Akinbiyi Akinlabi and Bruce Connell

1. Introduction

A comparison of the tone structures of nominal constructions in Defaka and Nkoroo, two most closely related Ijoid languages, reveals that one of the remaining distinguishing features is the tonal system.

Of the two, Defaka is the more endangered language, with probably less than 100 speakers left. All Defaka speakers are bilingual in Defaka and Nkoroo, but Nkoroo speakers (in most cases) do not speak Defaka. This would suggest a convergence of the tonal systems of the two languages over time, favoring Nkoroo.

However, the evidence presented here shows that while Nkoroo has moved in the direction of an accentual system, Defaka remains a true tone system, with some structural borrowing from Nkoroo.

2. Key claims

1. Viewed from a processorial perspective, the output tone patterns of Nkoroo nominal compounds and proclitic+host structures reveal a cocktail of processes, including postulation of a floating tone, tone spreading, and tonal metathesis. However the result of each process is the same (fixed output pattern) regardless of input tone structure.

2. The output tone pattern of the same structures in Defaka reveals that Defaka borrowed and broadened some fixed patterns in nominal compounds, but the output tone patterns of nominal phrases are contextually derived.

3. The overall pattern shows that Defaka speakers are able to keep the tone system distinct from that of Nkoroo, contrary to an expectation of convergence.

Both Defaka and Nkoroo are two-tone plus downstep languages.

Noun + Noun Compounds

HH as Noun 1

<table>
<thead>
<tr>
<th>Noun 1</th>
<th>Noun 2</th>
<th>Tonal Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>HH + HH</td>
<td>(floating L?)</td>
<td></td>
</tr>
<tr>
<td>bú</td>
<td>ápára</td>
<td>→</td>
</tr>
</tbody>
</table>

- body | skin
- ápá | ñmgbá | → | ápá | ñmgbá |

- shoulder | bone
- fóní | bèbé | → | fóní | bèbé |

- bird | mouth
- kíní | òkpò | → | kíní | òkpò |

The compound takes the tone pattern HL. Fall occurs after the first syllable of the second noun. Tone of Noun 1 remains unchanged.

(2) HH + LL | (H spread?) |

<table>
<thead>
<tr>
<th>Noun 1</th>
<th>Noun 2</th>
<th>Tonal Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>kíní</td>
<td>òkpò</td>
<td>→</td>
</tr>
</tbody>
</table>

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The compound takes the tone pattern HL.

(3) \( HH + HL \) (No change)

<table>
<thead>
<tr>
<th>English</th>
<th>Tone Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>bió</td>
<td>fúró</td>
</tr>
<tr>
<td>leg</td>
<td>belly</td>
</tr>
<tr>
<td>bió</td>
<td>kírí</td>
</tr>
<tr>
<td>leg</td>
<td>land / ground</td>
</tr>
</tbody>
</table>

The compound takes the tone pattern HL.

(4) \( HH + H^1H \) (same as HH)

<table>
<thead>
<tr>
<th>English</th>
<th>Tone Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>buú</td>
<td>dimè</td>
</tr>
<tr>
<td>body</td>
<td>hair</td>
</tr>
<tr>
<td>náma</td>
<td>dimè</td>
</tr>
<tr>
<td>animal</td>
<td>hair</td>
</tr>
<tr>
<td></td>
<td>fur</td>
</tr>
</tbody>
</table>

The compound takes the tone pattern HL.

(5) \( HHH + LH \)

<table>
<thead>
<tr>
<th>English</th>
<th>Tone Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>ánáná</td>
<td>tkú</td>
</tr>
<tr>
<td>sheep</td>
<td>child</td>
</tr>
<tr>
<td>óbórí</td>
<td>tkú</td>
</tr>
<tr>
<td>goat</td>
<td>child</td>
</tr>
<tr>
<td></td>
<td>kid</td>
</tr>
</tbody>
</table>

Now what is going on in (5)? Tone spreading? Tonal metathesis? Or just a pattern? The compound takes the tone pattern HL.

**HL as Noun 1**

If the fall already occurs on the first noun, there cannot be a second fall on the second noun. So, there are no HLHL compounds.

