

TONAL PROCESSES IN NKWEN: AN AUTOSEGMENTAL PERSPECTIVE

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This article examines the tonal processes in the associative construction of Nkwen, a Grassfields language of Cameroon. In structures of the form “N₁ AM N₂”, where N stands for noun and AM stands for the associative marker, the author posits a floating H tone in the associative marker. If the last vowel of N₁ has an underlying Low tone, and the first vowel of N₂ has a Low tone, the floating H of the AM surfaces as a High tone on that last vowel of N₁ and the first vowel on N₂ surfaces with a falling tone. The author argues for the existence of a tonal metathesis rule to account for these surface tones. In addition the author presents evidence of downstep and upstep as further tonal processes in this language.

Cet article examine en détails les processus tonologiques dans les structures associatives du nkwen, une langue Bantoue du grassfields parlée au Cameroun. Dans les structures « N₁ AM N₂ » où N symbolise le nom et AM la marque associative, au cas où la dernière voyelle du premier nom porte un ton bas et que la première voyelle du deuxième nom a un ton bas également, le ton Haut flottant qui est la seule marque de l'associatif se réalise comme un ton haut sur la dernière voyelle du premier nom et la première voyelle du deuxième nom porte le ton descendant. Pour rendre compte de ces tons de surface, l'auteur propose une règle de métathèse tonale. Par ailleurs, l'auteur montre l'existence de la faille tonale « downstep » et l'existence du ton haut surélevé (« upstep ») dans cette langue.

0. INTRODUCTION

Nkwen is an Ngemba language spoken in part of the town of Bamenda in the North-West Province of Cameroon. Leroy (1977:15) and ALCAM (1983) classify Nkwen together with languages such as Bafut, Mankon, and Mbui under Ngemba languages, a subgroup of the Eastern Grassfields Bantu languages of Cameroon.

The aim of this article is to present some observable tonal processes which occur in the phonology of Nkwen. In order to limit the length of the article only examples of observable processes from the associative construction have been analysed.

The Nkwen language together with other Ngemba languages has segmental and tonal alternations at the phonetic level which can be captured by means of rules.

This analysis has been carried out using autosegmental assumptions, such as separation of tiers, tonal stability and association conventions based on the ideas of Goldsmith (1976) and others. An analysis of tonal processes in Nkwen shows how they are interwoven. Tonal processes in the language do have a feeding order relationship whereby tone docking feeds tone simplification; while high spread may lead to tone simplification, and simplification to downstep, and downstep to upstep.

1. TONAL PROCESSES IN THE ASSOCIATIVE CONSTRUCTION

The associative construction, also called the genitive construction, occurs in Nkwen when a noun is modified by another noun. The associative construction is primarily used to express possession. The possessed noun normally precedes the possessor noun. Between the possessed noun and the possessor noun, an associative marker (AM) appears, which is a segmental morpheme of CV structure for noun classes 2, 5,

6 and 19. The associative marker is a copy of the noun class prefixes, and usually bears a high tone at the surface level in contexts where no alternations affect it.

- (1) a. **bìsínǎ** **bí** **bífò** → [**bìsín bí bífò**]
 c2.birds AM chiefs chiefs' birds
- b. **fìNgwánǎ** **fí** **bífò** → [**fìngwán fí bífò**]
 c19.salt AM chiefs chiefs' salt
- c. **nìkàǎ** **ní** **bífò** → [**bìkàǎ ní bífò**]
 c5.pipe AM chiefs chiefs' pipe
- d. **mìkùǎ** **mí** **bífò** → [**mìkùǎ mí bífò**]
 c6.bboxes AM chiefs chiefs' boxes

1.1 EVIDENCE OF FLOATING TONES AS ASSOCIATIVE MARKERS

There is surface evidence in Nkwen to show that there are floating grammatical Low (L) tones and high (H) tones as associative markers in the associative construction.

This associative marker, which has the grammatical meaning of genitivity, may be either a segmental morpheme, already presented in (1) for noun classes 2, 19, 5 and 6; or a segmentless tone.

For the other noun classes—1, 9, 3, 7, 8 and 10—there is no overt segmental associative marker as in (1). However, tonal changes either on the first noun (N₁) or on the second noun (N₂) in the associative construction provide evidence for the postulation of floating tone associative markers.

1.1.1 Noun Classes 1 and 9

Taking into consideration the fact that the tones of nouns in isolation have been established as the underlying tones,¹ in the examples in (2) below the underlying strings on the left provide evidence for the establishment of floating low tone associative markers for noun classes one and nine.

- (2) a. **nínáǎ** (L) **ǎfò** → [**nínáǎ mfò**]
 cla.chameleon AM chief chameleon of chief
- b. **ǎnàmàkárá** (L) **bífò** → [**ǎnàmàkárá bífò**]
 clg.horse AM chiefs horse of chiefs
- c. **nínáǎ** (L) **bífò** → [**nínáǎ bífò**]
 cla.chameleon AM chiefs chameleon of chiefs
- d. **núé** (L) **wàrè** → [**nwé wàrè**]
 cla.cutlass AM hawk cutlass of hawk
- e. **núé** (L) **fòrá** → [**nwé fórá**]
 cla.cutlass AM rat cutlass of rat

In (2) the N₁ has a final high tone underlyingly, but a final high fall contour tone on the surface. The nouns in the N₂ position do not undergo any tonal alternations. The

¹ Cf. Awambeng (1991).

fall element of the high fall contour can neither be attributed to the N_1 nor to the N_2 . From surface evidence provided by the examples in (1a–d) in which a CV segmental AM surfaces between the two nouns in the associative construction, we claim that the fall element comes from a floating low tone, which has become associated with the N_1 through a leftward tone docking process.

The evidence provided by (2a) might lead to the suggestion that the fall element derives from the tone of the desyllabified nasal of the N_2 . This possibility may be dismissed on the grounds that in most fast speech registers, as compared to slow deliberate speech, the desyllabified nasal is actually deleted; and that in the other cases in (2b–e) no tone loss takes place.

