix to [a], for example: \(\delta_2b\delta - \delta_2bh\delta \) ‘hands’; \(\delta_2w\delta - \delta_2w\delta \) ‘legs’.

It involves alternating the prefix vowel of the singular noun with the plural prefix \textipa{i}- which becomes \textipa{i}- before [+ATR] roots and \textipa{a}- before [-ATR] roots. It is generally easy to predict the shape of the plural noun from the prefix vowel of the singular, possibly because PE had a noun class system that became non-existent in the synchronic system of most of the languages, and also because in harmony systems, co-occurrence restrictions enables prefix and root vowels to agree in terms of the harmony feature(s).

In Urhobo, the allomorphs are \textipa{i}- before [+ATR] roots and \textipa{a}- before [-ATR] roots (another line of evidence for the merging of *[i] with [e]). The data reveal the co-occurrence of ‘typical’ [+ATR] vowels [e, o] with [-ATR] vowels. We find that where [i, e, u] occur as prefix vowel of the singular noun, they always select [i] as the plural prefix, the variant for [+ATR] nouns, and where [e, a, o] occur as the singular prefix vowels, they always select [e], the variant for [-ATR] nouns. Where, however, the singular prefix is [o] it may select either [i] or [e] as the plural prefix, and there is really no way of predicting which variant will be selected. This is because [o] is ambiguous as to being [o\textsubscript{1}] i.e. /o/ which would be in harmony with a [+ATR] vowel, or [o\textsubscript{2}] i.e. /u/, which would be in harmony with a [-ATR] vowel. We note the absence of [e] in the prefix position of singular [-ATR] nouns. All cases of [e] in singular nouns found in our data belong to the
[+ATR] group. This may not be unconnected with the fact that, as has been noted by Donwa-Ifode (1989), when vowels disappear from a system, they do so first at the prefix position.

A look at the vowels of the noun root does not make the prediction of the plural form much clearer even though, as was the case with verbs, Urhobo operates a root-controlled harmony. We find that where [i, u] occur as root vowels in the singular, the plural prefix is [i] and where [ɔ, a] occur as root vowels in the singular, the plural prefix is [e]. However, where the root vowel of the singular noun is any of [e, o], the plural variant to be selected is unpredictable: it could be [i] or [e]. As a result, the system appears complex. Thus, the co-occurrence of vowels at both the prefix and root positions are important in selecting the plural prefix of nouns.

\[
(15) \quad a. \quad [+ATR] \quad Nouns
\]

<table>
<thead>
<tr>
<th>Sg.</th>
<th>Pl.</th>
</tr>
</thead>
<tbody>
<tr>
<td>üdì</td>
<td>ìdì</td>
</tr>
<tr>
<td>ìbè;kù</td>
<td>ìbè;kù</td>
</tr>
<tr>
<td>òjé</td>
<td>ìjé</td>
</tr>
<tr>
<td>òdibó</td>
<td>ìdibó</td>
</tr>
<tr>
<td>òjré</td>
<td>ìjré</td>
</tr>
<tr>
<td>ébò</td>
<td>ìbò</td>
</tr>
<tr>
<td>ékpè</td>
<td>ìkpè</td>
</tr>
<tr>
<td>égò</td>
<td>ìgò</td>
</tr>
<tr>
<td>ýò</td>
<td>ýò</td>
</tr>
<tr>
<td>ije</td>
<td>ije</td>
</tr>
<tr>
<td>iribó</td>
<td>iribó</td>
</tr>
</tbody>
</table>

\[
b. \quad [-ATR] \quad Nouns
\]

<table>
<thead>
<tr>
<th>Sg.</th>
<th>Pl.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ò2dè</td>
<td>è2dè</td>
</tr>
<tr>
<td>ò2phàrò</td>
<td>è2phàrò</td>
</tr>
<tr>
<td>ò2fò</td>
<td>è2fò</td>
</tr>
<tr>
<td>atò</td>
<td>ètò</td>
</tr>
<tr>
<td>è2è</td>
<td>è2è</td>
</tr>
<tr>
<td>è2γà</td>
<td>è2γà</td>
</tr>
<tr>
<td>è2nekpò</td>
<td>è2nekpò</td>
</tr>
<tr>
<td>è2sè</td>
<td>è2sè</td>
</tr>
<tr>
<td>è2bò</td>
<td>è2bò</td>
</tr>
<tr>
<td>è2vé</td>
<td>è2vé</td>
</tr>
<tr>
<td>è2fètò</td>
<td>è2fètò</td>
</tr>
<tr>
<td>èbàrà</td>
<td>èbàrà</td>
</tr>
<tr>
<td>èmò</td>
<td>èmò</td>
</tr>
<tr>
<td>èkpe</td>
<td>èkpe</td>
</tr>
<tr>
<td>ègbarà</td>
<td>ègbarà</td>
</tr>
</tbody>
</table>

In the examples in (16) below, a surface [-ATR] vowel [ɛ] occurs in the root with a surface [+ATR] prefix vowel, and the noun patterns as a [+ATR] noun to agree with the prefix [the prefix agrees with the root, the root does not agree with the prefix]. As mentioned earlier, [ɛ] is absent from the prefix position of singular [+ATR] nouns. Again, this may not be unconnected with the weak prefix position and, also as mentioned earlier, in the order of vowel disappearance among Edoid languages, ɔ disappears first. As a result, traces of ɔ can hardly be
expected in that position. Both our verb and noun data therefore show that the sound has merged with \([\varepsilon]\) and that when it patterns as a [+ATR] vowel, it is \([\varepsilon_1]\).

(16) \(\text{úkè}_1 \quad \text{ýkè}_1\) ‘eggs’
\(\text{úgè}_1 \quad \text{ýgè}_1\) ‘fish traps’
\(\text{ýjè}_1 \quad \text{ýjè}_1\) ‘flies’
\(\text{útùè}_1 \quad \text{ýtùè}_1\) ‘oranges’
\(\text{úrùkpè} \quad \text{ýrükpè}\) ‘lamps’

It is necessary to mention here, too, that the low [-ATR] vowel \([a]\) sometimes co-occurs with and patterns as a [+ATR] vowel as we show in (17). A similar occurrence has been reported in a number of Niger-Congo languages and has been traced to the merging of *\(i\) with \([e], [\varepsilon]\) and \([a]\) (cf. Elugbe 1983, Donwa-Ifode 1989, Williamson 2004). The following are some examples.

(17) \(\text{ùsá} \quad \text{ýsá}\) ‘rings’
\(\text{úsiàãrè} \quad \text{ýsiàãrè}\) ‘keys’
\(\text{àcùcà} \quad \text{ýcùcà}\) ‘umbrellas’
\(\text{úkúta} \quad \text{ýkúta}\) ‘stones’
\(\text{ùgbèjá} \quad \text{ýgbèjá}\) ‘friends’
\(\text{úkpácá} \quad \text{ýkpácá}\) ‘towels’

4.2. Phrasal combinations. One other factor that is germane to our argument in establishing the existence of abstract underlying vowels */i, u/ that have become surface \([e, o]\) can be seen when nouns occur in phrasal combinations. As with verbs, in phrasal combinations involving Noun + Noun, our data show that when \([e_2, o_2]\) occur as final vowels of \(N_1\), they consistently trigger glide formation in the fashion of the typical high vowels \([i, u]\), rather than undergoing vowel elision as the nonhigh vowels \([e_1, o_1]\) do.

(18) a. \(V_1\) as a high vowel
\(\text{ùdù} + \text{àmè}_2 \quad [\text{ùdjámè}]\) ‘palm wine’
\(\text{è}_1\text{kù} + \text{è}_1\text{kù} \quad [\text{èkwékù}]\) ‘only trouble’
\(\text{è}_2\text{vé}_2 + \text{è}_2\text{vò}_2 \quad [\text{èujóvò}]\) ‘one goat’
\(\text{àsò}_2 + \text{è}_2\text{rà} \quad [\text{aswèrà}]\) ‘three nights’
b. $V_1$ as a nonhigh vowel

\[
\begin{align*}
\text{ìzé}_1 + \text{ítè}_1\text{tè}_1 & \quad [\text{ìzítètè}] \quad \text{‘small basins’} \\
\text{úkò}_1 + \text{àmè}_2 & \quad [\text{úkámè}] \quad \text{‘a cup of water’} \\
\text{ê}_2\text{mò} + \text{ê}_2\text{rà} & \quad [\text{émérà}] \quad \text{‘three children’}
\end{align*}
\]

In the forms in (19) below, we present sequences with [$e_2, o_2$] with regard to both glide formation and plural formation. The data shows that the nouns with [$e_2, o_2$] as root vowels become glides at phrasal level (meaning that they are high vowels) and they also select the plural prefix [$e$] (meaning that they are [-ATR] vowels), an indication that they are underlying */i, u/ which have become surface [$e_2, o_2$] respectively.

<table>
<thead>
<tr>
<th>Sg</th>
<th>Pl.</th>
<th>Phrase</th>
<th>Spoken form</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>ìsè</td>
<td>è₂sè</td>
<td>è₂sè + ènè₂</td>
<td>[esjènè]</td>
<td>‘four lovers’</td>
</tr>
<tr>
<td>ènè</td>
<td>ènè</td>
<td>ènè₂ + ènè₂</td>
<td>[ènènè]</td>
<td>‘in fours’</td>
</tr>
<tr>
<td>ìkè</td>
<td>è₂bò</td>
<td>è₂bò + ènè₂</td>
<td>[èbwèra]</td>
<td>‘three doctors’</td>
</tr>
<tr>
<td>ìtò</td>
<td>è₂tò</td>
<td>è₂tò + ìbìbì</td>
<td>[ètbìbì]</td>
<td>‘black chewing sticks’</td>
</tr>
<tr>
<td>ìbò</td>
<td>è₂bò</td>
<td>è₂bò + ìbìbì</td>
<td>[èbwòbì]</td>
<td>‘western doctors’</td>
</tr>
</tbody>
</table>

5. Summary and Conclusion.

Our study has shown that the synchronic vowel system of Urhobo has abstract underlying vowels resulting from historical vowel merging, which still influence vowel behavior in the synchronic grammar of the language. There are abstract high [-ATR] vowels */i, u/ that have become surface [$e_2, o_2$] respectively and abstract underlying */a/ that has become [e₁] (and possibly [a]). The merging of vowels is complete on the surface in the synchronic system, and an absolute neutralization rule has nullified any distinction between the vowels with respect to their source.

Using glide formation, which affects high vowels, plural formation, which affects nouns, and affixation, which induces harmonic co-occurrence restrictions, we have been able to establish that Urhobo has at the underlying level the ten vowels */i, 1, e, e, a, ɔ, o, ʊ, u/, while at the surface/phonetic level, there are only seven vowels, without [ɪ, ø, u]. The abstract underlying high [-ATR] vowels */i, u/ have merged with mid [+ATR] vowels /e, o/ respectively. In addition, facts from affixation reveal the existence of the abstract underlying low [+ATR] vowel */ɔ/ that has neutralized with /e/, making it be the [+ATR] counterpart of [a] as a
suffix vowel. The result is that surface e, o, e each displays both expected and unexpected vowel behavior. The only way to tell which vowel underlies e, o, e is to observe them in [ATR]-harmony or height-revealing environments. We also noted that there are many nouns in which a typical [-ATR] vowel /a/ occurs in both prefix and stem positions in some nouns that select the [+ATR] plural prefix, a situation that suggests the merging of */ə/ with /a/, as has been reported in some Niger-Congo languages.

Thus, just like Okpè and Uvwiè (Omamor 1988), Urhobo phonemic vowels can be grouped on the basis of both vowel height and [ATR] harmony. A study such as this is necessary for phonotactic reasons and for a better understanding of the vowel system but as has been rightly pointed out by Elugbe (1991), any attempt to write the language using the phonemically ‘accurate’ vowels would create problems for the native speaker because it is at variance with his linguistic instincts. The native speaker knows whether the [e] or [o] in a word would undergo glide formation or not, so that the use of the seven vowels for writing the language is appropriate and in consonance with his competence and innate knowledge of his language. Judging from the speech patterns of young Urhobo speakers, [ATR] harmony is on its way out of the system, because it is not reflected with much seriousness in their speech forms. For instance it is common to hear young speakers say [mì ɣọ rọ] instead of [mè ɣọ rọ] ‘I formally received him’ with the subject pronoun being [+ATR] rather than [-ATR] to agree with the verb.
References


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A TEMPLATIC APPROACH TO GEMINATION IN THE IMPERFECTIVE STEM OF TASHLHIYT BERBER*

Mohamed Lahrouchi
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Tashlhiyt Berber uses, among other processes, gemination to form the imperfective. Most accounts of this phenomenon make reference to syllabic or prosodic structure. In this paper, I diverge from this trend, claiming that imperfective gemination is better analyzed as a templatic-based phenomenon resulting from morphological activity at the skeletal tier. I will argue for the use in the imperfective of a fixed-shape template over which consonant gemination is realized. Moreover, I will show that tri-, bi- and monoconsonantal verbs share the same template. The surface irregularity that bi- and monoconsonantal verbs display is viewed as the consequence of the identification of templatic positions.

In Tashlhiyt Berber,¹ three processes are involved in the formation of the imperfective:

1. the gemination of a consonant in the base
2. the prefixation of the augment \textit{tt-}
3. the insertion of a vowel in the base

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* I am grateful for suggestions, comments and criticisms from the following people: the editor, the anonymous referees, J. Lowenstamm, J. Brandão de Carvalho, X. Barillot and B. Copley. All remaining errors are of course my own.

¹ Tashlhiyt is one of the three main dialects of Berber spoken in Morocco. In this language, facts may differ by dialect or even inside the same dialect. The variety of Tashlhiyt we are dealing with here is the one spoken in Agadir, in the south-west of Morocco.
Some examples\(^2\) are given in (2) to illustrate these processes:

\[(2) \quad \begin{array}{ll}
\text{Aorist} & \text{Imperfective} \\
\text{a.} & \text{nk} & \text{nkkr} & \text{‘stand up’} \\
& \text{krf} & \text{kkrf} & \text{‘tie up’} \\
& \text{knu} & \text{knnu} & \text{‘lean over’} \\
\text{b.} & \text{ak^w} & \text{ttak^w} & \text{‘steal’} \\
& \text{r^uh} & \text{tttr^uh} & \text{‘go back’} \\
& \text{rkuku} & \text{tttrkuku} & \text{‘rot’} \\
\text{c.} & \text{sawl} & \text{sawal} & \text{‘speak’} \\
& \text{skr} & \text{skar} & \text{‘do’} \\
& \text{smun} & \text{smuna} & \text{‘collect’} \\
\end{array}\]

Vowel insertion may operate jointly with prefixation or with gemination to form the imperfective (e.g. \(\text{gawr} \rightarrow \text{ttgawar} \quad \text{‘sit’}, \quad \text{gn} \rightarrow \text{gghan} \quad \text{‘sleep’}\)), whereas gemination never combines with prefixation except for few mono-consonantal verbs such as \(\text{g} \rightarrow \text{tgg} \quad \text{‘be’}\).

In this paper, we will focus on the process exemplified in (2a). Attention will be drawn to the templatic mechanism underlying gemination in the imperfective. We shall try to answer the questions, how does gemination operate in the imperfective, and what is the nature of the morphological unit that underlies that operation?

Most accounts of gemination in the imperfective (Dell & Elmedlaoui 1988, 1991, 2002; Jebbour 1996, 1999; Bensoukas 2001; MacBride 2004) make reference to syllabic or prosodic structure. In this paper (see also Louali & Philippson 2003), I diverge from this trend, claiming that this process is better analysed as a templatic-based phenomenon resulting from morphological activity at the skeletal

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\(^2\) No schwa appears in my transcription. The existence of schwas in Tashlhiyt Berber is controversial. For authors such as Coleman (1996, 2001) and Puech & Louali (1999), epenthetic schwas appear between consonants to fill nuclei that would otherwise be empty (in Tamazight Berber, they are even treated as underlying vowels, see Saib 1976). For others such as Dell & Elmedlaoui (2002) and Ridouane (2003), these schwas are not epenthetic but mere transitions between consonants. We will not go into this issue as it will not affect the analysis proposed here.
tier in the sense of McCarthy (1979, 1981). It is proposed that triconsonantal verbs geminate their consonant in the imperfective by use of a fixed-shape template composed of four CV units. It is also proposed that mono- and biconsonantal verbs use the same template. Their surface irregularity is construed as the straightforward result of the identification of templatic positions.

The paper is organized as follows. In section 1, I briefly survey some principles of Templatic Morphology. In section 2, I present the data. Then, important attempts at understanding geminated imperfective in Tashlhiyt Berber are discussed in section 3. My own analysis is provided in sections 4 to 6. Then, it is generalized in section 7 to other languages in the Berber family. Section 8 concludes the paper.

1. Templates.

1.1. Classical Arabic verb conjugation. Classical Arabic is probably the best known templatic language. Well before McCarthy’s work (1979, 1981), which argues for the morphological role of the skeletal tier in Classical Arabic verb conjugation, linguists of the Middle Ages such as Sibawayh used fa‘al ‘to do’ as a template model for derivation. The novelty with McCarthy is the way he extends the proposal of autosegmental phonology to Classical Arabic verbal conjugation. He indeed shows that the various forms of the verb are obtained in a natural way from the association of a consonantal root with vocalic melodies to prosodic templates.

In order to reduce the number of templates proposed by McCarthy (1979: 135, 1981: 386), Guerssel & Lowenstamm (1990) and Lowenstamm (2003) suggest that the verbal forms of Classical Arabic are derived by means of a single template, composed of four CV units. The template is given below in (3):

\[(3) \quad \text{CV} \text{CVCV}\]

The idea of reducing the number of templates in the verbal conjugation of Classical Arabic is not new. McCarthy (1979: 135) has already suggested expressing the regularities that the verbal forms and their canonical patterns show by means of two templates: CV((CV)[+seg])CVC and CCV([+seg])CVC. The first template abbreviates the patterns CVCVC, CVCCVC, CVVCVC, CVCVCCVC and CVCVVCVC. The second one abbreviates the patterns CCVCVC, CCVCCVC and CCVVCVC.
Two observations are in order. First, the template consists of strictly alternating C and V positions. The reader is referred to section 4.1 below and references therein for an outline of the CVCVV approach to syllable structure. Second, the template is made of two components: the italicized syllable is a derivational site that serves as the morphological head of the form, and the boxed syllables constitute the complement of the head. These components are filled one after the other by means of two operations, namely root formation and verb derivation. The first operation involves the association of root consonants and vocalic melody with the boxed CV positions. Then, verb derivation involves the identification of the derivational site by means of consonant or vowel spreading. Thus for example, forms II and III of the root √ktb ‘write’ are derived as shown in (4).

(4)  a. Form II  b. Form III

```
| k | t | b |
C  V C  V C  V C  V
```

C V C V C V C V

\[ \text{[kattaba]} \]  \[ \text{[kaataba]} \]

The root consonants ktb are connected with their slots and the vocalic melody /a/ is added. Then, the medial consonant /t/ geminates by use of the empty C, and the vowel /a/ spreads into the empty V, leading to kattaba ‘he made write’ in (4a) and kaataba ‘he corresponded’ in (4b). The distinction in Classical Arabic between the root-formation and verb-derivation phases is characterized, according to Lowenstamm (2003: 22), by the direction of association. In the first phase, the association of segments to the complement (i.e. the boxed positions) proceeds in

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4 The head-complement structure refers to the traditional intuition that words, like sentences, are composed of elements that are associated with a single element, the head, which determines the fundamental properties of the complex. In Semitic languages where prosodic templates play a central role, the head of the template is assumed to determine certain grammatical properties of the output.

