

The Tonal Structure of Nkoroo Nominal Constructions¹

Akinbiyi Akinlabi, Bruce Connell and Ebitare Obikudo
Rutgers University, York University and Delta State University.

1. Introduction

1.1 The Language

The Nkoroo people are located in Opobo/Nkoroo local government area of Rivers State, Nigeria. Nkoroo is an endangered minority language spoken in Nkoroo town alongside Defaka (another severely endangered language) and in some other smaller villages. In official records, Nkoroo is the name of the people and the dialect they speak but the people refer to themselves and their dialect as Kirika, so named after their ancestor who led the migration to their present location. Kirika has no semblance with Okrika, which is the anglicised form of **wá kírìkèè** meaning 'we are the same' in Okrika dialect. Linguistically, Nkoroo has been classified as an Eastern Ijoid dialect (Jenewari, 1989; Williamson and Blench, 2000) alongside the dialect cluster of Kalabari, Ibani and Okrika.

1.2 The Key Claims

This paper presents a comparison of the tone patterns found in Nkoroo nominal compounds and proclitic plus host structures with the tone patterns found in other types of Noun Phrases. We reveal that a crucial output tone pattern separates Nkoroo nominal compounds and proclitic+host structures from these Noun Phrases.

Viewed from a processorial perspective, the output tone patterns of Nkoroo nominal compounds and proclitic+host structures reveal a cocktail of processes, including the possible postulation of a floating tone, tone spreading processes, and tonal metathesis. However the result of each process is always the same (a fixed output pattern), regardless of input tone structure. This paper argues that an adequate account, whether rule based or constraint based, must capture this apparent conspiracy.

We define tonal conspiracy as a phenomenon in which several independent tonal processes in a language result in the same tonal outcome. It is as if the language requires a specific tonal melody on the output, and it does not matter what the input is.

Nkoroo is a two-tone plus downstep language. The examples in (1) illustrate this lexical contrast.

(1) Tonal contrast in Nkoroo

ókí (HH) 'take'
ókí (H[↓]H) 'swim'
ókì (HL) 'swordfish'

However, the overall pitch pattern in nominal compounds shows that Nkoroo may be moving in the direction of an accentual system, with fixed tonal melodies associated with particular morpho-syntactic categories. Other scholars, including Jenewari (1977) and Williamson (1978, 1986) have made similar "accentual" observations about Ijoid languages in general, and Harry (1987) has made this observation about Nkoroo.

2.0 Noun + Noun Compounds

In this section, we present a representative set of examples of nominal compounds. Our only interest is in the tone structure of the compounds. Therefore the nouns are arranged based on the underlying (or isolation) tone patterns. In the examples in 2-6 the tone of the first noun of the compound is H (or HH if we take the H tone of each syllable as separate). The tone of the second noun in the compound is varied. In (2) the second noun is HH; in (3) it is LL; in (4) it is HL; in (5) it is H^hH; and finally in (6) it is LH. This exhausts the possible patterns that can occur in the second noun position.

2.1 HH as Noun 1

(2) HH + HH

ḃú	ápára	→	ḃú	ápàrà
body	skin		skin	(of body)
ápá	ḡmgbá	→	ápá	ḡmgbà
shoulder	bone		shoulder	blade
fóní	ḃéḃé	→	fóní	ḃéḃè
bird	mouth		bird	beak

The generalization from the above examples is that the compound takes the tone pattern HL. Fall occurs after the first syllable of the second noun, as the form **ḃú ápàrà** “skin” indicates. Essentially input HH + HH becomes output HH HL. Two things are important, (i) the overall output pattern (HL), and (ii) the alignment of the pattern (the fall from H occurs after the first syllable of the second noun). Note that the H tone of the first noun remains unchanged. Processorially, we can assume a floating L (?) or a default L that associates with all syllables of the second noun, except the first syllable.