There is therefore definitely a floating low tone between the nouns in (2), which belongs neither to N_1 nor to N_2 . Hence we conclude that the fall element must derive from a floating low tone AM for noun classes one and nine.

1.1.2 Noun Classes 3, 7, 8 and 10

On the same grounds the AM for noun classes 3, 7, 8 and 10 is established, based on the data in (3) below.

- (3)
- | | | | | | |
|----|--------------|-----|--------------|---|-----------------------|
| a. | ìkwò | (H) | tálà | → | [ìkwǒ tálà] |
| | c3a.belt | AM | Tala | | Tala's belt |
| b. | ìfìfì | (H) | Ńgóbì | → | [ìfìfì ñg'óbì] |
| | c8.thread | AM | Ngebi | | Ngebi's thread |
| c. | nàrè | (H) | tálà | → | [nàrě tálà] |
| | c10.bush.cow | AM | Tala | | Tala's bush cow |
| d. | àgèm | (H) | bìfò | → | [àgěm bìfò] |
| | c7.fig.tree | AM | Bifò | | Bifò's fig tree |
| e. | àfò | (H) | tálá | → | [àfǒ tálà] |
| | c7.farm | AM | Tala | | Tala's farm |

From the evidence above we posit a floating high tone AM for noun classes 3, 7, 8 and 10. Remember that for nouns in N_1 position the AM is a copy of the noun prefix, as evidenced by (1) for noun classes 2, 5, 6 and 19.

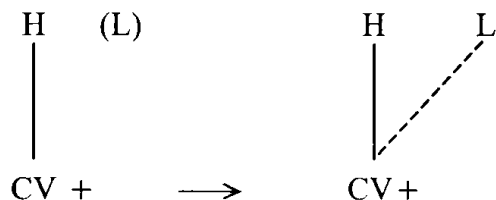
1.2 TONE DOCKING

Tone docking is the process whereby an underlying floating tone (L) or (H) becomes associated with a vowel at the phonetic level. In the following associative constructions the floating (L) AM docks to the left, forming the fall element of the high fall contour on the surface.

- (4)
- | | | | | | |
|----|--------------|-----|--------------|---|-----------------------|
| a. | nínán | (L) | bìfò | → | [nínán bìfò] |
| | chameleon | AM | chiefs | | chiefs' chameleon |
| b. | ɣírán | (L) | nínán | → | [ɣírán nínán] |
| | butterfly | AM | chameleon | | chameleon's butterfly |

This is a common tonal process in the language, and stated in prose form it reads: A floating (L) AM will dock to the left if the preceding syllable has an associated high tone. This rule can be formalised as in TR₁, leftward low tone docking.

(5) **TR₁ LEFTWARD LOW TONE DOCKING**



A floating (H) AM also docks to the left, as evidenced by the examples in (6).

- (6)
- | | | | | | |
|----|--------------|-----|--------------|---|-----------------------|
| a. | àbáŋè | (H) | m̄fè | → | [àbáŋé mfè] |
| | barn | AM | chief | | chief's barn |
| b. | àsáŋè | (H) | síŋè | → | [àsáŋé s'íŋè] |
| | whisk | AM | bird | | whisk of bird |
| c. | ŋgárè | (H) | fòrè | → | [ŋgáré f'òrè] |
| | gun | AM | rat | | gun of rat |
| d. | ntíŋè | (H) | ɣíɣán | → | [ntíŋé ɣ'íɣáŋ] |
| | heart | AM | butterfly | | heart of butterfly |
| e. | àsáŋè | (H) | tálà | → | [àsáŋé t'álà] |
| | whisk | AM | Tala | | Tala's whisk |
| f. | Ñtárè | (H) | mú má | → | [ñtáré m'ú má] |
| | communion | AM | Muma | | Muma's communion |

It is worth noting that in Nkwen there is tonal downstep. A floating low tone will automatically downstep a following associated high tone at the surface level:

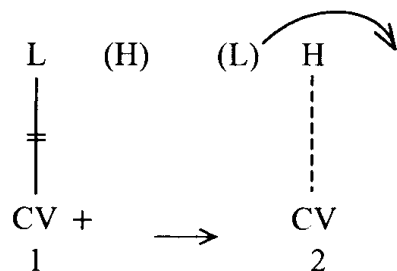
- (7) H → 'H / (L) _____

Downstep will be treated more fully in §1.6.

The following observations may be made concerning the examples in (6). In the surface forms to the right, a high tone appears on the last syllable of the N₁; and a downstepped high tone consistently occurs on the first syllable of the N₂, as seen in (6b–f). This leads to our proposal of tonal metathesis of the floating (H) AM and the dissociated floating (L) of the last syllable of the N₁. This is followed by leftward tone docking of the floating (H) AM, and rightward docking of the floating (L)—which leads to downstep on the first syllable of the N₂. Hence a floating (H) AM will dock leftwards, if the preceding syllable has a dissociated low tone.

Note that the possibility of a high spread process taking place in N₁ is dismissed on the grounds that high spread only takes place from the last (ultimate) syllable of a word to the first syllable of the following word; not from the penultimate to the ultimate syllable of the same word.

(8) **TR₂ LEFTWARD HIGH TONE DOCKING**

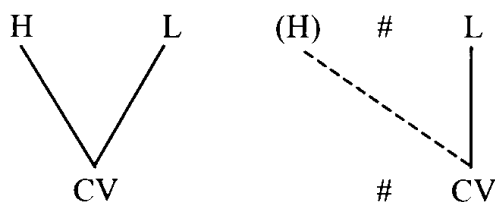


However, there is also evidence in the language to show rightward tone docking of the floating (H) tone AM:

- (9) a. **Ñgúà² (H) bífò** → [**ɲgwó bífò**]
 dogs AM chiefs chiefs' dogs
- b. **Ñrâ (H) bífò** → [**ɲrá bífò**]
 deer AM chiefs chiefs' deer
- c. **Ñbiá (H) bífò** → [**mbyà bífò**]
 mice AM chiefs chiefs' mice

Evidence from (9c) especially supports the fact that the rise element of the high fall contour on the first element of the N₂ could be attributed to a rightward tone docking of the floating (H) AM. We conclude that in Nkwen rightward tone docking of the floating (H) AM takes place when the last syllable of the N₁ already has associated to it a complex tonal pattern such as a high fall or a low rise contour. It is worth noting that the complex tone of the N₁ simplifies, leading therefore to our conclusion that rightward tone docking precedes simplification. Hence a floating (H) AM will dock rightwards if the syllable preceding it has an associated HL or LH contour, and if the following syllable across the word boundary has an associated low tone.

(10) **TR₃ RIGHTWARD HIGH TONE DOCKING**



The derivation of (9a) may be represented autosegmentally as follows:

² Contour tones are represented as single tone units in the underlying representation. There are also no underlying glides in the language. There is therefore a phonological process of glide formation whereby /i/ and /u/ change to [j] and [w] respectively. Glide formation is equivalent to vowel desyllabification. There is a homorganic nasal assimilation process whereby nasal consonants assimilate to the place of articulation of the following consonant.

- (11)
- | | | | | |
|----|--------------------|-----|-------------|---|
| | L HL | (H) | L L | |
| | | | | |
| a. | Nguo | | bifo | UR |
| | L HL | (H) | L L | |
| | \ | | | |
| b. | ngwo | | bifo | Homorganic nasal assimilation, glide formation and rightward tone docking |
| | L HL | (H) | L L | |
| | V | | | |
| c. | ngwo | | bifo | Rightward tone docking |
| | L H | (L) | H L L | |
| | | | | |
| d. | ngwo | | bifo | Tone simplification |
| | | | | |
| | | | | |
| e. | [ngwó bífò] | | | Surface form (SR) |
| | chiefs' dog | | | |

In cases where the last syllable of the N_1 bears an identical tone to the floating AM, no noticeable and observable tonal changes take place. A number of processes such as tone absorption and docking must therefore be assumed which have no observable effect on the surface.

- (12)
- | | | | | | |
|----|--------------|-----|--------------|---|--------------------------|
| a. | bàtə | (L) | bifò | → | [bàtə bifò] |
| | wine.gourd | AM | chiefs | | chiefs' wine gourd |
| b. | ìkùkú | (H) | tálà | → | [ìkùkú tálà] |
| | fools | AM | Tálà | | Tala's fools |
| c. | kàŋ | (L) | tòŋè | → | [kàŋ tòŋè] |
| | squirrel | AM | type.of.bird | | squirrel of type of bird |
| d. | nnà | (L) | wàrè | → | [nnà wàrè] |
| | animal | AM | hawk | | animal of hawk |
| e. | káá | (L) | wàrè | → | [káá wàrè] |
| | crab | AM | hawk | | crab of hawk |
| f. | kàà | (L) | mífò | → | [kàà mífò] |
| | old.basket | AM | chief | | old basket of chief |
| g. | àkì | (H) | àfònè | → | [àkì fònè] |
| | trap | AM | lion | | lion's trap |

These are only some of the causes of tone docking in the language. Others include glide formation, nasal desyllabification and tone simplification. Tone docking creates contour tones in the Nkwen language, and its normal direction in the associative construction is leftwards.

1.3 TONE SIMPLIFICATION

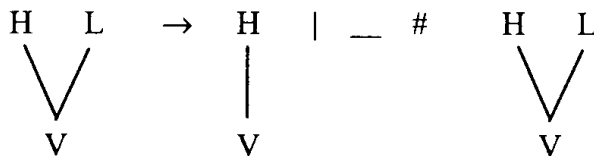
Tone simplification is the process whereby a high fall or a low rise contour is simplified to a simple high or low tone through the delinking of the rightmost contour.

1.3.1 High Fall Simplification

- (13) a. $\dot{N}g\acute{u}\grave{u}$ (H) $b\grave{i}f\grave{o}$ → [$\grave{h}g\acute{w}\acute{u} b\grave{i}f\grave{o}$]
 hens AM chiefs chiefs' hens
- b. $\dot{N}r\acute{a}$ (H) $b\grave{i}f\grave{o}$ → [$\grave{h}r\acute{a} b\grave{i}f\grave{o}$]
 deer AM chiefs chiefs' deer

In (13) the N_1 ends in a high fall contour at the underlying level. In (9) we claimed that the rise element of the first tone bearing unit (TBU) of the N_2 was due rightward tone docking of the floating (H) tone AM. We conclude that the high fall contour of the last TBU of N_1 becomes a simple high tone on the surface. The tonal process of simplification in (13) above may therefore be stated as follows: a high fall contour across a word boundary simplifies to a high tone if the first syllable of the following word is associated with a high fall contour, HL.

(14) TR_5 HIGH FALL SIMPLIFICATION

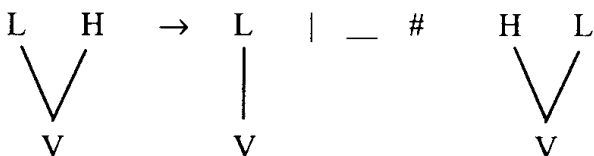


1.3.2 Low Rise Simplification

- (15) a. $\grave{i}k\check{u}$ (H) $b\grave{i}f\grave{o}$ → [$\grave{i}k\grave{u} b\grave{i}f\grave{o}$]
 bed AM chiefs chiefs' bed
- b. $\grave{a}k\check{x}\check{i}$ (H) $k\grave{a}\eta$ → [$\grave{a}k\check{x}\grave{i} k\grave{a}\eta$]
 mortar AM squirrel mortar of squirrel

In (15) above the low rise contour becomes a simple low tone on the surface, which may be attributed to the disappearance of the right element of the contour due to simplification. Such simplification takes place when two contour tones occur on either side of a word boundary—a situation which arises in (15) after rightward tone docking of the high tone AM. Hence we have a low rise simplification rule which states that a low rise contour simplifies to a low tone across a word boundary when the first syllable of the following word has a (HL) high fall contour associated with it.

(16) TR_6 LOW RISE SIMPLIFICATION



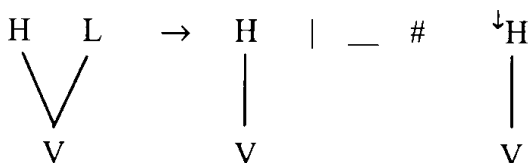
1.3.3 High Fall Simplification

- (17) a. $\dot{N}f\grave{i}$ (H) $s\grave{i}\eta\acute{o}$ → [$\grave{n}f\grave{i} s'\acute{i}\eta\acute{o}$]
 face AM bird face of bird

- b. àbúò (H) tsówè → [àbwó ts'ówè]
 hand AM sparrow hand of sparrow

In (17) a high low contour simplifies to a high tone across a word boundary when the first syllable of the following word has an associated high tone. The assumption here is that the floating high tone AM docks leftward and is absorbed. The occurrence of a downstep high on the first syllable of the N₂ can be traced back to the floating low from the high fall simplification.

(18) TR₇ HIGH FALL SIMPLIFICATION

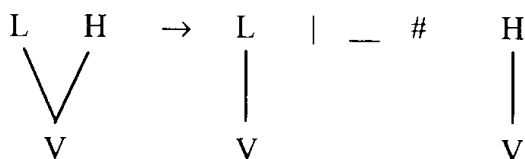


1.3.4 Low Rise Simplification

- (19) a. àtĩ (H) síḡó → [àtĩ síḡó]
 tree AM bird tree of bird
- b. ìkũ (H) tsówè → [ìkũ tsówè]
 bed AM sparrow bed of sparrow

In (19) a low rise contour will simplify to a low tone across a word boundary when the first syllable of the following word has an associated high tone. The assumption here is that both the delinked floating high tone from low rise simplification and the floating high tone AM are absorbed or deleted. A number of processes such as tone absorption and deletion must be assumed which have no observable surface effects.

(20) TR₈ LOW RISE SIMPLIFICATION



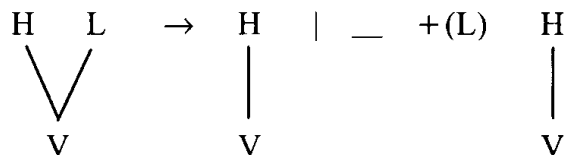
1.3.5 High Fall Simplification across a syllable boundary

- (21) a. fìsáḡò fí nìx'óḡò → [fìsáḡ f'í nìx'óḡò]
 broom AM fishing.basket broom of fishing basket
- b. fìNdòḡó fí fìn'ónò → [fìndòḡ fí fìn'ónò]
 groundnuts AM grassbird groundnuts of grassbird
- c. mìkùḡò mí bìwàrè → [mìkùḡ m'í bìwàrè]
 boxes AM hawks boxes of hawks

In (21) tone simplification takes place across a syllable boundary. The high tone on the surface in the first syllable of the N₂ can be traced back to a high spread process (cf. §1.4 below) across a word boundary. Taking into consideration that tone is

stable, the underlying low tone of the noun prefix of the TBU of the N₂ can be traced back to the process of tone simplification. The underlying low tone thus set afloat leads to automatic downstep on the second syllable of the N₂ as in (21a,b). From these observations, we come out with another tone simplification rule which states that a high fall contour will simplify to a high tone across syllable boundary if the following tone occurs on the penultimate syllable nucleus. This may be formalised as in TR₉.

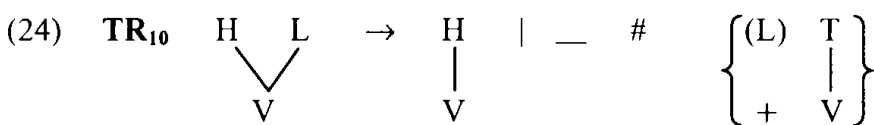
(22) **TR₉ HIGH FALL SIMPLIFICATION ACROSS A SYLLABLE BOUNDARY**



Tone rules TR₅, TR₇ and TR₉—repeated here for the reader’s convenience:

- (23) a. **TR₅** $\begin{array}{c} \text{H} \quad \text{L} \\ \diagdown \quad \diagup \\ \text{V} \end{array} \rightarrow \begin{array}{c} \text{H} \\ | \\ \text{V} \end{array} \quad | \quad _ \quad \# \quad \begin{array}{c} \text{H} \quad \text{L} \\ \diagdown \quad \diagup \\ \text{V} \end{array}$
- b. **TR₇** $\begin{array}{c} \text{H} \quad \text{L} \\ \diagdown \quad \diagup \\ \text{V} \end{array} \rightarrow \begin{array}{c} \text{H} \\ | \\ \text{V} \end{array} \quad | \quad _ \quad \# \quad \begin{array}{c} \downarrow \text{H} \\ | \\ \text{V} \end{array}$
- c. **TR₉** $\begin{array}{c} \text{H} \quad \text{L} \\ \diagdown \quad \diagup \\ \text{V} \end{array} \rightarrow \begin{array}{c} \text{H} \\ | \\ \text{V} \end{array} \quad | \quad _ \quad +(\text{L}) \quad \begin{array}{c} \text{H} \\ | \\ \text{V} \end{array}$

—can be captured by a single rule in order not to miss a linguistically significant generalisation. TR₁₀ states that a high fall contour in Nkwen will simplify to a high either across a syllable or a word boundary, when followed by any tone.



