

# Vowel harmony, transparency, and opacity in Cicipu

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## 1 Introduction

### ***Aims***

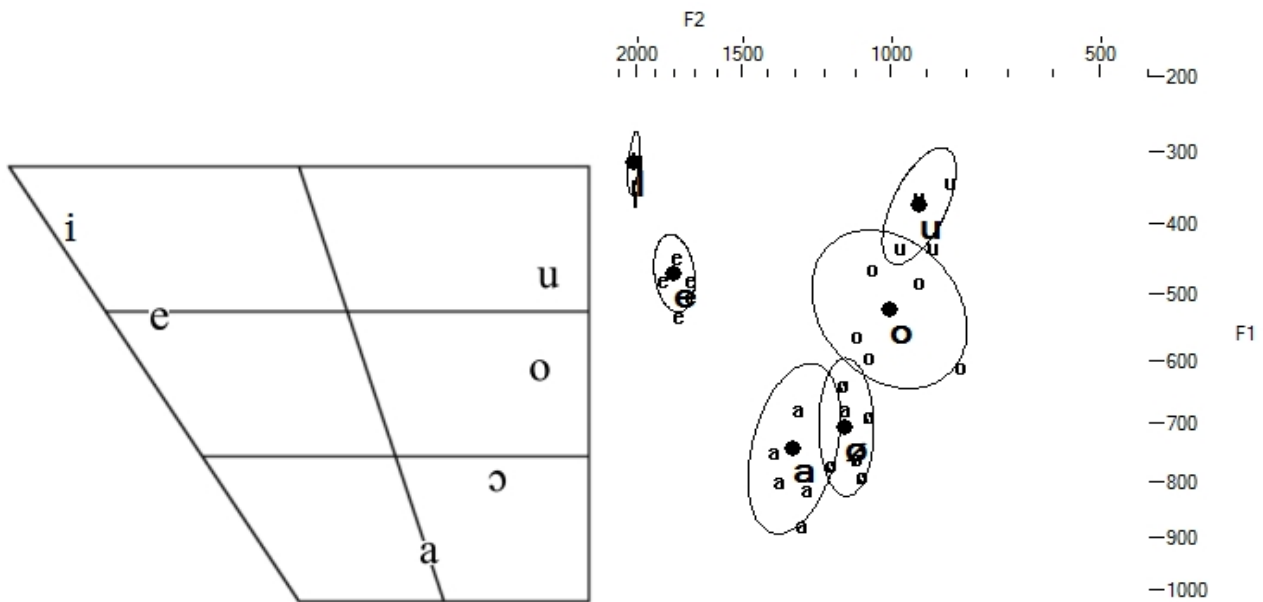
- Present an overview of vowel harmony in Cicipu, including:
  - treatment of loanwords
  - conflict resolution
  - domain issues including transparency and opacity
  - optionality

### ***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, i, u plus ε, a, ɔ)
- However Tsuvadɪ (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’

(Hyman 1975:233)

- Cross River languages Efik and Ibibio (e.g. Akinlabi and Lee 2006:47)
- Yucatec Maya (Krämer 2003)
- Ainu (Krämer 2003)
- “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	<i>old man</i>
	mè-pésé	<i>twin</i>
	mò-pódó	<i>bushbaby</i>
	kè-pòdḗḗ	<i>frog</i>

(2)	pata	<i>ask</i>	
	pete	<i>split</i>	
	kodó	<i>peck</i>	
	kodó	<i>cut</i>	
(3)	mà-díyá	<i>hare</i>	I and A
	kù-cíyè	<i>hand</i>	I and E
	kò-ríbó	<i>footprint</i>	I and O
	mò-rìgídó	<i>navel</i>	I and ∅
	à-húlá	<i>name</i>	U and A
	tì-ré'ù	<i>rat's nest</i>	U and E
	kò-'úwó	<i>hemp</i>	U and O
	kò-wó'ù	<i>flesh inside cheeks</i>	U and ∅
(4)	pidá	<i>lick</i>	I and A
	títteke	<i>continue</i>	I and E
	pišo	<i>break</i>	I and O
	cišo	<i>stare</i>	I and ∅
	kufá	<i>stick</i>	U and A
	'etu	<i>dry by hanging out</i>	U and E
	yongu	<i>kneel</i>	U and O
	kudó	<i>meet</i>	U and ∅

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)

	i	e	a	ɔ	o	u
i	17	1	25	2	20	17
e	5	11				13
a	21		40			14
ɔ	6			17		8
o	3				9	3
u	8	1	9	1	9	14

- Diphthongs harmonise according to the first part:

(5)	kà-rákátâu	<i>ankle</i>
	kè-rèzêu	<i>cotton</i>

## 4.2 Affixes

- Harmony is root-controlled<sup>1</sup>
- 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-kúrì      *thirst*  
 kà-mílú      *kidney*

- See Table 2 below for the other harmonising affixes

Table 2: Other harmonising affixes

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

(7)	(a) á-dùkwà 3 <sub>P</sub> -go\IRR <i>they should go</i>	(b) ɔ-dònò 3 <sub>P</sub> -follow\IRR <i>they should follow</i>
(8)	(a) tì-yáa-wà 1 <sub>P</sub> -do\RLS-APPL <i>we did to [him]</i>	(b) mí-dòonù-wò AG5-sit\IRR-APPL <i>may they stay with [you]</i>
(9)	(a) màsídûwà mà-sídû-wà AG4-heat\RLS-ANTIC <i>it [water] spoiled [lit. got hot]</i>	(b) gólùwò Ø-gólò-wò AG8-cut-ANTIC <i>[he/she] gets cut</i>

<sup>1</sup> The demonstrative pronouns may be an exception to this.

- |      |     |   |     |  |
|------|-----|---|-----|--|
| (10) | (a) | ù-hálù-wà<br>3S-coil\RLS-SEP<br><i>it uncoiled</i>            | (b) | ù-'úmbù-wò<br>3S-close\RLS-SEP<br><i>it opened</i>                           |
| (11) | (a) | à-dúkwà-nà<br>3P-go\RLS-PFV<br><i>they had gone</i>           | (b) | kù-'íngò-nò<br>AG9-go_home\RLS-PFV<br><i>it had gone home</i>                |
| (12) | (a) | sékè-nè<br>release\RLS-VENT<br><i>[he] released down</i>      | (b) | ù-yúwò-nò<br>3S-fall\RLS-VENT<br><i>he fell down</i>                         |
| (13) | (a) | yáa-nà!<br>do\IMP-PL.IMP<br><i>[you(pl.)] do!</i>             | (b) | sèkèlè-wé-nè!<br>move\IMP-ANTIC-PL.IMP<br><i>[you(pl.)] move over there!</i> |
| (14) | (a) | ù-gwáanù-kwà<br>3S-understand\RLS-LW<br><i>he understands</i> | (b) | ù-tóorù-kwò<br>3S-push\RLS-LW<br><i>he pushed</i>                            |

- 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

- |      |                         |  |     |   |
|------|-------------------------|--|-----|---|
| (15) | (a)                     | é↓ = k-kèeké<br>LOC=NC8-bicycle<br><i>on a bicycle</i> | (b) | ó↓ = kó-ocì<br>LOC=NC9-hole<br><i>into a hole</i> |
| (16) | kà-sùuríyà<br>NC1-flute | <b>ké↓ = kè-zzémé</b><br>AG1=NC1-festival_k.o.         |     |   |
- festival flute*

## 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) kè-bìmbîi *buzzing insect, k.o.*  
mè-gísì *walking stick*  
kè-bíkí *celebration (from Hausa biki)*

kà-yíví *cold meal (of tuwo)*  
ká-dísíi *spot*  
kà-gìlí *vagina*

(18) kó-cìyû *heap*  
kò-dûu *heart*  
kò-lúu *knee*

kà-búngú *snake*  
kà-gúutù *buttock*  
kà-núu *head of corn*

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

- (19) kò-síttú *fig tree*  
 kó-cìyû *heap*
- kà-sídfù *whip*  
 à-cípù *Acipu people*

- 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:

- (20) kè-ré'è **kó** = Cìcípù *language of=Cicipu*  
 mé-l-lóokàcí *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):

- (21) **kà-híî** *blood*  
**kà-sîî** *feather*  
**kà-tîî** *head*  
**kà-yínî** *water pot*

- (22) **mò-híî** *blood*  
**mò-sîî** *shame*  
**mò-ní** *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-ní** ‘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	<i>boy</i>	méngé ‘child’ + táarì ‘manhood’
	méngétikáa	<i>girl</i>	méngé ‘child’ + tì-káa ‘womanhood’
	kwáakùllè	<i>then</i>	kwáa’á ‘day’ + kù-llè ‘that’
	kwáakwènè	<i>when?</i>	kwáa’á ‘day’ + kw-ènè ‘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	<i>plastic container</i> (Hausa <i>roba</i> from English <i>rubber</i> )
	móotà	<i>car</i> (Hausa <i>mota</i> from English <i>motor</i> )
	bàtúurè	<i>white person</i> (Hausa <i>bature</i> )
	'ángò	<i>bridegroom</i> (Hausa <i>ango</i> )
	kámèrà	<i>camera</i>
	kàsèt	<i>cassette</i>
	sóbòdà	<i>because</i> (Hausa <i>saboda</i> ) – partially harmonised
	teemika	<i>help</i> (Hausa <i>taimaka</i> )