(3) HH + LL

kíní	òkpò	→	kíní	ókpò
person	back		human	back
ndó	mìndì	→	ndó	mìndì
breast	water		milk	
ḃíḃ	tòḡḡ	→	ḃíḃ	tòḡḡ
leg	edge		leg	heel

When the second noun is LL, the same generalization holds of the output tone pattern of the compound, as when the second noun is HH. The compound still takes the tone pattern HL, and what needs to be accounted for is the alignment of this pattern (or melody). Notice that in this case we need to account for the sudden emergence of an H tone on the first syllable of the first noun. Processorially, we can postulate the spread of the H from the first noun.

(4) HH + HL

ḃíḃ	fúró	→	ḃíḃ	fúró
leg	belly		leg	thigh

ḅíḵ	kírì	→	ḅíḵ	kírì
leg	land / ground		foot	

When the second noun is HL, the same generalization holds of the output tone pattern of the compound, as when the second noun is HH (in 2 above) or LL (in 3 above). Again the compound takes the output tone pattern HL. Interestingly, since the input is HH + HL, nothing needs to be done in this case. But is this the result of a “null-process”, or the result of the fact that the output pattern is fixed?

(5) HH + H[↑]H (same as HH)

ḅú	dí[↑]mé	→	ḅú	dímè
body	hair		hair (of body)	
námá	dí[↑]mé	→	námá	dímè
animal	hair		fur	

When the second noun is H[↑]H, the same generalization holds of the output tone pattern of the compound, as in all the cases previously seen. Again the compound must be HL in the output. But this example is probably easy to account for. This is because the second noun is H[↑]H. If we assume that the input tone of the second noun has a Low tone, that is H(L)H, we can say that the final H is simply not realized. But note that we now have a third process that results in the same output.

(6) HHH + LH

ánáná	tòkú	→	ánáná	tókù
sheep	child		lamb	
óborí	tòkú	→	óborí	tókù
goat	child		kid	

Finally, when the second noun is LH, the same generalization holds of the output tone pattern of the compound; it has to be HL. This is by far the most complicated structure to account for. The examples in (6) show that the input tones LH of the second noun have suddenly become HL. Now what is going on in (6)? Is this tone spreading, tonal metathesis, or just a pattern HL? Notice that if we do not want to assume tonal metathesis we must assume that the final H of the first noun spreads, and the final L tone is inserted (by default?).

We propose instead that there is a pattern HL in Nkoroo nominal compounds. This pattern emerges as long as the first noun is all H, regardless of the tone of the second noun. But in order to conclude whether or not the only pattern is HL, it is crucial to vary the tone of the first noun. We now turn to this in the next two sections.

2.2 HL as Noun 1

Just as we did in the preceding section, we keep the tone pattern of the first noun as HL, while varying the tone patterns of the nouns in Noun 2 position. In all of the examples in (7) – (9), we have HL on Noun 1.

(7)	HL + HH			
	ḅàrà	ḡmgbá	→	ḅàrà ḡmgbà
	arm/hand	bone		arm bone
	ḅàrà	mémémé	→	ḅàrà mèmémé
	arm/hand	nail / claw		finger nail
	dímè	ḡmgbólí	→	dímè ḡmgbòlì
	palm	seed		palm nut
	dímè	ápá	→	dímè àpà
	palm	shoulder		palm frond

These examples reveal that 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. But note that, taken together, the entire compound constitutes a single HL pattern, with the H remaining only on the first syllable of the first noun, and ALL of the remaining syllables of the second noun having a L tone.

Therefore, when the first noun is HL, and the second noun is HH, the same generalization holds of the output tone pattern of the compound as when both nouns are HH. The compound still takes the overall tone pattern HL. The only difference is how the HL is mapped or aligned to the compound. This shows that the tone of Noun 1 contributes to the alignment of the overall HL of the compound.