TR₆ and TR₈ dealing with low rise simplification—repeated here for the reader’s convenience:

- (25) a. **TR₆** $\begin{array}{c} \text{L} \quad \text{H} \\ \diagdown \quad \diagup \\ \text{V} \end{array} \rightarrow \begin{array}{c} \text{L} \\ | \\ \text{V} \end{array} \quad | \quad _ \quad \# \quad \begin{array}{c} \text{H} \quad \text{L} \\ \diagdown \quad \diagup \\ \text{V} \end{array}$
- b. **TR₈** $\begin{array}{c} \text{L} \quad \text{H} \\ \diagdown \quad \diagup \\ \text{V} \end{array} \rightarrow \begin{array}{c} \text{L} \\ | \\ \text{V} \end{array} \quad | \quad _ \quad \# \quad \begin{array}{c} \text{H} \\ | \\ \text{V} \end{array}$

—can also be captured by a single rule in order not miss a linguistically significant generalisation. TR₁₁ states that a low rise contour will simplify to a low tone across a word boundary when followed by either a high fall contour or a high tone.

$$(26) \quad \text{TR}_{11} \quad \begin{array}{c} \text{L} \quad \text{H} \\ \diagdown \quad \diagup \\ \text{V} \end{array} \rightarrow \begin{array}{c} \text{L} \\ | \\ \text{V} \end{array} \quad | \quad - \quad \# \quad \left\{ \begin{array}{c} \text{H} \quad \text{L} \\ \diagdown \quad \diagup \\ \text{V} \end{array} \quad \begin{array}{c} \text{H} \\ | \\ \text{V} \end{array} \right\}$$

Tone simplification in Nkwen creates floating tones as in TR₇. A high tone preceded by a floating low tone becomes downstepped. In TR₅, the floating low tone from tone simplification does not downstep the high fall element of the high fall across word boundary. We conclude from this observation that the Nkwen language possibly does not allow complex tone segments on a single tone bearing unit. We also observe that a floating low tone will not downstep the following right high tone element of a contour tone, as seen in (13). This is because of the disyllabic nature of the N₂. This observation leads to our proposal of a contour tone simplification rule which only applies when the contour occurs in the penultimate position of the N₂.

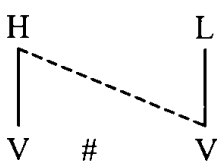
1.4 HIGH SPREAD

High Spread (H-spread) is the process whereby a high tone on a morpheme spreads to a low tone on the following syllable across a word boundary, creating a high fall contour. Note that High Spread only takes place from the ultimate syllable of a word to the following word, and not from the penultimate syllable to the following word.

- (27) a. **mìkù mí wàrà** → **[mìkù mí wàrà]**
 feet AM hawk feet of hawk
- b. **fìfà fí bífò** → **[fìfà fí bífò]**
 ulcer AM chiefs chiefs' ulcer
- c. **bìtòk bí bífò** → **[bìtòk bí bífò]**
 men's.gowns AM chiefs chiefs' gowns
- d. **bàbàtè bí wàrà** → **[bìbàtè bí wàrà]**
 wine.gourds AM hawk wine gourds of hawk
- e. **mìkàṅó mí kàṅ** → **[mìkàṅó mí kàṅ]**
 gunpowder AM squirrel gunpowder of squirrel

In (27) the consistent recurrence of the right high tone element of the high fall contour on the first syllable of the N₂ leads to our postulation of a high spread process. This high spread process is frequent and is always progressive. Stated in prose form it reads as follows: A high tone will spread to a low tone bearing unit across a word boundary.

(28) TR₁₂ HIGH SPREAD



High Spread is not an isolated process, as can be seen in the following:

- (29) a. **bìsìŋ bí m̀ìkùr̀è** → [**b̀ìsìŋ bí m̀'ík'úr̀è**]
birds AM dirty.place birds of dirty place
- b. **f̀ìNk̀áb̀è f̀í b̀ìf̀òr̀è** → [**f̀ìŋk̀óp f̀'í b̀'íf̀'òr̀è**]
statue AM Bafut Bafut's statue
- c. **f̀ìs̀àŋ̀è f̀í f̀ìnk̀áb̀è** → [**f̀ìs̀àŋ̀ f̀'í f̀'ìŋk̀'áb̀è**]
star AM statue star of statue
- d. **̀ǹìk̀òŋ̀è ǹí ǹìk̀ùr̀ù** → [**̀ǹìk̀òŋ̀ ǹí ǹ'ík'úr̀ù**]
spear AM quarter spear of quarter
- e. **ǹìs̀òŋ̀é ǹí f̀ìǹóǹè** → [**ǹìs̀òŋ̀ ǹí f̀'ín'óǹè**]
tooth AM grassbird tooth of grassbird

In (29) the consistent appearance of a high tone on the first TBU of the N₂ can be traced to TR₁₂ H-spread, while the consistent appearance of a downstep high on the penultimate syllable can be traced to tone simplification, which creates the floating low tone (TR₉) that leads to downstep. Note that in Nkwen there is a vowel elision process of the final vowel of the N₁ AM which triggers other tonal perturbations at the surface level.

1.5 METATHESIS

Tonal metathesis is a process whereby two tonal elements interchange their normal positions with each other. In Nkwen, there is evidence to postulate a metathesis rule which takes place on the tonal tier between two floating tones before tone docking takes place.

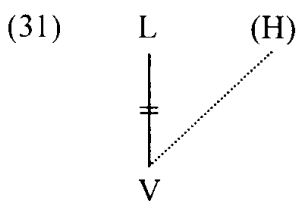
The examples in (30) involve nouns from noun classes 7, 8 and 3a which have a LHL pattern in N₁ position in the UR. The phonetic forms to the right are those that are used in slow, deliberate speech. In normal speech the final schwa of the N₁ is deleted by an optional vowel deletion rule in most cases.

- (30) a. **̀Ǹg̀ár̀è (H) b̀ìf̀ò** → [**̀ŋ̀g̀ár̀é b̀ìf̀ò**]
gun AM chiefs chiefs' gun.
- b. **̀Ǹt̀ár̀è (H) b̀ìf̀ò** → [**̀ǹt̀ár̀é b̀ìf̀ò**]
communion AM chiefs chiefs' communion
- c. **̀Ǹt̀íŋ̀è (H) b̀ìf̀ò** → [**̀ǹt̀íŋ̀é b̀ìf̀ò**]
heart AM chiefs chiefs' heart
- d. **̀à̀b̀áŋ̀è (H) ẁà̀r̀è** → [**̀à̀b̀áŋ̀é ẁà̀r̀è**]
barn AM hawk barn of hawk
- e. **̀Ǹt̀íŋ̀è (H) f̀ó̀r̀é** → [**̀ǹt̀íŋ̀é f̀'ó̀r̀é**]
heart AM rat heart of rat
- f. **̀Ǹg̀ár̀è (H) m̀ú̀m̀á** → [**̀ŋ̀g̀ár̀é m̀'ú̀m̀á**]
gun AM Muma Muma's gun
- g. **̀Ǹg̀ár̀è (H) ̀Ǹf̀ò** → [**̀ŋ̀g̀ár̀é ̀m̀f̀ò**]
gun AM chief chief's gun

Several tone changes are observed on the nouns in the surface strings in (30). There is the appearance of a high tone on the last syllable of all the N_1 nouns. On the N_2 there is the appearance of a high fall contour in (30a–d). There is a downstepped high tone in (30e–f). There is also the disappearance of the low tone of the nasal prefix of (30f).

To account for the appearance of the high tone on the last syllable of the N_1 and the disappearance of the underlying original low tone of the same syllable, three alternative solutions are possible.

In solution A, we propose first of all a leftward docking of the AM, then a tone simplification in order to account for the surface high tone. This claim states that a low high contour will simplify to a high:



—but as evidenced by our surface strings this claim is contradicted, because so far in the language a low high simplifies to a low tone (cf. TR₆).

Something like Chumbow's (1982) proposal could be considered as solution B, but this is equally unsatisfactory. This proposal is a universal tone simplification rule which states that a HL or LH contour will always simplify to a high. Applying this principle, however, will produce the wrong output: note that such a simplification in Nkwen will produce a floating low tone, which should normally lead to downstep. But what we have on the surface is a high tone, not a downstepped high, on the last syllable of the N_1 .

In order to account for the surface forms in (30), we propose another solution, C. In this solution, the final low tone of N_1 is dissociated, then metathesis takes place in which the now-floating (L) tone changes places with the floating (H) tone of the AM. Following this, the floating low tone docks to the right. Our metathesis rule therefore states that a floating high tone and a dissociated floating low tone will exchange positions.

(32) **TR₁₃ TONAL METATHESIS RULE**

	(L)	(H)
SD	1	2
SC	2	1

The application of tonal metathesis is illustrated in the following derivations of (30a) and (30d).

<p>(33)</p> <p>a. $\begin{array}{c} L & H & L & (H) & L & L \\ & & & & & \\ \text{Ngarə} & & \text{bifə} & & & \end{array}$ UR</p> <p>b. $\begin{array}{c} L & H & L & (H) & L & L \\ & & & & & \\ \text{ŋgarə} & & \text{bifə} & & & \end{array}$ Homorganic nasal</p> <p>c. $\begin{array}{c} L & H & L & (H) & L & L \\ & & & & & \\ \text{ŋgarə} & & \text{bifə} & & & \end{array}$ Tone dissociation</p> <p>d. $\begin{array}{c} L & H & (H) & (L) & L & L \\ & & & & & \\ \text{ŋgarə} & & & & \text{bifə} & & \end{array}$ Tonal metathesis</p> <p>e. $\begin{array}{c} L & H & H & & L & L \\ & & & & & \\ \text{ŋgarə} & & \text{bifə} & & & \end{array}$ Tone docking</p> <p>f. $\begin{array}{c} L & H & H & & L & L \\ & & & & & \\ \text{ŋgarə} & & \text{bifə} & & & \end{array}$ H-spread</p> <p>g. $[\text{ŋgárá} \quad \text{bífə}]$ SR</p>	<p>(34)</p> <p>a. $\begin{array}{c} L & H & L & (H) & L & L \\ & & & & & \\ \text{abaŋə} & & \text{warə} & & & \end{array}$ UR</p> <p>b. $\begin{array}{c} L & H & L & (H) & L & L \\ & & & & & \\ \text{abaŋə} & & \text{warə} & & & \end{array}$ Tone dissociation</p> <p>c. $\begin{array}{c} L & H & (H) & (L) & L & L \\ & & & & & \\ \text{abaŋə} & & & & \text{warə} & & \end{array}$ Tonal metathesis</p> <p>d. $\begin{array}{c} L & H & H & & L & L \\ & & & & & \\ \text{abaŋə} & & \text{warə} & & & \end{array}$ Tone docking</p> <p>e. $\begin{array}{c} L & H & H & & L & L \\ & & & & & \\ \text{abaŋə} & & \text{warə} & & & \end{array}$ H-spread</p> <p>f. $[\text{àbáŋə} \quad \text{wârə}]$ SR</p>
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1.6 DOWNSTEP

Downstep (DS) occurs in Nkwen when a high tone is preceded by a floating low tone. The high tone in question becomes downstepped or slightly lower than the normal high tone. Note that there is no lexical or derived mid tone in Nkwen.

Many segmental and tonal processes give rise to floating low tones, but those that lead directly to downstep are tone simplification, vowel deletion, optional vowel deletion nasal desyllabification and tonal metathesis.

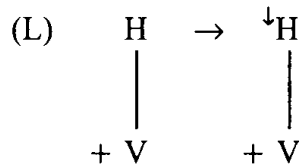
In normal speech in Nkwen as opposed to slow deliberate speech there is an optional vowel deletion rule in the genitive construction that leads to downstep.

<p>(35)</p> <p>a. $\text{Ńtíŋə} \quad (H) \quad \text{fə̀rə} \quad \rightarrow \quad [\text{̀n̩tíŋ} \text{ f'ə̀rə}]$ heart AM rat heart of rat</p> <p>b. $\text{àbáŋə} \quad (H) \quad \text{síŋə} \quad \rightarrow \quad [\text{̀àbáŋ} \text{ s'íŋə}]$ barn AM bird barn of bird</p> <p>c. $\text{àsáŋə} \quad (H) \quad \text{f'é́rə} \quad \rightarrow \quad [\text{̀àsáŋ} \text{ f'érə}]$ whisk AM ring whisk of ring</p> <p>d. $\text{nìfúŋə} \quad \text{ní} \quad \text{kúŋàm} \quad \rightarrow \quad [\text{̀nìfúŋ} \text{ n'í} \text{ kúŋàm}]$ fat AM pig fat of pig</p> <p>e. $\text{nìxóŋə} \quad \text{ní} \quad \text{f'é́rə} \quad \rightarrow \quad [\text{̀nìxóŋ} \text{ n'í} \text{ f'é́rə}]$ fishing.basket AM ring fishing basket of ring</p>

In (35a-c) tone simplification results in a floating tone, which causes downstep across a syllable boundary after TR₉. From this evidence we postulate TR₁₄,

a downstep rule in Nkwen which states that a floating low tone (L) will downstep a following high tone across a syllable boundary.

(36) **TR₁₄ DOWNSTEP**



However, the examples in (35) are not isolated, as several segmental and tonal processes are interwoven and lead to downstep.

1.6.1 Sequential Downstep

Of the many segmental and tonal processes that give rise to floating low tones and consequently downstep, it has been observed that a combination of the optional vowel deletion process and nasal desyllabification produce a series of downsteps or sequential downstep.

- (37) a. **fìnkèrè fí nír'óhè** → **[fìnkèrè fí nír'óhè]**
 story AM fishing.basket story of fishing basket
- b. **mìtòhè mí fìnkóbè** → **[mìtòhè mí fìnk'óbè]**
 navels AM statue navels of statue
- c. **nìfúhè ní Ñtíhè** → **[nìfúhè ní nt'íhè]**
 fat AM heart fat of heart
- d. **fìhgwáhè fí Ñtárè** → **[fìhgwáhè f'í nt'árè]**
 salt AM communion salt of communion
- e. **fìsàhè fí hégàrè** → **[fìsàhè f'í hég'árè]**
 star AM gun star of gun
- f. **mìwúrè mí hégàrè** → **[mìwrú m'í hég'árè]**
 oil AM gun oil of gun

In (37a,b) the recurrence of the high tone on the first syllable of the N₂ has already been seen to be due to high tone spread (TR₁₀). This tone immediately simplifies and leads to downstep. In (37c–f) optional vowel deletion and nasal desyllabification lead to a sequence of two downsteps, or sequential downsteps.

Hyman (1979) claims that downstep is almost always caused by tone simplification. The evidence provided by the downstep high on the AM indicates that it will be simpler and more natural for the floating low tone from vowel deletion to downstep the following high tone directly. Hence this direct downstep process contradicts Hyman's re-analysis proposal of leftward tone docking before simplification and then downstep. The autosegmental derivations (38) and (39) illustrate automatic downstep once the low tones are set afloat.

(38)	L H L	H	L H L	
a.	fingwəḡə	fi	Ntarə	Underlying Representation
	L H L	H	L H L	
b.	fingwəḡə	fi	ntarə	Homorganic nasal assimilation
	L H L	H	(L)H L	
			‡	
c.	fingwəḡə	fi	ntarə	Optional vowel deletion PR ₅ and nasal desyllabification
	L H	↓H	↓H L	
d.	fingwəḡ	fi	ntarə	Downstep: TR ₁₄ (sequential)
	σ σ	σ	σ σ	
	∧ ∧	∧	∧ ∧	
	cvc cvc	cvc	cvcv	
e.	fingwəḡ	fin	tarə	Resyllabification
f.	[fɪŋwəḡ]	f'in	t'árə]	Surface Representation
	salt	of	communion	

The resyllabification process in Nkwen takes place at the phonetic level, since the forms we are considering occur in natural speech. Otherwise in fast speech the desyllabified nasal is deleted. The resyllabification takes place in keeping with the core syllable structures of the language, which are CV, V or CVC, where in CVC the final consonant is either a nasal as in **kàŋ**, ‘squirrel’, a voiceless velar stop **k** as in **tàk**, or a voiceless bilabial stop [p] as in **[təkəp]**, ‘type of plantain’. Examples like (39) below add further evidence to support our claim.

(39)	L H L	H	L H L	
a.	nifugə	ni	Ntigə	Underlying Representation
	L H L	H	L H L	
b.	nifugə	ni	ntigə	Homorganic nasal assimilation
	L H (L)	H	(L)H L	
c.	nifug	ni	ntigə	Optional vowel deletion and nasal desyllabification
	L H	↓H	↓H L	
d.	nifug	ni	ntigə	Downstep: TR ₁₄ (sequential)
	σ σ	σ	σ σ	
	∧ ∧	∧	∧ ∧	
	cvcv c	cvc	cvcv	
e.	nifug	nin	tigə	Resyllabification
f.	[nɪfúḡ]	n'in	t'igə]	Surface Representation
	fat	of	heart	

The fact that no evidence is found in these Nkwen examples for leftward tone docking following nasal desyllabification and optional vowel deletion, strengthens our claim that downstep occurs immediately following the desyllabification process.

1.7 UPSTEP

Upstep is a process whereby a high tone is raised or becomes extra high. Evidence for an upstep process is provided by the following examples in Nkwen.³

- (40) a. **f̀̀nkáb̀̀b̀̀ f̀̀́ ákíkùé** → **[f̀̀̀̀̀̀káp f̀̀́ k'ík'w'é]**
 statue AM softwood.tree statue of softwood tree
- b. **m̀̀l̀̀ù'̀̀ù m̀̀́ ìf̀̀f̀̀́** → **[m̀̀̀̀̀̀l̀̀ù'̀̀ m̀̀́ f̀̀'f̀̀'f̀̀́]**
 palm.wine AM mushrooms palm wine of mushrooms
- c. **m̀̀ẁ̀r̀̀ù m̀̀́ m̀̀ǹ̀ínà** → **[m̀̀̀̀̀̀ẁ̀r̀̀ù m̀̀́ m̀̀'ín'ínà]**
 oil AM grassbirds oil of grassbirds
- d. **m̀̀ìf̀̀úg̀̀ ǹ̀́ ǹ̀ì'ó'g̀̀** → **[m̀̀̀̀̀̀ìf̀̀úg̀̀ ǹ̀́ ǹ̀'ì'ò'g̀̀]**
 fat AM fishing.basket fat of fishing basket
- e. **f̀̀̀nkáb̀̀b̀̀ f̀̀́ m̀̀ìsá'g̀̀** → **[f̀̀̀̀̀̀káp f̀̀́ m̀̀'ísá'g̀̀]**
 statue AM broom statue of broom
- f. **m̀̀ǹ̀ínà m̀̀́ àkíkùé** → **[m̀̀̀̀̀̀ǹ̀ínà m̀̀́ k'ík'w'é]**
 grassbirds AM softwood.tree grassbirds of softwood tree
- g. **f̀̀̀ndà'g̀̀ f̀̀́ f̀̀ínínà** → **[f̀̀̀̀̀̀ndà'g̀̀ f̀̀́ f̀̀'ín'ínà]**
 groundnuts AM grassbird groundnuts of grassbird
- h. **ǹ̀ìkà'g̀̀ ǹ̀́ f̀̀̀nkáb̀̀b̀̀** → **[ǹ̀̀̀̀̀kà'g̀̀ ǹ̀́ f̀̀'f̀̀̀̀̀k'áb̀̀]**
 pipe AM statue pipe of statue
- i. **b̀̀ìs̀̀í'g̀̀ b̀̀́ m̀̀ìkú'rá** → **[b̀̀̀̀̀̀ìs̀̀í'g̀̀ b̀̀́ m̀̀'ík'ú'rá]**
 birds AM dirty.place birds of dirty place

In (40a) a glide formation process creates a floating low tone in the N₂. In (40a,b) a vowel deletion rule PR₁ and an optional vowel deletion rule PR₅ take place, creating floating low tones which should normally downstep the following high tone according to TR₁₄.

However, what we observe at the phonetic or surface level is an upstep high tone on the first syllable of the N₂. In (40d,e,g) the first syllable of the N₂ bears a high tone which is also phonetically higher. In (40h,i) the first syllable of the N₂ still bears an extra high tone, though not preceded by a downstepped high. Three questions arise out of our observations of extra high or upstep:

1. Why does a downstepped high tone become extra high in the middle of two downstepped highs?

³ The extra high tone is also observed in simple indicative sentences to mark the remote past tense (cf. Awambeng 1991):

tála (L) (H) **sà'g̀̀ s̀̀í'g̀̀** → **[tá'la s'á'g̀̀ s̀̀í'g̀̀]**
 Tala ASP P₃ dried bird Tala dried a bird, *meaning*: Tala and no one else dried a bird.

2. Why does a high tone in the middle of two downsteps become perceptively higher than the normal high tone?
3. Why does the high tone of the first syllable of the N₂ become extra high in a sequence a several high tones?

At this point one may be tempted to propose as an alternative analysis, that the domain of downstep does not extend beyond one syllable in certain environments; but what do we then say about sequential downstep, as in (37c–f)?

For the second question we could use the phonetic justification. It is normal and natural for a high tone between two downstepped high tones to be perceptively high; but should the high tone become an upstep high?

From this observation and those made from the analysis of (40h,i), where the optional vowel deletion rule creates a floating high tone, and where no upstep takes place on the AM, we are able to postulate three upstep rules in Nkwen due to our identification of the environments in which upstep appears at the phonetic level.

TR₁₅ states that a downstepped high tone will become upstepped in the middle of two downstepped highs.

$$(41) \quad \text{TR}_{15} \quad \begin{array}{c} \downarrow\text{H} \\ | \\ \text{V} \end{array} \rightarrow \begin{array}{c} \uparrow\text{H} \\ | \\ \text{V} \end{array} \quad / \quad \begin{array}{c} \downarrow\text{H} \\ | \\ \text{V} \end{array} \text{ — } \begin{array}{c} \downarrow\text{H} \\ | \\ \text{V} \end{array}$$

TR₁₆ states that a normal high tone will become upstepped in the middle of two downstepped highs.

$$(42) \quad \text{TR}_{16} \quad \begin{array}{c} \text{H} \\ | \\ \text{V} \end{array} \rightarrow \begin{array}{c} \uparrow\text{H} \\ | \\ \text{V} \end{array} \quad / \quad \begin{array}{c} \downarrow\text{H} \\ | \\ \text{V} \end{array} \text{ — } \begin{array}{c} \downarrow\text{H} \\ | \\ \text{V} \end{array}$$

From observations made from (40h,i), TR₁₇ is postulated. It states that a high tone will be upstepped before any downstep high tone.

$$(43) \quad \text{TR}_{17} \quad \begin{array}{c} \text{H} \\ | \\ \text{V} \end{array} \rightarrow \begin{array}{c} \uparrow\text{H} \\ | \\ \text{V} \end{array} \quad / \quad \begin{array}{c} \text{H} \\ | \\ \text{V} \end{array} \text{ — } \begin{array}{c} \downarrow\text{H} \\ | \\ \text{V} \end{array}$$

TR₁₇ seems contradictory, but helps to point to the fact that what actually triggers the upstep process may not be phonological or from the underlying representation; it is mainly phonetic.

The upstep process, however, while pending further investigations in progress into verbal constructions, can be captured by a single rule, TR₁₈. TR₁₈ states that a downstep high or a normal high will become upstepped in the antepenultimate position of the N₂ in genitive constructions.

$$(44) \quad \text{TR}_{18} \quad \begin{array}{c} \downarrow\text{H} \\ | \\ \text{V} \end{array} \rightarrow \begin{array}{c} \uparrow\text{H} \\ | \\ \text{V} \end{array} \quad / \quad \begin{array}{c} \downarrow\text{H} \\ | \\ \text{V} \end{array} \text{ — } \begin{array}{c} \downarrow\text{H} \\ | \\ \text{V} \end{array}$$

2. CONCLUSION

In Nkwen, in the associative construction tonal changes occur mostly on the last syllable of the N_1 and the first and sometimes second syllable of the N_2 . Floating low tone associative markers normally dock leftwards unless there is a complex tonal pattern already associated with the last syllable of the N_1 . In such cases rightward tone docking takes place.

Like segmental phonological processes, not all tone rules interact with one another; however a feeding order relationship exists, between tone docking and tone simplification, high spread and tone simplification, tone simplification and downstep, upstep and downstep. Hence the interwoven nature of Nkwen tonal processes.

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