



# Tonal alternations in Kusaal

URS NIGGLI

## Contents

1	Introduction .....	2
	Tone-bearing units (TBU) .....	3
2	Tone inventory .....	4
3	Tonal alternations .....	6
3.1	Tonal allophones .....	6
3.2	Downdrift.....	6
3.3	Downstep .....	8
3.4	Tone spreading .....	10
3.4.1	Tone spreading to the left .....	10
3.4.2	Countour tone .....	11
3.4.3	Tone spreading to the right .....	13
3.4.4	Combination of left and right spreading.....	15
3.5	Tone on epenthetic vowels.....	15
3.6	Tone on verbs .....	16

## Introduction

I want to look at the tonal alternations in the Kusaal language of Burkina Faso. I worked for about eight years in Kasem which had three tone levels and I thought I could handle tone quite well because they were fairly stable even in the context of a sentence. But when I learned Kusaal I was a little bit puzzled because the words seemed to change their tones according to the context where they happened to appear in a sentence. So I want to find out how tone changes in different contexts. Obviously this is quite a large subject and in the scope of this paper I can only scratch on the surface.

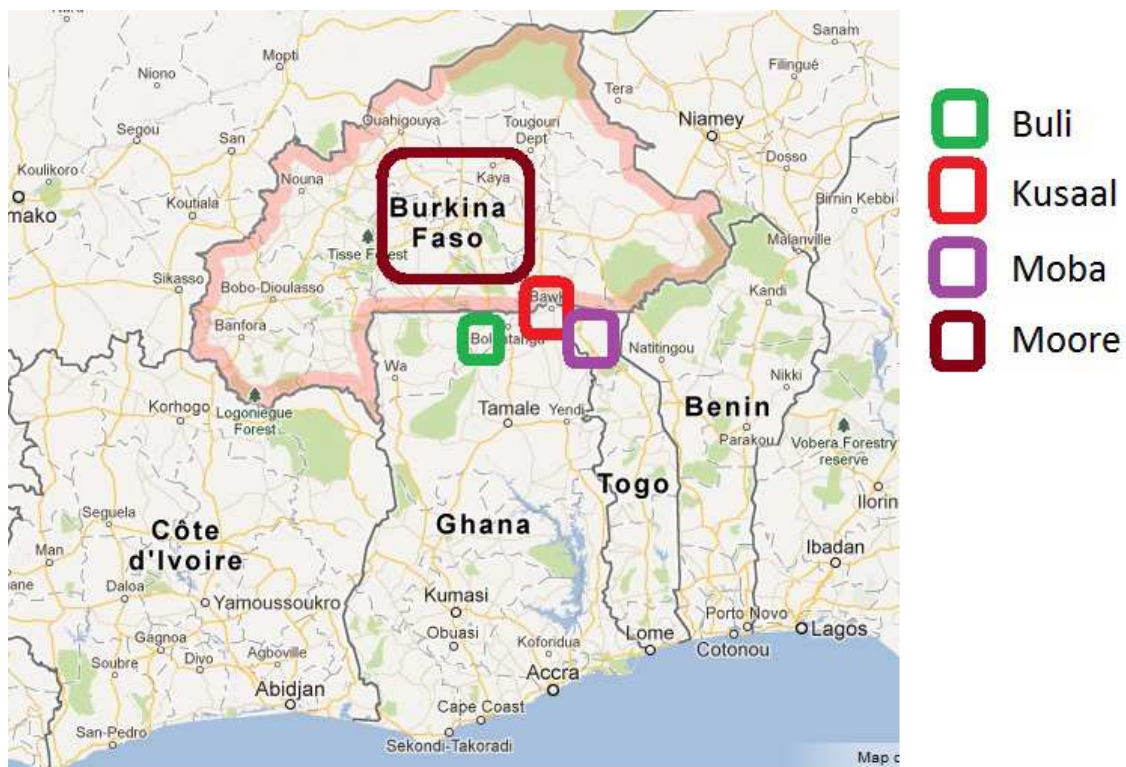


Figure 1 Kusaal and related languages with a similar three level tone system

## TONE-BEARING UNITS (TBU)

The tone-bearing unit or TBU could relate to the mora ( $\mu$ ) or to the syllable ( $\sigma$ ). In

Kusaal, firstly tone spreading affects the whole syllable, and not just the mora.