Processorially, we must say that the final L of Noun 1 spreads to all the syllables of the second noun. But by now it is becoming clear that the processorial way of looking at this is complete waste of time, since the result is always HL, notwithstanding the process assumed to result in it.

(8)	HL + LL			
	ḅàrà	kḡḡgò	→	ḅàrà kḡḡgò
	arm/hand	neck		lower arm
	ḅàrà	àlèkì	→	ḅàrà lèyì
	arm	upper		lower arm

When the second noun is LL, the same HL generalization holds of the output tone pattern of the compound, as when the second noun is HH (in 7 above). Interestingly, the tonal alignment is also the same. But as in (4) above, one can assume that this is another case of “null-process”. That is, the input tone pattern is the same as the output tone pattern.

If the forms results from “null-process”, and if we fail to assume a fixed pattern, then the output result of the form in (9) must be a colossal accident, because an LH second noun is realized as LL on the surface, just like the LL noun of (8).²

(9)	HL + LH			
	wàrì	tòkú	→	wàrì tòkù
	house	child		domestic servant

The above compound is comparable to the one in (6), where **t̀̀kú** “child” takes the tone pattern HL after a Noun 1, which ends in H tone. Note however that in this case, as in all compounds in which the first noun underlyingly HL, the entire compound is HL.

If we assume that the desired output tone of the compound is HL, all we need to account for is how to align the surface HL pattern of the compounds. We can do by assuming that tone of noun 1 always remains the same. That is, the fall from H to L takes place after the first syllable of the second noun, except when the first noun is HL. In this case once there is a fall on the second syllable, this continues throughout the compound.

However, whether the fall takes place on the first noun or the second noun, the overall melody of the compound is HL.

Finally, does the compound always take the HL tone pattern? If the first noun always retains its tone as stated here, then we expect that LL nouns in Noun position will also retain their tone. This is confirmed in the following section.

2.3 LL as Noun 1

Finally, as in the preceding section, we keep the tone pattern of the first noun constant as LL, while varying the tone patterns of the nouns in Noun 2 position. In all of the examples in (10) – (13), the compound is all Low toned. This confirms two things. First, it confirms that the tone of Noun 1 is always the same in isolation as in the compound. Secondly, it proves that once there is a fall to the low tone or once the Low tone starts, the low remains until the end of the compound. Essentially therefore, what we need to worry about is where the Fall begins, while keeping the tone of Noun 1 constant.

A processorial account of the forms below (10) – (13) will need a Low tone spreading process. The tone spreading must stipulate that it continues to the end of the second noun, to account for the forms in (10). However, this is not always true. This is because sometimes we must assume that it is the L tone of the second noun, and not that of the first noun, that spreads. Proof of this is (13). In (13), it is last syllable of the second noun that is H. The initial syllable is L. If there already a L tone on the second noun, why start the spreading from the first noun.

- (10) LL + HH
- | | | | |
|----------------|---------------------|---|----------------------------|
| k̀̀kẁ̀ | ̀̀m̀̀gb̀̀l̀̀ | → | k̀̀kẁ̀̀̀m̀̀gb̀̀l̀̀ |
| scrotum | seed | | testicle |
| ̀̀kp̀̀ | ̀̀m̀̀gb̀̀ | → | ̀̀kp̀̀ ̀̀m̀̀gb̀̀ |
| back | bone | | spine/backbone |
| m̀̀nd̀̀ | ̀̀k̀̀k̀̀ | → | m̀̀nd̀̀ ̀̀k̀̀k̀̀ |
| water | tortoise | | turtle |
- (11) LL + HL
- | | | | |
|------------|---------------|---|-------------------|
| d̀̀ | k̀̀r̀̀ | → | d̀̀ k̀̀r̀̀ |
| farm | ground/land | | village |
- (12) LL + LL
- | | | | |
|----------------|------------------|---|--------------------------|
| m̀̀nd̀̀ | ̀̀ab̀̀ǹ̀ | → | m̀̀nd̀̀ ̀̀ab̀̀ǹ̀ |
| water | pit | | well |

