

VOWEL RAISING IN BABANKI

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Vowel raising in Babanki, a language of northwestern Cameroon is manifested through the alternations between **a, o** and **o, u** respectively in associative and possessive constructions just in case they are part of the sequence **Vŋ** (where V stands for vowel) as in **táj** ‘hill’ and **tó ghé** ‘your hill’; **kòŋ** ‘love’ and **kù wàyn** ‘child’s love.’ The same alternation also occurs with the V of this **Vŋ** sequence in certain verbal constructions. To account for this vowel raising, it is proposed that this is the result of the association of the floating features [+hi,+ATR,+bk] which constitute the underlying features of the vowel **i** that never surfaces after the **ŋ** sound. The analysis proposed in this paper also exploits the featural make-up of the vowels as underlyingly underspecified.

Le rehaussement des voyelles en babanki, langue du Nord-Ouest Cameroun se manifeste par les alternances entre **a, o** et **o, u**, selon le cas, dans les tournures associatives et possessives, là où elles font partie d'une séquence **Vŋ** (où V représente une voyelle), comme dans **táj** 'colline' et **tó ghé** 'ta colline', **kòŋ** 'amour' et **kù wàyn** 'amour d'enfant'. La même alternance se présente dans la V de cette séquence **Vŋ** dans certaines tournures verbales. Pour expliquer ce rehaussement vocalique on propose qu'il résulte des traits flottants [+hi,+ATR,+bk] (soit [+haut,+ATR,+postérieur]), lesquels sont les traits sous-jacents de la voyelle **i** qui ne se manifeste jamais après **ŋ**. L'analyse que propose cette étude exploite également l'ensemble des traits des voyelles dont la spécification sous-jacente reste incomplète.

0. INTRODUCTION

In Babanki, a Grassfields Bantu language of northwestern Cameroon, there is vowel raising where the back vowels **a, o** alternate with **o, u** respectively in associative and possessive constructions just in case they are part of the sequence **Vŋ** (where V stands for vowel) as in **táj** ‘hill’ and **tó ghé** ‘your hill’; **kòŋ** ‘love’ and **kù wàyn** ‘child’s love.’ The same alternation also occurs with the V of this **Vŋ** sequence in certain verbal constructions. This paper seeks to account for this vowel raising by proposing that this is the result of the association of the floating features [+hi,+ATR,+bk] which constitute the underlying features of the vowel **i** that never surfaces after the **ŋ** sound. The analysis proposed in this paper also exploits the featural make-up of the vowels as underlyingly underspecified. The paper is organized as follows. In §1, we briefly present the problem of vowel raising in nouns through typical examples; in §2, we present the featural make-up of the Babanki vowels; in §3, we propose an account for vowel raising in nouns; and in §4, we account for vowel raising in the verb.*

* The data in this paper were obtained from Akumbu Pius and Esther Phubon Chie, two native speakers of Babanki to whom I (the first author) am very grateful.

(2) a.	mbàŋ	walking stick	mbò wàyn	child's walking stick
	ntàŋ	rope	ntò wì?	person's rope
	sáŋ	corn	só fòyn	fon's corn
	nsáŋ	tail	nsó nyàm	cow's tail
	ŋkáŋ	corn beer	ŋkó wòŋ	market corn beer
	táŋ	hill	tó Kùmbuè	Akumbu's hill
	àyáŋ	mat	àyò wàyn	child's mat
	kàkáŋ	dish	kàkó wì?	person's dish
	àsáŋ	maize	àsó fòyn	fon's maize
	àyáŋ	root	àyó ìgòŋ	root of tree
	ndzàŋ	song	ndzó wú kàbén	dancer's song
	kàŋ	sky	kò nyàm	animal's sky
	sàŋ	moon	sò lùwàyn	mother's moon
b.	sòŋ	tooth	sú wàyn	child's tooth
	ndóŋ	cup	ndú wàyn	child's cup
	kóŋ	pestle	kú wàyn	child's pestle
	ghóŋ	spear	ghú wàyn	child's spear
	kòŋ	love	kù wàyn	child's love
	nyìŋgòŋ	God	nyìŋgù wàyn	child's God
	tsòŋ	thief	tsù fòyn	fon's thief

What is curious about these alternations is that they just occur only when the noun is in the possessive form or in the associative constructions. When used with an adjective, or with any other construction, the alternation does not occur as shown below.