Secondly, tonal distribution patterns are described in terms of syllables rather than moras. Therefore we opt for the syllable as the TBU in Kusaal. Olawsky comes to the same conclusion for Dagbani (1996, p.189) and Cahill (2007, p.309) also considers the syllable as the TBU in Konni, so does Schwarz for Buli (2005, p.23), all three languages are related to Kusaal (see Appendix 1), see also Mbelime (Melick, p.90).

The syllable nucleus V is always the tone-bearing element of a syllable.

Examples:

V	õ	'he / she'	V.CV	à.yí	'two'
CV	mà	'mother'	CV.CV	gé.lá	'eggs'
CVC	kúk	'chair'	CVC.CVv	nín.dāā	'face'

## I TONE INVENTORY

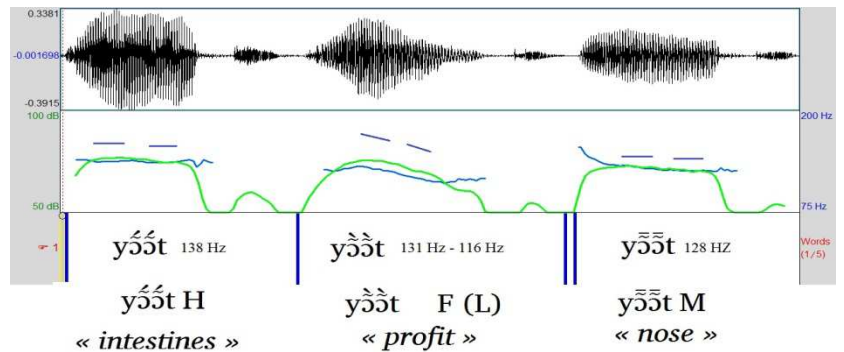
The tonal system of Kusaal has three tones (Agoswin 2010, p.108–109), more exactly two level tones, high (H) and mid (M), and a falling tone (L) (Spratt and Spratt 1968, 35) as well as a down-stepped high tone (!H). The tones are marked by acute accent (á), middle accent (ā), grave accent (à), and for the down-stepped high tone an exclamation mark before acute accent (!á).

High	báŋ	H	« <i>bangle</i> »
Mid	bāŋ	M	« <i>crocodile</i> »
Low	ò bāŋ	L	« <i>he knows</i> »
High-Down-stepped	kpá'!áŋ	H !H	« <i>guinea fowl</i> »

The graphics I made with the help of the Praat sound program serve as a visual

illustration of tone levels.

y <sup>á</sup> ŋt	H	« <i>intestines</i> »
y <sup>ā</sup> ŋt	M	« <i>nose</i> »
y <sup>à</sup> ŋt	L	« <i>profit</i> »



A similar three tone system is

also reported by neighbouring languages Bimoba (Russell 1985, p.11), Buli

(Schwarz 2005, p.7), and Moore (Canu 1976, p.79). All these three languages are

closely related to Kusaal, see map above and language family tree in Appendix.

We can classify the nouns in four tonal groups:

1. Tonal class with H tone root (e.g. pé'ók 'sheep', búú 'goat', kóbúk 'hair')
2. Tonal class with M tone root (e.g. gbīgīm 'lion', yōōt 'water pot')
3. Tonal class with L tone root (e.g. zàk 'courtyard', zìlìm 'tongue', dàà̀̀k 'wood')
4. Tonal class with underlying L tone root, but surface as H tone because of stress. This could also be interpreted as a toneless noun stem receiving a Low tone as the default, but having a High tone in citation form (Cahill 2007, p.331), e.g. póók 'field', bíí 'child', báá 'dog', p'á 'woman', bá'á 'diviner')

