Vowel harmony, transparency, and opacity in Cicipu

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1 Introduction

Aims

• Present an overview of vowel harmony in Cicipu, including:
  ◦ treatment of loanwords
  ◦ conflict resolution
  ◦ domain issues including transparency and opacity
  ◦ optionality

Language background

• Spoken by c. 20,000 in north-west Nigeria
• Benue-Congo > C. Nigerian > Kainji > Kambari > Cicipu (Tirisino dialect)
• Research based on (i) elicitation and (ii) collection and qualitative analysis of a 20,000-clause text corpus, leading to a lexicon of 2,200 words.
• Heavy influence from Hausa (500 borrowed words in the lexicon)

2 Cicipu vowel system

• Asymmetric six-vowel system with at least two (ai, au) and perhaps (ei, eu) four diphthongs
• Nasalisation and vowel length are contrastive
Asymmetric vowel systems weighted toward the back are rare cross-linguistically (Crothers 1978:137, Schwartz et al. 1997)

- Not mentioned in Casali (1995)
- Six-vowel systems are found in other Kainji languages (Kamuku, Hungwəryə, and Cishingini according to Stark 2010), but these are usually symmetrical (i, ɨ, u plus ɛ, a, ɔ)
- However Tsuvaɗi (Kambari) seems to be the same as Cicipu (Lovelace 1990)
- And also the Cross River language Ibibio (Akinlabi and Urua 2002), which has some interesting parallels with Cicipu (see later)
- Syllable types are V and CV(V), with arguments for CVN non-finally.
- Restricted vowel distribution in verbs (/i/ cannot occur as V2)

3 Total and partial harmony

- Cicipu has “total” vowel harmony
- Aoki (1968:142) distinguishes between “partial” and “total/complete” vowel harmony:
  - “TOTAL harmony refers to the situation in which vowels of certain morphemes are not specified in the lexicon except as plus vocalic and minus consonantal, and the phonological rules give specifications similar to those of vowels in another morpheme in the same word”
- Sometimes equated with “vowel copying or reduplication” (Hyman 1975:234)
- Other languages:
  - Igbo (some dialects) past tense -rV e.g. mè-rè ‘did’ vs. mà-rà ‘knew’
• “Total” harmony seems to be fairly unusual (Rhodes 2010, Kissock 2010)
  ○ but perhaps under-reported due to analysis as vowel-copying/reduplication

• General literature on VH concentrates on partial systems
  ○ van der Hulst and Weijer (1995:525) relegate “total harmony systems” to the “remaining issues” section of their discussion and note that they usually occur with triangular vowel systems (i.e. i, a, and u). They also mention the Dravidian language Telugu (but see Kissock 2009, 2010... “Telugu should not be counted among those languages containing vowel harmony”).
  ○ Krämer (2003) does discuss “total harmony” in the 5-vowel systems of Yucatec Maya and Ainu, but reduces them to just the dimensions of [backness] and [height]
    ▪ “this type of harmony affects maximally one vowel in a word” and moreover, it is “not iterative”. Therefore a better analysis might be reduplication or umlaut. This is not the case for Cicipu.
  ○ Archangeli and Pulleyblank (2007) do discuss “copying” type systems and argue that two distinct mechanisms are required to handle (i) local spreading harmony, and (ii) copying at a distance and over certain kinds of transparent segments

4 The basic Cicipu vowel harmony system

4.1 Roots

• Vowel harmony affects all word classes
• “Total” harmony: the six vowels can be divided into (i) one set of mutually-exclusive harmonic counterparts {o, ɔ, e, a} (1, 2)
• (ii) the neutral vowels {i and u} which may occur with any vowel from the first set (3, 4)
• Only lexical exceptions are compounds (§6) and loanwords (§7)

(1) kà-bárá  old man
    mè-pésé  twin
    mò-póɗó  bushbaby
    kɔ̀-pɔ̀ɗɔ̂ɔ  frog
(2) pata  
    pete  
    kodò  
    kodò

(3) mà-dfyá  
    kù-cfyè  
    kò-rfò́  
    mò-rígìdó  
    à-húlá  
    tí-ré’ù  
    kò-’úwó  
    kò-wò’ù

(4) pida  
    titteke  
    piso  
    cirò  
    ku’ba  
    ’etu  
    yongu  
    kudò

Table 1: Vowel co-occurrence restrictions in CVCV noun roots where \( V_1 \) and \( V_2 \) are both short oral vowels (\( V_1 \) down the left, \( V_2 \) along the top)

<table>
<thead>
<tr>
<th></th>
<th>i</th>
<th>e</th>
<th>a</th>
<th>ò</th>
<th>o</th>
<th>u</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>17</td>
<td>1</td>
<td>25</td>
<td>2</td>
<td>20</td>
<td>17</td>
</tr>
<tr>
<td>e</td>
<td>5</td>
<td>11</td>
<td>13</td>
<td></td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>21</td>
<td>40</td>
<td></td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ò</td>
<td>6</td>
<td>17</td>
<td></td>
<td></td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>o</td>
<td>3</td>
<td>9</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>u</td>
<td>8</td>
<td>1</td>
<td>9</td>
<td>1</td>
<td>9</td>
<td>14</td>
</tr>
</tbody>
</table>

- Diphthongs harmonise according to the first part:

(5) kà-rákátâu  
    kè-rèzêù

Table 1: Vowel co-occurrence restrictions in CVCV noun roots where \( V_1 \) and \( V_2 \) are both short oral vowels (\( V_1 \) down the left, \( V_2 \) along the top)
4.2 Affixes

- Harmony is root-controlled.
- Affix vowels are either /i/, /u/, or the harmonising /A/ - there are no invariant affix vowels from the harmonising set (a, e, o, ɔ).
  - See (1) and (3) for the 3 harmonising noun class prefixes (kA-, A-, and mA-). The other six class prefixes have either /u/ or /i/ as the prefix vowel.
  - If the stem contains only high vowels then the prefix vowel surfaces as [a]:

(6) ká-kúří  
thirst
kà-mílú  
kidney

- See Table 2 below for the other harmonising affixes

<table>
<thead>
<tr>
<th>Affix</th>
<th>Gloss</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-</td>
<td>3PP agreement</td>
<td>(7)</td>
</tr>
<tr>
<td>-wA</td>
<td>applicative</td>
<td>(8)</td>
</tr>
<tr>
<td>-wA</td>
<td>anticausative</td>
<td>(9)</td>
</tr>
<tr>
<td>-nA</td>
<td>separative</td>
<td>(10)</td>
</tr>
<tr>
<td>-nA</td>
<td>perfective</td>
<td>(11)</td>
</tr>
<tr>
<td>-nA</td>
<td>ventive</td>
<td>(12)</td>
</tr>
<tr>
<td>-nA</td>
<td>plural imperative</td>
<td>(13)</td>
</tr>
<tr>
<td>-kwA</td>
<td>suffix for borrowed verbs</td>
<td>(14)</td>
</tr>
</tbody>
</table>

(7) (a) á-dùkwà  
3P-go\_IRR
they should go
(b) ɔ̄-dɔ̀nɔ̀  
3P-follow\_IRR
they should follow

(8) (a) tì-yā-a-wà  
1P-do\_RLS\_APPL
we did to [him]
(b) mí-dòonù-wò  
AG5-sit\_IRR\_APPL
may they stay with [you]

(9) (a) mà-sìɗù-wà  
AG4-heat\_RLS\_ANTIC
(b) gólù-wò  
0-gólò-wò
[he/she] gets cut
[lit. got hot]

1 The demonstrative pronouns may be an exception to this.
Anderson (1980) briefly discussed prefix-root vowel harmony in nouns for the East Kainji language Amo. He states that “Though this vowel harmony may provide a phonetic ‘target’, considerable variation still exists even on individual words” (1980:157).

This is true for some Cicipu dialects (e.g. Tidipo), less so for Tirisino, at least for nouns (but see below)

4.3 Clitics

There are also two clitics which harmonise with their hosts – the locative proclitic á, and the associative proclitic

\[
\begin{align*}
(a) & \quad \hat{\downarrow} = k-\text{kèeké} \\
& \quad \text{loc=} \mathcal{NC}8\text{-bicycle} \\
& \quad \text{on a bicycle} \\
(b) & \quad \hat{\downarrow} = kó-\text{ocì} \\
& \quad \text{loc=} \mathcal{NC}9\text{-hole} \\
& \quad \text{into a hole}
\end{align*}
\]

\[
\begin{align*}
(a) & \quad \text{kà-ùùrirìyà} \\
& \quad \mathcal{NC}1\text{-flute} \\
(b) & \quad \text{ké} \downarrow = \text{kè-zzémé} \\
& \quad \mathcal{AG}1=\mathcal{NC}1\text{-festival}_k.o. \\
& \quad \text{festival flute}
\end{align*}
\]
4.4 Exceptions

- All words that are (i) simplex and (ii) not known to be Hausa borrowings are harmonic except:
  - 'oba ‘build’
  - báatákórí ‘bird, k.o.’
  - ù-dáddò ‘aerial yam’
  - kà-gáatò ‘stilt’

5 Two complications

- When an underspecified affix attaches to a root with only high vowel, two additional complicating factors come into play

5.1 Unexpected mid-vowels

- Roots with only high vowels sometimes occur with prefixes containing the mid vowels [e] and [o] respectively, rather than the expected [a].

(17) kê-bimbíi buzzing insect, k.o.
    mê-gísí walking stick
    kê-bíkí celebration (from Hausa biki)
    kà-yíví cold meal (of tuwo)
    ká-dísíi spot
    kà-gílí vagina

(18) kó-ciyû heap
    kó-dûu heart
    kó-lúu knee
    kà-búngú snake
    kà-gúutù buttock
    kà-nûu head of corn

- If the root contains both /i/ and /u/ then the prefix will never be [e], only [o] or [a]:

This can be viewed as an assimilatory process, with the underlying prefix vowel /A/ raising in the environment of a high root vowel, but there does not seem to be any way to predict (across the lexicon) whether or not this process will in fact occur.

This kind of ‘assimilation’ can occur at quite some distance:

\[
\text{kè̀ré'è kò= Cicipù} \quad \text{language of=Cicipu}
\]
\[
mé-l-lóokàc \quad \text{NC4-NC8-time ‘a little time}
\]

5.2 Unexpected [o]

Some words cannot be accounted for by either VH or the above ‘assimilation’. Compare (21) and (22):

\[
\text{kà-hìì} \quad \text{blood}
\]
\[
\text{kà-sìì} \quad \text{feather}
\]
\[
\text{kà-tìì} \quad \text{head}
\]
\[
\text{kà-yìnì} \quad \text{water pot}
\]
\[
\text{mò-hìì} \quad \text{blood}
\]
\[
\text{mò-sìì} \quad \text{shame}
\]
\[
\text{mò-nì} \quad \text{water}
\]

In (22) the prefix vowels should be [a] by VH or else [e] by assimilation
The roots in (22) share two properties:
  ◦ only [i] vowels
  ◦ at least one vowel in the root is nasal (or nasalised in the case of mò-nì ‘water’)
  ◦ why this should result in an [o] prefix is mysterious...

6 Compounds

van der Hulst and Weijer (1995:501) “compounds, although single words grammatically, usually constitute as many harmonic spans as they have stems”.

