

NUPE TONOLOGY¹

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A. Introduction

Any linguistic description of the Nupe language must posit the existence of contrastive tone. This is immediately evident from examples (1) through (3). An acute accent (´) represents a high tone, a grave accent (`) represents a low tone, mid tone is left unmarked. (All vowels bear some tone.)

1. u ló kata
 he entered house
 He entered the house.
2. u lo dzukó
 he went market
 He went to the market.
3. u lò bise
 he untied chicken
 He untied the chicken.

Nadel (1964), in his discussion of the Nupe language, by ignoring tone, is forced to treat three phonetically distinct forms as homonyms, when he states that eba has three different meanings. But

¹I am greatly indebted to Professor Victoria Fromkin, who spent much of her time giving me assistance in writing this paper. I am also grateful to Larry Hyman for his insightful comments and criticisms.

ebà 'ground' or 'place', eba 'male organ', and ebá 'husband' are as different to Nupe speakers as are bit, pit, and fit to speakers of English. Nadel's omission of such obvious tonal contrasts is strange for one as knowledgeable about the Nupe language and culture as he is. However, when one views the complicated morphotonological alternations and tonal assimilations in Nupe (as discussed below) it is not surprising that a non-linguist decided to ignore tone altogether.

Smith (1967) on the other hand, in his 'Phonology of Nupe', postulates five lexical tones (tonemes), and abandoned a possible sixth tone on the grounds that 'it is more economical to postulate a ninth vowel phoneme rather than a sixth toneme' (p. 168). His tonal description is very accurate phonetically, but due to his theoretical framework at that time, he was unable to find the generalizations which we seek in a descriptively adequate phonology. He concludes by saying that 'further analysis will yield greater complexity and so no further generalization will be ventured here' (p. 168).

This paper attempts to present some further generalizations, based on the fact that the surface complexities can be accounted for with a set of ordered phonological rules and a necessary 'mixing of levels'.

B. The Rising Tone

The five distinctive pitches or tones postulated by Smith include three level pitches, High (´), Mid (unmarked), and Low (`), and two kinetic or contour pitches of tones, namely, Rising (ˆ), and Falling (˘). The minimal quintuple which exemplify these contrasts are:

4. bá 'to be sour'
5. ba 'to cut'
6. bà 'to pray'
7. bã 'negative emphatic particle'
8. bā 'defamation' (from Hausa ba'a)

Given the three contrasting level tones in examples (1) through (3) above and the contrasting tones of edu in examples (9) through (13) below, it seems fairly certain that one must posit at least three phonemic tones.

9. musa wā edú²
moses caught edu (edu is a species of fish)
10. èdù zā²
Niger flooded
The Niger flooded.
11. musa dzò èdu
moses planted edu (edu is a wild species of yam)
12. edu yā² nānkó dānā²
thigh of cow this is
This is a thigh of a cow.
13. musa wā edù
moses caught deer
Moses caught a deer.

²Smith has èdú for this form. I think this is an error. The correct form is edú.

In sentences (9) through (13) there are five different nouns with the same segmental form, contrasted only by tone. These nouns conform to the general phonological shape of many Nupe nouns, namely, a CV stem preceded by a nominal prefix [e]. In the above examples the vowel of the stem is shown to be High (edú 'fish'), or Mid (èdu 'yam') or Low (edù 'deer'). The prefixes, however, are limited to Mid or Low tones.³

Furthermore, we find the following sequences of tones in the examples above produced as (14) through (18) below:

14.	èdu	'yam'	Low-Mid
15.	èdù	'the Niger'	Low-Low
16.	edú	'fish'	Mid-High
17.	edu	'thigh'	Mid-Mid
18.	edù	'deer'	Mid-Low

The only gap in the possible tone sequences (given the restriction of Mid and Low prefix tones) is a Low-High tonal sequence. Further examination will reveal, however, that this gap exists only when the

³Certain words have an initial high tone [á] as in the following:

- | | | |
|-----|---------|----------------|
| (a) | ádváni | 'seventy' |
| (b) | ámínci | 'faithfulness' |
| (c) | ázârûfa | 'silver' |
| (d) | áziki | 'riches' |

Most of these seem to be borrowings. Note that they do not have a CV stem.

consonant of the stem is a voiced consonant. Thus examples (19) through (22) include nouns with a low tone prefix, followed by a high tone stem vowel:

19. ètú èvu cigbā́
 parasite kills tree
 A parasite kills trees.
20. u gí èkó
 he ate shea-butter nut
 He ate a shea-butter nut.
21. kata nānā́ de èkpá
 house this has length
 This house is long.
22. èfú mǎ́
 honey sweet
 Honey is sweet.

It should also be noted that among the forms cited by Smith to illustrate the validity of the phonemic status of the Rising tone are the nouns [èdě] 'cloth' and [èdũ] 'taxes'. These rising tones occur both in isolation and in sentences as in examples (23) and (24).

23. èdě gá mǎló
 cloth that expensive
 That cloth was expensive.
24. musa ta èdũ
 moses paid taxes

Even in a strictly autonomous phonemic description it is possible to suggest that the rising tone is an 'allotone' of the High tone, occurring in the environment after a Low tone followed by a Voiced Consonant. Using three distinctive Features of tone to specify the phonetic tones above, they may be distinguished as follows:

<u>Features</u>	<u>High Tone</u>	<u>Low Tone</u>	<u>Mid Tone</u>	<u>Rising Tone</u>
H(igh)	+	-	-	+
L(ow)	-	+	-	-
G(lide)	-	-	-	+

The rule predicting the Rising Glide may then be stated as in (I).

$$I. [+H] + [+G] / [+L] \left[\begin{array}{l} +Cons. \\ +Vcd \end{array} \right] \text{ ---}$$

At this point we can see that only two tonal features need be specified in the lexicon--[±High] and [±Low] since [G] is predictable by rule. Examples (25) through (30) illustrate the applicability of Rule (I).

	<u>Underlying form</u>	<u>Phonetic form (by I)</u>	<u>Gloss</u>
25.	ègbá	[ègbǎ]	'a border on a garment'
26.	èbé	[èbě]	'pumpkin'
27.	èbú	[èbǔ]	'cross'
28.	ègó	[èg ^v ǎ]	'name of a town'
29.	èdzá	[èdzǎ]	'sash'
30.	èlé	[èlě]	'past'

As is evident from these examples, the Rising Tone does not occur on the initial vowel.⁴

The lexical entries of nouns which phonetically show a Low tone prefix followed by a Rising tone on the stem vowel are therefore represented with a phonological low tone followed by a High tone as shown in (25) through (30).

The existence of such a tone glide is not unique to Nupe, but can be found in a number of Kwa languages. Courtenay (1968) suggests such a rule for Yoruba:

H → LH Glide / L _____ (page 51)

The Yoruba version of the rule is a more general one, lacking the voicing constraint which Nupe imposes on the intervening consonant.

Rule (I), however, still does not seem to handle the Rising Tone in example (31).

31. *musa si dẽ*

Moses bought cloth

Moses bought some cloth.

In this example the Rising Tone follows a Mid Tone, which appears to contradict the prediction of Rule (I).

⁴In Nupe certain words have a Rising Tone on the initial syllable, as in [lõ: zũ] 'evening'. Note, however, that the initial syllable is a CV and not a vowel. Moreover, the Rising Tone is quite distinct from the one that is obtained through the application of Rule (I), for the one in case rises higher than the Rising Tone we have discussed above. The type of rising that is found in this word is typical of low tone nouns when they are the first element in a compound. Thus we recognize a high tone 'associative' tone and the underlying form /lõ' zũ/. Examples of this type do not, therefore, constitute counter examples, to the claim made above.

In a taxonomic phonemic analysis, with unordered rules, and where only the phonetic string is considered as data, one would have to consider the Rising Tone as a phonemic tone. Compare, however, example (31) with (32):

32. *musa si ɛ̀ɛ̃*

Moses bought some cloth.

Both (31) and (32) are acceptable alternants of the given sentence. The deletion of the prefix vowel is a very common phenomenon in Nupe, and as we shall see, vowel deletion is a still more general process.

The first thing that comes to mind is to propose that Rule (I) be ordered prior to the Vowel Deletion Rule so as to obtain a derivation that follows:

/musa si ɛ̀ɛ̃/	
musa si ɛ̀ɛ̃	by Rule (I)
musa si ødɛ̃ ⁵	by Vowel Deletion Rule.

But as we shall see later the presence (or absence) of the segment features does not affect the application of Rule (I) because the tone of deleted segments are not themselves deleted in other cases.

Other occurrences of the phonetically Rising Tone are found in verb stems of the form $\left[\begin{array}{c} C \\ +Vcd \end{array} \right] V$.

⁵The phonetic string in the given derivation is not the final tonal phonetic realization. The tone of /si/ is actually a glide which starts on Mid tone pitch and glides to a low tone. This can be specified as [-H, -L, +G] and will be symbolized by a grave accent following the vowel (e.g. [siː]). This is discussed in section C.

Examples (33) through (40) show that in certain constructions these verbs have a simple High Tone, whereas in others they occur with a Rising Tone.

33. etsú gí nākā̃
 rat ate meat
 A rat ate the meat.
34. musa lǎ nākā̃
 Moses took meat
 Moses took the meat.
35. u bǎ
 it sour
 It is sour.
36. etsú à gǐ nākā̃⁶
 rat will eat meat
 A rat will eat the meat.
37. musa èlǎ nākā̃
 Moses carrying meat
 Moses is carrying the meat.

⁶The actual phonetic forms of examples (36), (38), and (39) are:

36. [etswâ: gǐ nākā̃]
 38. [wâ: bǎ]
 39. [etsû: gǐ]

The vowel contractions and the Falling Tone will be discussed below.

38. wũ à bǎ
 it will sour
 It will be sour.
39. etsú á u ǎi
 rat has it eaten
 A rat has eaten it.
40. u lá èdu bě
 he took yam came
 He brought the yam.

The High Tone/Rising Tone alternations of these verb stems can be predicted from the form of the verb whether it occurs with or without one of the low tone particles (e.g., the continuous marker /è/ or the future morpheme /ǎ/). Thus examples (33) through (35) represent a high tone occurring in the absence of these particles, whereas in (36) through (38) the Rising Tone is obtained because of the presence of a preceding Low Tone particle. In many cases, however, the particle /è/ is deleted in the surface forms. In complex constructions (those which are termed serialization by Stahlke in this volume) such as examples (39) and (40) above, we obtain the Rising Tone because the /è/ is present at the appropriate point in the derivation. The segment features get deleted on the surface, the tone does not.⁷

⁷Thus we observe from these examples, (39) and (40), that the continuous form of the verb is required in such constructions despite the fact that they are semantically past. It is not surprising to find that a construction should dictate the form in which the verb is to occur. Thus in what we might term 'consecutive construction' marked by a sort of conjunction [çi] 'and to', the past form is required as in musa à lá èdu çi bé (Moses will take yam and to come) 'Moses will bring the yam', where the verb [bé] is future in meaning.

When a vowel in a verb stem is phonologically High, and the verb stem begins with a [-Voiced] consonant, one does not find this alternation, since rule (I) does not apply, as in examples (41) through (43).

41. gbìgbì tí
 owl hooted
 An owl hooted.
42. gbìgbì ètí
 owl hooting
 An owl is hooting.
43. gbìgbì á tí⁸
 owl has hooted
 An owl has hooted.

The following derivation further demonstrates the applicability of Rule (I):

	/musa bɛ́/	/gbìgbì tí/
Rule (I)	- - - - -	- - - - -
	/musa èbɛ́/	/gbìgbì ètí/
Rule (I)	musa èbɛ̀	- - - - -

⁸The final phonetic forms of examples (42) and (43) are:

42. [gbìgbè̄ : tí] (= sign for raised Low Tone)
 43. [gbìgbyâ : tí]

	/musa à bé/	/g̀big̀b̀i à tí/
Rule (I)	musa à b̃	- - - - -

Without postulating the pre-verbal Low Tone in the complex constructions, there is no way to explain the alternation of the tones on the verb stems which have voiced consonants initially, and one would be forced to represent such formatives with two lexical entries. The present solution permits one underlying phonological form for each verb stem, and at the same time shows that there is no phonological Rising Tone, since the general rule which predicts the Rising Tone also explains the alternations of the verb stems.

One can therefore conclude that Smith's Rising Toneme is the phonetic realization of a general rule in Nupe which predicts that a high tone will become a glide following a low tone and a voiced consonant.

C. The Falling Tone

The fifth tonemic tone suggested by Smith is a falling glide. Examples of words which could be used to support this conclusion are:

- | | | |
|-----|--------|--------------------------------|
| 44. | ĉizi | 'cheese' |
| 45. | b̂â | 'defamation' (from Hausa ba'a) |
| 46. | m̂ãŋ | 'teacher' |
| 47. | ĵam̂ã | 'people' |
| 48. | ĵim̂ã | 'Friday' |
| 49. | ã̂m̂ã | 'but' |
| 50. | d̂ê | 'outside' |

51. sàlá a kind of drum
 52. kâŋ 'a farm'

One can also add four of the personal pronouns to the list:

(these have a tonal contour [˩])

53. mí 'I' or 'me'
 54. wé 'you' (singular)
 55. yé 'you' (plural)
 56. yí 'we'

Obviously, example (44) is a borrowing from English. Examples (45) through (49) also appear to be recent borrowings from Hausa. One might suggest that these few items be marked [+Foreign] or [+Exception] and ignore the problem of the Falling Tone. That suggestion, however, is unsatisfactory since we do find the Falling Tone in utterances, alternating with other tones. It is possible that if such Falling Glide can be predicted, some light will be shed on these few items.

Before we consider some examples of utterances in which the Falling Tone occurs, let us clarify the Rising Tone part of the pronouns in (53)-(56). In these forms we recognize a low tone prefix /è/. Thus /è mí/ becomes [è mí̃] by Rule (I). Similarly, we obtain the same glide on the other pronouns. This postulation is justified by some historical evidence. [è mí̃] still occurs in the dialect of Kpada. In Pategi and Bida dialects, where the prefix is obligatorily deleted, the presence of a Rising Tone is assumed to be sufficient justification

for the positing of a preceding low tone. We can now treat the remaining part of the contour as part of the Falling Tone.

Examples (57) through (59) show the occurrence of the Falling Tone in utterances.

- | | | | |
|-----|----------|------|----------------------|
| 57. | etsũ: gí | from | /etsú á u gí/ |
| | | | rat has it eaten |
| | | | A rat has eaten it. |
| 58. | ebe: tí | from | /ebe ètí/ |
| | | | monkey howling |
| | | | A monkey is howling. |
| 59. | musè: gĩ | from | /musa ègĩ/ |
| | | | Moses is eating. |

From these examples we can note that first, the Falling Tone occurs on lengthened vowels, second, that certain vowels appearing in the underlying strings (or which would occur in slow deliberate articulation, or in isolation of the individual formatives) have been deleted, and third, that the Falling Tone may be a glide starting from a high tone or a mid tone. Example (57) shows a falling glide from high to mid, and (58) and (59) show a falling glide from mid to low. (A glide from high to low is also possible.) There are many examples where no glides occur in similar tonal environments where there is no immediate succession of vowels and when there has been no vowel deletion or contraction as in example (60).

or symbolized as \emptyset . VDR may now be stated (with further constraints on the position in which the noun occurs; for example, some nouns in subject position do not permit this deletion):

$$\text{II. VDR (Optional)} \quad V \rightarrow [+T \text{ -Seg.}] / \left\{ \begin{array}{l} \text{[Nom. Pref.]} \\ \text{V} \\ \text{[-Nom. Pref.]} \end{array} \right\} \begin{array}{l} \text{(a)} \\ \\ \text{(b)} \end{array}$$

This rule is to be read as follows: if a noun prefix occurs it can be optionally deleted. If, however, it is not deleted, part (b) cannot apply to delete the vowel immediately preceding it. If two vowels occur in succession, where the second is not a noun prefix, the first vowel can be optionally deleted by (b). The application of this rule is shown in the following derivation:

$$\begin{array}{rcl} & /á u há èfí^{\uparrow} bo/ & /á u há èfí^{\uparrow} bo/ \\ \text{VDR (a)} & á u há èfí^{\uparrow} o & \text{-----} \\ \text{(b)} & \emptyset u há èfí^{\uparrow} o & \emptyset u há èfí^{\uparrow} o \end{array}$$

(The rule which deletes [b] of the underlying /bo/ does not concern us here.)

We can now state the Falling Glide Rule (FGR) as the following:

$$\text{III.} \left[\begin{array}{c} V \\ \text{αT} \end{array} \right] \rightarrow [+G] / \left[\begin{array}{c} \text{-αT} \\ \text{-Seg} \end{array} \right]$$

This states that the tone on a vowel will become a glide just in case it is preceded or followed by a different tone. It is necessary that the VDR precede this Glide Rule so that the glide will occur on the segmental vowel. Applying this rule to the output of the VDR in the

above example we get the following derivation:

By VDR \emptyset u há \emptyset fi o
 By FGR \emptyset ú hâ \emptyset fi o

A later P-rule will lengthen a V in the environment of a unit specified as [+T, -Seg.]. This rule may be stated as Vowel Lengthening Rule (VLR)

IV. (VLR) V → V: / $\left[\begin{array}{c} \text{T} \\ \text{-Seg} \end{array} \right]$

The units which are [-Seg] will be deleted, deriving the final phonetic output of the above derivation as:

By VLR \emptyset ú: hâ: \emptyset fi o

and finally,

[ú: hâ: fi o].

Intuitively one would like to combine the Rising Glide Rule with the Falling Glide Rule. However, the RGR occurs only when a high tone occurs after a low tone, and only when a voiced consonant precedes the high tone. These two rules may be conflated as a general glide rule (GR).

V. GR.

$$T \rightarrow [+G] / \left\{ \begin{array}{l} [-\alpha\text{Tone}] \\ < [+Low] > \end{array} \right\} \left\langle \begin{array}{c} C \\ [+Vcd] \end{array} \right\rangle / \left\{ \begin{array}{l} [-\alpha\text{Tone}] \\ < [+High] > \end{array} \right\}$$

It seems quite obvious that such a rule must be stated to predict the Falling Glide when it occurs in sentences. Otherwise different phonological shapes of the same roots must be given in the lexicon. Can such a rule provide an explanation for the falling tones which occur in the few formatives given in examples (44) through (56)?

As already stated, a number of these forms cited are direct borrowings from Hausa. [bâ:] is the Nupe form for the Hausa bá'á. The tones on the Hausa form is High-Low. In Nupe the glottal stop is lost, and the Falling Tone on the lengthened vowel is predicted by the rules given above. Thus we have the following:

	/báá/
by VDR	bóá
by GR	bóá
by VLR	bóá:

and finally,

[bâ:].

[káŋ] is a shortened form of [kámi] which is 'farm'. There is an optional rule in Nupe which permits the deletion of [i] after [m] if followed by a word boundary. This is represented in VI.

VI. $i \rightarrow \emptyset / m __\#$

Some provision must be made to transfer syllabicity to the derived final [m] to become [ṁ]. Another rule would convert [ṁ] to [ŋ] if in final position. Thus an alternative realization of

64. /lá yà èmí/

take give me

Give it to me.

is

(([lá yà èmí]))

64'. [lá yà ŋ].

This reflects the regularity of the monosyllabic stems. Since sonorants can bear tone, there is a rule which spreads the tone of a deleted vowel onto a preceding sonorant. This can be stated as Tone Spreading Rule (TSR).

VII. TSR. [+Son] + [◀T] / ____ [◀T]

This rule applies prior to the GR, and must precede the [i] deletion rule. Thus we get:

Underlying form	kámi
By TSR	kámi
By [i]-Deletion	kám̄
By GR	kám̄̂

and finally,

ká̂

[m̄án̄] is similar to [k̄á̂], since it is the shortened form of [m̄álàmi] from Hausa m̄állàmi ('teacher'). But this form is an exception in that not only is the final vowel deleted after the nasal, but the second syllable is also deleted. Since it is an exception, no general rule can be written for the deletion of -là-. Given the shortened form, however, the tonal Falling Glide rule applies.

[dê] also requires some explanation. In the dialect of Kpada, instead of [dê:] of the Pategi and Bida dialects, we get [dê̂] (both forms mean 'outside'). If the phonological representation for all dialects is /d̄é̂̂/, one must mark this as an exceptional item (which indeed it is) in Bida and Pategi. Then there will be a rule

which deletes the final [n]. One can also represent this form as /d^he^hθ/, in these dialects.

The four pronouns would also be represented as /^hemi/, etc. An alternative would be to represent the final /i/ with features [+T, +L] with no segment features represented.

It may be argued that such lexical representation violates the naturalness condition and as such is untenable. But since it is necessary to include the Falling Glide Rule in any case, and since this rule predicts the correct phonetic forms of this small closed class of formatives, any other solution would require that we miss real generalizations which predict the occurrence of the Falling Glide.

D. The Sixth Tone

As stated above, Smith postulated a possible sixth tone, which he then chose to represent as an additional vowel phoneme. This tone is a sort of level tone, and in pitch, it is between a mid and low tones. Example (65) illustrates this.

65. u dā mi (= represents the tone in question)

He went home.

The underlying form for (65) is

65'. /u dā ^hemi/

/^he/ is deleted by the VDR since it is a nominal prefix. Regularly in Nupe, all low tones are raised when they interact with neighboring tones. Thus /dā/ becomes [dā:] (the vowel lengthening is obtained by

the VLR). /dã/ occurs at the end of utterances as [dã]. This is illustrated in (66).

66. /u dâ zã dâ/	u dã: zã dâ
he walked walk	He actually walked.

This mysterious 'sixth tone' is then the result of a simple low tone phonetic raising rule which can occur at the end of the P-rules.

It should also be noted that in rapid speech when the long vowel is often reduced the Falling Glide tones can merge with the raised low tone, and the result is that phonetically they may be indistinguishable. What is important, however, is that all the glides, both Rising and Falling, and the Raised Low Tone are predictable by rule, given only three phonological tones.⁹

In summary, the rules which are necessary to predict the non-phonological tones of Nupe are given below:

⁹The following words occur in Smith's analysis:

- | | |
|----------------|---------------------------------|
| (a) /lũkõtata/ | 'arm pit' |
| (b) /sěšęgi/ | 'swollen glands in the arm pit' |
| (c) /sũsũgi/ | 'waxbill' |
| (d) /tãmu/ | 'tinder' |

In Pategi dialect (a) is phonetically [lũkõtata]. If we recognize a low tone prefix, we can predict the Rising Tone. The Falling Tone also can be predicted by our rules. The remaining forms (b)-(d) seem to be ideophones. As such they do not undergo regular phonological rules.

1. Vowel Deletion Rule
2. Tone Spreading Rule
3. [i]-Erasure Rule
4. Glide Rule
5. Vowel Lengthening Rule
6. [-Seg] Deletion Rule
7. Low Tone Raising Rule

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