An explanation to Nr. 4: In Kusaal the stress is on the penultimate syllable, which very often is the first syllable. This stress on the first syllable of a word provokes a High tone in an underlying L tone root and so it surfaces as a High tone word. But when a noun root adds an adjective, the stress is often not on the Low tone noun root anymore and thus it keeps its Low tone. For example **'póók** 'field' is a stressed syllable and surfaces as High tone word but actually it has an underlying Low tone root **pò**. For example **pò**- root of 'field' + títá'át 'big' ⇒ pò-tí'**tá**'át 'big field' the stress is placed on '**tá**'

**báá** 'dog' + bé'ók 'bad' becomes: **bà**-bé'ók 'bad dog'

A **pre-nuclear margin** of a word/root always has Low tone.

à.ní « eight »; à.lē « how many »; À.wīn « personal name »; à.rà.kō « one »

## 2 TONAL ALTERNATIONS

Tones change according to context. Given the limited scope of this paper I can only mention some of those tone alternations.

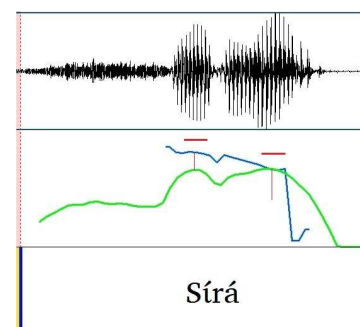
### 2.1 Tonal allophones

Both high and low tones have more than one allophone.

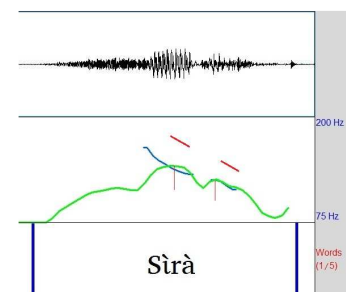
High tone: When one high tone follows another, it is slightly lower in pitch than the one that precedes it

(Spratt and Spratt 1968, 36).      *Sírá* ‘*husband*’

Low tone: When a low tone follows another, it starts on a lower pitch than the preceding one and ends on a lower pitch.      *sìrà* ‘*truth*’



*Sírá* « *husband* »