	̀ndzì	̀abàná	→	̀ndzì	̀abàná
	fish	pit		fish	pond
(13)	LLL + LH				
	nàmbùlò	t̀kù	→	nàmbùlòt̀kù	
	cow	child		calf	
	ḃ̀̀k̀̀	t̀kù	→	ḃ̀̀k̀̀ t̀kù	
	chicken	child		chick	

2.4 Generalizations from sections 2.1 – 2.3

The following generalizations emerge from the foregoing discussion.

- (a) The Nkoroo nominal compound has a HL pattern, unless Noun 1 begins with an L tone.
- (b) When Noun 1 begins with L tone, the entire compound is Low toned.
- (c) The tone of Noun1 never changes in the compound.
- (d) When Noun 1 ends in an H tone, the L tone of the HL melody is aligned with the second syllable of Noun 2, otherwise the entire Noun 2 is L toned.

3.0 Alternative Analyses

In the foregoing we have considered an unattractive processorial alternative, suggesting what amounts to the following processes:

- (i) Floating L on last syllable

ḃ̀	ápará	→	ḃ̀	áparà
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- (ii) H spread from Noun 1

kíní	òkpò	→	kíní	ókpò
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- (iii) L spread from Noun 1

ḃ̀arà	ḡmgbá	→	ḃ̀arà	ḡmgbà
m̀ndì	íkákí	→	m̀ndì	ìkàkì
ḃ̀̀k̀̀	t̀kù	→	ḃ̀̀k̀̀	t̀kù
- (iv) Tonal Metathesis in Noun 2

ánaná	t̀kù	→	ánaná	t̀kù
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However, there is processorial alternative that assumes none of these³. This alternative also does not assume that a fixed melody drives the tone of the compounds. Suppose we assume that in Noun1 plus Noun2 compounds the tonal tier of the second noun is deleted wholesale. When Noun 1 ends in a High tone, there is a one step spread of the High tone to the second noun, otherwise there is no spreading. Apart from this one step spread, all remaining syllables receive a Low tone by default.

There are several objections to this, but we will only discuss two. The first is the so-called “Duke of York” gambit. A pattern is undone, only to turn round and do it again. First we delete a high tone only to replace that same High tone by spreading. This is true of all forms like (4), where Noun2 is HL. The melody of Noun2 is HL, and it is deleted wholesale only to create the same melody by spreading an H from the preceding noun and insert a Low tone by default.

The second objection is that any rule-based approach loses sight of the fact that the language calls for a fixed melody, HL, in compounds, whose exception occurs only when Noun 1 begins in L. It is interesting that even in this case the compound has a fixed Low-tone melody, regardless of the tone of the second noun.

In a constraints only framework, we do not need to assume deletions, spreading, etc. The only focus is the tonal melody that is considered unmarked for compounds. We state this roughly as a constraint in (14).

- (14) Compound Tone:
Compounds have the tone pattern HL.

This constraint drives the surface tone pattern of compounds. It certainly has to interact with other constraints. That of faithfulness to the underlying tone patterns of the nouns; the alignment of the surface HL, and the LL exceptions. But all these are secondary to the surface pitch pattern that the compounds assume.

4.0 Nkoroo Noun Phrases

In this section we turn to the nominal structures consisting of short possessive pronouns and following nouns. The tonal evidence leads us to conclude that these pronouns cliticize with the following nouns and so form one prosodic word with the noun. This is because their output tone pattern is the same as that of compounds. This tone structure separates them from other noun phrases.

4.1 Short pronouns

In Nkoroo, subject short pronouns plus nouns have the same tone structure as compounds. This suggests that the pronouns cliticize with, and form one prosodic word 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.

As in the nominal compounds when the pronoun is High toned, the entire possessive structure has the pitch pattern HL, with the L aligned with the second syllable of the noun, regardless of the underlying tone pattern of the noun. However, when the short pronoun is L toned the entire structure takes a surface L, just as we find in the compounds. The examples in (15) – (18) illustrate this.

- (15) HH noun: t^éé^é head
 ì t^èè^è my head
 í t^éè^è your head
 wá t^éè^è our head

- (16) HL noun: t^órù eye
 ì t^òrù my eye
 í t^órù your eye
 wá t^órù our eye

- (17) LL noun: kòlò walking stick
 ì kòlò my walking stick
 í kòlò your walking stick
 wá kòlò our walking stick

- (18) LLH noun: òmòmó fly
 yè òmòmò my fly
 yé òmòmò your fly
 wá òmòmò our fly

The form in (18) is especially instructive. It is always possible to claim that the L of the first person pronoun spreads to the noun, and the H of the second and third person pronouns spread to the noun. Note however that the isolation tone pattern of the noun in (18) 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? Viewed from a processorial perspective, the loss of the final H is a problem that calls for powerful maneuvers. Doing this, the overall picture gets lost. The generalization is simply that the clitic+noun host tone pattern is HL, else LL if the clitic is L.

4.2 The Numerals

Nkoroo numerals behave differently from one another. The numeral “one” behaves like it is forming compound with the noun. The tone pattern is the same HL that compounds have.

Compare all the forms meaning “one X” in (19a-d). Regardless of the underlying tone pattern of the noun, the output tone pattern of “bóri X” is HL, with the L aligned with the second syllable of the noun as in compounds whose Noun1 is HH. We must conclude therefore that based on tonal evidence the numeral “one” compounds with the noun.

- (19a) HH noun: tébé head
 bóri tébè one head
- (19b) HL noun: tórù eye
 bóri tórù one eye
- (19c) LL noun: kòlò walking stick
 bóri kòlò one walking stick
- (19d) LLH noun: òmòmó fly
 bóri òmòmò [bóró: mòmò] one fly

The other numerals (“two”, “three”, “four”) do not behave like the numeral “one”. They also do not have the same tonal effect that the possessive pronouns have have the same effect that preceding clitics have on following hosts. Though the underlying tone pattern of the numeral “three” (tára) is HH like that of the numeral “one”, the tones do not behave the same way. This

tonal evidence shows that there is no tone spreading in nominal phrases. The underlying tones of the items are the same on the surface. The forms in (20a – d) show this.

- (20a) HH noun: tẹ́bẹ́ head
 màà tẹ́bẹ́ two heads
 tára tẹ́bẹ́ three heads
- (20b) HL noun: tórù eye
 màà tórù two eyes
 tára tórù three eyes
- (20c) LL noun: kòlò walking stick
 màà kòlò two walking sticks
 tára kòlò three walking sticks
- (20d) LLH noun: òmòmó fly
 màà òmòmó two flies
 tára òmòmó three flies

Finally, The numerals 5-9 show behaviors that combine the above two. On the one hand the numerals themselves form independent words within the phrase. But each of these numerals comes with a clitic-like element, a Low-tone [à]. The vowel [a] seems to cliticize with the noun, and therefore its Low tone forms the same output seen in compounds where Noun1 has a Low tone (10 – 13), or where a Low-toned possessive pronoun is followed by a noun (15 – 18). Compare all the forms meaning “eight X”. In each case the phrase can be separated into two words: the numeral “eight” and the low tone [à] plus the noun. While the numeral “eight” retains its underlying HL tone, the [à] cliticizes with the noun, and like the L tone possessive pronoun “my” forms a L tone word with the noun, regardless of the input tone of the noun. The forms in (21a – d) illustrate the points made above.