- 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)	kèlèngù	<i>talking drum</i> (Hausa <i>kalangu</i> )
	ś'ò	<i>no</i> (Hausa <i>a'a</i> )
	dègè	<i>from</i> (Hausa <i>daga</i> )
	kò-ccòkó	<i>bag</i> (Hausa <i>jaka</i> )

- this raising process often takes care of disharmony:

(26)	kiiweye	<i>surround</i> (Hausa <i>kewaye</i> )
	èsée	<i>actually</i> (Hausa <i>ashe</i> )
	rùuká	<i>conversation</i> (Hausa <i>roka</i> )
	dúulì	<i>for sure</i> (Hausa <i>dole</i> )
	kwáanù	<i>metal container</i> (Hausa <i>kwano</i> )

- The same thing frequently (but by no means always) happens in non-borrowed code-switching:

(27) yàarí      *language* (Hausa *yare*)  
 kóomè      *everything* (Hausa *kome*)

- 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

(28) gwede      *thank* (Hausa *gode*)      [loanword]  
 róotò      *hanging* (Hausa *reto*)      [code-switching]

## 8 Conflict resolution

- What happens when affixes are added to non-harmonic loanwords?
- Generally (29) the nearest vowel seems to win out, but not always (30)...

(29)	kà-sàbíllè	<i>soap</i>	noun prefix
	kà-cáuré	<i>door</i>	noun prefix
	kà-háskè	<i>light</i>	noun prefix
	kà-gájímàaré	<i>rainbow</i>	noun prefix
	kà-kàsàncène	<i>it happened</i>	gender agreement prefix
	é-tèemàkà	<i>they would help</i>	person agreement prefix
	téemàkà-nà	<i>helped</i>	perfective suffix
	mé = Mèkóomò	<i>of Mekomo</i>	associative proclitic
(30)	kà-gòogá	<i>bag for fetching water</i>	noun prefix
	kò-wàndó	<i>trousers</i>	noun prefix
	ká = Róomàwa	<i>of Romans</i>	associative proclitic

## 9 Domain, transparency/opacity, and optionality

### 9.1 Domain

- The domain of VH in Cicipu is usually the prosodic word (compounds do not exhibit vowel harmony)
- However phrasal harmony may occur in connected speech (this is also true of other Kainji languages e.g. Ucinda (Mort 2011) and Hungwəryə)

(31) ['ésī:vè]  
 'ásù      wu-ívè  
 place<sub>(NC7)</sub>      AG7-3P.POSS  
*their place*

- (32) ['ésē:vì]  
 'ásù wu-éví  
 place(NC7) AG7-3S.POSS  
*his place*

## 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) ḡ = kù-sḡḡ  
 LOC=NC9-pool  
*in the pool*
- (b) hḡ = cí-kóotò  
 AG2=NC6-drum  
*of the drum*

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

- (34) (a) ù-sì-hé'w <is> è  
 3S-HAB-dry\_up<CAUS>  
*it causes to dry up*
- (b) ú-rìb <is> à  
 3S-dry\_up\IRR<CAUS>  
*it causes to sink*

- (35) (a) ó-pìs <il> ò-nò  
 3P-break\IRR<PLAC>-VENT  
*they would smash down*
- (b) ò-'óp <il> ò-nò  
 3P-break\IRR<PLAC>-PFV  
*they grabbed*

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

- (36) (a) ò-sì-cíyó h-è  
 3P-HAB-get AG2-PRO  
*they get them*
- (b) à-sì-cíyó má-kkàbà  
 3P-HAB-get NC4-palm\_fronde  
*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) è-dérè-nùu-nà	(b) ò-cú'ò-nùu-nà
	3P-stack\RLS<RES>-PFV	3P-besmeared\RLS<RES>-PFV
	<i>they stacked</i>	<i>they besmeared</i>

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

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

### 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 <ìl > <ìs > ù-wò- {wò/wà}
	NC7-cool<PLAC><CAUS>-ANTIC-APPL
	<i>repeatedly causing s.t. to become cool for s.o.</i>

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

Table 3: Cline of likelihood of affix harmonisation

Noun class prefix	Vb. affixes (adjacent)	Vb. affixes (distal)	Locative proclitic
<b>obligatory</b>	----->		<b>optional</b>

- 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)
  - *Tsuvaḍi*: 6-vowel **total**? (Lovelace 1990)
- Height
  - *Kamuku*: 6-vowel **height/horizontal** (Mort 2011)
  - *Hungwəryə*: 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/Hungwəryə?
  - 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/)

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