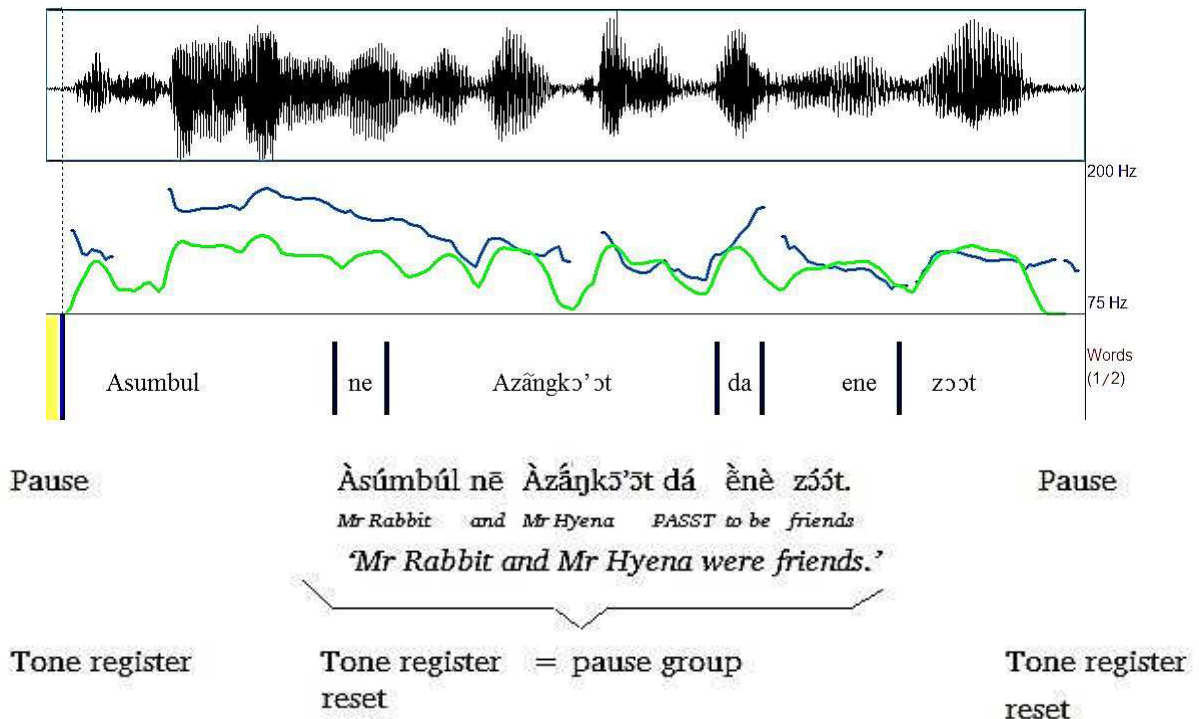


*Sìrà* « *truth* »

### 2.2 Downdrift

Kusaal displays the phenomenon of downdrift: Following a L tone, the pitch level of a following non-L tone is usually lowered, thus lowering the whole register until the end of the pause group (phonological utterance). This phenomenon could be called ‘automatic pitch lowering’ or ‘automatic downstep’.

The downdrift occurs within a phonological pause group, it falls till the end of the pause group and then the high tone level/pitch is reset to its normal pitch level to start the next pause group etc.



Observations: In the Praat graphic above can be seen that the last high tone on *zóót* 'friends' is almost lower than the first low tone on *À* 'Mister'. This confirms what Yip said: 'As Hs get progressively lower across the phrase they may end up as low as or lower than Ls earlier in the phrase' (Yip 2002, p.149). Further can be observed in the graphic that the low tone is not stable on its original level but it too goes lower and lower. After a pause, the new sentence will start at the



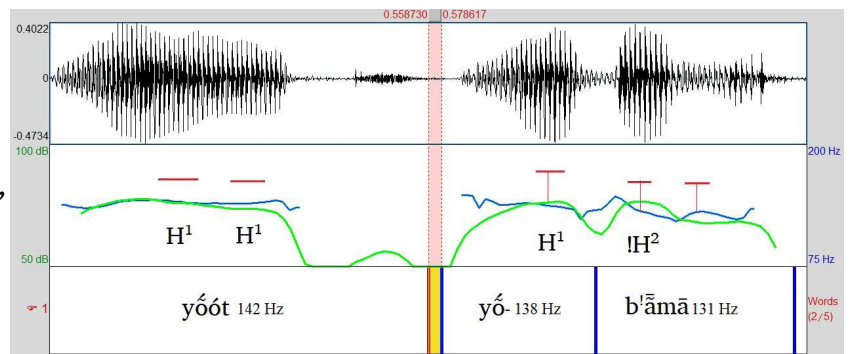
original pitch levels and drift down until the next pause unit where it will be reset to its normal pitch. This phenomenon does not need to be marked in phonology since it is totally predictable.

### 2.3 Downstep

When a Low tone is ‘hidden’ or ‘floating’ through assimilation or deletion, even though this L is not ‘present’ in the surface form, one sees the effect of it because it can still influence a High tone by lowering it. A downstepped High tone can be considerably lower than a previous High tone. For example in a series of High tones, they do not all have the same pitch level as shown in the following

example:

yóót bāmá [yó- b'āmā]  
*intestines those* ‘*Those intestines.*’  
 H<sup>1</sup> !H<sup>2</sup> H



This downstepped High tone

could be explained by the

yóót « *intestines* »      yóót bāmá [yó b'āmā]  
*intestines those*      « *Those intestines.* »

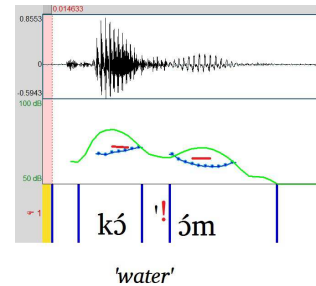
fact that the class 8 suffix has a Low tone. This low tone is pronounced High in isolation because of tone spread of the noun root of yó ‘*intestine*’. The Low tone is now ‘hidden’ in the citation form yóót but it has not totally disappeared (i.e. it is a

‘floating’ tone). In certain contexts it reappears by lowering a following High tone

which is now downstepped <sup>!</sup>H or <sup>!</sup>H.