(3) a.	mbàŋ yì	that stick
	sáŋ yì	that corn
	nsáŋ yì è	that tail
	tàŋ yé	this hill
	sáŋ yeà	this corn
b.	mbàŋ ó bǒ	red stick
	mbàŋ ó tsén	another stick
	kú mbàŋ á mò	give the stick to me
	kú mbàŋ à wén	give the stick to him
c.	sòŋ bó ghó	a red tooth
	sòŋ tsé ghó	another tooth
	kú sòŋ yì	give that tooth

Unlike **Akɔɔse** where the velar nasal **ŋ** deletes intervocalically according to Robert Hedinger (personal communication), the forms in (3b) show that it does not delete in Babanki. An account of this **ŋ**-deletion will be proposed later on.

This vowel raising does not affect the high back vowels, but does affect the schwa and the high front vowel as shown in the following examples.

(4) a.	m̀dz̀n̄	urine	m̀dz̀ m̀ẁm̀	my urine
	ndz̀n̄	lie	ndz̀ ẁ	your lie
	lyũ̀	guitar	lyũ̀ ẁ	your guitar
	əz̄w̄n̄	breast	əz̄w̄ ghóm	my breast ¹
	nỳn̄	hair	nỳ ghóm	my hair
b.	ŋg̀	house	ŋg̀ ghóm	my house
	ʦ̄ŋg̀	door	ʦ̄ŋg̀ ghómə	my door
	k̀b̀	compound	k̀b̀ k̀m̀	my compound
	k̀l̀	bamboo	[k̀b̀: k̀m̀]	
			k̀l̀ k̀k̀	his bamboo

Notice in these cases that the **ŋ** segment deletes in the associative constructions, that the back vowels **i**, **u** do not change and that the high front vowel surfaces as the central (slightly back) vowel **ɪ** as shown in (4a). As for the forms in (4b), they show that the schwa is either replaced by the vowel **ɪ** or, if it remains, it is followed by this vowel **ɪ**. In this case, the phonetic output is a lengthened rounded upper mid front vowel [ø] which is not part of the phonemic inventory of the Babanki vowels.²

That this vowel raising is restricted to forms whose final consonant is **ŋ** is shown in the following data.

(5)	ŋkám	thousand	ŋkám ə wén	his thousand
	nyàm	cow	nyàm ə ẁ	your cow
	ndzàm	axe	ndzàm ə vəwé	their axe
	ŋg̀m	plantain	ŋg̀m ə wáyn	child's plantain
	ntóm	fireplace stone	ntóm ə ẁ	your fireplace stone
(6) a.	k̀ŋgwá	limestone	k̀ŋgwá ghóm	my limestone
	b̀sà	purse	b̀sà yés	our purse
	shúkà	sugar	shúkà ẁ	your sugar
b.	k̀mb̀	bag	k̀mb̀ khóm	my bag
	k̀f̀	thing	k̀f̀ k̀wén	his thing
	k̀	money	k̀ wáyn	child's money

Whereas the forms in (5) end with the nasal **m** and the forms in (6) end in a vowel, their possessive forms do not exhibit vowel raising.

¹ Strictly speaking, the process illustrated in (4) for the high front vowel is not vowel raising, rather vowel backing.

² Akumbu Pius and Esther Chie, our informants, were unaware of the existence of this vowel [ø] in such words. In fact, Akumbu had to pronounce these forms several times to realize that, definitely, the vowel in the associative constructions was different from a schwa. This sound is not quite round as the regular [ø] sound. While checking the form, Esther pointed out that one cannot say **k̀l̀ k̀k̀** or **ik̀k̀** by itself.

So far, vowel raising has originated and resulted in a back vowel. However, there is a limited set of data where the alternation is between ɔ and e as shown in the following forms.