On Head and Complement in syntax, the reader is referred to X-bar theory, built on the proposal of Chomsky (1970). Similar structures are used in phonological theory such as in Dependency Phonology (Anderson 1985, 2002, Anderson & Ewen 1987), Government Phonology (Kaye, Lowenstamm & Vergnaud 1985, 1990) and Metrical Phonology (Hammond 1984, Prince 1985).
the usual manner from left to right,\textsuperscript{5} whereas in the second phase the direction of spreading is determined by the position of the head (i.e. the italicized CV) with respect to the neighbouring segments: spreading is left to right in \textit{kaataba} and the opposite in \textit{kattaba}.\textsuperscript{6} With such a structure, Guerssel & Lowenstamm (1990) and Lowenstamm (2003) aim to show that the association of segments with skeletal positions cannot be reduced to purely phonological conditions. Rather, they must be determined by some morphological conditions that allow identifying root positions in the template before C- or V-spreading is performed.\textsuperscript{7}

In addition, the proposed template not only offers the tools needed to account for a range of morphological operations internal to the word, but also contributes a perspective on the theory on the phonology-syntax interface, where the prosodic units that constitute the template may project syntactic nodes. Such a hypothesis has been recently investigated in works by Bendjaballah & Heiden (2003 and 2005 on Berber and German), Kihm (2006 on Classical Arabic) and Rucart (2006 a,b on Afar).\textsuperscript{8}

1.2. Berber template morphology. The templatic character of the morphology of Berber languages is not as well established as it is in Semitic languages, in spite of important studies (see Guerssel 1992, Bendjaballah 1999, Idrissi 2000 and Lahrouchi 2003) showing that various phenomena such as causatives, inchoatives, reciprocals, passives, negative preterit and internal plurals are better analysed in terms of templatic processes (see also Jebbour 1988, Iazzi 1991, Moktadir 1989 and Dell & Elmedlaoui 1992 for alternative analyses of the same aspects). The imperfective forms given in (2a) are similar to Classical Arabic ver-

\textsuperscript{5} This allows associating the root of biconsonantal verbs such as \textit{madada} to the complement before the corresponding forms II \textit{maddada} and III \textit{maadada} are derived.

\textsuperscript{6} The well-known phenomenon of compensatory lengthening supports the universal tendency for vowels to spread in the opposite direction of consonants: vowels tend to spread to the right into the following empty slot while consonants spread to the left into the preceding empty slot (see Ingría 1980 and Meillet & Vendryes 1963 on Latin, Sezer 1986 on Turkish and Keneseci, Vago & Fenyvesi 1998 on Hungarian).

\textsuperscript{7} In the analysis of gemination in the imperfective of Tashlhiyt Berber, which is the topic of this paper, I will assume, following Yip (1988), that the mapping of segments onto the template proceeds from the edges inward (see section 4.3 below). Further discussions about standard association conventions are given in Dwyer (1978), Hoberman (1988), Odden (1988) and Yip (1988), among others.

\textsuperscript{8} Other works investigate the role of the template in syntax (see Banksira 1999 and Lumsden & Halefom 2003).
bal form II. They suggest the existence in Tashlhiyt Berber of a fixed-shape template over which consonant gemination is realized. Though gemination in the imperfective of Tashlhiyt Berber is in an infixed position — it involves either the initial consonant (krf → kkrf) or the medial consonant (nkr → nkkr) — it shows one regularity: imperfectives where the final consonant is geminated (mrd → *mrdd) are excluded. In subsequent sections, I demonstrate two points. First, all verbs that form their imperfective by means of gemination involve the mapping of a root onto a quadrisyllabic template whose second syllable is a derivational site. Second, mono- and biconsonantal verbs use the same template as triconsonantal verbs to form their imperfective. These verbs will prove crucial to my demonstration. They are viewed in the Berber literature as irregular in that they use more than one morphological operation to derive their imperfective: e.g. nu → nwwa ‘cook’, g → tggα ‘be’, ut → kkat ‘beat’, gn → ggan ‘sleep’. I will show that their alleged irregularity hides an underlying regular mechanism: identification of templatic positions. However, I will not discuss the origin of the operations they use.

2. Data.

As an imperfectivizing mechanism in Tashlhiyt Berber, gemination concerns verbs containing no more than three consonants and no full vowels9 as well as verbs with the following shapes: CCU, CCI. Consider the examples in (5):

(5) | Aorist | Imperfective |
--- | --- | --- |
| gmr | gmmr | ‘hunt’ |
| kfm | kffm | ‘enter’ |
| lkm | llkm | ‘arrive’ |
| nkr | nkkr | ‘stand up, wake up’ |
| msl | mssl | ‘fill’ |
| mgr | mggr | ‘harvest’ |

These verbs form their imperfective by geminating the second consonant. Most triconsonantal verbs (71% of the data in the appendix) follow this pattern though others as in (6) geminate the initial root consonant.

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9 Except non-native verbs such as xdm ‘work’, sbr ‘support’ and hbs ‘stop, jail’, which form their imperfective by means of t-prefixation and vowel insertion, and causative verbs such as sgn ‘put to bed’ and sgl ‘fill up’ which use only vowel insertion.
Gemination in the Imperfective Stem of Tashliyt Berber

(6) hrg hhrg 'burn'
    frn ffrn 'pick over'
    krz kkrz 'plough'
    krf kkrf 'tie up'
    xrb xxrb 'scratch'
    xʷm3 xxʷm3 'scratch'
    kʷmz kkʷmz 'scrape'

The verbs in (6) reject gemination of the medial consonant. The careful reader will have noticed that the medial consonants of the group are all liquids or nasals. Interestingly, a root medial sonorant will geminate when followed by a more sonorous segment, as shown in (7).

(7) knu knnu 'lean over'
    zru zrru 'delouse'
    xlu xllu 'destroy'
    rwi rwwi 'mix'
    kmi kmmi 'smoke'
    bsi bssi 'melt'

In addition, two groups of biconsonantal verbs can be distinguished: verbs geminating their second consonant (8a) and those geminating their first consonant (8b). Both groups are subject to vowel insertion.

(8) a. ns nssa 'stay overnight'
    nz nzza 'be sold'
    kl klla 'spend the day'
    ẓr ẓrra 'see'
    ls lssa 'wear'

b. gn ggan 'sleep'
    gl ggal 'dry up'
    fl ffal 'leave, let'
    dl ddal 'cover'
    ḍr tṭar 'fall'

In the following section, I briefly review earlier attempts at handling the facts just described.

Earlier treatments of gemination in the imperfective have relied on the idea that prior syllabification is necessary for the explanation of the phenomenon (cf. Dell & Elmedlaoui 1988, 1991, 2002; Jebbour 1996, 1999, Bensoukas 2001 and MacBride 2004). This section reviews the main proposals made therein.

3.1. Dell & Elmedlaoui (2002). Dell & Elmedlaoui draw up a list of conditions that each verb in Imdlawn Tashlhiyt Berber should satisfy in order to undergo gemination in the imperfective, stating (p. 118) “a. the basic stem contains three segments none of which is a geminate; b. if the basic stem contains a vowel, that vowel must be the last segment”. Then they make use of the following syllable rule (p. 119): “the segment which is geminated in the imperfective stem is that segment which is an onset in the basic stem”.

The examples in (8), borrowed from Dell & Elmedlaoui (2002: 118), illustrate their hypothesis.

(9)  

<table>
<thead>
<tr>
<th>Perfective</th>
<th>Imperfective</th>
</tr>
</thead>
<tbody>
<tr>
<td>krz</td>
<td>kkrz</td>
</tr>
<tr>
<td>xng</td>
<td>xxng</td>
</tr>
<tr>
<td>z’llm</td>
<td>zz’llm</td>
</tr>
<tr>
<td>3bd</td>
<td>3bbd</td>
</tr>
<tr>
<td>v’ml</td>
<td>v’mml</td>
</tr>
<tr>
<td>x’si</td>
<td>xssi</td>
</tr>
</tbody>
</table>

The underlined segments in the first column mark syllable nuclei. The period indicates the syllable boundary. In the first three verbs, it is the first consonant which is an onset, while in the other three it is the second consonant.

Dell & Elmedlaoui’s analysis relies entirely on the information provided by their syllabification algorithm. This algorithm states that in Imdlawn Tashlhiyt Berber any segment can act as a syllable nucleus if it is the most sonorous segment in the syllabification domain: for instance, r is the syllable nucleus in krz because it is more sonorous than k and z. In 3bd, 3 stands for the nucleus of the first syllable, while the remaining segments form another syllable where d is the

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11 Dell & Elmedlaoui (2002: 76) assume the following sonority scale where segments are ranked in a decreasing sonority order: a, high vocoids, liquids, nasals, fricatives, stops.
nucleus and $b$ the onset. Without the information provided by the syllabification algorithm it would be impossible to identify the targeted segment in the imperfective.

3.2. Jebbour (1999). This author argues that syllable weight has a central role in determining the verbs that undergo gemination in the imperfective. Within a moraic approach à la Hayes (1989) he proposes that for any verb to resort to gemination in the imperfective the output must contain two light syllables (i.e. two moras).

His analysis disputes Dell & Elmedlaoui’s conception of syllable weight, specifically the lack in their syllabification algorithm of a distinction between syllables with a vowel as their nucleus and those with a consonant. He has noticed that their analysis of geminated imperfective fails to explain why CVC, VCC and VCV verbs reject gemination in the imperfective. According to him, Dell & Elmedlaoui’s statement that each verb must not contain a vocoid in a non-final position for it to undergo gemination

is curious in two regards: first, it is nothing else than the formulation of surface characteristics of geminating bases; second it needs to make reference both to the segmental composition and the syllabic make-up of the base. [p.107]

This problem, Jebbour argues, is a direct consequence of their model of syllabification that states that CCC verbs have the same syllabic structure as CVC verbs, and C.CC verbs are the same as V.CV verbs (the underlined segments mark syllable nuclei).

The key to understanding why CVC, VCC and VCV verbs fail to geminate in the imperfective relies, according to Jebbour, on the constraint that requires that the output to gemination in the imperfective contains exactly two light syllables. As shown in the table in (10), only the output of CCC and CCV verbs obeys such a constraint:
<table>
<thead>
<tr>
<th>Verb base</th>
<th>Onset gemination</th>
<th>Syllabic structure</th>
<th>Type of syllables</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. frs</td>
<td>ffrs</td>
<td>f.frs C.OCC(^{12})</td>
<td>LL</td>
</tr>
<tr>
<td>fsr</td>
<td>fssr</td>
<td>fs.sr OC.OC</td>
<td>LL</td>
</tr>
<tr>
<td>gru</td>
<td>grru</td>
<td>gr.ru OC.OV</td>
<td>LL</td>
</tr>
<tr>
<td>b. mun</td>
<td>*mmmun</td>
<td>m.mun C.OVC</td>
<td>*LH</td>
</tr>
<tr>
<td>amr</td>
<td>*ammr</td>
<td>am.mr VC.OC</td>
<td>*HL</td>
</tr>
<tr>
<td>aru</td>
<td>*arru</td>
<td>ar.ru VC.OV</td>
<td>*HL</td>
</tr>
</tbody>
</table>

The verb bases in (10a) undergo gemination since the resulting imperfective has two light syllables. In contrast, those in (10b) cannot geminate because their output would not have the LL syllabic pattern.

However, as noticed by Dell & Elmedlaoui (2002:123), Jebbour’s weight-sensitive analysis still has problems. It fails to account for the imperfective of biconsonantal verbs that use gemination despite the fact that they contravene the LL syllable pattern (e.g. gn → ggan ‘sleep’, fl → fflal ‘leave, let’, dr̅ → ttar̅ ‘fall’ and ɗi → tɔay ‘take out’). Note that biconsonantal verbs raise another type of problem regarding Dell & Elmedlaoui’s analysis. It fails to explain why these verbs use both gemination and vowel insertion to form their imperfective (see section 6 below).


Like Jebbour, Bensoukas adopts Dell & Elmedlaoui’s hypothesis that vowelless syllables have consonantal nuclei. His Optimality Theoretic account\(^{13}\) begins with the observation that gemination is in complementary distribution with tt- prefixation in the imperfective. Then, he proposes that “imperfective formation in Tashlhiyt consists in affixing a consonantal mora to the verb root” (p. 122). This affixation is claimed to be the underlying morpheme of the imperfective. tt- prefixation\(^{14}\) and gemination are merely variant realizations of this morpheme. The choice of either realization relies, according to

---

\(^{12}\) The underlined segment stands for the nucleus and O stands for the onset. The second syllable in frs (OCC) is analyzed by the author as a light syllable whose last C does not count in weight. It can be linked either to the preceding µ or directly to the node σ (see Jebbour 1999: 104).

\(^{13}\) See MacBride (2004) for an alternative account of the facts within the framework of OT.

\(^{14}\) Bensoukas assumes, on the basis of Hayes (1989) and Davis (1995, 1999) among others, that geminates are underlyingly mono-moraic. The prefix tt- in the imperfective is thus counted as mono-moraic.
the author, on the interaction of specific well-formedness constraints: (i) a bimo-
raicity constraint, similar to that proposed in Jebbour (1999), which is responsible
for the choice between gemination and tt- prefixation, and (ii) a sonority contour
constraint that determines which consonant geminates in the verb. The first con-
straint prevents CCC and CCV verbs from using the prefix tt-. The second con-
straint chooses the candidate that has the optimal sonority contour: for instance, in
the case of competing candidates such as kkrz and krrz, the sonority contour of
the syllable kruz in the first form (syllabified as k.krz) is preferred to that of the
syllable ruzz in the second form (syllabified as kr.rz).

In sum, the syllable-based approaches to geminated imperfective as stated
in Dell & Elmedlaoui (1988 and 2002) and amended in Jebbour (1999) and Ben-
soukas (2001) focus on characterizing the kind of interrelation that exists between
prosody and morphology in Tashlhiyt Berber. They predict the correct output for
almost all triconsonantal verbs, but they leave out mono- and biconsonantal verbs
such as g ‘be’, kk ‘pass by’, ff ‘eat’ and rg ‘grind, stone’ which are morphologi-
cally complex, using gemination and affixation to derive tggga, ttka, fttta and rrag
respectively. The authors show among other things how the geminated consonant
is selected in the base, but the relation that may exist between gemination as a
derivational device and the syllabic status of segments is left as an open question.
In addition, their analyses limit themselves to the case of Tashlhiyt Berber where
the gemination involves either C1 or C2. Once extended to Berber languages other
than Tashlhiyt (see section 7 in this paper), their analysis becomes unnecessarily
complicated, since the geminated consonant is invariably C2 regardless of its syl-
labic status. In my own account, I will try to bring out more explicitly the tem-
platic mechanism responsible for gemination as well as the relationship between
c consonant gemination and the structure of the template.

4. Templatic Account of Gemination.

This section outlines the main assumptions about the representation of the skeletal
tier and the syllable structure in the framework of Government Phonology.

4.1 CVCV model. All examples handled in this paper use the CVCV model
(Lowenstamm 1996), which falls within the framework of Government Phonol-
ogy as outlined in Kaye, Lowenstamm & Vergnaud (1985, 1990). This approach
to syllable structure stipulates that the skeletal level of phonological representa-
tions consists of strict alternations of onset and nucleus positions, i.e. C and V
positions. Only consonantal segments are linked to C positions and only vocalic
segments appear in V positions. Moreover, within this model, different surface syllable types such as a ‘closed syllable’, a ‘branching onset’, a ‘branching nucleus’ and a ‘geminate’ share the same skeletal material: two CV units.

(11)  

a. closed syllable  

<table>
<thead>
<tr>
<th>b</th>
<th>a</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>V</td>
<td>C</td>
</tr>
<tr>
<td>[bar]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

b. branching nucleus  

<table>
<thead>
<tr>
<th>b</th>
<th>a</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>V</td>
</tr>
<tr>
<td>[baa]</td>
<td></td>
</tr>
</tbody>
</table>

c. branching onset  

<table>
<thead>
<tr>
<th>b</th>
<th>r</th>
<th>a</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>V</td>
<td>C</td>
</tr>
<tr>
<td>[bra]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

d. geminate  

<table>
<thead>
<tr>
<th>b</th>
<th>a</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>V</td>
</tr>
<tr>
<td>[bba]</td>
<td></td>
</tr>
</tbody>
</table>

The differences in the surface syllabic structures obtained in (11) lie in the way segments are associated to the skeletal tier:

a. The geminate in (11d) has an empty V position between its members whereas the long vowel in (11b) contains an empty C position.

b. The branching onset in (11c) has an empty V between its consonants.

c. The consonant located in the coda of the surface closed syllable in (11a) appears in the onset of the second syllable whose nucleus is empty.

Skeletal positions that have no phonetic realization are said to be licensed to remain empty by virtue of the government relation that they share with the neighbouring segments. Proper Government is one such relation which allows a vocalic position to remain empty when followed by a vowel. This particularly accounts for the distribution of schwas and the well-known V/Ø alternation such as in Moroccan Arabic kɔtɔb ‘he wrote’, where the V position between /k/ and /t/, properly governed by the schwa that appears between /t/ and /b/, remains empty opposed to kɔtɔbu ‘they wrote’, where the same V position, non-governed, surfaces as schwa (see Kaye 1990). The same phenomenon occurs in certain Berber varieties such as Kabyle Berber: for instance, the vocalic position between /x/ and /ð/ remains empty in xɔðɔmt ‘work!’ but not in xɔðɔmtɔ ‘I worked’. Interestingly, this position is properly governed by the following schwa in the first form but not in the second one (see Bendjaballah 2001: 188). For more
details about this model, the reader will refer to the work mentioned above and Scheer (2004).

4.2 Representation of Berber peripheral vowels. In Kabbaj (1990), Bendjaballah (1999, 2001) and Idrissi (2000), it is argued on the basis of Lowenstamm’s hypothesis (1991) about the vocalic system of Maghribi Arabic and Ethiopian-Semitic, that the peripheral vowels of Berber are associated with ‘branching nuclei’. The same parameter is adopted here:

(12) In Tashlhiyt Berber, peripheral vowels must be associated with two V positions.

According to this parameter, the representation of the three peripheral vowels of Tashlhiyt Berber follows under (13):

(13) skeletal level CVCV CVCV CVCV
    segmental level I U A
    phonetic realization [i] [u] [a]

Note that the parameter in (12) is a condition on the association of vocalic elements to the skeletal level. It does not affect the segmental level. Thus, the three vowels of the language surface as short vowels, viz. [i], [a] and [u].

The correspondences between Tashlhiyt Berber and Classical Arabic endorse the above proposal. Indeed, in a number of items shared by these languages there is a regular change whereby the long vowels of Classical Arabic correspond to phonetically short vowels in Tashlhiyt Berber. Short vowels in Classical Arabic disappear in Tashlhiyt Berber. By contrast, singleton and geminate consonants in Classical Arabic are preserved as such in Tashlhiyt Berber. The examples in (14) illustrate these correspondences:

(14) | Classical Arabic | Tashlhiyt Berber |
    |------------------|-----------------|
    a. 3aahada        | 3ahd            | ‘to fight’      |
    saafara           | safr            | ‘to travel’     |
    laahaqa           | lahg            | ‘to reach, pursue’ |
    al kitaab         | lktab           | ‘the book’      |
    albahr            | lbhr            | ‘the sea’       |
b. farraqa  frrq  ‘to divide’
   ŋaɗøaba  ɗddb  ‘to torture’
   ŋallama  ŋllm  ‘to teach’
   fakkara  fkker  ‘to think’
   3azzaar  a-gzzar  ‘butcher’

The parameter in (12) characterizes these correspondences by distinguishing the vowels that occupy two vocalic positions from those that have access to only one position. The first surface as short in Tashlhiyt Berber, the latter disappear. For instance, in the Classical Arabic form *saafara* in (14a), the long vowel is associated with two vocalic positions while the remaining vowels connect to only one position. In the corresponding form in Tashlhiyt Berber, the first vowel surfaces as [a], the others remain silent (further discussion of this proposal is provided in Bendjaballah 2001: 190).

4.3 Imperfective template. In terms of templatic morphology, the imperfective of the triconsonantal verbs given in (5) and (6) is derived by means of a quadri-consonantal template that allows geminating the initial or medial consonant. For the sake of uniformity, I propose that these verbs use the same template as in Classical Arabic verb conjugation, repeated in (15) for convenience:

(15) Imperfective template

![Template Diagram]

Segments are mapped onto this template from the edges inward (cf. Yip 1988).\(^{15}\) This direction of association predicts that if there are fewer consonants in the root than consonantal positions in the template, the medial consonant is likely to spread, since after associating the initial and final consonants with the edges of the template, the medial consonant automatically fills the remaining consonantal positions. Thus, for example, the verb *nkr* ‘stand up’ gets its medial consonant geminated in the imperfective as shown in (16):

\(^{15}\) The same direction of association is used by Moktadir (1989) in the analysis of the passive formation in Tashlhiyt Berber.
In (16a), the consonants /n/ and /r/ are associated to the initial and final consonantal positions in the template. Then, in (16b), the consonant /k/ fills the remaining C positions.

The verbs given in (7) behave like those ones in (5) in that they geminate the second consonant to form their imperfective. Moreover, they display a high vocoid; /u/ or /i/ in the final position. Given the parameter in (12), these vocoids connect to two V positions. The imperfective form of xlu ‘be crazy’ is represented below in (17):

The first segment /x/ is associated to the first C position in the template and the last segment /u/ is associated to the last two V positions. Then, the medial consonant /l/ geminates by use of the remaining consonantal positions in the template.

In the following section, we will see that initial consonant spreading in verbs such as in (6) is not automatic. Rather, it requires a rightward spreading rule that compensates for prohibited spreading of certain consonants in the medial position.

4.4 Sonority effect. The verbs in (6) undergo the same morphological operation as those ones in (5): they geminate one consonant by use of the template in (15). However, their particular behaviour with respect to gemination — i.e. geminating...
C₁ instead of C₂ — has to be explained at the phonological level. Admittedly, this is what Dell & Elmedlaoui (1991:85) suggest: “geminate that consonant which is a syllable onset”. This would be sufficient if all Berber languages geminate either C₁ or C₂. But apart from Tashlhiyt all other varieties invariably geminate C₂. The reason why C₁ geminates in a number of imperfective forms in Tashlhiyt Berber is related to the nature of consonants that appear in the medial position. Thus, we notice that the verbs in (6) contain sonorants (liquids and nasals) in this position. One could ask if Tashlhiyt Berber prohibits geminating liquids and nasals in the imperfective. The answer appears in the examples in (7) where such consonants geminate. Therefore, another question arises: is there any phonological constraint that prohibits geminating sonorants in the verbs in (6)?

The answer to this question involves examining the segmental environment of sonorants occurring in the medial position of both groups of verbs in (6) and (7). In terms of sonority hierarchy (cf. Sievers 1881, Jespersen 1904, Clements 1990), each sonorant in the verbs in (6) is surrounded by less sonorous segments, i.e. obstruents, whereas in (7) it is followed by a more sonorous segment, i.e. a vocoid. At the same time, these sonorants geminate in (7) but not in (6). For instance, the liquid /r/ geminates in zru ‘delouse’ where it is followed by a more sonorous segment, but not in krz ‘plough’ where it is the most sonorous segment.

The sonority hierarchy or sonority scale is a ranking of segments along a scale on the basis of their sonority. This scale explains, in particular, the organization of segments within the syllable: more sonorous segments stand closer to the peak of the syllable than less sonorous segments. In the present analysis, I am assuming the following sonority scale where segments appear in order of increasing sonority: Obstruent > Nasal > Liquid > Glide/Vowel (see Clements 1990). In this scale, stops and fricatives are assumed to be sonority-equal. So do glides and vowels. This is all the more tenable in the first case that in Tashlhiyt Berber fricatives have no effect on determining the geminating consonant in the imperfective. That is to say, a fricative in the medial position does not imply the gemination of the preceding stop: verbs such as bsr ‘spread’, gzm ‘cut’ and kfm ‘enter’ geminate their medial fricative despite the fact that it is preceded by a stop. On the other hand, I assume following Angoujard (1990: 15) that gutturals (h, h, ʕ, ʔ) are lower in sonority than nasals, i.e. they have the same sonority as obstruents. This is supported in Tashlhiyt Berber by the imperfective of verbs that contain such consonants in the initial or medial position. Verbs such as hrf ‘feel slightly ill’, hrf ‘be smart’, hrg ‘burn’, zhr ‘blaze up’ mḥdī ‘poison’ and lḥm ‘solder’ form their imperfective by geminating the guttural while it is adjacent to a sonorant. They would not do so if gutturals were higher in sonority.
Let us return now to the behavior of sonorants with respect to gemination. A phenomenon similar to that present in the imperfective of the verbs in (6) is found in the action noun formation. In Tashlhiyt Berber, nouns of this type show a uniform pattern $aCCaC$ where the medial consonant is either simple or geminated, depending on its sonority. For instance, the action nouns corresponding to the verbs $ri'i$ ‘lend’, $bzg$ ‘swell up’ and $ntl$ ‘hide’ are $artt'al$, $abzzag$ and $anntal$, respectively. In contrast, the verbs $frg$ ‘tighten’, $mrg$ ‘be ashamed’, $srh$ ‘free (ebb tide)’ and $frn$ ‘sort out’ form their action noun as $afrag$, $amrag$, $asrah$ and $aftran$, respectively. As we can see, in the first group of verbs the medial consonant is an obstruent preceded or followed by a more sonorous segment, while in the other group it is a sonorant surrounded by less sonorous segments. In the corresponding action nouns, the first group geminates the medial consonant, and not the second group.

These facts suggest that there is a relationship of cause and effect between the sonority of segments and their behaviour towards gemination. Sonorants do not geminate in the imperfective if their neighbouring segments are less sonorous. Consequently, I propose that the following constraint is active in the imperfective derivation:

(18) Any segment is prohibited to geminate in the imperfective if it is the most sonorous segment in the root.

This constraint prevents all sonorants which appear in the medial position of the verbs in (6) from gminating. Given the configuration of the template, it is the initial consonant that geminates through spreading into the derivational CV. The gemination of the initial consonant can thus be seen as a subsidiary operation that compensates for prohibited gemination of the medial consonant. This is somewhat similar to the strategy used in the Tiberian Hebrew morphology. In this language, a number of noun derivations involve $C_2$ gemination as in $naggar$ ‘carpenter’ and $sippuur$ ‘story’. Opposed to these forms are $paaraaf$ ‘horseman’ and $baaheret$ ‘white spots on skin’ where the second consonant is not geminated. Instead, the preceding vowel lengthens. The same phenomenon is found in the verbal conjugation (binyanim): $kitteb$ ‘write’ vs. $beerak$ ‘bless’. In fact, /r/ and /h/ belong to a class of consonants that never geminate in Tiberian Hebrew. Therefore, vowel lengthening is but a ‘subsidiary’ operation that compensates for prohibited gemination of certain consonants (cf. among others Gesenius 1881, Bauer & Leander 1922 and Lowenstamm & Kaye 1986). Note that compensatory lengthening in Tiberian Hebrew should not be understood in the sense that the
lengthened segment compensates for the loss of another segment. Rather, lengthening occurs to preserve the number of slots in the skeleton (cf. De Chene & Anderson 1979, Ingria 1980 and Hayes 1989 among others about the standard version of compensatory lengthening).

The imperfective form of xrb ‘scratch’ illustrates the whole derivation.

(19)  

\[
\begin{array}{cccccccc}
\text{Aorist} & \text{Imperfective} \\
\hline
x & r & b & x & r & b \\
\end{array}
\]

b. \[C & V & C & V & C & V & C & V \]

\[x & r & b \]

\*[xrrb]

c. \[C & V & C & V & C & V & C & V \]

\[x & r & b \]

\[xxrb\]

The segments are associated to the template from the edges inward. In (19b), the segment /r/ fails to geminate since it is the most sonorous segment in the root. The correct form geminating the first consonant /x/ is given in (19c).

However, three observations are in order. Firstly, the constraint in (18) does not necessarily imply the gemination of the least sonorous segment in the root. If this were the case, many verbs in (5) such as gmr, frn, knu and kmi would geminate their initial consonant. The important thing is that (18) allows the gemination of the medial consonant in any case, except when it is the most sonorous segment in the root.\(^\text{16}\) Secondly, there are few verbs such as xwu ‘empty’, jwu

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\(^{16}\)Only one counter-example to this constraint, rwl ‘run away’, is found in the data. In the imperfective, this verb either geminates the medial glide (though it is the most sonorous segment) or surfaces with a geminated g in place of geminated w. The latter form may suggest that rgw is the underlying form of the verb. In Dell & Elmedlaoui’s syllable-based analysis (2002), the first form, viz. rwwl, is analyzed with reference to ranked constraints: in the verbal base rwl, the medial glide is first syllabified in the onset of the second syllable by virtue of a highly ranked constraint that prohibits onsetless syllables in the non-initial position.
‘roast’ and \( z^f \)\( wi \) ‘left-handed’ where the medial and final consonants are sonority-equal (see the sonority scale on page 36). These verbs all geminate the medial segment. So do the verbs that end with two obstruents such as \( nff \) ‘scrape’, \( ngd^f \) ‘drown’ and \( nfd \) ‘be stirred up’ and those that begin with two obstruents such as \( bdr \) ‘mention’, \( fsr \) ‘spread’ and \( fsi \) ‘melt’.\(^{17}\) Thirdly, there exist in the language a number of verbs that are entirely made of obstruents and others that contain only sonorants. Five native verbs of the latter type are found in the data: \( nru \) ‘defeat’, \( rwi \) ‘make dirty’, \( rwl \) ‘flee’, \( mlu \) ‘be limp’ and \( rmi \) ‘be tired’. Apart from \( rwl \) that contradicts (18) by geminating the medial glide (see footnote 16) and \( mlu \) that forms its imperfective by means of the prefix \( tt- \), the remaining verbs geminate, as expected, their medial consonant. In contrast, verbs with only obstruents, such as \( bdg \) ‘be wet’, \( bzg \) ‘enflame’ and \( zdg \) ‘inhabit’ (nine verbs in the data are of this type) all form their imperfective by means of \( tt- \) prefixation and vowel insertion. Given their segmental make up, one may expect them to undergo gemination.\(^{18}\)

In sum, the template in (15) and the constraint in (18) ultimately allow distinguishing two classes of triconsonantal verbs:

a. verbs as in (5) that geminate the second root consonant,
b. verbs as in (6) that geminate the first root consonant.

However, both of these classes are shown to be underlyingly similar in that their consonant geminates by use of the same template, the one as in (15).

---

\(^{17}\) Only 3 verbs that begin with two sonorants are found in the data. They are of the type NLO or LNO (where N = nasal, L = liquid and O = obstruent): \( mrz \) ‘wound’, \( mrg \) ‘be ashamed’ and \( lmz^f \) ‘swallow without chewing’. The first verb geminates the initial consonant and the others use the prefix \( tt- \) with the vowel a inserted between the last two consonants.

\(^{18}\) Dell & Elmedlaoui (2002:119) gave the example of \( fsd \) ‘be spoiled’ that forms its imperfective in Imdlawn Tashlhiyt Berber either by geminating the initial consonant or by prefixing \( tt- \) and inserting the vowel a between the last two consonants. The fact that the authors “have not found more is not surprising, for there are not many CCC verbs with only obstruents.” In the dialect we are examining here (see also Boumalk 2003 and El Mountassir 2003), the verb \( fsd \), which is borrowed from Arabic, has only one imperfective form: \( tt-fsad \).

It is unknown why verbs of this type behave in this way. What we observe, however, is that unlike the other verbs, they do not contain any sonorant in their root.
5. **tt- Prefixation and Vowel Insertion in the Imperfective.**

Before we discuss the imperfective of mono- and biconsonantal verbs, let us examine briefly the imperfective formation involving *tt-* prefixation and vowel insertion. Some aspects of this outline fall within the analysis presented so far. As noticed in the first section, gemination and *tt-* prefixation never co-occur in the same form in the imperfective. In addition, *tt-*prefixation involves verbs whose base shows one of the following properties:

(20)  
\begin{itemize}
  \item a. It is vowel-initial or medial.
  \item b. It contains a lexical geminate.
  \item c. It contains more than three segments.
  \item d. It is a loan word.
\end{itemize}

Moreover, the prefixation of *tt-* is accompanied by the insertion of a prefinal vowel in verbs that end with two consonants. The inserted vowel is a copy of the preceding vowel in the base; otherwise, it is *a*. The examples in (21) illustrate these processes.

(21) \begin{tabular}{lll}
<table>
<thead>
<tr>
<th>Aorist</th>
<th>Imperfective</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>awk</td>
<td>ttawk</td>
<td>‘pull’</td>
</tr>
<tr>
<td>anf</td>
<td>ttanf</td>
<td>‘withdraw, move away’</td>
</tr>
<tr>
<td>aru</td>
<td>ttaru</td>
<td>‘give birth’</td>
</tr>
<tr>
<td>ddz</td>
<td>ttddz</td>
<td>‘cram’</td>
</tr>
<tr>
<td>brrm</td>
<td>ttbrram</td>
<td>‘turn’</td>
</tr>
<tr>
<td>k\textsuperscript{w}mm\textsuperscript{f}</td>
<td>ttk\textsuperscript{w}mma\textsuperscript{f}</td>
<td>‘crease, crumple’</td>
</tr>
<tr>
<td>tndf</td>
<td>tt\textsuperscript{w}ndaf</td>
<td>‘swindle’</td>
</tr>
<tr>
<td>kr\textsuperscript{f}s</td>
<td>ttkr\textsuperscript{f}fas</td>
<td>‘exhaust’</td>
</tr>
<tr>
<td>rfufn</td>
<td>ttrfufn</td>
<td>‘go through hardships’</td>
</tr>
<tr>
<td>xdm</td>
<td>ttxdam</td>
<td>‘work’</td>
</tr>
<tr>
<td>\textsuperscript{f}br</td>
<td>tt\textsuperscript{f}bar</td>
<td>‘weigh’</td>
</tr>
<tr>
<td>fhm</td>
<td>tt\textsuperscript{f}ham</td>
<td>‘understand’</td>
</tr>
</tbody>
</table>
\end{tabular}

The verbs in (21a) are vowel-initial. Those in (21b) contain a lexical geminate. Quadriconsonantal verbs appear in (21c) and loan verbs are in (21d). The
reason that verbs of this type reject gemination has been a matter of debate in the literature. One noticeable explanation, provided in Jebbour (1999) and Bensoukas (2001), makes reference to weight. The first author suggests that for any verb to undergo gemination in the imperfective it must contain two light syllables in the output. Outputs that contravene this condition resort to tt-prefixation. The second author proposes that gemination and tt-prefixation are but variant realizations of an underlying consonantal mora affixed to the verb (see section 3 above).

In the present analysis, the weight constraint can be defined in terms of the number of CV units that the imperfective form contains. Many of the verbs in (21) would exceed the quadrisyllabic template in (15) if their imperfective were formed by means of gemination. The forms represented in (22) illustrate this situation:

(22) a. \[\text{C V C V C V C V C V} \]
\[\text{a n f} \]
\[*[\text{annf}]\]

b. \[\text{C V C V C V C V C V} \]
\[\text{k r f s} \]
\[*[\text{kkrfs}^c]\]

c. \[\text{C V C V C V C V C V C V} \]
\[\text{r f u f n} \]
\[*[\text{rffufn}]\]

In comparison with the above verbs, many other verbs such as \textit{luh} ‘throw’, \textit{mun} ‘accompany’, \textit{sgn} ‘put to bed’, \textit{sgl} ‘bury’, \textit{xdm} ‘work’ and \textit{fhm} ‘understand’ use the prefix \textit{tt-} though their imperfective would fit the template if it were derived by means of gemination. The first two verbs, \textit{luh} and \textit{mun}, are vowel-medial, the following two are causative and the remaining are borrowed from Arabic. An alternative analysis for \textit{mun}-like verbs can hold that the branching medial vowel blocks the identification of the derivational syllable by means of consonant spreading, provided that the segments of the base are first associated to the boxed positions in the template. The situation is illustrated below in (23).
The radical vowel /u/ branches over the derivational syllable, thus blocking gemination of the initial /m/.

In the following section, we show that the irregularity of the imperfective of mono- and biconsonantal verbs results from the use of the same template as in triconsonantal verbs.

6. The Imperfective of Bi- and Monoconsonantal Verbs.

6.1. Biconsonantals. Verbs grouped in (8a) and (8b) are more complex; they belong to those verbs which use more than one morphological operation to derive their imperfective. Moreover, their behaviour with respect to these operations seems to differ from one category to the next. This calls for a more extensive examination. First of all, let us examine their conjugation paradigm including the aorist, imperfective and preterit in comparison with CCU verbs:

\[
\begin{array}{cccc}
\text{Aorist} & \text{Imperfective} & \text{Preterit} \\
\hline
a. & \text{ns} & \text{nssa} & \text{nsa} & \text{nsi}s & \text{‘stay overnight’} \\
& \text{ls} & \text{lssa} & \text{lsa} & \text{lsi}s & \text{‘wear’} \\
& \text{nz} & \text{nzza} & \text{nza} & \text{nzi}s & \text{‘be sold’} \\
& \text{kl} & \text{klla} & \text{kla} & \text{kli}s & \text{‘spend the day’} \\
& \text{z’r} & \text{z’ra} & \text{z’ra} & \text{z’ri}s & \text{‘see’} \\
\hline
b. & \text{gn} & \text{ggan} & \text{gn} & \text{gni}s & \text{‘sleep’} \\
& \text{dl} & \text{ddal} & \text{dl} & \text{dli}s & \text{‘cover’} \\
& \text{gl} & \text{ggal} & \text{gl} & \text{gli}s & \text{‘dry up’} \\
& \text{d’r} & \text{tt’ar} & \text{d’r} & \text{d’ri}s & \text{‘fall’} \\
& \text{fl} & \text{ffal} & \text{fl} & \text{fli}s & \text{‘leave, let’}
\end{array}
\]
Gemination in the Imperfective Stem of Tashliyt Berber

c. ml mmal mla mliɣ ‘show’
sb ssaw ska sbiɣ ‘buy’
zd⁵ zzad⁵ zd⁰a zd¹iɣ ‘grind’
rg rrag rga rgiɣ ‘grind, stone’
ƙz qqaz ƙza ƙziɣ ‘dig’

d. bnu bnnu bna bniɣ ‘build’
rbu rbbu rba rbiɣ ‘carry in the back’
ʒlu ʒluu ʒla ʒliɣ ‘loose’
rku rkku rka rkiɣ ‘be dirty’

The verbs in (24a) behave in a similar way to CCU verbs: they geminate the medial consonant. They also use the vowel i in the preterit 1st person singular, and end with the vowel a in the preterit 3rd person masculine singular. In contrast, the verbs in (24b) form their imperfective by geminating the initial consonant and infixing the vowel a. Their preterit merely exhibits the two radicals.

On the basis of these similarities, Lazzi (1991) has suggested that biconsonantal verbs as in (24a) contain an underlying vocalic segment that has no more than one distinctive feature, namely [+vocalic]. According to Lazzi this underlying vowel stands for an ancient segment that went out of use, revealing a state of the language where a vowel, probably u, occupied the final position of the verb. Certain Berber varieties (cf. Basset edition 2004: 64) actually use the vowel u instead of a at the Preterit 3pms: e.g. i-nsu ‘stay overnight’ in Snous, Menacer and Ouargla varieties, i-lsu ‘wear’ in Ghadames variety, i-rz’u ‘break’ in Seghroushen, Snous, Menacer, Ouargla and Ghadames varieties, and i-nzu ‘be sold’ in Menacer and Ouargla varieties.

An alternative explanation is proposed in Prasse (1972) and Kossmann (2002, 2003), and taken up by Louali and Philippson (2003). According to the authors, the difference between verbs infixing the vowel a and those suffixing it is diachronic: it is due to the loss of a root consonant, the medial consonant in the first type of verbs and the final consonant in the second type.

Given the morphophonological similarities discussed above, I assume that biconsonantal verbs such as those in (24) are underlying trisegmental. The vowel they display in the imperfective is phonologically well motivated. It compensates for the unexpressed root segment and allows them to fit the same template as triconsonantal verbs. The imperfective form of kl and gl illustrate the proposal below in (25).
6.2 Monoconsonantals. So far we have seen that the structure of the template that bi- and triconsonantal verbs use in the imperfective causes gemination of the initial or medial consonant. In this section, we examine the imperfective formation of monoconsonantal verbs. The reader’s attention is drawn to the template that their imperfective forms use.

Monoconsonantal verbs form their imperfective with a combination of different operations including affixation and gemination.

(26)  

<table>
<thead>
<tr>
<th>Aorist</th>
<th>Imperfective</th>
<th>Aorist</th>
<th>Imperfective</th>
</tr>
</thead>
<tbody>
<tr>
<td>g</td>
<td>tggə¹⁹</td>
<td>bbi</td>
<td>tbbi</td>
</tr>
<tr>
<td>ññ</td>
<td>ñtta</td>
<td>su</td>
<td>ssa</td>
</tr>
<tr>
<td>nu</td>
<td>nwwwa</td>
<td>zu</td>
<td>zwwa</td>
</tr>
<tr>
<td>fi</td>
<td>tfay</td>
<td>d'i</td>
<td>tt'ay</td>
</tr>
<tr>
<td>kr'i</td>
<td>qqq'ay</td>
<td>ut</td>
<td>kkat</td>
</tr>
<tr>
<td>aṣ</td>
<td>ttaṣ</td>
<td>af</td>
<td>ttaf</td>
</tr>
</tbody>
</table>

¹⁹In Tashlhiyt Berber, there is a dialectal variation as to the shape of the prefix that monoconsonantal verbs use in the imperfective. For example, the imperfective forms of the verbs g ‘be’, kk ‘pass through’, ddu ‘go’ and bbi ‘cut’ are given with a non-geminated prefix in the dialect described in Elmoutassir (2003), whereas in the dialect described in Boumalk (2003) they are given with a geminated prefix. In other Berber varieties such as Tamashek, the prefix is always non-geminated: e.g. t-ā33 ‘do’, t-āræbba ‘raise young’, t-īru ‘bray’ (cf. Heath 2004).
i. a verb using gemination, vowel insertion and prefixation (tgga)
ii. verbs using both gemination and vowel insertion (ssa, tt'ay, qq"ay)
iii. a verb using both prefixation and vowel insertion (tfay)
iv. verbs using vocalic and consonantal insertion (jta, kkat)
v. verbs using only prefixation (tddu, tbbie, tta's, ttaf)

The verbs *nu* and *zu* behave differently, and are analysed as underlying bi­
consonantal. Their second consonant is a glide /w/ that surfaces as [u] word­
finally and preceded by a consonant (see also /y/ which surfaces as [i] in *kmi*
‘smoke’ and *d'i* ‘drive away-aorist’ but as [y] in *akmmay* ‘smoker’ and *tt'ay*
‘drive away-imperfective’). In addition, the vowel *u* in *su* ‘drink’, which altern­
ates with *a* in the imperfective, seems to be a lexical vowel. Most linguists treat
glides and high vowels in Berber as phonetic reflexes of the same phonological

Returning to the imperfective of monoconsonantal verbs, many linguists
discuss lexical idiosyncrasy since some verbs change completely (*ut* → *kkat*)
while others use unusual infixes (*ff* → *jta*). My claim does not concern the origin
of such affixes or other changes in the form. Rather, I show that the size of their
imperfective depends on their base: the shorter the base is, the more numerous the
operations used to transform the verb are. This idea seems to lead us toward a
template-based explanation of these phenomena. It appears that the verbs in (26)
form their imperfective with the same template as triconsonantal verbs, similar to
(15). A short verb like *g* ‘be, become’ must use all operations possible to fill a
template with four CV units, while a triconsonantal verb such as *nkr* ‘stand up’
merely geminates its medial consonant. Below are represented some of the verbs
in (26) with some bi- and triconsonantal verbs, using the template given in (15).

---

20The underlying form of verbs with high vowels relates to the question of the segmental con­tent of the root in Berber. There is no consensus as to the content of the root in Berber. Some
(Basset 1929, Cantineau 1950 and Galand 1988) conceive the root as the minimal meaningful
unit, entirely composed of consonants, while vowels have a grammatical role. Others, mostly
working within the generative tradition (see also Kossman 1997:130) claim that in certain
cases, consonants and vowels should not be separated as they share lexical information.
No segregation between consonants and vowels is assumed in the representations above.\textsuperscript{21} That is, consonants and vowels connect to the template at the same level.

\textsuperscript{21}Unless an argument is made that Berber displays Semitic-like roots, entirely composed of consonants, we maintain that the root in Tashlhiyt Berber may contain consonants and vowels as well (see footnote 20). This allows us to prevent certain problems related to the direction of associations, which would have risen if consonants and vowels are associated separately to the template.
7. Geminated Imperfective in Other Berber Languages.

The templatic account of gemination as suggested in Tashlhiyt Berber can be easily generalized to other Berber languages. All Berber languages which use gemination as an imperfectivizing mechanism geminate one root consonant. Gemination in the imperfective is also found in Semitic languages such as Ge’ez (cf. Gragg 1997 and 2004) and Akkadian (cf. Kouvenberg 1997). Many other languages outside of the Afroasiatic family use gemination as a morphological operation: e.g. Alabama and Choctaw (Muskogean family), Balangao and Keley-I (Austronesian family). The reader is referred to Samek-Lodovici (1992) and references therein.

However, while Tashlhiyt Berber geminates either the initial or the medial consonant, the remaining languages invariably geminate the medial consonant. Thus for example, a verb like krz ‘plough’ geminates the medial consonant /r/ in the imperfective in all Berber languages except in Tashlhiyt where it is the first consonant /k/ that is geminated. In parallel, a verb like lkm ‘arrive’ geminates its medial consonant /k/ in all Berber varieties including Tashlhiyt. Another example is lmad ‘learn’, which forms its imperfective as lammad in Tarifit (cf. Kossmann 1997 and 2000) and lammad in Tamashek (cf. Heath 2004). Further examples from Kabyle, Tamazight, Tamashek and Tarifit are given in the table below.


<table>
<thead>
<tr>
<th>Aorist</th>
<th>Imperfective</th>
<th>Aorist</th>
<th>Imperfective</th>
</tr>
</thead>
<tbody>
<tr>
<td>frən</td>
<td>farrən</td>
<td>nəkər</td>
<td>nəkkər</td>
</tr>
<tr>
<td>kərəz</td>
<td>kərrəz</td>
<td>kəram</td>
<td>kərrəm</td>
</tr>
<tr>
<td>xədəm</td>
<td>xədəm</td>
<td>kəməd</td>
<td>kəmməd</td>
</tr>
<tr>
<td>bərəc</td>
<td>bərrəc</td>
<td>kərəz</td>
<td>kərrəz</td>
</tr>
<tr>
<td>bəzzəg</td>
<td>bəzzəg</td>
<td>kəməz</td>
<td>kəmməz</td>
</tr>
<tr>
<td>gədəl</td>
<td>gəddəl</td>
<td>zəlf</td>
<td>zəlləf</td>
</tr>
</tbody>
</table>

b. Tamazight (Iazzi 1991)

<table>
<thead>
<tr>
<th>Aorist</th>
<th>Imperfective</th>
</tr>
</thead>
<tbody>
<tr>
<td>krəz</td>
<td>krəz</td>
</tr>
<tr>
<td>kvəm</td>
<td>kvəm</td>
</tr>
<tr>
<td>bəzzəg</td>
<td>bəzzəg</td>
</tr>
<tr>
<td>gədəl</td>
<td>gədəl</td>
</tr>
</tbody>
</table>

22 Tamazight and Tarifit are spoken in Morocco. Kabyle is spoken in north-east Algeria. Tamashek is spoken in north Mali.
c. Tamashek (Heath 2004)  

<table>
<thead>
<tr>
<th>Aorist</th>
<th>Imperfective</th>
</tr>
</thead>
<tbody>
<tr>
<td>álmæd</td>
<td>lámmaid ‘learn’</td>
</tr>
<tr>
<td>ñkkæm</td>
<td>lókkæm ‘follow’</td>
</tr>
<tr>
<td>órgæh</td>
<td>réggæh ‘walk’</td>
</tr>
<tr>
<td>ñknæw</td>
<td>zürræw ‘get’</td>
</tr>
<tr>
<td>ñhlæk</td>
<td>húllæk ‘destroy’</td>
</tr>
</tbody>
</table>

d. Tarifit (Kossman 2000)  

<table>
<thead>
<tr>
<th>Aorist</th>
<th>Imperfective</th>
</tr>
</thead>
<tbody>
<tr>
<td>d‘hæc</td>
<td>d‘álhæc ‘laugh’</td>
</tr>
<tr>
<td>lmaid</td>
<td>lómmæd ‘learn’</td>
</tr>
<tr>
<td>rau</td>
<td>ræbbu ‘carry’</td>
</tr>
<tr>
<td>kri</td>
<td>kærrí ‘rent’</td>
</tr>
<tr>
<td>nkær</td>
<td>nákær ‘stand up’</td>
</tr>
<tr>
<td>cæs</td>
<td>cærræs ‘tie, knot’</td>
</tr>
</tbody>
</table>

Apart from Tashlhiyt, which is sensitive to sonority in choosing the consonant candidate for gemination, all Berber languages show a fixed geminated consonant. Rather than stating a language-particular analysis, I suggest that in all Berber languages, including Tashlhiyt, gemination is performed through the use of the same template as stated in (15). In most cases, it is the medial consonant that spreads. Otherwise, it is the first consonant. The imperfective forms mentioned above are all represented in the same manner as nkør ‘stand up’ in (16). In addition, mono- and biconsonantal verbs behave in a templatic fashion across Berber languages. They use various morphological operations to form their imperfective, including the gemination of one consonant or affixation, and sometimes both of them. In terms of templatic analysis, these verbs use the same template as triconsonantal verbs, which they fill by means of both gemination and affixation. The following examples in Tamash (cf. Heath 2004) illustrate this point.

(29) **Imperative**  

<table>
<thead>
<tr>
<th>Long Imperfective</th>
<th>Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>abs</td>
<td>báss ‘vomit’</td>
</tr>
<tr>
<td>ñtf</td>
<td>d‘áff ‘be poured’</td>
</tr>
<tr>
<td>ñlh</td>
<td>háll ‘weep’</td>
</tr>
<tr>
<td>ñnf</td>
<td>náff ‘excuse’</td>
</tr>
<tr>
<td>ñkk</td>
<td>t-ákk ‘go to’</td>
</tr>
<tr>
<td>ñkk</td>
<td>tát ‘eat’</td>
</tr>
<tr>
<td>ñnn</td>
<td>jann ‘say’</td>
</tr>
</tbody>
</table>

Three morphological strategies are observed in long imperfective positive forms:
i. insertion of /a/ after \( C_1 \) and gemination of \( C_2 \) (e.g. \( \text{báss}, \text{dáff}, \text{háll}, \text{náff} \))

ii. addition of /t-/ prefix, then insertion of /a/ after the prefix (e.g. \( t-\text{ákk} \))

iii. replacement of the prefix /t-/ by an apparent epenthetic /j-/ (e.g. \( \text{jánn}, \text{tátt} \)) followed by an infixed /a/ and a geminated consonant.

All enumerated operations above are traditionally analysed as being idiosyncratic. Under a templatic approach, these operations are used to fill the whole template in the imperfective. In addition, the imperative vs. long imperfective positive derivation shows a vocalic ablaut that replaces the input /æ/ by an /a/ in the imperfective. /æ/ is analysed in the Tamashek vocalic system as a short vowel, whereas /a/ is a full vowel. Below in (30) three derivations illustrate the templatic behaviour of mono- and biconsonantal verbs in Tamashek.

(30) a. b a s
    \[ \text{C V C V} \]
    \[ [\text{báss}] \]

b. t a k
    \[ \text{C V C V C V} \]
    \[ [t-\text{ákk}] \]

c. j a n
    \[ \text{C V C V C V} \]
    \[ [\text{jánn}] \]

In a biconsonantal verb such as (30a), the imperfective template is filled by means of vowel insertion and consonant lengthening. In contrast, monoconsonantal verbs as in (30b) and (30c) use prefixation in addition to vowel insertion and \( C_2 \) spreading.

8. Conclusions.

This paper has been an attempt to provide a new analysis of geminated imperfective in Tashlhiyt Berber. I have proposed that the triconsonantal verbs which geminate one root consonant to form their imperfective use a fixed-shape template of the form \( CVCCVCCV \). I have also argued that irregular verbs (mono- and biconsonantals) derive their imperfective by means of the same template. Their derived forms combine more than one morphological operation (gemina-
tion, vowel insertion, prefixation and epenthesis) in order to fill the whole tem­
plate offered by the imperfective formation. The templatic approach to geminated
imperfective is then generalized to other languages, including Tamashek, Tarifit,
Tamazight and Kabyle.

Appendix

The data below were collated from various sources including El Mountassir

1. Verbs Geminatng C2

<table>
<thead>
<tr>
<th>Triconsonantals</th>
<th>Aorist Imperfective</th>
<th>Aorist Imperfective</th>
</tr>
</thead>
<tbody>
<tr>
<td>bdr</td>
<td>bddr</td>
<td>mgr</td>
</tr>
<tr>
<td>bxl</td>
<td>bxxl</td>
<td>md'l</td>
</tr>
<tr>
<td>bsr</td>
<td>bssr</td>
<td>msl</td>
</tr>
<tr>
<td>bzh</td>
<td>bzzr</td>
<td>nkr</td>
</tr>
<tr>
<td>d'fr</td>
<td>d'frr</td>
<td>ndr</td>
</tr>
<tr>
<td>fsl</td>
<td>fssr</td>
<td>nd'r</td>
</tr>
<tr>
<td>ftl</td>
<td>fttl</td>
<td>nfr</td>
</tr>
<tr>
<td>hsr</td>
<td>hssr</td>
<td>nsr</td>
</tr>
<tr>
<td>g'wmr</td>
<td>g'wmmr</td>
<td>ntl</td>
</tr>
<tr>
<td>gzm</td>
<td>gzzm</td>
<td>nzl</td>
</tr>
<tr>
<td>gzh</td>
<td>gzzr</td>
<td>n3m</td>
</tr>
<tr>
<td></td>
<td></td>
<td>n33m</td>
</tr>
<tr>
<td>bdr</td>
<td>bddr</td>
<td>rdm</td>
</tr>
<tr>
<td>kšm</td>
<td>kššm</td>
<td>rdm</td>
</tr>
<tr>
<td>xmr</td>
<td>xmmr</td>
<td>rdm</td>
</tr>
<tr>
<td>xsr</td>
<td>xssr</td>
<td>rdm</td>
</tr>
<tr>
<td>xtl</td>
<td>xttl</td>
<td>rdm</td>
</tr>
<tr>
<td>xzr</td>
<td>xzzr</td>
<td>rdm</td>
</tr>
<tr>
<td>zhr</td>
<td>zhr</td>
<td>rdm</td>
</tr>
<tr>
<td>θ'wbn</td>
<td>θ'wbbn</td>
<td>rdm</td>
</tr>
<tr>
<td>κml</td>
<td>κmml</td>
<td>rdm</td>
</tr>
<tr>
<td>3dr</td>
<td>3drr</td>
<td>rdm</td>
</tr>
<tr>
<td>lgr</td>
<td>lggr</td>
<td>rdm</td>
</tr>
</tbody>
</table>

Verbs Geminatng

C2

| Aorist Imperfective | Aorist Imperfective |
|---------------------|---------------------|---------------------|
| 'mention'           | 'mention'           |
| 'be stingy'         | 'be stingy'         |
| 'spread'            | 'spread'            |
| 'pluck'             | 'pluck'             |
| 'follow'            | 'follow'            |
| 'spread'            | 'spread'            |
| 'roll'              | 'roll'              |
| 'stop'              | 'stop'              |
| 'fish'              | 'fish'              |
| 'cut'               | 'cut'               |
| 'slaughte (animal)' | 'slaughte (animal)' |
| 'mention'           | 'mention'           |
| 'enter'             | 'enter'             |
| 'ferment'           | 'ferment'           |
| 'be damaged'        | 'be damaged'        |
| 'feint'             | 'feint'             |
| 'look nastily'      | 'look nastily'      |
| 'blaze up'          | 'blaze up'          |
| 'lash'              | 'lash'              |
| 'mould'             | 'mould'             |
| 'burn'              | 'burn'              |
| 'knock'             | 'knock'             |
| 'harvest'           | 'harvest'           |
| 'bury'              | 'bury'              |
| 'plug'              | 'plug'              |
| 'stand up'          | 'stand up'          |
| 'suffer'            | 'suffer'            |
| 'jump'              | 'jump'              |
| 'blow one’s nose’   | 'blow one’s nose’   |
| 'graze’             | 'graze’             |
| 'take shelter’      | 'take shelter’      |
| 'prick’             | 'prick’             |
| 'remain unharmed’   | 'remain unharmed’   |
| 'demolish’          | 'demolish’          |
| 'borrow’            | 'borrow’            |
| 'knock’             | 'knock’             |
| 'insult’            | 'insult’            |
| 'mark’              | 'mark’              |
| 'rot’               | 'rot’               |
| 'flee’              | 'flee’              |
| 'prune’             | 'prune’             |
| 'gather firewood’   | 'gather firewood’   |
| 'lower’             | 'lower’             |
| 'go across’         | 'go across’         |
| 'scratch’           | 'scratch’           |
Gemination in the Imperfective Stem of Tashliyt Berber

<table>
<thead>
<tr>
<th>Aorist Imperfective</th>
<th>Biconsonantals</th>
</tr>
</thead>
<tbody>
<tr>
<td>bsi bssi ‘melt’</td>
<td>dru drru ‘eat together’</td>
</tr>
<tr>
<td>dhi dhhi ‘push’</td>
<td>fru frru ‘pay off’</td>
</tr>
<tr>
<td>fsi fssi ‘melt, dissolve’</td>
<td>fsu fssu ‘vegetate’</td>
</tr>
<tr>
<td>gli gli ‘push’</td>
<td>ftu ftu ‘walk, go’</td>
</tr>
<tr>
<td>g&quot;mi g&quot;mmi ‘read slowly’</td>
<td>gnu gnnu ‘sew’</td>
</tr>
<tr>
<td>gzi gazzi ‘vaccinate’</td>
<td>gru grru ‘collect’</td>
</tr>
<tr>
<td>hri hrri ‘be toughless’</td>
<td>cru crru ‘be expensive’</td>
</tr>
<tr>
<td>k&quot;li k&quot;lli ‘tint, blacken’</td>
<td>cru crru ‘be expensive’</td>
</tr>
<tr>
<td>kmi kmmi ‘smoke’</td>
<td>rmu rmmu ‘dyed’</td>
</tr>
<tr>
<td>kti ktti ‘blaze up’</td>
<td>jwu jwwu ‘toast’</td>
</tr>
<tr>
<td>k&quot;ti k&quot;tti ‘remember’</td>
<td>hbu hbbu ‘hide’</td>
</tr>
<tr>
<td>ldi lddi ‘pull’</td>
<td>hfu hffu ‘stick, shove’</td>
</tr>
<tr>
<td>mdi mddi ‘trap’</td>
<td>xlu xllu ‘destroy, be insane’</td>
</tr>
<tr>
<td>md&quot;i mdd&quot;i ‘taste’</td>
<td>kbu kbbu ‘pierce’</td>
</tr>
<tr>
<td>msi mssi ‘be tepid’</td>
<td>kdu kdd&quot;u ‘smell’</td>
</tr>
<tr>
<td>mzi mazzi ‘mill, grind’</td>
<td>knu knnu ‘lean over’</td>
</tr>
<tr>
<td>nffi nff&quot;i ‘jostle, shove’</td>
<td>kru krru ‘rent’</td>
</tr>
<tr>
<td>ngi nggi ‘pour’</td>
<td>mdu mdpu ‘loose weight’</td>
</tr>
<tr>
<td>r&quot;i r&quot;f&quot;i ‘mix’</td>
<td>ndu nddu ‘strain’</td>
</tr>
<tr>
<td>rz&quot;i rzz&quot;i ‘thread’</td>
<td>nd&quot;u ntt&quot;u ‘jump’</td>
</tr>
<tr>
<td>xsi xssi ‘be extinct’</td>
<td>nru nr&quot;u ‘defeat’</td>
</tr>
<tr>
<td>zbi zbbi ‘hasten’</td>
<td>rbu rbbu ‘carry on the back’</td>
</tr>
<tr>
<td>z&quot;wi z&quot;wwi ‘left-handed’</td>
<td>rku rk&quot;u ‘be dirty’</td>
</tr>
<tr>
<td>bdu bddu ‘start’</td>
<td>rzu rzzu ‘crawl’</td>
</tr>
<tr>
<td>bd&quot;u bdd&quot;u ‘divide’</td>
<td>sdu sddu ‘be side by side with something’</td>
</tr>
<tr>
<td>bgu bggu ‘pierce’</td>
<td>zru zrru ‘delouse’</td>
</tr>
<tr>
<td>bnu bn&quot;u ‘build’</td>
<td>zwu zwwu ‘dry’</td>
</tr>
</tbody>
</table>