A glottal stop causes a downstep ['] of

the following High tone.



Example: kó'óm H <sup>!</sup>H ‘water’

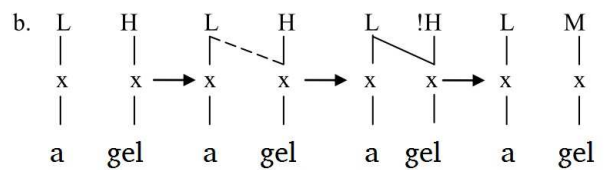
When a noun with High tone is preceded by a personifying prefix **À-** ‘Mr.’ that

prefix lowers a following High tone and transforms it into a downstepped <sup>!</sup>H.

à + gél ⇒ Àg<sup>!</sup>él ‘Mister Egg’  
 ‘Mr.’ ‘egg’

à- gél [àgēl]  
 ‘Mr.’ ‘egg’ ‘Mr. Egg’

à + láríábá ‘Wednesday’ ⇒



Àl<sup>!</sup>áríábá ‘Mister Wednesday’

Another occurrence of downstep is observed in an associative construction. The

first noun is the possessor, and the second noun is the possessed. Both keep their

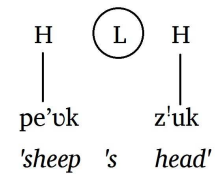
morphological structure. For example we can juxtapose two H nouns pé’úk ‘sheep’

and zúk ‘head’: ‘sheep’s head, or head of sheep’. The associative element might have

been a segment that has been deleted leaving its L tone behind.

On the autosegmental diagram the floating tone is indicated by a tone in a

circle. The second word, the possessed *z'úk* 'head'



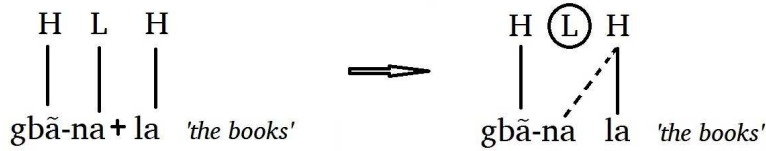
is downstepped. The Downstep on the second word is the result of this floating tone derived from the particular context of this construction. The associative morpheme 'of' is a floating L tone.

#### 2.4 Tone spreading

A tone can spread over to another TBU, syllable or word. Yip writes 'The most striking property of African tone is its mobility' (2002, p.132). Kusaal displays several cases of tone spreading. For example when a final vowel is deleted, its tone can become a floating tone which now can influence the neighbouring tones.

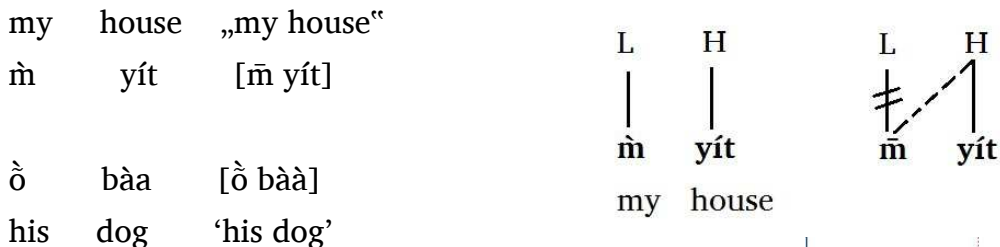
##### 2.4.1 Tone spreading to the left

Noun class suffixes in the citation form have undergone truncation of the -CV vowel and thus don't have a TBU anymore. In this case they are toneless (Schwarz 2005, p.42). Only the class 10 nouns maintain a final vowel -a. In H tone words this vowel -a is Low in final position ( \_#) but in non-final position, e.g. followed by the definite article *lá* the high tone of the article spreads to the left and leaves the L tone as a floating tone.