- (7) a. **kwóŋ** arm **kwé ghómó** my arm³
kàkwóŋ bone **kàkwé khóm** my bone
mbwóŋ palm maggot **mbwé ghóm** my palm maggot
kàbóŋ compound **kàbé khóm** my compound.
- b. **kwé wàyn** child's arm (cf. **kwóŋ** arm)
kàkwóŋ kə wàyn child's bone (cf. **kàkwóŋ** bone)
mbwé wàyn child's palm maggot (cf. **mbwóŋ** palm maggot)
kàbóŋ kə wàyn child's compound (cf. **kàbóŋ** compound)
- c. **à-kwé vyúnó** children's arms
ə-kwé vyúnó children's bones
mbwóŋ sá vyúnó children's palm maggots
mə-bóŋ mə vyúnó children's compounds.

The alternation $\text{ɔ} \sim \text{e}$ is clearly illustrated in (7a, b). The forms in (7c) are in plural. They show that, when the velar nasal ŋ is followed by an overt associative marker, it does not delete. This strongly suggests that what causes the ŋ deletion is a covert associative marker that follows it.⁴

Before proposing an account for this vowel raising, consider the following forms. (Here AM stands for associative marker).

- (8) a. **tàtóŋ** navels **tàtóŋ tə fòyn** fon's navels
navels AM fon
- kàndóŋ** neck **kàndóŋ kə wàyn** child's neck
neck AM child

³ Robert Hedinger (personal communication) has suggested that the vowels o and ɔ and also e and ɛ may not be distinctive underlyingly as is the case in Kom, a neighboring Cameroonian language. We have checked this information with Akumbu Pius by asking him to find minimal pairs that could show whether these suspicious pairs were distinctive. He failed to find any minimal pairs but he rather suspected that o tends to be produced as ɔ in closed syllables. He gave such words as: **tóŋ** 'navel', **kè-zòŋ** 'thanks', **kwóŋ** 'hand', **kóŋ** 'pestle', **tóf** 'brain', **fwóf** 'wind', **tóntó** 'greet' vs. **mò** 'I', **bò** 'two', **có** 'pass', **wú-tó** 'one who stays', **wú-dó** 'one who stretches'. The same observation could be made of the vowels $\text{e} \sim \text{ɛ}$ as in **kàbén** 'dance', **yès** 'us', **yén** 'see (imp)', **fə-sés** 'pepper' vs. **mbé** 'chisel', **bè** 'loss', **sè** 'grave', **nsé** 'ground', **ŋkyè** 'basket'.

⁴ One anonymous JWAL reviewer has suggested that the covert associative marker that provokes the deletion of the velar nasal may be related to some classes only and that it was necessary to identify the class markers of the nouns. The forms that are discussed in both (7c) and (8) show that the crucial factor that determines this velar nasal deletion is rather the absence of an overt associative marker that follows it. In an appendix to this paper, we will give the different class markers and indicate those that do not have overt associative markers.

	kàláj	cocoyam	kàláj kə wàyn	child's cocoyam cocoyam AM child
b.	tój	navel	tú fòyn	fon's navel
	ndòj	neck	ndù wàyn	child's neck
	láj	cocoyam	ló wàyn	child's cocoyam

Although these forms end in the sequence **Vŋ**, notice that vowel raising does not show up in their associative constructions when there is an overt associative marker as in (8a). Notice also that these forms in (8a) have a prefix which, according to Esther Phubon Chie (personal communication), conveys the meaning of 'each.' When used without this prefix as in (8b), the vowel in the **Vŋ** sequence undergoes vowel raising. We take the forms in (8b) as the ones giving the clue for the origin of vowel raising in these nouns: it is presumably caused by a vowel that is the associative marker, just as **tə**, and **kə** in (8a). As for the exact shape of this associative marker, it is hard to tell, as it does not manifest itself in surface representation. However, we assume that this vowel is **i**, that is, a high central vowel with the features [+back] and probably [+ATR]. We further assume that the features of this vowel are autosegmental in nature. This will be made clearer in the analysis.

To summarize the problem of vowel raising in Babanki nouns, any account should be able to explain (1) why vowel raising only occurs in the associative and possessive constructions, (2) why only back vowels result from vowel raising, (3) why the output vowel in the vowel raising process is a [+ATR vowel] (cf. the alternations **a~o**, **o~u**, **ɔ~e**), (4) why vowel raising only occurs in the sequence **Vŋ**.

2. VOWEL FEATURES OF BABANKI AND UNDERSPECIFICATION

Using the distinctive features of Sound Patterns of English (Chomsky & Halle 1968), the full specification of each of the nine vowels appears as in (9).

(9) Full specification of Babanki vowels

	I	Í	é	e	á	a	Ó	o	u
high	+	+	-	-	-	-	-	-	+
Back	-	+	-	-	-	+	+	+	+
ATR	+	+	-	+	-	-	-	+	+
Low	-	-	-	-	-	+	-	-	-
Round	-	-	-	-	-	-	+	+	+

Assuming the theory of radical underspecification (Archangeli 1984, Archangeli & Pulleyblank 1986) whose main tenets are that redundancy features are removed from the underlying representation of the segments and that they are assigned by default rules, the above segments can be represented with the following underspecified features.

(10) Underspecified matrices of Babanki vowels.

	i	í	é	e	a	o	u
high	+	+					+
Back		+				+	+
ATR			-				
Low					+		
Round						+	+

To obtain the full specification in (9) from these features, we assume the redundancy rules in (11) where (11a,b,i) are complement rules and (11c,d,f,g) are default rules, and (11e) is a postlexical rule.

- (11) a. [+low] → [+back]
 b. [+high] → [+ATR]
 c. [] → [-high]
 d. [] → [-low]
 e. [-high] → [-ATR]/ --- C
 [-low]
 f. [] → [+ATR]
 g. [] → [-back]
 h. [] → [-round]
 i. [+low] → [-ATR]

Some brief comments on the motivation of these rules and what they are meant to accomplish are in order here.

To implement the suggestion by Robert Hedinger (personal communication) that the mid vowels [o, ɔ] and [e, ɛ] are not contrastive, we have retained the vowel [e] with no

features in the underspecified matrix. Notice that we have not given it the feature [+ATR] because we have realized that it is the [-ATR] value that we should retain in the underlying representation of the schwa to distinguish it from the vowel [e]. As will become clearer later, this will allow us to account for the alternations [ɔ ~ e] in such words as **kwóŋ** ~ **kwé** ‘arm.’ The [-ATR] mid vowels [ɔ, e] will be the result of a postlexical rule in (11e) which can only apply after these vowels have been specified for the features [-high] and [-low] that are assigned by default rules.

Rule (11a) says: assign the features [+back] to low vowels. Since there is only one single low vowel and that it is back, it redundantly gets the [+back] feature. The low vowel will also be assigned the feature [-ATR] by rule (11i) later on, as a phonetic implementation rule, presumably because the features [+low] and [-ATR] are in sympathetic relation as argued in Archangeli and Pulleyblank (1993).

Rule (11b) says: assign the feature [+ATR] to high vowels. This rule will apply early in the phonology as it will be responsible for the delinking of the feature [+low] in associative constructions as will be made explicit in the derivations.

Rules (11c, 11d, 11f, 11g, and 11h) say: assign the features [-high], [-low], [+ATR], [-back] and [-round] respectively to vowels that are not specified for these features.

3. ACCOUNT OF VOWEL RAISING IN NOUNS

After thus giving the underspecified features of Babanki vowels, let us account for the data in (1) samples of which are repeated here for convenience.

(12) mbàŋ	walking stick	mbò ghóm	my walking stick
		mbò wàyn	child’s walking stick

As was made explicit earlier, we assume that the associative marker in the second form is the vowel **ɪ**. Notice that this same vowel can also be assumed as being underlying in the possessive form, in other words, the phrase can be literally translated as ‘walking stick of me.’ Such an assumption nicely explains why only the associative constructions and the possessive forms exhibit vowel raising.

Let us further assume that an important ingredient in the derivation of the surface forms is their syllabification. More precisely, each segment must be prosodically licensed by belonging to a syllable (Ito 1986). An observation of the surface forms of Babanki suggests that the core syllable in Babanki is CV. The second C in a CVC root syllabifies as a coda only if it cannot syllabify as an onset to a vowel.⁵

Since the nasal [ŋ] does not surface in the associative construction, we propose that it deletes due to the following rule:

⁵ There are cases like **wàyn** ‘child’ that presumably derives from /wain/ as suggested in Akumbu (1999). The high vowel devocalizes and syllabifies in a coda position.

& Bitjaa-Kody 2000). When the other redundancy rules apply, the vowel **a** will be specified for the missing features, that is [-lo, -hi], that is the vowel **o**. Notice that the feature [-round] will not be assigned to this vowel because a vowel bearing the features [+back, -low, -hi] can only be the vowel [o].

At this level, we have mentioned the [+hi] docking as preceding the [+ATR] docking in the derivation. We would like to point out that this [+hi] docking rule does not apply in the above derivation because of the presence of [+low] in the word **mbaŋ**. These two features cannot link to the same vowel because a vowel cannot be [+low] and [+high] at the same time for phonetic reasons. The effect of [+high] on the raising of a back mid vowel is demonstrated in the derivation of the alternation **kòŋ** ~ **kù**.

(16) **kòŋ** love **kù wàyn** child's love

UR /	koŋ	koŋ	i /
	+bk	+bk	+bk
	+round	+rd	+hi
Syllabification			
	σ	σ	σ
	/ \	/ \	/ \
	koŋ	k oŋ	i
+hi→+ATR	koŋ	koŋ	i
	+bk	+bk	+bk
	+rd	+rd	+hi
			+ATR
ŋ-del	---	k o	i
[+hi] docking	---	ko	i
		+bk	+hi
			+ATR
			+bk

(After the application of other rules, e.g. redundancy rules, tone rules)

Output: **kòŋ** **kù**

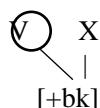
In this derivation [+hi] associates to the vowel as there is no feature like [+low] that could prevent it from linking. When the other redundancy features are assigned, the vowel will have the features [+hi +ATR +bk -lo] which correspond to the vowel **u**

Let us now address the alternation **ɔ** ~ **e** exhibited in the forms in (7), a sample of which is repeated here for convenience.

(17) **kwóŋ** arm **kwé ghómá** my arm

To account for this alternation, we posit a vowel **e** in the input form, i.e. /kweŋ/. Since the vowel **e** is completely underspecified, if we assume that, in the isolation form, this vowel gets the feature [+back] lexically from **ŋ**, then we can account for the reason why the form surfaces with **ə**, that is, when the remaining features are assigned by redundancy rules, namely [-hi -lo -ATR]. In other words, we are assuming the following rule:⁶

(18) Back spreading.



This rule says: a [+back] feature spreads onto a featureless vowel (represented here by an encircled vowel).

To get the correct result, particularly for the raised vowel in the associative construction, we further assume that a condition is placed on the assignment of the ‘high’ and ‘back’ docking rules’, namely that a floating [+high] or ‘+back’ does not apply on a form that is completely featureless. This will prevent the vowel in the associative construction from becoming a high back vowel. The application of these rules is illustrated in the following derivations.

(19) **kwóŋ** arm **kwé ghómá** my arm

UR /	kwVŋ +bk	kwVŋ	i /
		+bk	+bk
			+hi

Syllabification

σ	σ	σ
/ \	/	/
kwVŋ	kwVŋ	i

⁶ Akumbu (1999) contains no **eŋ** sequence. When I checked the few **eŋ** sequences in Chie (1999), they turned out to be **əŋ** sequences, as produced by the author herself, Esther Phubon Chie.

+hi→+ATR	kwVŋ	-----	kwVŋ i +bk +hi +ATR
ŋ-del	---		k wV i
[+hi] docking	---		---- (N/A)
[+bk] docking	--		--- (N/A)
Back spreading	kw V ŋ \ +bk		

(After the application of other rules, e.g. redundancy rules, tone rules)

	kwVŋ		kwV
	+bk		-bk
	-hi		-hi
	-lo		-lo
	-ATR		+ATR
	ɔ		e
Output:	kwóŋ		kwé

Presumably, the features [+hi] and [+bk] which do not associate get stray erased. The assignment of the features [+ATR] in the associative construction is the result of the default rule whereas [-ATR] in the non-associative word is the result of the complement rule (11e) that says that a mid vowel is assigned the feature [-ATR] when it is followed by a consonant. Notice also that the default feature [-round] will not be assigned in the word **kwVŋ** because of the presence of the features [+back, -hi, -lo] which can only be a round back vowel. As shown in the derivations, the conjugation of the different features result in **ɔ** for the vowel in the isolated form and **e** in the associative construction form.

In the following section, we show how this analysis of vowel raising in nouns can be extended onto verbs.

4. VOWEL RAISING IN VERBS

Consider the following data:

(20) a.	ɔ-tàŋ	to stay	wú-tǒ	one who stays
	ɔ-sàŋ	to dry	wú-soâ	one who dries
	ɔ-tsàŋ	to display	wú-tsǒ	one who displays
	ɔ-dàŋ	to stretch	wú-dǒ	one ho stretches

ǎ-fáŋ	to remain	wú-fó	one who remains
ǎ-káŋ	to fry	wú-koà	one who fries
ǎ-wáŋ	to spread	wú-woà	one who spreads
ǎ-táŋ	to count	wú-tó	one who counts

- b. **ghə tǒ** he's staying
wù tǒ you are staying
mà tǒ I'm staying
yé tǒ we're staying
ghé toâ you're staying
vəwé tǒ they are staying

As shown in these forms, the vowel **a** of the verb root also raises to [o] in the forms in the right hand column in (20a) (a relative construction) and those in (20b) (a progressive form). In (20a), the initial vowel ə is the infinitive marker. Consider also the forms in (21).

(21) a.	ǎ-ban	to hit	wú baná	one who hits
	ǎ-bīnā	to sleep	wú bīnā	one who sleeps
b.	ǎ-kū?	to climb	wú kú?uà	one who climbs
	ǎ-nyī	to drink	wú nyí	one who drinks
	ǎ-ví	to come	wú ví	one who comes

Notice that vowel raising does not occur in (21) because the root vowel is not part of a **Vŋ** sequence as is the case in (20). The forms in (22) also show that vowel raising occurs when the vowel is **o** and is part of a **Vŋ** sequence in the root.

(22) a.	ǎ-səŋ	to snatch	wú-sǔ	one who snatches
	ǎ-təŋ	to dip	wú-tǔ	one who dips
	ǎ-bəŋ	to be good	wú-buâ	one who is good
	ǎ-kəŋ	to love	wú-kǔ	one who loves
	ǎ-tŋ	to blow	wú-tú	one who blows
	ǎ-bŋ	to pick	wú-buà	one who picks
	ǎ-fŋ	to fall	wú-fú	one who falls
	ǎ-tsŋ	to steal	wú-tsú	one who steals
b.	mà sǔ	I'm snatching		
	wù tǔ	you are dipping		
	ghè buâ	he is being good		

Like vowel raising in the nouns, the V in the **Vŋ** sequence does not raise automatically when it occurs in medial position as exemplified below.

- (23) **mà kó kòŋ wù** I want to love you
 I want love you
mà kó wàŋ dzisó I want to spread a dress
mà kó sàŋ bólòŋ I want to dry groundnuts

Vowel raising does not also occur when the verb is for example conjugated in the future tense as in (24a) or when used in an exclamation as in (24b).

- (24) a. **mà né tàŋ** I will stay
wù né tàŋ you will stay
mà né sòŋ I will snatch
wù né sòŋ you will snatch
- b. **wù ntāŋ** (exclamation) so you stayed !
wù nsāŋ (exclamation) so you dried !
wù nsōŋ (exclamation) so you snatched !
wù ntōŋ (exclamation) so you dipped !

Because vowel raising is restricted to certain forms, namely, the relative constructions and the progressive forms, we propose that these forms be represented underlyingly with the vowel **i** as their formative. In other words, the following forms are thus underlyingly represented.

- (25) a. **ś-tàŋ** to stay / **ś-taŋ** /
ś-tòŋ to dip / **ś-toŋ** /
- b. **wú-tǒ** one who stays / **wu tàŋ-i** /
wú-tǔ one who dips / **wu tòŋ-i** /
- c. **wù tǒ** you are staying / **wù tàŋ-i** /
wù tǔ you are dipping / **wù tòŋ-i** /

Once this vowel **i** is posited in the underlying representation, the derivation proceeds as in nouns, that is, the vowel **i** is underlyingly specified with the features [+hi], [+ATR], [+bk]. Lexically, the form is syllabified, that is **i** is syllabified with **ŋ** as its onset. This is followed by the assignment of the feature [+ATR] on high vowels, then the deletion of **ŋ** and the subsequent [+hi] and [+bk] docking, and later the redundancy rules and other rules such as the tonal rules which will give the correct vowel raising output.

So far, we have simply assumed that the vowel triggering vowel raising in both nouns and verbs is [**i**]. The question now is: what is the motivation for positing **i** as the underlying segment in these forms?

Although it is hard to come up with strong evidence, one reason to believe that it is the vowel **i** that causes vowel raising can be adduced from the forms in (4) a sample of which is repeated here for convenience.

(26) a.	məd̀zìŋ	urine	mədzĩ mwìmà	my urine
b.	nyìŋ	hair	nyì ghóm	my hair
c.	ŋgə̀ŋ	house	ŋgì ghóm	my house
d.	kəĺŋ	tree sp.	kəĺ ìkəḱ	his bamboo
	kìb́ŋ	compound	kìb́ ìkóm	my compound
			[kìb́: kóm]	

When the vowel in the **Vŋ** is **i**, notice that in the possessive form, only the **ŋ** deletes as our rule of **ŋ**-deletion would predict as shown in (26a). Because the vowel **i** that we are positing as causing the deletion of **ŋ** has the underlying features of this **i** in the **Vŋ** sequence, we naturally expect no change to occur to this vowel. When the vowel in the **Vŋ** is **[i]**, we rightly expect **[i]** in the associative construction because the front high vowel in the input will have received two new features, [+back] and [-round] as shown in (26b). If our assumption that the schwa is underlyingly associated with the feature [-ATR] is correct, we assume that the schwa may delete when followed by the vowel **i** as in (26c) after the **ŋ**-deletion rule has applied, or it may not delete, and in that case, we obtain the form such as (26d) where both vowels surface.

Even when the vowel corresponding to the schwa is **[ø]** in the associative construction as shown in (26d), one can still surmise that **[ø]** is basically the combination of the features [+ATR+bk -rd] from **[i]** together with the features [-lo, -hi] that are assigned by the redundancy rules. The non assignment of the feature [+hi] of the **[i]** vowel would result from the fact that the schwa is underlyingly [-ATR] and that [+high] and [-ATR] are not in a sympathetic relationship (Archangeli and Pulleyblank 1993).⁷

It is far harder to find evidence for positing **i** in the deverbatives. But if Babanki as a Bantu Grassfields language could still have traces of the agentive marker, one may speculate that the agentive marker of ProtoBantu **-i-** has become **i** in certain Babanki forms. This agentive marker **-i-** is illustrated in the following Narrow Bantu languages: Luganda, Kinande, and Swahili:

(27)	o-ku-lim-a	to work	o-mu-lim-i	worker (Luganda)
	eri-hum-a	to hit	o-mu-hum-i	hitter(Kinande)
	ku-longofy-a	to lie	mu-longof-i	liar (Swahili)

⁷ The features [+back -round] in the sound **[ø]** phonetically translate the fact that the sound is central as opposed to **[e]** or **[o]**. In fact, the way Akumbu, the informant, pronounced it, it was clearly different from a schwa but not quite a round vowel as well. Unlike the forms that have been analyzed in the text, here we must assume that the vowel of the schwa is assigned the features [+back - round] of the vowel **[i]**. This sound was not produced by the other informant, Esther P. Chie.

In all these forms, the final **-i-** is agentive. Because it is a high vowel, it is possible that Babanki has retained its height and ATR nature and has only made it central, that is with a [+back] feature.

To conclude, the vowel **i** has been posited in this language as being the origin of vowel raising in Babanki. It has been posited mainly as an associative marker and that is why vowel raising occurs only in the possessive and associative constructions because these are the forms that independently use the associative marker. Crucial for the analysis of vowel raising in this paper is the fact that the vowels in Babanki are underspecified lexically. Only some features are manipulated lexically. Because the vowel **i** is [+hi, +ATR, +bk], the output vowel is a [+ATR vowel] which, in most cases is back. The marginal case where the output vowel in vowel raising is **e** has been accounted for by positing a completely unspecified vowel in the input form. It has also been argued that vowel raising is the result of the deletion of **ŋ** in the **Vŋ** sequence when it is followed by the vowel **i** and that, subsequently the features of **i**, which are autosegmental, associate to the V of the **Vŋ** sequence.

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APPENDIX

In this appendix, we give the table of the noun class system as well as examples of the associative constructions in Babanki to show which nominal classes use an associative marker.

Class	Prefix	Example	Possessive 'my'	Possessive 'your'	Demonstrative 'this'
1	w-	wàyn 'child' wìh 'person'	ghóm	wuè	yèn
2	v-	vwónà 'children' vìh 'people'	vwómó	vyà	vé:
4	mèè-	mà-nyì 'knives'	mwómà	myà	mèn

		mà-sés ‘peppers’			
5	éè-	à-sáj ‘corn’ à-wúm ‘egg’	ghómó	wú	yé:
6	aè-	à-sáj ‘corn’ à-wúm ‘eggs’	ghómó	wú	yé:
7	kéè-	kà-káj ‘pan’ kè-mboè ‘bag’	khóm	kyàè	kèn
8	éè-	à-kàŋ ‘bags’	vwómó	vɣá	vé:
9	∅-	mbàyn ‘fence’	ghóm	wù	sèn
10	-sèà	mbàyn-sàà ‘fences’ nyíŋ-só ‘beard’	shóm	shyà	sèn
13	éè-	tà-ŋgòm ‘plantains’ tà-tàŋ ‘hills’	tyóm	tyà	tèn
19	féè-	fà-nyì ‘knife’ fà-sés ‘pepper’	fwóm	fyàè	fèn

Forms in the associative construction:

- a. **wìh wàyn** child’s person
c1
wèy wìh someone’s child
c1
mbà kà-kùm juju’s fence
c9
nyìŋ kà-chú head’s hair
c9
nyíŋ-só ké-zhèlè armpits’ hair
c10
- b. **à-mbò wàyn /à-mbò wàyn/** child’s bag
c8
à-kó fòyn /à-kó fòyn/ chief’s money
c8
- c. **wú-lím mà-wùwí** woman’s husband
c1 AM
và-lím vó vîh people’s husbands
c2 AM
mà-nyì mà wìh someone’s knives
c4 AM
à-wúm á wùwí woman’s egg
c5 AM
à-wúm á kyĩ women’s eggs

c6	AM		
		kə-kóŋ ká wén	his half (portion).
c7	AM		
		kà-mbò kó wáyn	child's bag
c7	AM		
		tə-tóŋ tə fòyn	fon's navels
c13	AM		
		fə-nyì fə wìh	someone's knife
c19	AM		

The above examples illustrate the following facts: Given N1 AM N2 where N1 means the first noun, AM means the associative marker, and N2 the second noun,

- a. no associative marker follows the nouns in classes 1, 9, and 10 in N1 position;
- b. the forms in class 8 have presumably a floating H tone as the associative marker which associates to the noun in the N1 position (to explain the rising tone in the noun of the first example).
- c. The remaining classes have an overt associative marker that agrees with the noun in N1 position.