Biconsonantals

Aorist Imperfective

| kl kl\"a ‘spend the day’ | ns nssa ‘stay overnight’ |
| ks kssa ‘graze’          | ns nqa ‘kill’            |
| z\"m z\"mma ‘wring’      | ns nzza ‘be sold’        |
| z\"r z\"rra ‘see’        | rz\" rqq\"a ‘be lightened, hot’ |
| ls l\"ssa ‘wear’         | rz\" rzz\"a ‘break’      |
2. Verbs Geminating C1

### Triconsonantals

<table>
<thead>
<tr>
<th>Aorist</th>
<th>Imperfective</th>
<th>Aorist</th>
<th>Imperfective</th>
</tr>
</thead>
<tbody>
<tr>
<td>frd</td>
<td>ffrd</td>
<td>kʷms</td>
<td>kkʷms</td>
</tr>
<tr>
<td>frk</td>
<td>ffrk</td>
<td>'guess'</td>
<td>'tie into a neat bundle'</td>
</tr>
<tr>
<td>frg</td>
<td>ffrg</td>
<td>kʷmz</td>
<td>kkʷmz</td>
</tr>
<tr>
<td>frʃ</td>
<td>ffrʃ</td>
<td>knd</td>
<td>'dupe'</td>
</tr>
<tr>
<td>frn</td>
<td>ffrn</td>
<td>kkrz</td>
<td>'plough'</td>
</tr>
<tr>
<td>frs</td>
<td>ffrs</td>
<td>kkrf</td>
<td>'tie'</td>
</tr>
<tr>
<td>hlb</td>
<td>hhhlb</td>
<td>krm</td>
<td>'be dried out'</td>
</tr>
<tr>
<td>hṛg</td>
<td>hrhṛg</td>
<td>krs</td>
<td>'tie'</td>
</tr>
<tr>
<td>hrm</td>
<td>hrm</td>
<td>krḍ</td>
<td>'comb'</td>
</tr>
<tr>
<td>hṛʃ</td>
<td>hhṛʃ</td>
<td>krs</td>
<td>'slaughter'</td>
</tr>
<tr>
<td>hrd</td>
<td>hhrd</td>
<td>knṣ</td>
<td>'lose a bad habit'</td>
</tr>
<tr>
<td>hrʃ</td>
<td>hhrʃ</td>
<td>qlb</td>
<td>'knock out'</td>
</tr>
<tr>
<td>xrb</td>
<td>xrrb</td>
<td>qrṣ</td>
<td>'reopen (wound)'</td>
</tr>
<tr>
<td>xʷm3</td>
<td>xxʷm3</td>
<td>smd</td>
<td>'add'</td>
</tr>
<tr>
<td>xng</td>
<td>xxng</td>
<td>srg</td>
<td>'have a miscarriage'</td>
</tr>
<tr>
<td>brḍ</td>
<td>bbrḍ</td>
<td>trm</td>
<td>'shimmy down'</td>
</tr>
<tr>
<td>kls</td>
<td>kkls</td>
<td>trm</td>
<td>'shimmy down'</td>
</tr>
<tr>
<td>kms</td>
<td>kkms</td>
<td>zḷ</td>
<td>'singe'</td>
</tr>
</tbody>
</table>

### Biconsonantals

<table>
<thead>
<tr>
<th>Aorist</th>
<th>Imperfective</th>
<th>Aorist</th>
<th>Imperfective</th>
</tr>
</thead>
<tbody>
<tr>
<td>dl</td>
<td>ddal</td>
<td>ml</td>
<td>mmal</td>
</tr>
<tr>
<td>fl</td>
<td>ffal</td>
<td>zḍ</td>
<td>zzaḍ</td>
</tr>
<tr>
<td>gn</td>
<td>ggan</td>
<td>rg</td>
<td>rrag</td>
</tr>
<tr>
<td>d'r</td>
<td>tt'ar</td>
<td>bsz</td>
<td>qqaז</td>
</tr>
<tr>
<td>gl</td>
<td>ggal</td>
<td>sḅ</td>
<td>ssaḳ</td>
</tr>
</tbody>
</table>

- mmal is ‘show’
- zsz is ‘dig’
REFERENCES


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ENCODING POLAR QUESTIONS IN DHOLUO

Benson Oduor Ojwang
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Most languages have both content questions and polar questions (Dryer 2005a). Previous studies on Dholuo have considered content questions in detail (cf. Okoth 1997; Omondi 1982, 1993). However, research on the nature of polar questions in Dholuo remains inconclusive. Omondi (1993) identifies a few particles in polar interrogatives but does not offer the full range of possible pragmatic interpretations beyond the structural function of these words. Onyoyo (2001) also outlines some particles in interrogatives of Dholuo, but does not place them in context and simply states that such particles provide more meaning. In this paper, I present descriptive data to illustrate the semantic, syntactic and pragmatic properties of polar questions in Dholuo. The two main strategies considered here are interrogative uses of question particles and affixations to the verb.

1. Introduction.

1.1. The language of study. Dholuo is a Western Nilotic language spoken in Kenya (Tucker 1993). The word order in this language is predominantly S-V-O (Payne 2002). However, due to movement of certain constituents to express focus, free word order occurs within the clause, giving rise to O-S-V patterns in declaratives. Okoth (1997) analyses such constituent order variations in detail, while Ojwang (1998) discusses the pragmatics of focus in Dholuo. Example (1) below illustrates this free movement.
Example (1a) shows the unmarked order of constituents in a declarative while (1b) in which the object is fronted, is the marked order. The arguments in such declaratives can be questioned in different ways, and this paper examines the formation of questions that elicit either a ‘yes’ or ‘no’ answer. In Dholuo, content questions are formed using a set of words equivalent to English *wh*-words. These have been described in Okoth (1997) and Omondi (1982).

2. The Role of Particles in Dholuo Polar Questions.

According to Radford (1997: 267), particles are constituents which “are invariable in form and which don’t fit easily into traditional systems of grammatical categories.” Dryer (2005a) identifies the use of question particles as a widespread strategy for forming polar questions, and concludes that the majority of languages with question particles fall into three areas, one of which is a belt stretching across Africa from Western Africa to central eastern Africa. This geographical range covers the area where Dholuo is spoken.

There is ample evidence of particles that encode polar questions in Dholuo. However, Okoth (1997) lists only three such particles: *bende*, *donge* and *koso*, but one should note that Okoth’s objective was to illustrate constituent order in Dholuo syntax in general. Omondi (1993) also considers only three particles: *ni*, *kare*, and *koso*, with the aim of illustrating how they are to be understood as Q-words in a transformational framework, while Tucker (1993: 294-295) classifies *donge* as an interrogative conjunction, *koso* as an interrogative form and *ni* as a particle. In the works cited, there is no conclusive classification and analysis of question-forming particles in Dholuo. It should also be noted that these authors were concerned with the structural rather than the pragmatic and semantic properties of Dholuo particles. Each of the questions in the forthcoming data can either be answered in the affirmative, using the word *ee*, or in the negative, using *ooyo*. We now turn to the data.
2.1. *be / be(nde)* particle. The word *bende* takes the variant form *be* in less emphatic speech. The word *be* is apparently a dummy. According to Radford (1997: 258), “a dummy is a word that has no intrinsic semantic content but which is used to satisfy a structural requirement that a position be filled.” The particle *be* can occupy three different structural positions in the interrogative clause. Although *be* and *bende* have the same function, the shortened form *be* is more common, while *bende* is used in slow emphatic speech. In (2a) and (2b), the speaker simply wants to know the true state of affairs without any additional intentions. In comparison, examples (3a) and (3b) are probable in a context where the speaker did not expect Arum to run and is in fact surprised that Arum is doing so.

(2) a. Be Arum ringo?
   Q Arum run-PROG
   ‘Is Arum running?’

   b. Bende Arum ringo
      Q Arum run-PROG
      ‘Is Arum running?’

In all cases, there is no ambiguity when *be* or *bende* occur sentence initially, since they only have an interrogative reading. However, when *be* or *bende* occur in medial position, a declarative reading of (3a) and (3b) is possible, i.e. ‘Arum too is running’ as in (3c), but a declarative reading requires a preposed element that makes it unambiguously a statement. The modification takes the form of a disjunct for example *parie ni*, as indicated in (3c).

(3) a. Arum be ringo
    Arum Q run-PROG
    ‘Is Arum running?’; ‘Arum too is running.’

   b. Arum bende ringo
      Arum Q run-PROG
      ‘Is Arum running?’; ‘Arum too is running.’

   c. (Parie ni) Arum be/bende ringo.
      Arum too run-PROG
      ‘(Imagine) Arum too is running.’
In some contexts, only \textit{be} is used, as shown in (4a). Here, the speaker doubts whether Arum has even started the activity of running.

(4) a. Arum ringo \textit{be}?  
   \begin{tabular}{lll}
   \textit{Arum} & \text{run-PROG} & \text{Q}  \\
   \end{tabular}  
   ‘Is Arum (really) running?’

   b. *Arum ringo \textit{bende}?  
   \begin{tabular}{lll}
   \textit{Arum} & \text{run-PROG} & \text{Q}  \\
   \end{tabular}  
   ‘Is Arum running?’

The word \textit{be} in (4a) encodes a challenge. The speaker is challenging the addressee to ensure that the former’s expectation is met. The speaker expects Arum to be running and seeks confirmation from the addressee. Utterance (4a) implies that some unspecified action may be taken by the speaker if it turns out in the response that Arum is not running. This is probable in a context where the speaker is in a position of authority and is able to enforce an order, for example, if Arum were an athlete and the speaker, his trainer.

In sentence final position, \textit{be} becomes ambiguous when we question the object, as shown in (5). In such a case, \textit{be} has two functions: one as a question particle, and the other as an adverb meaning ‘also’ or ‘in addition.’ The alternative readings confirm our earlier contention that the interrogative use of \textit{be} is the result of grammaticalisation of an otherwise independent lexical item.

(5) Tom mako \textit{rech be}  
   \begin{tabular}{llll}
   \textit{S} & \text{catch} & \text{PRES} & \text{Q/ADV}  \\
   \end{tabular}  
   ‘Does Tom catch fish (as the others are doing)?’; ‘Does Tom catch fish (in addition to other things)?’; ‘Tom catches fish too.’

If we prepose \textit{be} to the beginning of the sentence, the adverbial function becomes more explicit, as seen in (6), where the preposed word functions as the Q-word, while the sentence-final one has an adverbial function without any redundancy. Whereas (6b) is ambiguous between a question and a declarative reading, (6c) has only a declarative reading since, pragmatically, it is not possible for the speaker to pose a question to himself. This shows that the context of the utterance and the perspective of the speaker, as well as the semantic requirements of the verb, determine whether the particle takes a declarative or interrogative reading.
(6)  a. Be Tom dwaro rech be?
   Q Tom want PRES fish ADV
   ‘Does Tom want fish in addition?’

   b. Tom be dwaro rech
      Tom Q want PRES fish
      ‘Does Tom also want fish?’; ‘Tom also wants fish.’

   c. An be a- dwaro rech
      S ADV 1 SG want PRES fish
      ‘I also want fish.’

The different positions occupied by be confirm the contention of Omondi (1993: 230) that “many of the particles can be moved around within the sentence for various effects”. We shall argue that the various effects that Omondi refers to in her work include the subtle pragmatic notions that we identify in this paper.

2.2. **donge** particle. The word **donge** also seems to have been grammaticalised into a question particle. Evidence for this claim is that the word also occurs in declaratives, especially in conversational contexts where it is used as a discourse signal to indicate concurrence or agreement with what has been said by an interlocutor. In declaratives, **donge** means ‘I confirm that it is true’. Compare (7a) and (7b) below.

(7)  a. Mary timo ang’o? (Interrogative)
   Mary do-PROG what
   ‘What is Mary doing?’

   b. Donge Mary nindo. (Declarative response)
      Mary sleep-PROG
      ‘(I confirm that) Mary is sleeping.’

In contrast, **donge** as a question particle implies that the speaker is making a suggestion in addition to, or apart from, merely asking the addressee to do something. It could also mean that the speaker has some prior information or strongly believes in a certain position and is seeking the addressee’s opinion. For example, in (8), the speaker believes that Kamau is expected. Therefore, in this usage, **donge** means ‘is it not true that’.
(8) a. Donge Kamau biro?
    Q Kamau come-PROG
    ‘Is it not true that Kamau is coming?’

b. Kamau biro, donge?
    Kamau come-PROG Q
    ‘Kamau is coming, is that not true?’

A declarative reading of (8a) is possible, but not of (8b). However, a de­
clarative reading of (8a) has to be in a context where the speaker has confirmed
Kamau’s intention or has even seen Kamau on his way, hence gives an assurance
to the addressee, as in (9).

(9) Donge Kamau biro
    Part. Kamau come-PROG.
    ‘Kamau is coming indeed’; ‘(Take it from me that) Kamau is coming’

The context of the utterance is crucial, so (8a) is likely if the referent, Ka­
mau, is expected or presumed to be on his way to the place, while (9) assures the
addressee not to worry about the absence of the referent, as he is strongly ex­
pected to arrive soon. Therefore, in the above cases, it is apparent that structural
position does not always determine the function of the question particles.

In (10) below, where donge follows the subject, the speaker strongly sus­
ppects or has reason to believe that the dog might bite. This notion of seeking con­
firmation of suspicion applies both to the sentence initial and mid-sentence usages
of donge, and applies to both positive and negative sentences.

(10) a. Guok donge kayo ji?
    dog Q bite people
    ‘Is it not true that the dog bites people?’

b. Donge guok kayo ji?
    Q dog bite people
    ‘Is it not true that the dog bites people?’

c. Donge guok ok ka ji?
    Q dog NEG. bite people
    ‘Doesn’t the dog bite people?’
In Dholuo polar questions, *donge* is the particle that is used to form tag questions as seen in (11)-(13) below. A question tag is an interrogative clause added to the end of a statement to invite agreement. In our data, the element that functions as a question tag is the particle *donge*. In this usage, *donge* is placed after a statement in order to request confirmation of the proposition. Often, when used as a tag, *donge* expresses a degree of bias of the speaker toward one answer, usually a positive answer. The tag is usually added to positive statements. This implies that the speaker has already adopted a positive or optimistic stand. It should be noted that as a tag, there is a pause preceding *donge*. This is indicated by a comma in the examples that follow:

(11) a. Chaye liet, donge?
   Tea hot Q
   ‘The tea is hot, isn’t it?’

   b. Chaye ok liet, donge?
   Tea NEG. hot Q
   ‘The tea is not hot, is it?’

(12) Otipo biro kelo ring’o, donge?
   Otipo FUT bring meat Q
   ‘Otipo will bring meat, won’t he?’

(13) Dhiang’ nyalo bet, donge?
   Cow AUX sit Q
   ‘The cow can sit, can’t it?’

Although Tucker (1993: 294) envisages only an interrogative conjunction function for *donge*, our examples (8a)-(13) show that the word has three distinct structural positions and diverse pragmatic implications.

### 2.3. Combinations of the particles be(nde) + donge, donge + bende.

It is possible to combine sequences of some of the Q-particles. This yields various pragmatic and semantic effects. Let us consider:

(14) Nyako be donge idho yien?
   Girl Q Q climb PRES tree
   ‘Is it not true that the girl also climbs the tree?’
(15) Onyoso donge be o- hero tugo?
   Onyoso Q Q 3SG like playing
   ‘Is it not true that Onyoso too likes playing?’

(16) a. *Waseka nyalo ywak donge bende?
   Waseka ADV cry PRES Q Q
   ‘Waseka can cry, is it not true also?’

   b. *Waseka nyalo ywak donge be?
   Waseka ADV. cry Q Q
   ‘Waseka can cry also, is it not true?’

   c. Waseka nyalo ywak be, donge?
   Waseka ADV. cry Q Q
   ‘Waseka can also cry, can’t she?’

   d. Waseka nyalo ywak bende, donge?
   Waseka ADV. cry Q Q
   ‘Waseka can also cry, can’t she?’

In sentence final position, the combination of polar question markers is disallowed if the word be or bende occurs last, as in (16a-b), while the combination is possible wherever donge occurs word-finally, as in (16c-d). Compare this with the word order illustrated in example (4a-b).

2.4. The particles *di, dang*, *diwang*. These particles express possibility and doubt. Pragmatically, *di* implies a supposition involving a limitless possibility or a hypothetical situation, *dang* implies present possibility while *diwang* implies future possibility. The particles *di, dang* and *diwang* are restricted to sentence-initial position and the position immediately after the subject. Thus they cannot occur sentence-finally, as seen in various starred forms below. We begin with *di* in (17).
(17)  
a. Di ji cham gweno?
   Q people eat chicken
   ‘Could people eat chicken?’

   b. Ji di cham gweno?
   people Q eat chicken
   ‘Could people eat chicken?’

   c. *Ji cham gweno di?
   people eat chicken Q
   ‘Could people eat chicken?’

Example (17a) implies both possibility and availability. In the possibility reading, the speaker is not sure whether there is chicken or not while in the availability reading, the speaker has confirmed that there is chicken and is simply seeking permission to act. Declarative readings of (17a) and (17b) are possible with modifications. For that to happen, we need to introduce one of the adverbs *mano*, *kare* or *ndi* which indicate that the speaker concurs with the interlocutor as follows:

(18)  
Mano di ji cham gweno.
ADV Part. people eat chicken
‘In that case people could eat chicken.’

(19)  
Kare ji di cham gweno.
ADV people Part. eat chicken
‘Then people are likely to eat chicken.’

(20)  
Di ji cham gweno ndi.
Part. people eat chicken ADV
‘People can eat chicken seriously.’

With the inclusion of the adverbs in (18)-(20), the sentences are unambiguously declarative both structurally and semantically.

Let us now turn to the usage of *dang*’ using examples (21a)-(21c):
(21) a. Dang’ Aloo kel pi?
   Q Aloo bring water
   ‘Can Aloo bring water?’

b. Aloo dang’ kel pi?
   Aloo Q bring water
   ‘Can Aloo bring water?’

c. *Aloo kel pi dang’?
   Aloo bring water Q
   ‘Can Aloo bring water?’

Example (21a) can have three interrogative readings: ‘Is Aloo able to bring water?’ ‘Will Aloo bring water?’ and ‘Is Aloo allowed to bring water?’ This indicates that the word dang’ is context dependent for its appropriate interpretation. The first reading simply questions Aloo’s ability and predisposition to perform the task. The second reading doubts the probability of Aloo acting in the desired manner, while the third reading comes from the perspective that the speaker seeks the addressee’s consent before Aloo can act. A declarative reading of (21a) and (21b) is also not possible unless we introduce additional constituents as follows.

(22) (A- ng’eyo ni) Aloo dang’ kel pi.
   1SG know ADV S Part. bring water
   ‘I know that Aloo can bring water.’

We can draw a parallel between (22) and (3c). In both cases, the parenthesized disjuncts indicate that the speaker makes it clear that the facts have been ascertained.

The word diwang’ shares some features with dang’, except that it implies a futurity more distant than dang’.
(23) a. Diwang’ Ogalo ndiki?
   Q S write
   ‘Can Ogalo write later?’

b. Ogalo diwang’ ndiki?
   S Q write
   ‘Can Ogalo write later?’

c. *Ogalo ndiki diwang’?
   S write Q
   ‘Can Ogalo write later?’

A declarative reading is marginally possible for (23a) and (23b) with modification. For example, we may have (24).

(24) (Samoro) diwang’ Ogalo ndiki.
   ADV. Part. S write
   ‘Maybe Ogalo will write.’

2.5. The use of be + di / dang’ / diwang’. When a question is introduced by these combinations, the contextual reality obtaining is that the one posing the question has doubts about the addressee or about a situation, and anticipates a negative rather than a positive response.

(25) Be di Oluru miel thum?
   Q Q Oluru dance music
   ‘Can Oluru really dance (to music)?’

(26) Be dang nyathi ting’ kom?
   Q Q baby carry chair
   ‘Can the baby really carry the chair?’

(27) Be diwang Munini chur adier?
   Q Q Munini groan ADV
   ‘Will Munini really groan?’
In (25)-(27), no declarative reading is possible even if we include the particles which would otherwise call for a declarative reading in the manner of (18) and (19). For example, by modifying (27) using *mano*, it remains an interrogative.

(28) Mano be diwang Munini chur adier?
    ADV Q Q Munini groan ADV
    ‘In that case will Munini really groan?’

Strong doubt is expressed by using *adier* ‘is it true’ as shown in (27) above, while stronger doubt can be formulated by placing the Q word after the adverb of doubt as in (29).

(29) Diwang’ Sifuma nind adier be?
    Q Sifuma sleep ADV Q
    ‘Are you sure that Sifuma will really sleep?’

All three combinations in 2.5 can also follow the subject, but cannot occur sentence finally. So, (25) can be reformulated as (30a) but not as (30b):

(30) a. Oluru be di miel thum?
    Oluru Q Q dance music
    ‘Can Oluru really dance (to music)?’

b. *Oluru miel thum be di?
    Oluru dance music Q Q
    ‘Can Oluru really dance (to music)?’

2.6. The use of *donge* + *di* / *dang*’ / *diwang*. This pattern is used when it is believed that an envisaged situation can be realized. The pragmatics of *donge*+*di* contrasts in presuppositions with *be*+*di*, in that *donge* retains the presupposition of truth and certainty noted in uses such as (8)-(13), whereas *be*+*di* seems to have a presupposition of non-truth or doubt. However, the speaker still expresses confidence that things can turn out as desired, as in the following.
(31) Donge di Tabu riemb mtoka?
Q Q Tabu drive car
‘Is it not possible for Tabu to drive a car?’
‘Can’t Tabu drive a car?’

(32) Donge dang’ a- som?
Q Q 1SG read
‘Is it not possible for me to read?’

(33) a. Osiep-ni donge diwang’ nen-i?
   Friend 2SG. POSS Q Q see 2SG.
   ‘Is it not possible for your friend to see you later?’

   b. *Osiep-ni nen-l donge diwang’
   Friend 2SG.POSS. see 2SG Q Q
   ‘Is it not possible for your friend to see you later?’

I have included (33b) to show that just as in the patterns seen in section 2.4, the sentence final position is not possible with some of these particles, so we cannot reformulate (33a) as (33b).

We cannot drop di from (31) because that would leave a wrong structure in the form of (34) below.

(34) *Donge Tabu riemb mtoka
Q Tabu drive car
‘Is it not possible for Tabu to drive a car?’

2.7. The use of to. As a question particle, to means that the questioner reminds the addressee about another possible alternative in the circumstances. For example, (35) is probable in a context where the listener is reluctant to make a choice. In order to use the word to in a complete sentence, it has to occur as part of a disjunct to another main clause. In (35a) and (36), I show a contextualized usage of to, while in (35b) the antecedent clause has been omitted. It should however be noted that although (35b) seems to be structurally incomplete, it is meaningful in itself, in a context where the interlocutors share some common knowledge about the referents.
(35) a. I- kawo diel; to bando?
    2SG take goat Q maize
    ‘You have taken the goat; what about the maize?’

b. To bando Ø Ø?
    Q maize
    ‘And the maize?’

The particle to can also occur after the subject.

(36) Opuk wuotho; pada to?
    Opuk walk-PROG donkey Q
    ‘The tortoise is walking; what about the donkey?’

Sometimes to is stated twice in the same utterance. This is not for mere emphasis. Pragmatically, there are two conceivable implications. Firstly, the illocutionary force is that the speaker is undecided and does not know what step to take next or how to handle a situation, hence the repetition is a form of prodding for the addressee to guide the speaker’s next action as in (37a). Secondly, the speaker may express surprise that an expected action did not take place as in (37b).

(37) a. A- kelo kom; to mesa to?
    1SG bring chair Q table Q
    ‘I have brought the chair; what about the table?’

b. Aloo tedo rech to ochele to?
    Aloo cook-PROG fish Q rice Q
    ‘Aloo is cooking fish; what about the rice?’

The use of to in declaratives is represented by the following examples. Items (38) to (40) represent a form of to which is just a homograph of the question particle but functions as a conjunction or adverb.

(38) Botiato to ok nyal
    Botiato Part. NEG manage
    ‘As for Botiato, she cannot manage.’
(39) A- kwero Gongo to o- dagi
   1SG tell off Gongo ADV 3SG refuse
   ‘I told Gongo off but she refused.’

(40) Ka Ongalo ok dwar to o- we
   ADV Ongalo NEG want ADV 3SG leave
   ‘If Ongalo doesn’t want (to do X) then she should leave.’

2.8. The use of *ni*. This particle is used if the speaker has been informed about a situation and is simply counterchecking with the addressee for the truth value of the utterance. There is also an element of surprise in this type of polar question, in the sense that the speaker expresses his or her consternation to the addressee and indicates that the news was unexpected or is unbelievable given the facts that the interlocutors already know about the referent. In all cases, this particle occupies only the sentence initial position, and (41b) and (42b) are not possible patterns.

(41) a. Ni Osiato jakuo?
   Osiato thief
   ‘Is it true that Osiato is a thief?’

   b. *Osiato ni jakuo
      Osiato thief
      ‘Is it true that Osiato is a thief?’

(42) a. Ni Apelo luoko-re?
   Apelo bath REFL.
   ‘Is it true that Apelo is bathing?’

   b. *Apelo luoko-re ni
      Apelo bath REFL Q
      ‘Is it true that Apelo is bathing?’

   If a structure begins with *ni*, it can be preposed with a disjunct to convert it into a declarative as in (43).

(43) Orudo wacho ni Achieng’ chotne
    Orudo say CONJ Achieng’ friend
    ‘Orudo says that Achieng is his girlfriend.’
If we again prepose the above sentence with *ni*, it reverts to a question as in (44).

(44) Ni Orudo wacho ni Achieng’ chotne
Q Orudo say CONJ Achieng’ friend
‘Is it true that Orudo says that Achieng’ is his girlfriend?’

2.9. The use of *koso*. Tucker (1993: 295) describes this form as “introducing a choice of alternatives.” However, we identify additional functions for it as in (45) which expresses both the notions of possibility and suggestion.

(45) O-ng’iewo ring’o koso?
3SG buy meat Q
‘Does he buy meat?’

Questions such as (45) can be answered felicitously by an elaboration in order for the answer to be complete, particularly if the response is negative. Therefore, the response to (45) may be ‘No, he buys fruits’ or ‘No, he sells meat’ depending on the contextual realities. Similarly, the answer to (46a) can either be a single word, or an elaborate one. In a context where the speaker has confirmed what the child really wants, the answer can be a simple ‘yes’ or ‘no’ but where the fact is not known, it is felicitous for one to respond with the words *samora* (maybe) or *akia* (I don’t know).

(46) a. Koso nyathi dwaro chak?
Q child want milk
‘Could it be that the child wants milk?’

b. A-kel buk koso Ø?
1SG bring book or Q?
‘Do I bring a book or not?’; ‘Do I bring a book or something else?’

The two interpretations of (46b) show that the use of *koso* in sentence-final position leaves an empty slot which may be recovered in two ways. In the first reading, the speaker is cautious and doubts whether the addressee approves of an intended action, while in the second, the speaker has a suggestion and just falls
short of mentioning the actual available alternative. There is no declarative reading of (45) or (46) that we can envisage.

2.10. **The use of kare.** This particle means ‘so’. When used to form a polar question, it implies the speaker’s surprise at an action, situation or an unexpected turn of events. For example, in (47), the implication is that the speaker has already confirmed that Apul is a liar, contrary to what was believed earlier.

(47) Kare Apul riambo?
    Q Apul lie PRES
    ‘So Apul is lying?’

Another position for this particle is immediately after the subject, as in (48), while the sentence-final position is also possible, but it is rare and marked, as in (49) below.

(48) Nyako kare ler?
    S Q clean
    ‘So the girl is clean?’

(49) Nyako duong’ kare?
    S big Q
    ‘So the girl is big?’

Although Cowper (1987: 139) says that “elements which are restricted to second position are verbs, auxiliaries, clitics and particles of various sorts,” the foregoing illustrations agree more with Dryer (2005b) who proposes a criterion of classifying question particles and says that their position is variable in some languages, and that in such languages:

> the position of the question particle often depends on what is the focus of the question. In most if not all such languages, however, there is one position which is associated with a more neutral question, where the truth of the entire sentence is being questioned without one constituent being the focus of the question. [p. 239]

On the basis of our data, we conclude that the neutral position for question particles in Dholuo is sentence initial. Secondly, our descriptions agree with the ob-
servation that “polar questions universally bear various illocutionary forces which enhance the cooperative principle” (Levinson 1983: 100-103). This would be at variance with Lyons (1977: 753-768) who suggests that interrogatives simply “grammaticalize the feature of doubt.”

It has been observed by Boelaars (1950: 152) that “occasionally, a question particle will code other grammatical features of the clause. For example in Aghu, the question particles also code tense”. In Dholuo, the question particles do not indicate any other grammatical information apart from their syntactic role of forming interrogatives. In terms of meaning of question particles, I agree with Omondi (1993: 229) who argues that “each of the lexical items has an idiosyncratic semantic content and / or function which determines its use.” These idiosyncrasies can be attributed to the different communicative contexts that call for use of specific question particles that speakers select so as to express certain wishes and expectations.

3. A Note on the Role of Tone.

Omondi (1982) and Owino (2003) conclude that Dholuo has only two significant tones, High (H) and Low (L). A third tone, downstepped high, is derived in particular environments (Okoth 1982, Tucker 1993). In this paper, I refer only to High and Low tones. Owino (2003) notes that tone is phonemic in Dholuo and is not marked in the orthography. The most important grammatical function of tone in Dholuo is in marking perfective and imperfective aspectual distinctions. In terms of mood, one has to look out for patterns of combinations of tones. Therefore, the use of intonation has been observed as one other major strategy for polar questions (cf. Okoth 1997: 71-72). This forms polar questions by simply expanding the tonal register by having higher realizations of pitch. Omondi (1993: 43) also avers that “the yes-no type of question [in Dholuo] is formed reasonably freely from the basic declarative sentence by changing the intonation.” In this paper, the focus is on lexical markers of polar questions rather than the general conversion of declaratives into interrogatives by expanding the tonal register.

The strategy of intonation results in polar questions without recourse to any of the lexical elements that we have discussed in the preceding sections. The use of tonal variation can be illustrated by comparing the intonation contours on a declarative which can be transformed into an interrogative by varying the pitch values as in (50) versus (51). In this paper, I use H for high or rising tone and L for low or falling tone.
(50) Munini dwàro lùth. (LLL: Declarative)
    Munini want pole
    ‘Munini wants a pole’

(51) Munini dwáró lúth? (HHH: Interrogative)
    Munini want pole
    ‘Does Munini want a pole?’

However, intonationally indicated interrogatives are prone to misconstrual. In less
emphatic speech, one may not easily distinguish a declarative from an interrogative
through intonation alone. Contextual realities during an interaction also enable the interlocutor to detect questions. Apparently, intonation is not absolutely
crucial in Dholuo polar questions. The use of particles seems to take priority as a
syntactic means of signaling polar questions. Even utterance (51) can correctly be
preposed with the particle koso which has an automatically interrogative function
as seen in section 2.9 hence relegating intonation. As Tucker (1993: 43) observes,
“it must be admitted that the Dholuo tonal values are not clear cut and are often
too hard to catch”. Tones in Dholuo are also not marked in the orthography so far.
I have revisited the issue of tone here only because I shall refer to its role occasion­
ally in the next section, which mainly involves affixation and variations of
verb forms to produce polar questions.

4. Polar Questions Involving Inflections on the Verb.

In this section, I show how inflections on Dholuo verbs are used to formulate po­
lar questions. I first introduce the possible inflectional forms that Dholuo verbs
take generally then proceed to illustrate their role in questions.

4.1. Dholuo verbal inflections in brief. Dholuo uses a combination of affixation
and adverbial support to the verb to yield functionally different verb forms. A
major feature of Dholuo verbs is that all finite forms take the suffix -o. The main
verb changes involving morphological modifications are outlined in (52).
(52) **Infinitive and Imperative**

<table>
<thead>
<tr>
<th>Simple Present</th>
<th>Past</th>
<th>Future time</th>
</tr>
</thead>
<tbody>
<tr>
<td>nind-o</td>
<td>ne nind-o</td>
<td>biro nind-o</td>
</tr>
<tr>
<td>‘sleep’</td>
<td>‘slept’</td>
<td>‘will sleep’</td>
</tr>
<tr>
<td>go-yo</td>
<td>ne go-yo</td>
<td>biro go-yo</td>
</tr>
<tr>
<td>‘beat’</td>
<td>‘beats’</td>
<td>‘will beat’</td>
</tr>
<tr>
<td>yud-o</td>
<td>ne yud-o</td>
<td>biro yud-o</td>
</tr>
<tr>
<td>‘get’</td>
<td>‘got’</td>
<td>‘will get’</td>
</tr>
<tr>
<td>her-o</td>
<td>ne her-o</td>
<td>biro her-o</td>
</tr>
<tr>
<td>‘love’</td>
<td>‘loved’</td>
<td>‘will love’</td>
</tr>
<tr>
<td>mi-yo</td>
<td>ne mi-yo</td>
<td>biro mi-yo</td>
</tr>
<tr>
<td>‘give’</td>
<td>‘gave’</td>
<td>‘will give’</td>
</tr>
</tbody>
</table>

In (53), I provide complete sentences to show how tense and number are marked on Dholuo verbs.

(53) a. **1sg**

A-nind-o
‘I sleep’

A-ring-o
‘I am running’

b. **2sg**

I-go-yo
‘You beat’

I-her-o
‘You are loving’

c. **3sg**

Ne o-nind-o
‘She slept’

Otieno tim-o
‘Otieno is doing’

**1pl**

Wa-nind-o
‘We sleep’

Wa-ring-o
‘We are running’

**2pl**

U-go-yo
‘You beat’

U-her-o
‘You are loving’

**3pl**

Ne gi-nind-o
‘They slept’

Otieno gini tim-o
‘Otieno and others are doing’
The second important distinction is between perfective, imperfective (progressive) and habitual aspects which are represented by the following patterns.

<table>
<thead>
<tr>
<th></th>
<th>Progressive</th>
<th>Perfective</th>
<th>Habitual</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>rwak-o</td>
<td>o-se-rwak-o</td>
<td>rwak-o-ga</td>
</tr>
<tr>
<td></td>
<td>‘wearing’</td>
<td>‘has worn’</td>
<td>‘wears’</td>
</tr>
<tr>
<td>b.</td>
<td>tiek-o</td>
<td>o-se-tiek-o</td>
<td>tiek-o-ga</td>
</tr>
<tr>
<td></td>
<td>‘finishing’</td>
<td>‘has finished’</td>
<td>‘finishes’</td>
</tr>
<tr>
<td>c.</td>
<td>tim-o</td>
<td>o-se-tim-o</td>
<td>tim-o-ga</td>
</tr>
<tr>
<td></td>
<td>‘doing’</td>
<td>‘has done’</td>
<td>‘does’</td>
</tr>
<tr>
<td>d.</td>
<td>yok-o</td>
<td>o-se-yok-o</td>
<td>yok-o-ga</td>
</tr>
<tr>
<td></td>
<td>‘hitting’</td>
<td>‘has hit’</td>
<td>‘hits’</td>
</tr>
<tr>
<td>e.</td>
<td>ol-o</td>
<td>o-se-ol-o</td>
<td>ol-o-ga</td>
</tr>
<tr>
<td></td>
<td>‘pouring’</td>
<td>‘has poured’</td>
<td>‘pours’</td>
</tr>
</tbody>
</table>

To change an infinitive form into a progressive, -o is affixed to all verbs; when the stem ends with a vowel, a palatal glide is inserted.

(55) \(ka + o \rightarrow ka-o \rightarrow ka-y-o\)

bite -PROG.

‘biting’

4.2. The role of affixation in forming polar questions. We can identify cases in which the prefixation of a subject marker, particularly the first person pronoun marker, onto a verb root gives it the value of a polar question. In this case, the addressee is understood to be present and the speaker is seeking confirmation before undertaking an intended action. Dholuo does not have contrastive vowel length in its sound system. However, question forms are subject to a kind of non-contrastive prosodic elongation. There is an element of lengthening of the vowel of the final syllable in the prefixed interrogative forms, as shown in the third column in (56a-e). This is perhaps a pragmatic indicator of the speaker’s hesitancy.
In (56), no significant lengthening occurs. The politeness marker -e designates the forms in the second column as question forms.

<table>
<thead>
<tr>
<th>Infinitive: pronoun marker:</th>
<th>Progressive: with subject:</th>
<th>Question form with subject:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(56) a. gwe ‘kick’</td>
<td>gwey- o ‘kicking’</td>
<td>a - gwe: ‘Do I kick?’</td>
</tr>
<tr>
<td>b. lor ‘close’</td>
<td>lor - o ‘closing’</td>
<td>a - lo:r ‘Do I close?’</td>
</tr>
<tr>
<td>c. gum ‘bend’</td>
<td>gum - o ‘bending’</td>
<td>a - gu:m ‘Do I bend?’</td>
</tr>
<tr>
<td>d. meny ‘flash’</td>
<td>meny - o ‘flashing’</td>
<td>a - me:ny ‘Do I flash?’</td>
</tr>
<tr>
<td>e. tong ‘cut’</td>
<td>tong’ - o ‘cutting’</td>
<td>a - to:ng ‘Do I cut?’</td>
</tr>
</tbody>
</table>

In (57a-e), no significant lengthening occurs. The politeness marker -e designates the forms in the second column as question forms.

<table>
<thead>
<tr>
<th>Infinitive:</th>
<th>Question form suffixed with politeness marker:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(57) a. gwe ‘kick’</td>
<td>a - gwe-(y)e ‘May I kick?’</td>
</tr>
<tr>
<td>b. lor ‘close’</td>
<td>a - lor - e ‘May I close?’</td>
</tr>
<tr>
<td>c. gum ‘bend’</td>
<td>a - gum - e ‘May I bend?’</td>
</tr>
<tr>
<td>d. meny ‘flash’</td>
<td>a - meny - e ‘May I flash?’</td>
</tr>
<tr>
<td>e. tong ‘cut’</td>
<td>a - tong - e ‘May I cut?’</td>
</tr>
</tbody>
</table>
There are a couple of ways of asking questions with personal pronouns in subject position. Therefore, other person and number categories represented in (58) below also participate in forming polar questions with a few exceptions.

(58) a. 1SG Prefix: a-gwe: a-gu:m
   ‘Do I kick?’ ‘Do I bend?’

b. 1PL Prefix: wa-gwe: wa-gu:m
   ‘Do we kick?’ ‘Do we bend?’

c. 2SG Prefix: i-gwe: i-gu:m
   ‘Do you kick?’ ‘Do you bend?’

d. 2 PL Prefix: u-gwe: u-gu:m
   ‘Do you kick?’ ‘Do you bend?’

e. 3SG Prefix: o-gwe: o-gu:m
   ‘Does he kick?’ ‘Does he bend?’

f. 3PL Prefix: gi-gwe: gi-gu:m
   ‘Do they kick?’ ‘Do they bend?’

When we use the words prefixed with a pronoun marker, the resulting utterance is inherently a polar question. The word forms outlined above do not take suffixes in ordinary polar questions but are suffixed with ‘-e’ if there is an additional pragmatic need to sound polite as in the second column of (57a-e). The usage of the third-column forms in (56a-e) can further be exemplified by introducing an object.

(59) A- gwe: mpira?
    1SG kick ball
    ‘Do I kick the ball?’

The comparable declarative will invariably take the inflected progressive forms as follows.
In comparison, the imperative takes the same lexical form and tone level as the interrogative form, and this is additional evidence for the conclusion that tone does not play a role in this kind of pattern. One can compare the three clause types where the verb has the same tone level as in (61).

(61) a. Imperative: b. Declarative: c. Interrogative:

Ø lór dhot Obbo lóró dhot a-lór (dhot?)
Close door Obbo close door 1SG door
‘Close the door’ ‘Obbo closes the door’ ‘Do I close the door?’

Another point to note is that this question pattern is only possible with the first and third person subject markers. The speaker is either asking for confirmation about what he intends to do, or this confirmation comes from the addressee who is the second person. Using the second person form yields an inherently incomplete but meaningful question. However, there is a pragmatic implicature of impoliteness because such an utterance does not give the speaker an option to act differently. It also sounds like an urgent prescription to the speaker as in (62).

(62) I - gum?
2SG bend
‘You bend?’

For (62) to be transformed into a complete question, a particle must be introduced as follows:

(63) Dang’ i - gum?
Q 2SG bend
‘Is it possible for you to bend?’

Further evidence for our claim about the use of prefixed verb forms in question formation is a comparison of (64) and (65) below. In (64), it is the speaker giving an instruction, while in (64) the addressee seeks a confirmation before executing the desired act. The difference in structure between the interrogative and imperative utterances is only the prefix a-.
(64) Ø tong’ yien ni (Imperative)
      cut        tree         DEM
‘Cut this tree.’

(65) A- tong’ yien ni? (Interrogative)
      1SG cut          tree         DEM
‘Do I cut this tree?’

With the third person subject marker -o, we also have a correct polar interrogative as follows.

(66) Onyango o- um gweno?
      Onyango 3SG cover hen
‘Should Onyango cover the hen?’

If we were to use the inflected progressive form of the verb, then the utterance would be open to two readings; one as a question and another as a declarative with tone making the distinction.

(67) Onyango úm-ò gweno (HL: Declarative)
      Onyango cover-PROG hen
‘Onyango is covering the hen.’

(68) Onyango úm-ó gweno? (HH: Interrogative)
      Onyango cover-PROG hen
‘Is Onyango covering the hen?’

Note that that the -o suffix in (68) is not a counterexample to the preceding pattern in which -o is only used in declaratives. Rather, it has a different function here, that of marking the progressive aspect.

Usually, it is superfluous to use the prefixed verb forms alongside the vocative interrogative word apenji unless the addressee is inattentive. Therefore, (69a) is a rare utterance. However, a Q-phrase (wh-word) may be used with the prefixed verb forms as shown in (69b) and (69c). Even if we drop the Q-phrase as in (69d), the result is still a correct question form. The only difference is that in (69b) and (69c), the Q-phrase is necessitated by the fact that the speaker is not certain about what to do and needs further clarification. If the speaker already
knows what is to be brought, then (69d) would be a sufficient question in the circumstances.

(69) a. A- penj-i, a- nind ka?
   1SG Q 2SG 1SG sleep here.
   ‘I am asking you, do I sleep here?’

   b. A- kel ang’o?
   1SG bring Q
   ‘What do I bring?’

   c. A- ol kanye?
   1SG pour where
   ‘Where do I pour?’

   d. A- kel?
   1SG bring
   ‘Do I bring?’

However, where the speaker needs confirmation in the form of the addressee’s approval of the action, a particle may be used with these verb forms.

(70) dongewa- ne bug-i ?
   Q 3PL see book POSS
   ‘Is it not true that we can see your book?’

Suffixing a verb with an object marker opens up the utterance to two readings, depending on the tone realization of the verb.

(71) Japuonj ó- hér- wà (HHL: Declarative)
    Japuonj 3SG love 1SG ‘Teacher should love us.’

(72) Japuonj ó- hér - wá? (HHH: Interrogative)
    Japuonj 3SG love 1SG ‘Should teacher love us?’
Even if a suffixed verb form has a first person subject marker prefixed to it as in (73), the utterance is restricted to a declarative reading. This is logical because it is not usual for one to confirm from an addressee what one is doing personally unless the speaker is calling for some form of evaluation of a certain action. So, an interrogative reading of (73) is untenable.

(73)  *A -om -o pi?
     1SG fetch-PROG water
     ‘Am I fetching water?’

However, if the prefix is the second or third person subject marker, both interrogative and declarative readings are possible.

(74)  í - mák - ó dhiang’?  (HHH: Interrogative)
     2SG catch-PROG cow
     ‘Have you caught the cow?’

(75)  í - mák - ó dhiang’  (HLL: Declarative)
     2SG catch-PROG cow
     ‘You have caught the cow.’

Column two of examples (57a-e) represents verb forms that function like subjunctives. In a sense, the speaker uses such words to express a wish that the permission or confirmation sought be granted. There is a regular pattern whereby the verbs are suffixed with the vowel ‘-e’ to express this notion. These constructions are inherently yes-no questions. They are also prefixed with a subject marker in their question forms. In sentences with objects, they are exemplified by (76).

(76)  A - kaw - e kom?
     1SG take chair
     ‘(Please) may I take the chair?’

To further qualify (76) as a question, we show that it is equivalent in meaning to (77) below.
(77) I- yie a- kaw kom?
   2SG accept 1SG take chair
‘Do you accept that I take the chair?’

However, if we drop the subject marker from (76), it is rendered imperative.

(78) Ø kaw - e kom.
  take chair
‘Please take the chair.’

Pragmatically, all our examples of verb roots that are prefixed with pronoun markers, as outlined in section 5, indicate the speakers’ intention to do something and that the addressee is in a position to confirm such a move. The speaker believes that by going ahead with the action, the addressee will be affected in a way either positively or negatively; therefore there is need to seek a confirmation which may be an approval of the action or its rejection. For example, (79) is analogous to the declarative (80).

(79) A- donj ot?
  1SG enter house
‘Shall I enter the house?’

(80) A- dwaro donjo ot
  1SG want/intend enter house
‘I want/intend to enter the house.’

Both (79) and (80) will elicit similar responses, either granting permission or disapproving the intention of the speaker. In addition to intention, there is the politeness nuance in which the speaker implicitly states that he or she will not go ahead with the intended action unless permission is granted by a ‘yes’ answer.

(81) Ø- ndik-e gi kalamb-i?
  3SG write with pen 2SG
‘May she write with your pen?’

Sentence (81) indicates that the speaker implores or prods the addressee and is desperate for a ‘yes’ answer. The illustrations presented in this paper reveal that
confirmation-seeking is the major illocutionary force encoded by posing polar questions. However, the diverse states of affairs and contexts of utterance are found to determine the choice of the specific strategy used. This enables us to recognize different nuances and various speech acts however slight the distinctions may be.

5. Conclusion.

The illustrations and discussion in this paper have shown that there are diverse ways of forming polar questions in Dholuo. The strategies that we have considered here perform complementary communicative goals of the speaker. Particles in interrogatives were found to occupy three distinct syntactic positions, with the sentence initial position being the commonest and unmarked form. The particles occur after the subject if there is a pragmatic reason to put them in that position. Therefore, the formulation of polar questions in Dholuo, using particles and affixation strategies, is determined mainly by pragmatic factors. The selection and positioning of question particles particularly requires further investigation in other related languages for comparative and typological purposes.

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A GENERATIVE ACCOUNT OF CONSONANT ALTERNATIONS IN BABA 1

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University of Yaounde 1

This paper analyses and accounts for various patterns of alternations exhibited by consonants as they interact within morphemes in Baba 1. Most of the alternations manifested by the consonantal segments of this language are in accordance with general phonological principles. Nevertheless, there are some apparently complex alternations that may not be sufficiently accounted for using simple phonetic logic, and that exhibits some typological novelties, which may be of some theoretical interest to specialists in the field. Moreover, the underlying consonant system of this language constitutes a typological curiosity rarely documented in the world’s languages. The contrast between voiced and voiceless consonants is highly restricted, appearing only with labio-dental, but never alveolar sounds.

1. Introduction.

This paper applies the generative theoretical framework in making a comprehensive analysis of alternations in consonant phonemes of morphemes and words in Baba 1, a Grassfields Bantu language of Cameroon spoken by about 15,000 people. This descriptive analysis will not only provide data on Baba 1, an understud-

1 I am quite grateful to David Odden for the patience he exercised in providing elaborate comments and suggestions, which led to the improvement made on the drafts of this paper. Anonymous reviewers of SAL also made useful observations that crucially contributed to the realisation of the final draft.
ied language, it will also show that some general principles governing surface data in the language can be easily explained by using formalised mental rules.

1.1. Geographical location. The name Baba 1\(^2\) is used to refer to a village, people and language. This language, which Dieu et al (1983) variably refer to as Bapa or Bapakum, is spoken by the people of one of the thirteen settlements/villages in the Ndop plain, Ngoketunjia Division of the North-west province in the Republic of Cameroon. More precisely, it is located at (6.06'N, 10.49'E). The speakers call their language ‘su papiax’, translated as ‘the speech of the Baba 1 people’\(^3\). Grimes (1996) also refers to the language as Papia, Bapa, Bapakum; it has the Ethnologue code BBW.

1.2. Phonological processes. There are phonological alternations that arise as a result of morphological/syntactic processes. Alternations in Baba 1 include assimilation, strengthening processes, and deletion. The processes described will not only present general and language-specific phenomena, they will also reveal somewhat curious phonological manifestations peculiar to this language. These include the lateral becoming a corresponding stop when preceded by a nasal in word initial position but a trill becoming a retracted affricate in the same environment. Nasals are also seen to be deleted in the environment of voiceless fricatives. Moreover, the voiced velar fricative [γ] and the velar stop [g] are allophones occurring in mutually exclusive environments. In initial position, [g] occurs exclusively before the high front vowels [i, ü], while the velar fricative precedes the remaining vowels. Finally, there is a highly restricted stop voicing rule, which voices the bilabial stop /p/ between two voiced sounds, but the other stops are unaffected in the same environment.

With these issues raised, we now present the phones of Baba 1 in (1).

\(^2\) This should be differentiated from Baba 2, which is a different village in Mezam division of the Republic of Cameroon, and whose language, which is not mutually intelligible with that of Baba 1, is classified under the Ngemba languages.

\(^3\) The translation is that of the author who is a native speaker of the language and presently a technical adviser to the language committee of the language.
(1) Phones
a. Consonants
   p t k kp ?
   [b]* [d]* [g]* gb
   m n η η m
   f s Σ x
   v
   t s tʃ [dz]* [dʒ]*
   l
   r
   j
   [w]*

   b. Vowels
   i i u
   e ə o

The sounds marked with asterisks are allophones as follows: /p/ → [b],
/l/→[d], /γ/→[g,w], /r/→[dz] and /j/→[dʒ]. It is seen that apart from the voiced
labio-velar stop, which contrasts with its voiceless counterpart as a separate pho-
neme, all of the other voiced stops and affricates in this language are allophones
of other phonemes, as will be clearly illustrated in our analysis. Another peculiar-
ity of this language is the presence of a contrast between voiced and voiceless
labial fricative and the absence of such a contrast for their non-labial counterparts.

Before we begin with the analysis of the attested processes responsible for
consonant alternations in Baba 1, it will be helpful to give some phonotactic facts
about the language. With respect to the data of the language, the following re-
marks can be made. First, words in this language end with no consonant other
than [p, m, η, ?, r, x]. Second, there are no vowel-initial roots whatsoever, but
single vowel segments can function as grammatical morphemes. The nasals of the
language [m, n, η] are not affected by a following vowel, but they are affected
when preceding a consonant in initial position. Finally, the language does not
have [z] or [ʒ], but there are [dz] and [dʒ]. With these facts in mind about Baba 1,
we now examine the attested assimilatory processes such as a consonant assimi-
lating consonant feature and a consonant assimilating vowel feature as analysed
below.

In this language, there are varied forms of consonant assimilation. A nasal
takes on the place features of a following consonant, and a consonant may take
the voice feature of surrounding sounds. The former describes exclusively the
behaviour of nasals in word-initial position while the latter describes a bilabial
stop between a nasal and a vowel. Rule (2) expresses this formally.
(2) Nasal place of assimilation.

\[ [+\text{nas}] \rightarrow [\alpha \text{ant}] / \# \rightarrow [\beta \text{cor}] \]

Data in (3) and (4), wherein a noun class prefix and the first person singular subject marker respectively are used, illustrate the validity of our nasal assimilation rule. The language has certain nouns whose plural marker is a nasal prefixed to the noun. Similarly, the first person singular subject marker is usually a nasal prefixed as a clitic to the verb during sentence construction. These two items are used to illustrate nasal assimilation below.

(3) Assimilation of nasal in word-initial position.

<table>
<thead>
<tr>
<th>Singular nouns</th>
<th>Plural</th>
</tr>
</thead>
<tbody>
<tr>
<td>kü ‘foot’</td>
<td>ŋ-kū ‘feet’</td>
</tr>
<tr>
<td>tòŋlò ‘ear’</td>
<td>n-tòŋlò ‘ears’</td>
</tr>
<tr>
<td>kòxtò ‘knee’</td>
<td>ŋ-kòxtò ‘knees’</td>
</tr>
<tr>
<td>tʃìŋlò ‘buttock’</td>
<td>n-tʃìŋlò ‘buttocks’</td>
</tr>
</tbody>
</table>

(4) 1st person subject pronoun. (asp = aspectual marker)

/Ŋ-tá mó wó/ [ŋtá mó wó] ‘I have kicked a stone’
1-kick asp stone

/Ŋ-túm mó kùŋ/ [ŋtúm mó kùŋ] ‘I have carried a pot’
1-carry asp pot

/Ŋ-kàŋ mó/ [ŋkàŋ mó] ‘I have cried’
1-cry asp

/Ŋ-kpì mó/ [ŋkpì mó] ‘I am absent’
1-absent asp

/Ŋ-gbàr mó sù/ [ŋgbàr mó sù] ‘I have cut a fish’
1-cut asp fish

/Ŋ-mòm mó/ [mòm mó] ‘I have attempted’
1-attempt asp

---

4 The nasal in this word does not assimilate the palatal place of articulation of the following consonant here because the sound [tʃ] is not considered a pure palatal in this language, but is better described as a prepalatal.
Since we do not have an argument strong enough to decide which among the attested nasals \(m, n, ŋ, p\) is underlying in this language, it is more convenient to assume an underlying nasal /\(N/\) without any place of articulation feature. This nasal will only acquire a place feature on the surface from the following consonant.

Our rule in (2) applies to a nasal before a consonant in root initial position, as indicated by the word boundary, in order to account for the parallel examples in (5) below, where there is no assimilation.

\[(5)\] Non-assimilation of nasal within a word

\[
\begin{align*}
\text{mbùmtò} & \quad \text{‘weevil’} \\
\text{wùmtò} & \quad \text{‘umbrella’} \\
\text{lòmtò} & \quad \text{‘delay’} \\
\text{vòmtò} & \quad \text{‘soft part of bamboo’} \\
\text{gàmtò} & \quad \text{‘help’} \\
\text{mòmtò} & \quad \text{‘to test’} \\
\text{sànmtò} & \quad \text{‘to count’}
\end{align*}
\]

\[
\begin{align*}
\text{tònlò} & \quad \text{‘ear’} \\
\text{fònlò} & \quad \text{‘among’} \\
\text{sìntò} & \quad \text{‘name of a village’} \\
\text{sònlò} & \quad \text{‘speech’} \\
\text{kànlò} & \quad \text{‘friendship’} \\
\text{fèntò} & \quad \text{‘to lock’} \\
\text{sèntò} & \quad \text{‘to break’}
\end{align*}
\]

The data above clearly illustrate that our proposed rule (2) applies exclusively in stem initial position in the presence of a preceding word boundary as indicated by data of (3,4), and not elsewhere within the word.

The next issue to be addressed is a case where a sound takes on features from both preceding and following sounds. This is the curious case of the bilabial stop, which is voiced between a nasal and a vowel, whereas no other stop is voiced in this environment. This is formalized in (6) below.

\[(6)\] Bilabial stop becomes voiced between a nasal and a vowel.

\[
\begin{align*}
\begin{bmatrix}
  +\text{ant} \\
  -\text{cont} \\
  +\text{lab} \\
  -\text{voice}
\end{bmatrix}
\end{align*}
\rightarrow
\begin{align*}
  \text{[+voice]} & / \text{[+nas] } \text{[+syll]}
\end{align*}
\]
This rule is exemplified by the data in (7) below where we use a nasal that serves as marker for plural nouns in (a) and another nasal used as first person singular subject pronoun in (b).

(7) a. pó ‘hand’ m-bó ‘hands’
pám ‘bag’ m-bàm ‘bags’
páñ ‘tin’ m-bán ‘tins’

b. /ń-póx má/ [mbóx mó] ‘I have struggled’
   l-struggle asp

   /ń-pá má/ [mbá mó] ‘I am mad’
   l-mad asp

   /ń-púptó má/ [mbúptó mó] ‘I have spoiled’
   l-spoiled asp

   /ń-póm mò/ [mbóm mó] ‘I have agreed’
   l-agree asp

Compare [ntá má] in (4), where other stops do not change.

Another instance where a consonant takes on the feature of neighbouring sounds is when the voiceless bilabial stop and the velar fricative become voiced in this language. We simply give a single rule that takes care of these two contexts. The rule says: “a bilabial stop and a velar fricative are voiced between two vowels”. This rule above describes a single unified process in Baba 1. Unfortunately the two sounds involved do not form a single natural class. For purpose of simplicity, we collapse the two rules to give the formalism in (8).
Consonant Alternations in Baba 1

(8) Voiceless bilabial stop and velar fricative become voiced

\[ [p,x] \rightarrow [b,y] / [+syll] \_ [+syll] \]

\[
\begin{cases}
+\text{cons} \\
+\text{ant} \\
+\text{lab} \\
-\text{voice} \\
+\text{cons} \\
+\text{back} \\
+\text{cont} \\
-\text{voice}
\end{cases}
\rightarrow [+\text{voice}] / [+\text{syll}] + \_ [+\text{syll}]
\]

Our rule in (8) will apply to give the surface forms in the data in (9) and (10), where 1sg refers to first person singular possessive/direct object pronoun, and “+” indicates a morpheme boundary.

(9) Bilabial stop voicing

a. **Noun citation form**

<table>
<thead>
<tr>
<th>Noun</th>
<th>Nouns + possessive</th>
</tr>
</thead>
<tbody>
<tr>
<td>táp ‘shoe’</td>
<td>/táp +á/ [tábå] ‘my shoe’</td>
</tr>
<tr>
<td>ngùp ‘mat’</td>
<td>/ngùp+å/ [ngùbå] ‘my mat’</td>
</tr>
<tr>
<td>nkìp ‘left’</td>
<td>/nkìp+å/ [nkìbå] ‘my left’</td>
</tr>
<tr>
<td>ñàp ‘proverb’</td>
<td>/ñàp +å/ [ñàbå] ‘my proverb’</td>
</tr>
</tbody>
</table>

[Images: Diagrams and tables related to the text content]
b. *Verb citation form*  

<table>
<thead>
<tr>
<th>Verb</th>
<th>Citation Form</th>
<th>Verb + Direct Object</th>
</tr>
</thead>
<tbody>
<tr>
<td>lòp</td>
<td>‘to beat’</td>
<td>/lòp+a/ [lòbá] ‘Beat me!’</td>
</tr>
<tr>
<td>sòp</td>
<td>‘to stab’</td>
<td>/sòp+a/ [sòbá] ‘Stab me!’</td>
</tr>
<tr>
<td>píp</td>
<td>‘to wait’</td>
<td>/píp+a/ [píbá] ‘Wait for me!’</td>
</tr>
<tr>
<td>jòp</td>
<td>‘to sing’</td>
<td>/jòp+a/ [jòbá] ‘Sing me’</td>
</tr>
</tbody>
</table>

(10) Velar fricative voicing

a. *Noun citation form*

<table>
<thead>
<tr>
<th>Noun</th>
<th>Citation Form</th>
<th>Nouns + Possessive</th>
</tr>
</thead>
<tbody>
<tr>
<td>póx</td>
<td>‘parcel’</td>
<td>/póx +a/ [póyá] ‘my parcel’</td>
</tr>
<tr>
<td>láx</td>
<td>‘calabash’</td>
<td>/láx +á/ [layá] ‘my calabash’</td>
</tr>
<tr>
<td>jáx</td>
<td>‘aubergine’</td>
<td>/jáx +á/ [jáyá] ‘my aubergine’</td>
</tr>
<tr>
<td>lóx</td>
<td>‘poison’</td>
<td>/lóx +á/ [lóyá] ‘my poison’</td>
</tr>
</tbody>
</table>

b. *Verb citation form*  

<table>
<thead>
<tr>
<th>Verb</th>
<th>Citation Form</th>
<th>Verb + Direct Object</th>
</tr>
</thead>
<tbody>
<tr>
<td>yàx</td>
<td>‘to grind’</td>
<td>/yàx +á/ [yàyá] ‘Grind me!’</td>
</tr>
<tr>
<td>mòx</td>
<td>‘uproot’</td>
<td>/mòx +á/ [mòyá] ‘Uproot me!’</td>
</tr>
<tr>
<td>jàx</td>
<td>‘kill’</td>
<td>/jàx+a/ [jàyá] ‘Kill me!’</td>
</tr>
<tr>
<td>kjàx</td>
<td>‘promise’</td>
<td>/kjàx +á/ [kjàyá] ‘Promise me!’</td>
</tr>
</tbody>
</table>
The rule in (8) requires a restriction, such that it applies only to root-final position as indicated by the presence of a morpheme boundary. This is shown by the existence of forms in the language like ṣàpúŋ ‘spoon’, tépòrè ‘table’, pópò ‘we/us’, sópó ‘finger’, ńdàpà? ‘tobacco’ in which the bilabial stop is not voiced between vowels. However, there is one peculiar case where the bilabial stop is voiced in a context other than root-final. This is the case of the word vábá ‘bitter leaf’. Nevertheless, this is the only word so far attested whereby our voicing rule seems to apply in root-internal position, thus posing as an exception.

One other case of a consonant alternation, resulting from its contiguity with a vowel, is the velar fricative which becomes an approximant when preceding a back rounded vowel, but a stop if the vowel is high and front. This can be expressed by a rule which states: “a velar fricative becomes a glide when preceding back rounded vowels, but a corresponding stop if the vowel is front and high.” For the purpose of simplicity and ease of stating the restrictions involved, we represent this rule as (11a) and (11b) below:

\[
\begin{align*}
\text{(11) a.} & \quad [+\text{cons}] \\
& \quad [-\text{ant}] \rightarrow [-\text{cont}] / \quad [+\text{syl}] \\
& \quad [+\text{cont}] \quad \quad [-\text{back}] \\
& \quad \quad [+\text{high}] \\
\text{b.} & \quad [+\text{cons}] \\
& \quad [-\text{ant}] \rightarrow [-\text{cons}] / \quad [+\text{syl}] \\
& \quad [+\text{cont}] \quad \quad [+\text{back}] \\
& \quad \quad [+\text{round}] \\
\end{align*}
\]

Our rules in (11) apply in discontinuous dependency, because the same underlying representation provides two different surface forms depending on the context. The same fricative becomes a stop if the following vowel is high and front (11a), but an approximant if and only if the following vowel is back and round (11b). These rules can only apply in stem initial position, as shown by the existence of pronominal forms in the language such as póղ ‘we (excl.), pʉɾi ‘we (dual)’. The data in (12) exemplify the application of the rules in (11) where a velar fricative becomes a stop and an approximant respectively.
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(12) a. Velar fricative becomes a stop

/ʃim/  [ɡim]  ‘to hold’
/ʃi/  [ɡi]  ‘to mourn’
/ʃi?lo/  [ɡi?lɑ]  ‘to shape’
/ʃe?lo/  [ɡe?lɑ]  ‘kernel’
/ʃi?ŋ/  [ɡi?ŋ]  ‘to frame’
/ʃe/  [ɡe]  ‘to be nice’
/ʃu?ax/  [ɡu?ax]  ‘to throw way’

b. Velar fricative becomes an approximant

/ʃu?mtɔ/  [wumtɔ]  ‘umbrella’
/ʃu?i/  [wu?i]  ‘type of vegetable’
/ʃo/  [wo]  ‘stone’
/ʃu/  [wu]  ‘death’
/ʃoΧ/  [wux]  ‘pride’
/ʃuptɔ/  [wuptɔ]  ‘to measure’
/ʃoptɔ/  [woptɔ]  ‘to entangle’
/ʃukɔr/  [wukɔr]  ‘adults’

c. Velar fricative unaltered before vowels other than [i,ɨ] and [u,o]

wu ɡi-mo nɔ  ‘you have done a thing’
2sg do-asp thing
ɡi  ‘ability’
ɡe  ‘thief’
ɡɔm  ‘ten’
ɡɔmtɔ  ‘help’

5 The vowel /u/ in this word is not basic in the language. It is derived by a rule whereby a high back vowel is fronted when followed by a high front vowel and another vowel within the same syllable. The language does not allow a sequence of three vowels within the same syllable in words. If this happens, the second of the three vowels in such a sequence is deleted. In our example, /giiax/ is realized as [ɡiiax], meaning that after triggering the fronting of [u], [i] is deleted. It should be noted that vowel-fronting rule applies before consonant strengthening, so as to avoid the velar fricative becoming a glide. We will not belabour the rule where /u/ becomes [i] since vowel alternation is not within the scope of this paper whose focus is on consonants.
In this language, the sounds [γ], [g] and [w] are seen to exhibit a sort of complementarity in their distribution, occurring in mutually exclusive environments with respect to the vowels they precede in word initial position. The data in (12a-c) illustrate that /γ/ can precede all other vowels in initial position except the high front and back rounded vowels. In addition, γ and w become [g] when preceded by a nasal as elaborated by data (14b). The data in (12a) reveal one of the curiosities of Baba 1. The behaviour of the velar fricative in (12b) can be accounted for using articulatory logic, i.e it assimilates the rounded quality of the following vowel. However, in (12a), γ is already high, hence there is no apparently logical phonetic explanation for it becoming a stop before a high vowel.

The next type of alternation to be examined is consonant hardening/strengthening.

2. **Consonant Hardening.**

There is a phonological process in this language whereby /l, γ, r, j/ become [d, g, dz, dʒ] respectively after a nasal. To be more precise, we need a fortition rule which states: “continuants become corresponding stops and affricates when preceded by a nasal.” This rule is formally presented in (13).

\[(13) \ [+\text{cont}] \rightarrow [-\text{cont}] / [+\text{nas}] \]

The validity of the preceding rule is illustrated by the data in (14) below, where (asp) is the aspectual marker.

\[(14) \ a. \ \text{Lateral becomes a stop.} \]

\[
\begin{align*}
/\text{Ñ-líí má}/ & \rightarrow [\text{ndúí mó}] & \text{‘I have slept’} \\
1-\text{sleep asp} & \\
/\text{Ñ-lò́? má mó-à}/ & \rightarrow [\text{ndò? mó móà}] & \text{‘I have taken my child’} \\
1-\text{take asp child-my} & \\
/\text{Ñ-lúé má}/ & \rightarrow [\text{ndúé mó}] & \text{‘I have begged’} \\
1-\text{beg asp} & \\
/\text{Ñ-làà má}/ & \rightarrow [\text{ndàà mó}] & \text{‘I have passed’} \\
1-\text{pass asp} & 
\end{align*}
\]
b. Velar becomes a stop

\[
\text{Velar becomes a stop}
\]

\[
/\text{N-}yù\text{ mó/} \quad [ŋgù\text{ mó}] \quad \text{‘I have fallen’}
\]

\[
/\text{N-}yúptó\text{ mó/} \quad [ŋgúptó\text{ mó}] \quad \text{‘I have measured’}
\]

\[
/\text{N-}óx\text{ mó/} \quad [ŋgóx\text{ mó}] \quad \text{‘I have become big’}
\]

\[
/\text{N-}ó?\text{ mó/} \quad [ŋgó?\text{ mó}] \quad \text{‘I have swum’}
\]

\[
/\text{N-}è\text{ mó nté/} \quad [ŋgè\text{ mó nté}] \quad \text{‘I have gone to the market’}
\]

\[
/\text{N-}í\text{ mó jù/} \quad [ŋgè\text{ mó jù}] \quad \text{‘I have done a thing’}
\]

\[
/\text{N-}ámto\text{ mó/} \quad [ŋgàmtó\text{ mó}] \quad \text{‘I have helped’}
\]

\[
/\text{N-}ómtó\text{ mó/} \quad [ŋgómtó\text{ mó}] \quad \text{‘I have welcomed’}
\]

\[
/\text{N-}óptó\text{ mó pó/} \quad [ŋgóptó\text{ mó pó}] \quad \text{‘I have curved the hand’}
\]

\[
/\text{N-}ù\text{ mó ndzòx/} \quad [ŋdzì\text{ mó ndzòx}] \quad \text{‘I have become old’}
\]

\[
/\text{N-}áŋ\text{ mó ndzòx/} \quad [ŋdzàŋ\text{ mó ndzòx}] \quad \text{‘I have tapped wine’}
\]

\[
/\text{N-}útó\text{ mó/} \quad [ŋdzùtó\text{ mó}] \quad \text{‘I have shaken’}
\]

\[
/\text{N-}ìtó\text{ mó/} \quad [ŋdzìtó\text{ mó}] \quad \text{‘I have ended’}
\]

\[
/\text{N-}òp\text{ mó/} \quad [ŋdzòp\text{ mó}] \quad \text{‘I have delayed’}
\]

\[
/\text{N-}ù\text{ mó ndzòx/} \quad [ŋdzì\text{ mó ndzòx}] \quad \text{‘I have tapped wine’}
\]

\[
/\text{N-}ú\text{ mó/} \quad [ŋdzù\text{ mó}] \quad \text{‘I have shaken’}
\]

\[
/\text{N-}étó\text{ mó/} \quad [ŋdzétó\text{ mó}] \quad \text{‘I have ended’}
\]

\[
/\text{N-}òp\text{ mó/} \quad [ŋdzòp\text{ mó}] \quad \text{‘I have delayed’}
\]
d. A palatal glide becomes an affricate.

\[ /\text{N\text{-}j\text{\textperiodcentered}m\text{\textperiodcentered}m\text{\textperiodcentered}m\text{\textperiodcentered}d\text{\textperiodcentered}p} / \rightarrow [\text{ndz\text{\textperiodcentered}m\text{\textperiodcentered}m\text{\textperiodcentered}m\text{\textperiodcentered}d\text{\textperiodcentered}p} \text{I-round asp house}] \]

\[ /\text{N\text{-}j\text{\textperiodcentered}m\text{\textperiodcentered}m\text{\textperiodcentered}m\text{\textperiodcentered}d\text{\textperiodcentered}p} / \rightarrow [\text{ndz\text{\textperiodcentered}m\text{\textperiodcentered}m\text{\textperiodcentered}m\text{\textperiodcentered}d\text{\textperiodcentered}p} \text{I-see asp thing}] \]

\[ /\text{N\text{-}j\text{\textperiodcentered}m\text{\textperiodcentered}m\text{\textperiodcentered}m\text{\textperiodcentered}d\text{\textperiodcentered}p} / \rightarrow [\text{ndz\text{\textperiodcentered}m\text{\textperiodcentered}m\text{\textperiodcentered}m\text{\textperiodcentered}d\text{\textperiodcentered}p} \text{I-chase asp fowl}] \]

\[ /\text{N\text{-}j\text{\textperiodcentered}m\text{\textperiodcentered}m\text{\textperiodcentered}m\text{\textperiodcentered}d\text{\textperiodcentered}p} / \rightarrow [\text{ndz\text{\textperiodcentered}m\text{\textperiodcentered}m\text{\textperiodcentered}m\text{\textperiodcentered}d\text{\textperiodcentered}p} \text{I-shout asp}] \]

\[ /\text{N\text{-}j\text{\textperiodcentered}m\text{\textperiodcentered}m\text{\textperiodcentered}m\text{\textperiodcentered}d\text{\textperiodcentered}p} / \rightarrow [\text{ndz\text{\textperiodcentered}m\text{\textperiodcentered}m\text{\textperiodcentered}m\text{\textperiodcentered}d\text{\textperiodcentered}p} \text{I-sing asp song}] \]

The last part of our description deals with the deletion of nasal consonants.

3. **Consonant Deletion.**

Voiceless fricatives never appear after nasals in this language. A rule that explains this fact states: “a nasal is deleted when it precedes a voiceless fricative”. This rule is concerned with \( s, f, x \) and \( j \).

\((15)\) \( /N/ \rightarrow \emptyset / _[s, f, x, j] \)

\[ [+\text{nas}] \rightarrow \emptyset / _[-\text{voice}] \]

\[ +\text{cont} \]

The rule in (15) explains the occurrence of the surface constructions obtained from the underlying forms of the data in (16) below. Here, (asp) as usual refers to aspectual marker. In deliberate slow speech, there may be a short schwa where the deleted nasal was (compare \( [\text{\( a \) f\text{\textperiodcentered}m\text{\textperiodcentered}m] \text{I has grown}] \), \( [\text{\( \text{\textperiodcentered}\) f\text{\textperiodcentered}m\text{\textperiodcentered}m] \text{I have grown}] \). After the deletion of the syllabic nasal, its low tone remains and needs vocalic support to be phonetically realised. However, that vowel is not realized in ordinary speech: this process will need to be the subject of a separate study.
Deletion of nasal in pre-fricative position.

<table>
<thead>
<tr>
<th>Underlying forms</th>
<th>Surface forms</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>/N-ú mó ngbí/</td>
<td>[ò ú mó ngbí]</td>
<td>‘I have returned from the farm.’</td>
</tr>
<tr>
<td>I-return asp farm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/N-ú mó láx/</td>
<td>[ò ú mó láx]</td>
<td>‘I have broken a calabash.’</td>
</tr>
<tr>
<td>I-break asp calabash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/N-sù mó ndzó/</td>
<td>[ò sù mó ndzó]</td>
<td>‘I have washed dresses.’</td>
</tr>
<tr>
<td>I-wash asp dresses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/N-jú mó nìàx/</td>
<td>[ò jú mó nìàx]</td>
<td>‘I have slaughtered a cow.’</td>
</tr>
<tr>
<td>I-cut asp cow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/N-xì mó ñmè/</td>
<td>[ò xì mó ñmè]</td>
<td>‘I have laughed at a person.’</td>
</tr>
<tr>
<td>I-laugh asp person</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/N-xì?ló mó mèmì/</td>
<td>[ò xì?ló mó mèmì]</td>
<td>‘I have frightened a dog.’</td>
</tr>
<tr>
<td>I-frighten asp dog</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It is interesting here to use parallel examples to show that the voiced counterparts of these fricatives in similar environment do not delete as illustrated in (17).

Non-deletion of nasal in the context of N+voiced fricative.

<table>
<thead>
<tr>
<th>Underlying forms</th>
<th>Surface forms</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>/N-vám mó ní/</td>
<td>[ìvám mó ní]</td>
<td>‘I have searched for a cutlass.’</td>
</tr>
<tr>
<td>I-search asp cutlass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/N-vù mó ndáp/</td>
<td>[ìvù mó ndáp]</td>
<td>‘I have constructed a house.’</td>
</tr>
<tr>
<td>I-construct asp house</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/N-ìgè mó/</td>
<td>[ìgè mó]</td>
<td>‘I have gone.’</td>
</tr>
<tr>
<td>I-go asp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/N-ìxìló mó/</td>
<td>[ìxìló mó]</td>
<td>‘I have choked’</td>
</tr>
<tr>
<td>I-choke asp</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the last two constructions in (17) above, rule (13) has applied to harden the velar fricative.
4. Conclusion.

Our description of alternations in Baba 1 has revealed that, although most of the changes undergone by the various consonants take place in the vicinity of a nasal in stem initial position, nasals nevertheless tolerate somewhat curious patterning with other consonants within the word. Similarly, certain language specific tendencies have been revealed. A case in point is the hardening of velar fricative before high front vowel and the deletion of nasals preceding voiceless fricatives, which are not too common phenomena documented in Bantu languages.

Moreover, in documenting these alternations, the paper has provided a considerable amount of data which can serve as a source of reference for the investigations into some of the unexplained issues raised in the paper.

References


[received April 8, 2004 accepted August 27, 2008]

The volume begins with a brief grammatical sketch [4-9] of this Khoisan language group, which is spoken in Angola, Namibia and Botswana, a dialect of which is known as Ju ′hoansi. This introduction covers the extremely rich segmental inventory as well as the noun class system. The remainder of the book presents the !Xun-English [15-106] and English-!Xun [107-186] dictionary. The approximately 4,200 entries for !Xun-English give the !Xun form and a grammatical category including indication of noun class, followed by an English gloss and some illustrative examples. The roughly 3,200 English-!Xun entries then present an English word, followed by !Xun equivalents.


In this volume the authors describe the grammatical structure of Otjiherero, a Bantu language of Namibia. The book is divided into four parts, covering phonetics and phonology, morphology, syntax, and texts and glossary. All data, including the texts, are tone-marked (thus augmenting the orthography, which omits tone). Chapter 2 [20-38] presents the phonology, giving the segmental inventory and commenting on phonotactic properties. Section 2.3.2 then enumerates phonological processes, including vowel hiatus reduction, vowel harmony, NC alternations and nasal harmony. Chapter 3 [40-79] discusses the systems of tone and stress. An unusual feature of the tone system is the existence of a surface extra-high tone, which appears in four syntactically-defined contexts. Chapter 4 [56-79] presents the historical phonology of Otjiherero within Bantu.

Chapter 5 [82-114] describes the morphology of nouns and pronouns. This covers the noun class system, syntactically-triggered tone modifications, and derivation including compounding. In Chapter 6 [116-144] the structure of agreeing nominal modifiers is presented: possessives, adjectives, numerals and other quantifiers, demonstratives and relative pronouns.
Chapter 7 [145-206] begins the description of verb morphology in section 7.1 by concentrating on derivational suffixes involved in stem formation and including combinations of extensions. Section 7.2 then presents the system of verb inflection, covering subject and object marking and inflection for tense-aspect, mood and polarity. Part 3 includes Chapter 8 [208-236] on basic sentence structure (NP and VP structure, the syntax of various complements and adjuncts, and Chapter 9 [237-242] describes predication. Chapter 10 [243-253] covers questions, and Chapter 11 [255-278] gives the structure of various embedded sentential constructions, such as conjunction, relative clauses, object complements and other kinds of adverbial clauses. The final chapter [279-287] discusses focus marking. The fourth part of the book presents 4 analyzed texts, and the book ends with Otjiherero-English and English-Otjiherero glossaries and eight tables of inflectional paradigms.


In this book, Nurse undertakes a comparison of the form and function of tense and aspect in Bantu languages, which are known for substantial diversity in how tense and aspect concepts are realized, both synchronically and diachronically. A companion webpage contains over 350 pages of data from numerous languages cited in the book. In Chapter 1 [1-27] we are given basic facts about the Bantu languages and the variable nature of the available data, the conceptual framework and focus of the book (on tense and aspect, not polarity, mood and relativization), and questions of methodology. Chapter 2 [28-79] describes and exemplifies the templatic structure of Bantu verbs, and shows how common inflectional categories such as tense, aspect, focus and conditional are realized given this template. Relevant background information on languages of the northwest and on “heavy contact” languages is also given. Chapter 3 “Tense” [80-127] gives an analysis of tense categories and their realization in Bantu languages. The emphasis is on providing an overall perspective on Bantu, so the chapter provides tables of most common patterns of tense marking, such as the fact that most Bantu languages have at least two degrees of past tense (possibly up to five), and that future tenses are less differentiated than past tenses. The chapter also addresses the problem of interpreting tense data in Bantu, arising from a conflation of anterior aspect and past tense. Patterns of innovation in the tense system are covered, such as the development of a category of “immediate” tenses, and the development of prosodic variants of past -a-.

Chapter 4 “Aspect” [128-178] looks at asceptual distinctions, including perfective, imperfective, progressive, habitual, and persitiv. Replication is also discussed, insofar as it has a tendency to be connected with imperfective concepts. There is an extended discussion of the problematic anterior (“perfect”) aspect, which is often treated as a tense. Chapter 5 “Other categories” [179-225] highlights additional categories of verb inflection connected to tense and aspect, especially the marking of negation, focus and pronominal object marking. Chapter 6 “What can be assumed for Proto-Bantu” [226-283] briefly sketches the internal genetic structure of Bantu, and then presents a series of proposals for what may be reconstructable to Proto-Bantu, concluding that Ø “vast present”, ka “itive, narrative”, -ki- “imperfective” and be-
locative-verbal noun “progressive” reconstruct to the proto-language. The final chapter “Processes of change” [284-307] then traces ways in which the proto-language system changed historically, pointing to sources of some of the elaboration of distinctions now made in Bantu languages. The book ends with lists of definitions [308-318], bibliography [319-369], a source language index [371-380] and a general index [381-401].
UPCOMING MEETINGS
ON AFRICAN LANGUAGES / LINGUISTICS

2009

July 27-August 7.
AFRICAN LINGUISTICS SCHOOL. NYU-in-Ghana Academic Centre, Labone, Accra, Ghana. Tuition free to participants. Web page: http://als.rutgers.edu/

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August 24-26.

October 9-11.

2010

February 13-14.