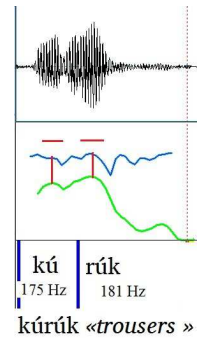
\*HLH = no Low can be singly associated between two High tones: \* H L H  
 (Cahill 2008, 8) |  
X

When the possessive pronoun (default Low tone) is placed before a noun, the low tone on the pronoun is raised through a process of low tone raising (LTR) to become a mid tone on condition that the noun has a non-low tone, i.e. it has either a high or mid tone. This is exemplified below:



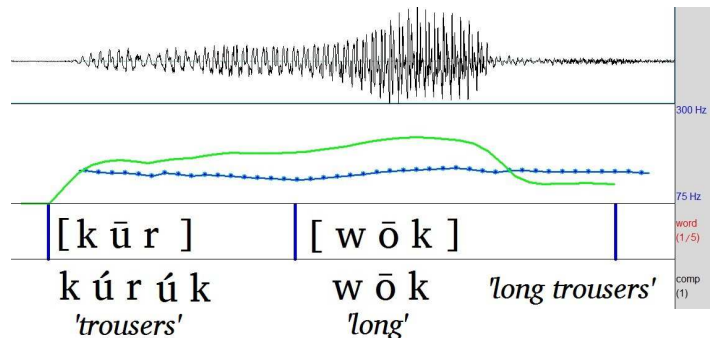
Adjectives tend to spread their tone to the left:

Kúruk ‘trousers’



kúruk ‘trousers’ + wōk ‘long’

gives kūr-wōk ‘long trousers’



#### 2.4.2 Countour tone

Countour tones occur only word finally. For example the vowels of the class

suffixes -CV are often dropped in the short form of words. So the C-final forms of

nouns are an apocoptation but the tone of the cut suffix vowel remains on the word.

long form:

short form (citation form):

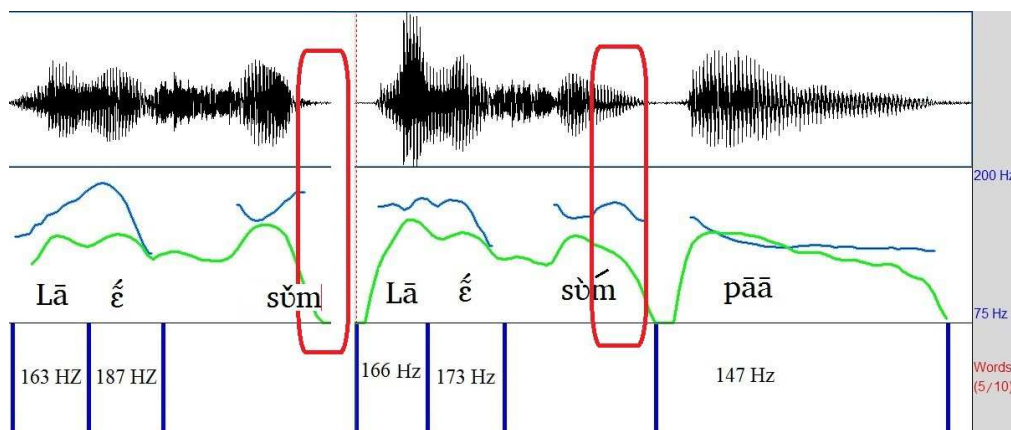
yáá + bà → yáábà ‘ancestor’

yáāp

sùŋ + á → sùŋá ‘good’

sùm

In this last example, the question is whether the tones go on the nasal *-m* or on the vowel *-v-*. The nasal coda could take on the tone (being a mora it could function as TBU) of the missing vowel (Schwarz 2005, p.49). The praat graphic shows that before pause, the tone goes on the vowel because the nasal in pre-pause position is voiceless, but elsewhere the tone goes on the nasal.



Lā é sùm. « *It is good.* »

Lā é sùm pāā. « *It is very good.* »

These countour tones at the right-hand word boundary are the result of a contraction, for example as in the above case, a lost syllable or vowel that left their tone on the noun.