All identifiable compounds in Cicipu form two harmonic spans:
(23) méngétàarì  

    boy  méngé ‘child’ + táarì ‘manhood’

méngétikáa  

    girl  méngé ‘child’ + ti-káa ‘womanhood’

kwáakúllè  

    then  kwáa ‘day’ + kú-llè ‘that’

kwáakwènè  

    when?  kwáa ‘day’ + kw-èné ‘which’

### 7 Treatment of loanwords

- van der Hulst and Weijer (1995:500) “Often, but not always, disharmonicity results from unassimilated loan stems”

- non-harmonic:

  (24) róobà  

    plastic container (Hausa roba from English rubber)

móotà  

    car (Hausa mota from English motor)

bátúurè  

    white person (Hausa bature)

'ángò  

    bridegroom (Hausa angó)

kámèrà  

    camera

kásèt  

    cassette

sóbòdà  

    because (Hausa saboda) – partially harmonised

tee'mika  

    help (Hausa taimaka)

- there is a general process which solves most Hausa violations

- Hausa loans are often automatically raised when borrowed, independently of issues of VH (perhaps because Cicipu vowels are relatively open)

(25) kèlèngû  

    talking drum (Hausa kalangu)

5’ā  

    no (Hausa a’a)

dègè  

    from (Hausa daga)

kò-ccòkò  

    bag (Hausa jaka)

- this raising process often takes care of disharmony:

(26) kiiweye  

    surround (Hausa kewaye)

èseè  

    actually (Hausa ashe)

rùuká  

    conversation (Hausa roka)

dúulì  

    for sure (Hausa dole)

kwáanù  

    metal container (Hausa kwano)

- The same thing frequently (but by no means always) happens in non-borrowed code-switching:
Sometimes violations are solved not by this general raising phenomenon but by a ‘sideways’ harmonising movement. Here we can be more certain VH is at work.

What happens when affixes are added to non-harmonic loanwords?

Generally (29) the nearest vowel seems to win out, but not always (30)...
9.2 Transparency/opacity

- We have already seen /i/ and /u/ are neutral and transparent within roots – what about affixes containing these vowels?
  - noun class prefixes are transparent

  
  
  (33)  
  (a)  \(\delta = \kappa - \text{s} \odot\)  
  \[\text{LOC=NC9-pool}\]  
  \(\text{in the pool}\)  
  (b)  \(h\theta = \text{c} - k\text{o} \odot\)  
  \[\text{AG2=NC6-drum}\]  
  \(\text{of the drum}\)

- two verbal infixes that occur between C2 and V2:
  - causative <is> and pluractional <il>
  - \textit{as we might expect, always transparent}

  
  (34)  
  (a)  \(\text{ù-sì-hé'w <i}s> \dot{\varepsilon}\)  
  \[\text{3S-HAB-dry\_up<CAUS>}\]  
  \(\text{it causes to dry up}\)  
  (b)  \(\text{ú-rìb <i}s> \dot{\dot{a}}\)  
  \[\text{3S-dry\_up\_IRR<CAUS>}\]  
  \(\text{it causes to sink}\)

(35)  
(a)  \(\dot{o}\text{-pis <i}l> \dot{o} - n\dot{\odot}\)  
[3p-break\_IRR<PLAC>-VENT]  
\(\text{they would smash down}\)  
(b)  \(\dot{\theta} - \text{'p <i}l> \dot{\delta} - n\dot{\odot}\)  
[3p-break\_IRR<PLAC>-PFV]  
\(\text{they grabbed}\)

- habitual prefix \textit{si-}: \textit{sometimes transparent, sometimes opaque}
  - Following examples are from the same speaker in a single text

  
  (36)  
  (a)  \(\dot{o} - \text{sì-cíyō h-è}\)  
  [3p-HAB-get AG2-PRO]  
  \(\text{they get them}\)  
  (b)  \(\dot{a} - \text{sì-cíyō má-kkàbà}\)  
  [3p-HAB-get NC4-palm\_frond]  
  \(\text{they get palm fronds}\)
○ resultative suffix -nu: always opaque
  ▪ N.B. when this suffix is penultimate the vowel lengthens (a common feature in Cicipu)

(37) (a) ò-òérè-nùu-nà  (b) ò-cù’ò-nùu-nà
    3P-stack\RLS<RES>-PFV  3P-besmeat\RLS<RES>-PFV
    they stacked               they besmeared

• One final problem:
  ○ Sometimes lexical /u/ is opaque too...
  ○ e.g. the u in doomu ‘sit’ is opaque in every perfective in the corpus (19 tokens), but not in the applicative (cf. (8b) above)

(38) (a) ì-tòpù-nà  (b) ù-hóyù-nà
    2P-put_inside\RLS-PFV  3S-slurp\RLS-PFV
    you (pl.) put inside               he slurped

9.3 Optionality
• Recall Anderson’s statement about Amo (vowel quality as a ‘target’)
• In Cicipu, as affixes get further away from the root harmony seems to become more and more optional (regardless of issues of transparency/opacity), as in (38) where either -wo or -wa is acceptable

(39) ù-tób<il > <is > ù-wò-{wò/wà}
    NC7-cool<PLAC><CAUS>-ANTIC-APPL
    repeatedly causing s.t. to become cool for s.o.

• Disregarding transparency/opacity, the situation can be summarised as follows (Tirisino dialect)

Table 3: Cline of likelihood of affix harmonisation

<table>
<thead>
<tr>
<th>Noun class prefix</th>
<th>Vb. affixes (adjacent)</th>
<th>Vb. affixes (distal)</th>
<th>Locative proclitic</th>
</tr>
</thead>
<tbody>
<tr>
<td>obligatory</td>
<td>------------------------</td>
<td>---------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>optional</td>
<td>------------------------</td>
<td>---------------------</td>
<td>--------------------</td>
</tr>
</tbody>
</table>

• This effect shouldn’t be exaggerated
  ○ even the locative proclitic is more likely to agree than not
10 Other Kainji languages

- A great deal of variation!
- “Total”
  - *Cicipu*: 6-vowel total
  - *Cishingini*: 6-vowel total (Stark 2010) or 9-vowel total (Crozier 1984)
  - *Tsuvaɗi*: 6-vowel total? (Lovelace 1990)
- Height
  - *Kamuku*: 6-vowel height/horizontal (Mort 2011)
  - *Hungwɔryɔ*: 6-vowel height/horizontal (Hackett and Davey 2004)
  - *C’Lela*: 8-vowel height/horizontal (Dettweiler 2000)
- Backness
  - *Ut-ma’in*: 8-vowel traces of backness/palatal (Smith 2007)
  - *Basa*: 7-vowel traces of backness/palatal (Blench 1991)
- None
  - *Pongu*: 8-vowel none (MacDonell 2007)

11 Questions

- Are there missing generalisations in the three processes responsible for determining affix vowels?
- Why should roots with [i] vowels have o- prefixes?
- Is there an explanation for the opacity of -nu (other than lexical restriction)?
  - is it metrical?
- Historically, how did the Kambari/Cicipu VH system arise?
  - From the six-vowel height harmony system found in Ucinda/Hungwɔryɔ?
  - By what mechanism?
- Is it appropriate to model the Cicipu system in terms of features?
  - i.e. vowels harmonise in [height] and [backness], with the “target condition” that high vowels are not affected
- What kind of formal mechanism is required to model long-range copying with transparency?
- More generally, does this example of a long-range “total harmony” system exhibiting both transparency and opacity have any relevance for current theories of VH?
There are some interesting parallels with Ibibio (Akinlabi and Lee 2006, Akinlabi and Urua 2002)

- asymmetric six vowel system (at least under Akinlabi’s analysis)
- bottom four vowels take part in “total harmony”
- restrictions on V2 in verbs (cannot be /i/)

References


Lovelace, David 1990. Tsuadafi word list. Electronic ms.


Smith, Rebecca Dow. 2007. The noun class system of ut-Ma’in, a West Kainji language of Nigeria.