(6) \( HL + HH \)

<table>
<thead>
<tr>
<th>English</th>
<th>Tone Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>bára</td>
<td>ṣìgbá</td>
</tr>
<tr>
<td>arm/hand</td>
<td>bone</td>
</tr>
<tr>
<td>bára</td>
<td>mmémé</td>
</tr>
<tr>
<td>arm/hand</td>
<td>nail / claw</td>
</tr>
<tr>
<td>dimè</td>
<td>ṣìgbálí</td>
</tr>
<tr>
<td>palm</td>
<td>seed</td>
</tr>
<tr>
<td>dimè</td>
<td>ápá</td>
</tr>
<tr>
<td>palm</td>
<td>shoulder</td>
</tr>
<tr>
<td></td>
<td>palm frond</td>
</tr>
</tbody>
</table>

After an HL Noun 1, HH nouns turn to LL. The compound still takes the tone pattern HL.
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Cologne, Germany  

(7) HL + LL (no change)

\begin{align*}
\text{bàrà} & \quad \text{kàŋgò} & \rightarrow & \quad \text{bàrà} \quad \text{kàŋgò} \\
\text{arm/hand} & \quad \text{neck} & \rightarrow & \quad \text{lower arm} \\
\text{bàrà} & \quad \text{a'lekì} & \rightarrow & \quad \text{bàrà} \quad \text{le'ì} \\
\text{arm} & \quad \text{upper} & \rightarrow & \quad \text{upper arm}
\end{align*}

The compound still takes the tone pattern HL.

(8) HL + LH (L spread? Where is the final H?)

\begin{align*}
\text{warì} & \quad \text{tòkú} & \rightarrow & \quad \text{warì} \quad \text{tòkú} \\
\text{house} & \quad \text{child} & \rightarrow & \quad \text{domestic servant}
\end{align*}

Compare this form to the one in (5), where tòkú “child” takes the tone pattern HL after a Noun 1, ending in H tone.

**LL as Noun 1**

(9) LL + HH

\begin{align*}
\text{kukwò} & \quad \text{ọ̀mgbólú} & \rightarrow & \quad \text{kukwó ọ̀mgbólú} \\
\text{scrotum} & \quad \text{seed} & \rightarrow & \quad \text{testicle} \\
\text{ọ́kpó} & \quad \text{ọ́mgbá} & \rightarrow & \quad \text{ọ́kpó ọ́mgbá} \\
\text{back} & \quad \text{bone} & \rightarrow & \quad \text{spine/backbone} \\
\text{mìndì} & \quad \text{ìkákì} & \rightarrow & \quad \text{mìndì ìkákì} \\
\text{water} & \quad \text{tortoise} & \rightarrow & \quad \text{turtle}
\end{align*}

(10) LL + HL

\begin{align*}
\text{dùò} & \quad \text{kírì} & \rightarrow & \quad \text{dùò} \quad \text{kírì} \\
\text{farm} & \quad \text{ground/land} & \rightarrow & \quad \text{village}
\end{align*}

(11) LL + LL

\begin{align*}
\text{mìndì} & \quad \text{àbànà} & \rightarrow & \quad \text{mìndì àbànà} \\
\text{water} & \quad \text{pit} & \rightarrow & \quad \text{well} \\
\text{èdìzì} & \quad \text{àbànà} & \rightarrow & \quad \text{èdìzì àbànà} \\
\text{fish} & \quad \text{pit} & \rightarrow & \quad \text{fish pond}
\end{align*}

(12) LLL + LH

\begin{align*}
\text{nàmbùlo} & \quad \text{tòkú} & \rightarrow & \quad \text{nàmbùlo tòkú} \\
\text{cow} & \quad \text{child} & \rightarrow & \quad \text{calf} \\
\text{bòòkò} & \quad \text{tòkú} & \rightarrow & \quad \text{bòòkò tòkú} \\
\text{chicken} & \quad \text{child} & \rightarrow & \quad \text{chick}
\end{align*}

**Generalizations:**

(a) The compound has a HL pattern, unless Noun 1 begins with an L tone.

(b) The tone of Noun 1 does not change

(c) Noun 2 takes HL pattern except when the Noun 1 ends in an L. In this case, the compound takes the form LL.
3. Analysis

(13) In a rule based framework:

Floating L

\[ \text{bú} \rightarrow \text{bú} \hspace{1cm} \text{ápárá} \rightarrow \text{ápárá} \]

H spread

\[ \text{kíní} \rightarrow \text{kíní} \hspace{1cm} \text{ókpò} \rightarrow \text{ókpò} \]

L spread progressive

\[ \begin{align*} &\text{bárà} \rightarrow \text{bárà} \hspace{1cm} \text{ŋmbá} \rightarrow \text{ŋmbá} \\ &\text{mìndì} \rightarrow \text{mìndì} \hspace{1cm} \text{ìkàkì} \rightarrow \text{ìkàkì} \\ &\text{bòòkò} \rightarrow \text{bòòkò} \hspace{1cm} \text{tòkú} \rightarrow \text{tòkú} \end{align*} \]

Metathesis

\[ \begin{align*} &\text{ánána} \rightarrow \text{ánána} \\ &\text{tòkú} \rightarrow \text{tòkú} \end{align*} \]

Problem: Treating it this way loses sight of the fact that all the processes seek to arrive at one single pattern, HL for compounds, whose exception occurs only when Noun 1 ends in L.

Proposal: The pattern HL defines compounds. When N1 is L initial, the compound is L-toned. Such constraints, referring to morphemes, must be recognized in the constraints system.

4. Nominal Compounds in Defaka

After nouns ending in H tone, there is no tonal change, except that HL becomes LL.

(14) HH + HH: No tonal change in compounds.

\[ \begin{align*} &\text{ígbe} \rightarrow \text{ígbe} \\ &\text{kúmbé} \rightarrow \text{kúmbé} \hspace{1cm} \text{lúá} \rightarrow \text{lúá} \\ &\text{kìngí} \rightarrow \text{kìngí} \hspace{1cm} \text{ígbé} \rightarrow \text{ígbé} \\ &\text{kolanut} \rightarrow \text{kolanut} \hspace{1cm} \text{basket} \rightarrow \text{basket} \end{align*} \]

HH + LL: No tonal change in compounds

\[ \begin{align*} &\text{kpànà̀ nà:} \rightarrow \text{kpànà̀ nà:} \\ &\text{fish basket} \rightarrow \text{fish smoking basket} \hspace{1cm} \text{cover} \rightarrow \text{cover} \\ &\text{lúá} \rightarrow \text{lúá} \hspace{1cm} \text{kpànà̀ nà:} \rightarrow \text{kpànà̀ nà:} \\ &\text{basket} \rightarrow \text{basket} \hspace{1cm} \text{cover} \rightarrow \text{cover} \end{align*} \]

HH + HL: Change of HL to LL.

\[ \begin{align*} &\text{ápá} \rightarrow \text{ápá} \\ &\text{ámbwà} \rightarrow \text{ámbwà} \\ &\text{shoulder} \rightarrow \text{shoulder blade} \\ &\text{nóm} \rightarrow \text{nóm} \\ &\text{nìbwà} \rightarrow \text{nìbwà} \\ &\text{person} \rightarrow \text{skeleton} \end{align*} \]
This tone change in compounds is probably a borrowing from Nkoroo. The HL tone change to LL cannot be right to left tone spreading because it takes place after nouns ending in H tone, as the preceding examples show. (It also occurs after nouns ending in L tone, as shown below.) It only occurs in compounds but not in phrases.

(15) Phrasal example (no HL → LL):

\[
\begin{array}{ccc}
\text{nóm} & \text{párà} & \rightarrow \text{nóm párà} \\
\text{person} & \text{leg} & \text{human leg}
\end{array}
\]

After nouns ending in L tone (HL becomes LL) (One step tone spreading?)

(16) LL → HL:

\[
\begin{array}{ccc}
\text{ebe} & \text{párà} & \rightarrow \text{ebe párà} \\
\text{pig} & \text{leg} & \text{pig leg} \\
\text{eberé} & \text{párà} & \rightarrow \text{eberé párà} \\
\text{dog} & \text{leg} & \text{dog leg} \\
\text{òbò mbwá} & \text{→} & \text{òbò mbwá} \\
\text{back} & \text{bone} & \text{spine} \\
\text{tìna} & \text{tóbo} & \rightarrow \text{tìna tóbo} \\
\text{fish} & \text{head} & \text{fish head} \\
\text{yìe} & \text{tóbo} & \rightarrow \text{yìe tóbo} \\
\text{bird} & \text{head} & \text{bird head} \\
\text{tìna nìò} & \rightarrow & \text{tìna nìò} \\
\text{fish} & \text{tail} & \text{fish tail} \\
\text{èbe nìò} & \rightarrow & \text{èbe nìò} \\
\text{pig} & \text{tail} & \text{pig tail} \\
\text{àgarà nìò} & \rightarrow & \text{àgarà nìò} \\
\text{lizard} & \text{tail} & \text{lizard tail}
\end{array}
\]

(17) HL + HL: HL becomes LL everywhere after noun ending in L.

\[
\begin{array}{ccc}
\text{idò ?ìà bò} & \rightarrow & \text{idò ?ìà bò} \\
\text{farm road/space/passage} & \text{farm road} \\
\text{idòù ?ìà bò} & \rightarrow & \text{idòù ?ìà bò} \\
\text{village road} & \text{village road} \\
\text{ándù ?ùà} & \rightarrow & \text{ándù ?ùà} \\
\text{boat end} & \text{boat stern}
\end{array}
\]

(Note: road is a compound ?ìà bò passage/road/passage)

The tonal change here is cyclic. The second in (?ìà bò) HL HL “road” changes to LL in the compound, and the first HL now changes to LL after idò “farm”, or idò ?ù “village”.

But is this L tone spreading? L tone does not “spread” if the second noun is HH.
LL + HH: No tone change. Final L tone of N1 does not spread to N2.

(18)  
\[
\begin{align*}
\text{ìgò} & \quad \text{ápá} & \rightarrow & \quad \text{ìgò} & \quad \text{ápá} \\
\text{eagle} & \quad \text{wing/arm} & \quad & \text{ùnà} & \quad \text{id₃á} & \rightarrow & \quad \text{ùnà} & \quad \text{id₃á} \\
\text{fish} & \quad \text{pot} & \quad & \text{yìe} & \quad \text{ápá} & \rightarrow & \quad \text{yìe} & \quad \text{ápá} \\
\text{bird} & \quad \text{wing/arm}
\end{align*}
\]

ti \quad na \quad \text{i} \quad d \quad \text{a} \quad \rightarrow \quad \text{ti} \quad \text{na} \quad \text{i} \quad \text{d} \quad \text{a}

HL + H : No change

(19)  
\[
\begin{align*}
\text{ánďù} & \quad \text{bé}: & \rightarrow & \quad \text{ánďù} & \quad \text{bé}: \\
\text{boat} & \quad \text{mouth} & \quad & \text{ma} & \quad \text{bwa} \quad \text{a} \quad \text{bwa} \quad \text{a}
\end{align*}
\]

The fact that there is no tone spreading in the examples in (18 – 19) can be blamed on one of two things.

(a) that the tone spread is restricted to HL nouns, or
(b) that there is really no tone spreading in Defaka compounds.

The first possibility cannot be correct because it is highly unusual for tones to select certain High tones to spread to. For example spreading will take place of the first H is followed by a L (i.e. HL), but will not take place if the first H is followed by another H (i.e. HH).

We adopt the second possibility that there is no tone spreading at all in Defaka compounds. This possibility is supported by the fact that the tone change is not conditioned by the environment. The tone change (HL → LL) takes place regardless of the preceding tone (H or L), like in Nkoroo.

(20) More compounds: tonal change not dependent on preceding context:  m̀bwà ‘bone’

After L
\[
\begin{align*}
\text{bà:mà \ m̀bwà} & \quad \text{(or \ bà: \ m̀bwà)} & \quad \text{rib} \\
\text{kwó \ 'má \ m̀bwà} & \quad \text{(or \ kwó \ 'má \ m̀bwà)} & \quad \text{breast \ bone}
\end{align*}
\]

Summary:
Defaka tone change has two characteristics: (a) tone change is not dependent on preceding context: it occurs after both L and H tones. (b) The tone change is restricted to compounds, and does not take place in phrases, as shown below.

5. Nkoroo Noun Phrases
Short pronouns
Subject short pronouns plus nouns have the same tone structure as compounds. This suggests that the pronouns cliticise with the nouns. A noun changes to L tone after the L tone clitic, and becomes HL after an H tone clitic, regardless of its underlying tone.
(20) HH noun: tébé head
            ì tébé my head
            ì tébé your head
            wá tébé our head

(21) HL noun: tóru eye
            ì tóru my eye
            ì tóru your eye
            wá tóru our eye

(22) LL noun: kòlò walking stick
            ì kòlò my walking stick
            ì kòlò your walking stick
            wá kòlò our walking stick

(23) LLH noun: ̀mòmò fly
            ì yè̀mòmò my fly
            ì yè̀mòmò your fly
            wá yè̀mòmò our fly

It is always possible to claim that the L of the first person spreads to the noun, and the H of the second and third persons spread to the noun. Note that the isolation tone pattern of this noun is LLH. But in all cases, it takes only two tone patterns: it is HLL or LLL. The question is, where is the final H of the isolation form in all cases? To account for this with rules, we MUST assume a “floating” final L and tone spreading from the clitics. Doing this, the overall picture gets lost. The generalization is that the clitic+noun host tone pattern is HL, else LL if the clitic is L.

6. Defaka Noun Phrases

Short Pronouns
In phrases, a final L spreads to a following H tone, as seen in the following examples, but only in HL nouns. Unlike in Nkoroo, the output tone pattern is not fixed. (Compare 23 above with 24c).

(24a) Pronominals
            ì rì káró my needle (káró needle)
            ì rì káró your needle
            wá rì káró our needle

(24b) ì tòbò my head (tòbò head)
            ì tòbò your head (tòbò head)
            wá tòbò our heads (tòbò head)
7. Numerals in Nkoroo

Generalizations

The numeral “one” behaves like it is compounding with the noun. The tone pattern is the same HL that compounds have. The other numerals (“two”, “three”, four) do not have the same effect that preceding clitics have on following hosts. Therefore we must assume that there is no tone spreading in phrases.

The numerals 5-9 comes a clitic-like element, a Low-tone [a]. The L tone of the [a] spreads to the initial syllable of the noun.

Compare all the forms meaning “one X”. Compare the forms meaning “eight X” Compare both of these with the forms preceded by L tone (“two X”) and the forms preceded by H tone (“three X”).

(25) HH noun: tébé head
    bɔrî tébé one head
    maa tébé two heads
    tara tébé three heads
    sɔnɔ a tébé five heads
    niini a tébé eight heads

(26) HL noun: tɔrù eye
    bɔrî tɔrù one eye
    maa tɔrù two eyes
    tara tɔrù three eyes
    niini a tɔrù eight eyes

(27) LL noun: kɔlɔ walking stick
    bɔrî kɔlɔ one walking stick
    maa kɔlɔ two walking sticks
    tara kɔlɔ three walking sticks
    niini a kɔlɔ eight walking sticks

(28) LLH noun: ɔmɔmɔ fly
    bɔrɛ ɔmɔmɔ one fly
    maa ɔmɔmɔ two flies
    tara ɔmɔmɔ three flies
    niini a ɔmɔmɔ eight flies
8. Numerals in Defaka

(29) Numerals (No participation)

\[\text{gberi} \, \text{gjiy\`a} \text{ one house } \] (HL noun)
\[\text{ma\`ma} \, \text{gjiy\`a} \text{ two houses } \]
\[\text{ta\`ta} \, \text{gjiy\`a} \text{ three houses } \]
\[\text{ma\`nga} \, \text{gjiy\`a} \text{ six houses } \]

(30) \[\text{gberi} \, \text{t\^\text{n}\`a} \text{ one fish } \] (LL noun)
\[\text{ma\`ma} \, \text{t\^\text{n}\`a} \text{ two fishes } \]
\[\text{ta\`ta} \, \text{t\^\text{n}\`a} \text{ three fishes } \]
\[\text{ma\`nga} \, \text{t\^\text{n}\`a} \text{ six fishes } \]

(31) \[\text{gberi} \, \text{so\`n\`o} \text{ one ant } \] (HH noun)
\[\text{ma\`ma} \, \text{so\`n\`o} \text{ two ants } \]
\[\text{ta\`ta} \, \text{so\`n\`o} \text{ three ants } \]
\[\text{ma\`nga} \, \text{so\`n\`o} \text{ six ants } \]

(32) \[\text{gberi} \, \text{a\`gar\`a} \text{ lizard } \] (LHL noun)
\[\text{ma\`ma} \, \text{a\`gar\`a} \text{ two lizards } \]
\[\text{ta\`ta} \, \text{a\`gar\`a} \text{ three lizards } \]
\[\text{ma\`nga} \, \text{a\`gar\`a} \text{ six lizards } \]

9. Demonstratives in Nkoroo

Among demonstratives, “this” and “that” behave differently from “some” and “many”. While “this” and “that” appear to share the tonal characteristics of the compound nouns, “some” and “many” leave the underlying tone pattern of the noun unaffected.

Compare the forms meaning “this X” and “that X” with the isolation forms of the nouns.

(Voiceless) consonants block H tone spreading here. Therefore we have used both vowel and consonant initial nouns to illustrate the tonal structures.

(33) \(\text{HH noun:} \, \text{aru}\) canoe
\[\text{mi\`aru} \text{ this canoe } \]
\[\text{\`ami\`aru} \text{ that canoe } \]
\[\text{d\`ji\`a\`aru} \text{ some canoes } \]
\[\text{su\`u(su)\`aru} \text{ many canoes } \]

\(\text{te\`be} \text{ head } \]
\[\text{mi\`te\`be} \text{ this head } \]
\[\text{\`ami\`te\`be} \text{ that heads } \]
dʒiá tebè  some heads
suù(sù) tebè  many heads

(34)  HL noun:  ówù  sand
mì ówù  this sand
àmì ówù  that sand
dʒíá ówù  some sands
suù(sù) ówù  many sands

tɔ́rù  eye
mì tɔ́rù  this eye
àmì tɔ́rù  that eye
dʒíá tɔ́rù  some eyes
suù(sù) tɔ́rù  many eyes

(55)  LL noun:  əkpà  eye
mì əkpà  this eye
àmì əkpà  that eye
dʒíá əkpà  some eyes
suù(sù) əkpà  many eyes

kə́lə  walking stick
mì kə́lə  this walking stick
àmì kə́lə  that walking sticks
dʒíá kə́lə  some walking sticks
suù(sù) kə́lə  many walking sticks

(36)  LLH noun:  əməmə́  fly
mì əməmə́  this fly
àmì əməmə́  that fly
dʒíá əməmə́  some flies
suù əməmə́  many flies

10. Demonstratives in Defaka
(37) Demonstratives (no participation)
àŋà  ándù  this canoe
ówàra  ándù  these canoes
numà  ándù  that/those canoe(s)
à  ándù  the canoe
11. Conclusions

Nkoroo noun compounds and pro-clitic+noun host combinations share a fixed tone pattern: they take a uniform HL pattern, except the noun is L-toned, and the entire structure is L. This output tone occurs without regard to the input tone of the noun.

Defaka noun compounds retain the underlying tone patterns of the nouns, except when the second noun has underlying HL tone. In this case the HL tone becomes LL, regardless of the tone of the preceding noun. Pro-clitic+noun host combinations spread a L tone one step when the following noun is HL, otherwise output tone is the same as input tone.

The overall pattern shows that Defaka speakers are able to keep the tone system distinct from that of Nkoroo, though there has been some structural borrowing from Nkoroo. Defaka has also resisted the gradual movement in the direction of an accentual system which is now widespread in Ijoid (Williamson 1986).