Long form:

citation form:

nìṃ + bá *meat* → nĩṃ

kò + ṛá *'cry of warning'* → kǒṛ

bì + lá *'small'* → bĩl *'small'* bībís *'small plural'*

The interrogative is formed by lengthening of the short final vowel segment and the attachment of a low tone. This creates a sequence of high - low tone, in other words a contour tone. Penultimate vowels in the interrogative forms carry a downstepped high tone.

ò sòy!áà? *'Has he bathed?'*

Fó né zóò? *'Will you run?'*

### 2.4.3 Tone spreading to the right

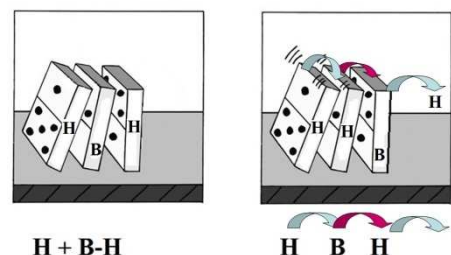
A High tone can spread to its right onto the next TBU. If its neighbour begins with a Low tone, this Low tone will give up its place and “jump” to the next TBU who

in its turn loses its tone and passes it on to the next **" Domino effect " in Kusaal**

TBU. This effect is called the “domino effect”.

Examples with noun + adjective:

pé'úk *'sheep'* + kàrók *'big'* ⇒ pé-kárùk *'big sheep'*

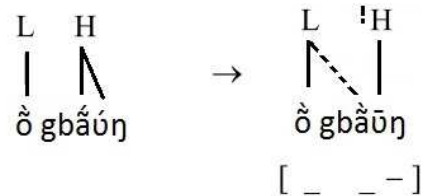


Also the Low tone of the 3<sup>rd</sup> person pronouns (e.g. ò ‘he/she’ and bà ‘they’)

spreads to the right (Schwarz 2005, p.48)

ò ‘her’ + gbáúŋ ‘book’ ⇒ ò gbăūŋ ‘her book’, whereby the second H tone is

downstepped to a Mid  $\bar{v}$ .



We can also observe a low spreading on locatives:

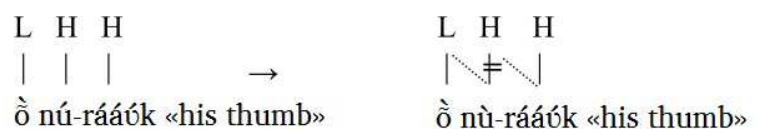
tì «tree» + zúk «head» ⇒ tò zūk «on top of a tree»



In a compound noun consisting of two high tone roots, the second root blocks the

L-spread on the second high tone, e.g. ò ‘his’ + nú-rááúk ‘thumb’

ò nú-rááúk ‘his thumb’



The main reason for this blockade to the L-spreading is the sequence of two high

tone roots that are associated with two different TBUs. If the second tone would

be a result of a high tone spreading from the first root, the L-spread would also reach that second tone which in turn would appear as a Mid tone.

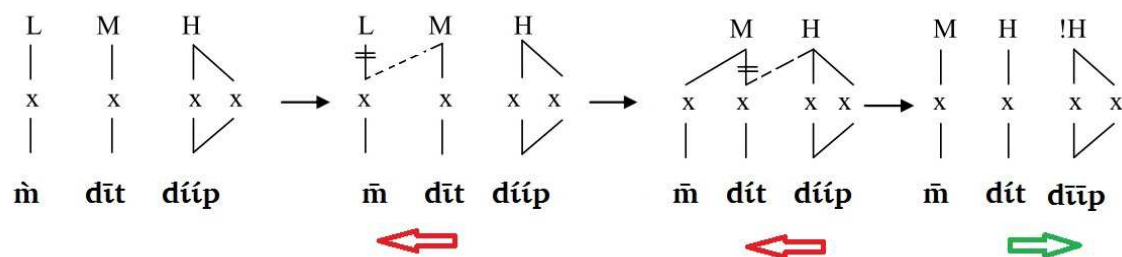
#### 2.4.4 Combination of left and right spreading

Tone can even spread in two directions in the same clause.