- (21a) HH noun: tẹ́bẹ́ head
 sóónó à tẹ̀bẹ̀ **five heads**
 níìní à tẹ̀bẹ̀ **eight heads**
- (21b) HL noun: tórù eye
 níìní à tórù eight eyes
- (21c) LL noun: kòlò walking stick
 níìní à kòlò eight walking sticks
- (21d) LLH noun: òmòmó fly

níìní à òmòmò eight flies

4.3 Nkoroo Demonstratives

Like the numerals, the demonstratives also split into two, in terms of tonal behavior. 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. Based on tonal behavior, we conclude that “this” and “that” compound with the following noun, while “some” and “many” do not.

Compare the forms meaning “this X” and “that X” with the isolation forms of the nouns. There is a minor tonotactic restriction involving voiceless consonants. Therefore we have used both vowel and consonant initial nouns to illustrate the tonal structures here.

(22a) HH noun: áru canoe
 mí áru this canoe
 àmì àru that canoe
 dzíá áru some canoes
 súù(sù) áru many canoes

(b) tébé head
 mí tèbè this head
 àmì tèbè that heads
 dzíá tébé some heads
 súù(sù) tébé many heads

(23a) HL noun: ówù sand
 mí ówù this sand
 àmì ówù that sand
 dzíá ówù some sands
 súù(sù) ówù many sands

(b) tórù eye
 mí tórù this eye
 àmì tórù that eye
 dzíá tórù some eyes
 súù(sù) tórù many eyes

(24a) LL noun: àkpà eye
 mí àkpà this eye
 àmì àkpà that eye
 dzíá àkpà some eyes

sũũ(sũ) àkpà many eyes

- (b) kòlò walking stick
mí kòlò this walking stick
àmì kòlò that walking sticks
dʒíá kòlò some walking sticks
sũũ(sũ) kòlò many walking sticks

- (25) LLH noun: òmòmó fly
mí òmòmò this fly
àmì òmòmò that fly
dʒíá òmòmó some flies
sũũ òmòmó many flies

5.0 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. In this case the entire compound is L. This output tone occurs without regard to the input tone of the noun. A processorial account of this outcome fails because nothing in such an approach captures the desired tonal output of the compounds.

Nkoroo phrases on the other hand have no fixed surface pitch patterns. Though there are tonal processes not described here, the inputs to these tonal processes rely on the input tones of the words in the phrase. This is unlike the output patterns described above, which have very little to do with the input tonal structure of the words.

The overall pattern shows the gradual movement in the direction of an accentual system, which is now widespread in Ijoid (Williamson 1978).

Endnotes

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² The pattern LH is very rare in Nkoroo nouns. In fact, we did not find any compound in which Noun1 is LH. Therefore it is not possible to test the claim that once the L tone begins in compounds it continues to the end of the compound.

³ This alternative is due to Peter Avery and John Roberts. They have the credit for the idea, but they are in no way responsible for the way it is presented here.

References

- Harry, Otelemate G. (1978). A Phonology of Nkoroo: A Dialect of Eastern Ijo. BA Long Essay. University of Port Harcourt.
- Jenewari, C. E. W. (1977). Studies in Kalabari Syntax. Ph. D Thesis, University of Ibadan.
- Jenewari, C. E. W. (1983). Defaka: Ijo's closest linguistic relative. Port Harcourt: University of Port Harcourt Press.
- Jenewari, C. E. W. (1989). Ijoid. In Bendor-Samuel, J. (ed.) *The Niger-Congo Languages*. Lanham: University Press of America, 105-118.
- Williamson, K. (1978). From Tone to Pitch Accent: The case of Ijo. *KIABARA* 1: 116-122. University of Port Harcourt.
- Williamson, K. (1989). Niger-Congo Overview. In Bendor-Samuel, J. (ed.) *The Niger-Congo Languages*. Lanham: University Press of America, 3-45.
- Williamson, K. and R. Blench (2000). Niger-Congo. In Heine, B. & D. Nurse (eds.) *African Languages: An introduction*. Cambridge: Cambridge University Press, 11–42.