Example of right spreading:  $\grave{o}$  *dīt dúp*. ‘he eats food’ becomes [ $\grave{o}$  *dīt dúp*]. First low pronoun spreads on the mid verb and second the low verb now downsteps the high toned object. (Agoswin p.129).

Example of spreading in both directions: *m̄ dīt dúp* ‘I eat food’ becomes [*m̄ dīt dúp*]

First: *m̄* ‘I’ is raised by mid verb (LTR), secondly: mid verb is raised by high object (LTR), thirdly: high object is downstepped by verb.



#### 2.5 Tone on epenthetic vowels

An epenthetic vowel has to be inserted to prevent undesirable consonant clusters

\*CC. The tone they bear depends on the surrounding tones. In nouns, the tone of the primary syllable spreads over to the epenthetic vowel.



yúgúr ‘hedgehog’ + t ‘class suffix’ needing a epenthetic vowel which is High -u-

yúgúrút ‘hedgehog in its short form’

## 2.6 *Tone on verbs*

Cahill writes in his description of Konni, a related Gur language of the Oti-Volta

branch, ‘verbs have no lexical tone’ (2007, p.305) ... ‘all verbs exhibit the same

tonal behaviour related to the number of syllables in the verb’ (2007, p.386). This

is also the analysis of M. E. Kropp Dakubu describing Frafra, the immediate

neighbour of Kusaal: ‘unlike nouns, verbs have no specified tone, even on their

accented syllable’ (2006, p.54). The same applies for Buli (see Schwarz 2005,

p.19). In my research I did not find minimal pairs for verbs, this means that tone

is not lexically contrastive for verbs in the way it is for nouns. However, verbs do

have a tonal melody, for a tonal melody is assigned as part of the morphology.

The same verb has different tones in the imperfective aspect, the perfective aspect,

and imperative or in a future tense. Thus tonal melodies for verbs depend on their

context in a sentence, as well as on tense, aspect and mood. For example the verb

k<sub>5</sub> ‘to farm’ is different depending whether it is situate in a perfective negative

sentence or in a future negative sentence. e.g.  $\bar{m}$  bú kóò. ‘I did not farm.’  $\bar{m}$  kòn kòò. ‘I will not farm.’

In general, all syllables of a verb up to the final one have the same tone (i.e. there is a uniform tone for the verb stem); the affirmative marker *-me* (with its allomorphs *-ě*, *-ne*, *-ke*, *-rɪ* etc.) has a polar tone as has the completive marker *-ya*.

This seems to be in line with what Yip writes: ‘certain affixes ... show a tone that is the opposite of the neighbouring tone. Words that end in L take H affixes’.

In the domain of tones on verbs further research is needed.

## References

- Agoswin, A.M. (2010) ‘Aspects of Kusaal Phonology.’ M.Phil Linguistic Degree, Accra: University of Ghana.
- Cahill, M. (2007) *Aspects of the Morphology and Phonology of Kɔnni*. Dallas: SIL International.
- Canu, G. (1976) *La Langue Moore: Le Dialecte De Ouagadougou* Haute-Volta 16. Peeters Pub & Booksellers.
- Kropp Dakubu, M.E. (2006) ‘Tone and the Gurene Verb.’ *Studies in the Languages of the Volta Basin* 4(2), 52–62.
- Olawsky, K.J. (1996) *An Introduction to Dagbani Phonology* Theories Des Lexikons; Arbeiten Des Sonderforschungsbereichs 282, Nr. 76. Düsseldorf: Heinrich Heine Universität.
- Russell, J.M. (1985) ‘Moba Phonology.’ Sydney: Macquarie University.
- Schwarz, A. (2005) ‘Aspekte Der Morphosyntax Und Tonologie Im Buli.’ Berlin: Universität zu Berlin.
- Spratt, D. and Spratt, N. (1968) *The Phonology of Kusal* Collected Language Notes 10. Institute of African Studies, University of Ghana.
- Yip, M. (2002) *Tone*. Cambridge: Cambridge University Press.

Appendix

Language family tree:

