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Babanki coda consonant deletion and vowel raising: A case of allomorphy*

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1 Introduction

The purpose of this paper is to account for two phonological alternations that occur on nouns, verbs, deverbal adjectives, and pronouns in Babanki, a Grassfields Bantu language spoken in Cameroon.¹ The alternations involve the deletion of certain coda consonants between two underlying vowels and vowel raising. Mutaka and Chie (2006) have noted that there is vowel raising in associative, possessive, and certain verbal constructions in the language. This can be illustrated in (1) where the deletion of /ŋ/ is accompanied by a counterfeeding opacity (Kiparsky, 1973; McCarthy, 1999, 2006) raising of /a/ to [o] and, separately, /o/ to [u].²

(1) *Deletion of ŋ*

ə́sáj	‘corn’	ə́sō: ghómá	‘my corn’	/ə́-sáj ə́-ghómá/
ə́sój	‘tooth’	ə́sū: ghómá	‘my tooth’	/ə́-sój ə́-ghómá/
ək̀wój	‘arms’	ək̀wō: ghómá	‘my arms’	/ə́-k̀wój ə́-ghómá/

The data above show that a noun root undergoes a number of changes when modified by a possessive adjective. The velar nasal is deleted, /a/ and /o/ become [o] and [u] respectively and are lengthened, and the high tone becomes mid. Counterfeeding opacity is seen in the data in that while /a/ goes to [o], /o/ goes to [u] separately, allowing a surface [o] which would otherwise have gone up to [u].

One question that arises from (1) is: Does the possessive adjective prefix ever surface, or is it an abstract underlying form chosen to make the $V_{\eta} \sim V$: alternation work out? I return to the issue in Section 4 where I illustrate that this vowel actually surfaces.³

The changes above fail to occur if /ŋ/ is not followed by a vowel in the underlying representation (UR), as illustrated in the second example in (2).

(2) *No deletion of ŋ*

ək̀áj	‘dishes’	ək̀ó: wì?	‘dishes of person’	/ək̀-áj é wìk/
k̀ək̀áj	‘dish’	k̀ək̀áj ʔk̀é wì?	‘dish of person’	/k̀ək̀-áj k̀é wìk/

There are two possible ways to account for these changes, namely, a rule- or constraint-based phonological analysis which starts with an input from which an output is derived, and a precompiled

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¹Although native speakers of the language prefer to use Kejom when referring both to the language and the two villages where it is spoken, I have chosen Babanki, the administrative name by which the language and the people are widely known.

²The data in this paper are drawn from Mutaka and Chie (2006) and a lexical database of 2,005 entries in Filemaker Pro™.

³ə́- is the class prefix for most noun classes. In some classes there is also a class suffix: ə́-ghóm-é ‘class 5 and 8’, ə́-kóm-ké ‘class 7’, ə́-shóm-sé ‘class 10’, ə́-tyóm-tó ‘class 13’, é-fwóm-fé ‘class 19’ while class 1 and 9 are not marked: ə́-ghóm. Class 6 alone has ə́-: ə́-ghóm-é. For more on the Babanki noun class system, see Akumbu and Chibaka (2012).

phonology approach in which allomorphs are listed with appropriate frames where they are inserted (Hayes, 1990). In the first approach, I would propose underlying segmental forms equivalent to the isolation forms, for example, /ə-sáj/ ‘corn’, /ə-ghómó/ ‘my’.⁴ However, the conditions that specifically determine the vowel changes do not lend themselves to an elegant account within a phonological framework such as rule ordering or constraint interaction. I therefore propose an account positing allomorphs and argue that for every word involved in the alternations, the grammar automatically generates allomorphs marked for specific phonological instantiation frames (Pater et al., 2012; Archangeli and Pulleyblank, 2015).

After an introduction to the phonology of Babanki in Section 2, I provide an overview of phrasal allomorphy in Section 3. In Section 4, I discuss the different contexts where these coda consonants are deleted and then show how allomorph selection is accomplished in Babanki. A brief conclusion ends the study in Section 5.

2 Babanki phonology

Babanki has 25 phonemic consonants (3), 8 vowel phonemes (4) and two underlying tones: /H/ and /L/.⁵

(3) Consonant phones

	Bilabial	Labiodental	Alveolar	Postalveolar	Palatal	Velar
Stops	b		t, d			k, g
Nasals	m		n		ny [ɲ]	ŋ
Fricatives		f, v	s, z	sh [ʃ], zh [ʒ]		gh
Affricates		pf, bv	ts, dz	ch [tʃ], j [dʒ]		
Liquids			l			
Glides	w			y [j]		

(4) Vowel phones⁶

	Front	Central	Back
High	i	ɨ	u
Mid	e	ə	o
Low		a	

Syllable structures in Babanki include V, CV, CGV, CVC and CGVC, where G stands for glide. Words in the language mostly consist of a monosyllabic root with a possible V or CV prefix and/or suffix. Stems always begin with a consonant, while the only vowels that can occur at the beginning of a word are the prefixes *a-* and *ə-*. Nouns can take a prefix or (in class 10) a suffix while verbs can have a prefix (infinitive) or other suffixes and extensions. All of the consonants in (3) can occur stem-initially. Six consonants (/f, s, k, m, n, ŋ/) may occur in stem-final (coda) position. In this position, /k/ is realized as a glottal stop [ʔ]. Coda consonants are shown in (5).

⁴The exact tonal representations are more complex than are generally shown in this paper so as not to distract from the discussion. See Hyman (1979) and Akumbu (2016) for a detailed description.

⁵On the surface, Babanki contrasts three level tones, H, M, L, plus a downstepped High (+H). It also has contrast between a falling and a level low tone before pause (Akumbu, 2016).

⁶In Babanki, /e/ and /o/ are realized as [ɛ] and [ɔ] respectively in closed syllables (Mutaka and Chie, 2006, p. 75).

- (5) *Coda consonants*⁷
- ə-wúm ‘egg’
 - fə-nyín ‘bird’
 - jìn ‘hunger’
 - á-^hchíf ‘to advise’
 - á-bìs ‘to scatter’
 - á-^hkú? ‘to climb’

The following table shows vowels that contrast before each of the six coda consonants.

- (6) *VC rimes*

	m	n	ŋ	f	s	ʔ
i		əfwín ‘leg’			á-bìs ‘to scatter’	əbwíʔ ‘hit’
e	əbè̄m ‘belly’	á ^h bén ‘dance’		kəfyè̄f ‘thickness’	əchès ‘pour’	əbè̄ʔ ‘seize’
a	əbàm ‘heat’	əbàn ‘hate’	əbàŋ ‘scrape’	əwàf ‘frighten’	əbàs ‘cut open’	əbàʔ ‘take off’
ə	ədèm ‘to grunt’	á ^h lyón ‘slide’	əlyəŋ ‘bamboo’	ədyə̄f ‘be long’		əkə̄ʔ ‘face’
ì	lí̄m ‘husband’		jìŋ ‘hunger’	á ^h líf ‘to hurry’		əlìʔ ‘poison’
ʉ	kət̄əm ‘odor’			kə̄nt̄uf ‘stomach’	á ^h dús ‘to emit’	əl̄ʔ ‘raffia palm’
o	á ^h kóm ‘to clean’	ntòn ‘pot’	ətóŋ ‘navel’	əfwóf ‘wind’	əfwòs ‘to fart’	əbòʔ ‘to open’
u	əwúm ‘egg’	wún ‘tattoo’	á ^h búŋ ‘to melt’	əgùf ‘to drive’	əlùs ‘to be blunt’	əkúʔ ‘ladder’

3 Phrasal allomorphy

This work draws on phrasal allomorphy developed and argued for by Zwicky (1985, 1987), Pullum and Zwicky (1988), and extended by Hayes (1990). According to Hayes (1990, p. 92), ‘Phrasal allomorphs may be derived by phonological rule within the lexical phonology, so that whole classes of words will have multiple precompiled allomorphs.’ Allomorphy uses the notion of phonological instantiation which ‘...suggests that words appear in syntactic representations in rather abstract form, consisting of a kind of place marker, lacking in phonological content’, and are filled in post-syntactically with phonemic material. Frames exist in the lexicon of a language and serve as the contexts for the realization of allomorphs. In other words, if the grammar of a language generates more than one allomorph of a word, each of them will have a particular phonological frame where it can be inserted, making it possible to explain those morphological alternations that cannot be insightfully accounted for using phonological rules. A frame for the allomorphs of the indefinite article *a/an* in English will be as follows.

⁷In final position /n/ is realized as ny [ɲ] after all vowels in the Kejom Ketinguh dialect of Babanki.

(7) *English indefinite article*

Allomorphs: [ən, ə]
 [ən]/ [̣V]
 [ən] elsewhere

Phonological instantiation is governed by the Elsewhere Condition (Kiparsky, 1973) ‘which insures that the most specific insertion context that is applicable in any particular environment takes precedence over more general insertion contexts’ (Hayes, 1990, p. 92-93).

As I will describe in considerable detail in the next section, the coda consonants /n/ and /ŋ/ are regularly deleted when they occur in intervocalic position, and the second vowel is found after a morpheme or word boundary. I begin in Section 4 with /ŋ/ since specific vowel changes accompany its deletion.

4 Babanki coda consonant deletion

As stated in Mutaka and Chie (2006), ‘when the possessive adjective is used with the nouns ending in ŋ, this ŋ deletes and this is accompanied by vowel raising, namely the vowel a that raises to [o] and the vowel o/ɔ that raises to [u]’. They have further stated that the same alternation is observed when these nouns are in an associative (possessive) construction and in certain verbal constructions. I show below that velar nasal deletion with vowel raising is attested in many more contexts than previously identified. I also demonstrate that in addition to the velar nasal, four other coda consonants also drop in specific contexts. While /ŋ/ deletion is accompanied by vowel raising under the conditions described in Section 4.1 below, it is not possible for vowel raising to occur when the rest of the coda consonants are deleted. Of the six coda consonants, five can be deleted intervocalically leaving only /m/ unaffected. The different grammatical contexts in which consonant deletion occurs are shown in (8).

As seen, these contexts have been arranged into six groups, which are discussed in turn. The deletion of /ŋ/ with vowel raising and /n/ without vowel raising is presented in Section 4.1 while in Section 4.2 instances of exceptional deletion of /n/, /f/, /k/ and /s/ in some words are used to make the case for allomorphy. Cases of /ŋ/ and /n/ deletion without vowel raising are discussed in Sections 4.3-4.6. In Section 4.7 I present data to show that /m/ is not deleted.

(8) *Contexts of coda consonant deletion (and vowel raising)*

++ = Coda consonant deletion and vowel raising

+ = Coda consonant deletion only

		ŋ	n	k	f	s
1	Noun + possessive pronoun	++	+			
	Noun + noun	++	+			
	Noun + interrogative	++	+			
	Noun + ‘a certain’	++	+			
	Noun + all	++	+			
	Noun + numeral	++	+			
	Noun + how many	++	+			
	Noun + interrogative ‘whose’	++	+			
	Noun + deverbal adjective	++				
	Progressive aspect	++				
2	In the words vèwéné ‘them’, féné ‘where’, zéné ‘when’		+			
	Deverbal adjective ghók ‘big’			+		
	Deverbal adjectives dyəf ‘long’ and byif ‘bad’				+	
	First person plural exclusive pronoun yès					+
3	CwVN sequence in both nouns and verbs	+	+			
	Disyllabic roots	+	+			
	Personal and animal names	+	+			
4	Noun + demonstrative pronoun áCV	+	+			
	Before relative marker á	+	+			
	Before prepositions á (locative, adverbial)	+	+			
	Before preposition à (indirect object)	+	+			
5	Subject (pro)noun+agreement (includes immediate future á)	+	+			
	Verb + object	+	+			
	Serial verbs	+	+			
6	Imperative with low toned verbs	+	+			

4.1 Group 1: deletion of /ŋ/ plus vowel raising, and deletion of /n/

In group 1, a single + indicates that /ŋ/ and /n/ drop out, while ++ indicate that the deletion of /ŋ/ is accompanied by the raising of /a/ to [o] and, separately, /o/ to [u]. These processes occur in the noun phrase when modifiers are added to the noun, as well as in progressive verb forms. /ŋ/ deletion with vowel raising is exemplified in (9) while /n/ deletion is shown in (10).

- (9) a. *Noun + possessive pronoun*
 əsō: ghómá ‘my corn’ /ə-sáj ə-ghómá/
 əsū: ghómá ‘my tooth’ /ə-sój ə-ghómá/
- b. *Noun + noun possessor*
 əsó: nyàm ‘corn of animal’ /ə-sáj ə nyàm/
 əsú: nyàm ‘tooth of animal’ /ə-sój ə nyàm/
- c. *Noun + interrogative ‘which’*⁸
 əsò: kò ‘which corn’ /ə-sáj ə-kò/
 əsù: kò ‘which teeth’ /ə-sójə-kò/

⁸As stated in footnote 6 above, [ɔ] is expected in closed syllables. However, there are a few grammatical words in the language where it occurs in open syllables: kò ‘which’, ghò ‘what’ and mbò ‘attention signal’.

- d. *Noun + interrogative ‘how many?’*
 àsò: shè? ‘how many corn?’ /à-sáj à-shèk/
 àsù: shè? ‘how many teeth?’ /à-sój à-shèk/
- e. *Noun + interrogative ‘whose?’*
 àsó: ndê ‘whose corn?’ /à-sáj ó ndè/
 àsú: ndê ‘whose tooth?’ /à-sój ó ndè/
- f. *Progressive*⁹
 mà yǐ nsò: ɲkò?
 mà yì ó ɲ-sàɲ ə ɲkòk
 1S P2 SM N-dry PROG c6a.wood
 ‘I was drying wood.’
- g. *Progressive*¹⁰
 mà: lú ɲkù: wù
 mà è lú` ɲ-kòɲ ə wù
 1S SM F3 N-like PROG 2S
 ‘I will be loving you.’

The next set of examples show /n/ deletion in identical contexts without vowel raising.

- (10) a. *Noun + possessive pronoun*
 kəbā: kóm ‘my fufucorn’ /kə-bán ə-kóm/
 kəzò: kóm ‘my spear grass’ /kə-zòn ə-kóm/
- b. *Noun + noun possessor*
 ɲgà: nyàm ‘story of animal’ /ɲgàn ə nyàm/
 ntò: nyàm ‘pot of meat’ /ntòn ə nyàm/
- c. *Noun + interrogative ‘which’*
 wā: byí ‘bad child’ /wàn ó-byí/
 fō: fí ‘new fon (king)’ /fòn ó-fí/

A general observation about (9) and (10) is that the roots lose their nasals when there is a following schwa which can be (i) the prefix of the possessive adjective, (ii) an associative (possessive) marker (AM), or (iii) a marker of the progressive form of verbs. It should be noted that this vowel occurs on the surface when the possessive adjective precedes the noun (11a) or when it occurs alone (11b), (11c).

- (11) a. əghómə: sáj ‘my corn’ /ə-ghómə ə-sáj/
 əghómə: sój ‘my tooth’ /ə-ghómə ə-sój/
- b. àsó: ndê ‘whose corn?’ /ə-sáj ó ndè/
 əghómə ‘mine’
- c. àkwó: ndê ‘whose arms?’ /ə-kwój ó ndè/
 àghómə ‘mine’

⁹The progressive marker is shown without a tone in the underlying form because it seems to be toneless and takes its tone from the verb root, being low with low tone verbs and high with high tone verbs.

¹⁰The nasal has simply been glossed ‘N’ because its status remains unclear in Babanki like in Kom (Shultz, 1997; Tamanji, 2009) where it has been analyzed as induced by the verb or as an aspect marker respectively.

Returning to vowel raising which accompanies only η -deletion, a previous account has proposed that the process ‘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 η sound’ (Mutaka and Chie, 2006). I suggest that vowel raising is conditioned by the [+hi, +bk] features of the velar nasal, which relink to the root vowel as part of the η -deletion process. Notice in particular that the [+bk] feature persists and ensures that *a > o [ɔ] instead of ə.

One could prefer to treat it as vocalization, in which case the resulting vowel would be expected to bear some of the place features of the original consonant. The problem with this alternative comes from instances where the deletion of η is not followed by vowel raising, showing that there is a consonant deletion process accompanied, only in some contexts, by vowel raising.

This synchronic process mirrors a diachronic change that happened in the language. At least two Proto-Grassfields coda consonants have been lost in Babanki, and, as shown in (11), this was followed by the raising of the open-syllable root vowels, /a/ and /o/ to [o] and [u] respectively.¹¹ It happens then that when η drops out in the contexts above, leaving /a/ and /o/ in open syllables of roots, they are also raised in a similar manner.

- (12) *Raising*
- | | | |
|-----|-----------|-------|
| əkó | ‘money’ | *káb |
| əsù | ‘to stab’ | *sòb |
| əlò | ‘bridge’ | *dàl` |
| zhù | ‘snake’ | *yól |

The following coda consonant deletion rule will be formalized in a traditional input-output account.

- (13) *Coda consonant deletion*
 $[+cons] \rightarrow \emptyset / V _ \# V$

However, an attempt to capture the environment where /a/ and /o/ are raised to [o] and [u] respectively is immediately challenged by cases where the vowels occur syllable-finally after coda consonant deletion but are not raised. To overcome the difficulty encountered in deriving the forms in a specific phonological or morphological context, I propose that the alternations are best viewed as allomorphs inserted in specific frames. The data in (9) show that the nouns (a)-(e) and verbs (f)-(g) each have two allomorphs, one with a raised vowel without a velar nasal and the other without vowel raising and the velar nasal. The allomorphs are then inserted as follows.

- (14) *Allomorphs:*
- | | |
|--------------------------------------|--------------------------------------|
| -sáj ‘corn’ | -kòŋ ‘like’ |
| [so, saŋ] | [ku, kɔŋ] |
| [so] / [_ #ə] _[FRAME 1] | [ku] / [_ #ə] _[FRAME 1] |
| [saŋ] elsewhere | [kɔŋ] elsewhere |

Frame 1 refers to the contexts listed in group 1-2 while Frame 2 (illustrated next) refers to those contexts in group 3-6. The data in (10) show that there is an allomorph with deletion and no vowel raising which requires a second frame given in (15).

¹¹Open syllable raising did not happen in all Central Ring Grassfields languages e.g. *-fá > kə-fó ‘thing’ (cf. *Okukə-fā*), *-bó > kə-vú ‘hand’ (cf. *Okukə-wō*).

- (15) *Allomorphs:*
- | | |
|---------------------------------------|---------------------------------------|
| ɲgan ‘story’ | -lon ‘beg’ |
| [ɲga, ɲgan] | [lɔ, lɔn] |
| [ɲga] / [_ #V] _[FRAME 1] | [lɔn] / [_ #V] _[FRAME 1] |
| [ɲgan] elsewhere | [lɔn] elsewhere |

The most specific insertion context of the allomorph that has undergone /ɲ/ deletion and vowel raising takes precedence in Frame 1 (14) while that of deletion without vowel raising does so in Frame 2 (15). Following that, the more general allomorph that has the nasal is then inserted elsewhere (Kiparsky, 1973). It should be mentioned that these are instances of opaque (input-driven) allomorph conditioning (Paster, 2006) since the vowel that conditions the selection of each allomorph doesn’t surface.

The allomorph approach is further justified by the fact that while the nasals obligatorily drop as illustrated above, there are coda consonants whose deletion is not predictable and should best be viewed as allomorphs. In the next section, I present such cases, represented in group 2 above.

4.2 Group 2: Deletion in exceptional lexical items

Group 2 presents strong arguments for allomorph selection in that it contains instances of the deletion of /n/, /k/, /f/, and /s/ only in some lexical items and also confirms that deletion is lexical. In this section, I illustrate that each of these coda consonants is deleted only under specific circumstances.

4.2.1 Deletion of /n/

The alveolar nasal exceptionally drops out in the following grammatical words.

- (16) a. vèwé: zhíó
vèwénó zhí ɔ
3P eat PROG
‘They are eating.’
- b. wù tsíó fé:
wù tsí ɔ féno
2S live PROG where
‘Where do you live?’
- c. wù kú?ó zé:
wù kú? ɔ zénó
2S climb PROG when
‘When are you coming up?’

4.2.2 Deletion of /k/

The voiceless velar stop is deleted in Babanki only in one deverbal adjective *ghók* ‘big’.

- (17) a. nyàmó †ghó:
nyàm ó ghók ɔ
c9.animal SM big PROG
‘a big animal’

- b. kət̪yí †kó ghó: †kó
 kə-t̪yí kó ghók ə kó
 c7.stick SM big PROG AM
 ‘a big stick’
- c. nyàm yì ghóʔ mǎ: mbáʔlǎ
 nyàm yì ghók mà é m-bák-lǎ
 c9.animal P2 big 1S SM N-sell-EXT
 ‘An animal grew fat and I sold.’

This is an exceptional property of the adjective form only, not of the progressive as the voiceless velar [glottal] stop is retained in progressive forms as in (18).

- (18) nyàm é ghók ə
 c9.animal SM big PROG
 ‘The animal is big.’

4.2.3 Deletion of /f/

Two deverbal adjectives *dyèf* ‘long’ and *byíf* ‘bad’ obligatorily lose their /f/ as follows.

- (19) a. wìʔó dyě:
 wìk é dyəf ə
 c1.person SM long PROG
 ‘a tall person’
- b. kət̪yí †kó dyó: †kó
 kə-t̪yí kó ghók ə kó
 c1.person SM long PROG
 ‘a long stick’
- c. nyàmó †byí:
 nyàm é byíf ə
 c9.animal SM bad PROG
 ‘a bad animal’

However, other deverbal adjectives do not lose their /f/ coda in the same phonological environment as illustrated in (20).

- (20) a. nyàmó chófǎ
 nyàm é chóf ə
 c9.animal SM wild PROG
 ‘wild animal’
- b. kèshí kǎ †záfǎ
 kə-shí kǎ záf ə
 c7-wound SM hurt PROG
 ‘A wound is hurting.’

4.2.4 Deletion of /s/

The voiceless alveolar fricative is deleted only when the first person plural exclusive pronoun *yès* occurs before /ə/.

- (21) a. *yɛ:* *kù:*
yès *ó* *kòŋ* *ə*
 1p(EXCL) SM love PROG
 ‘We are loving.’
- b. *yɛ:* *shwó:*
yès *ó* *shwóŋ* *ə*
 1p(EXCL) SM suck PROG
 ‘We are sucking.’
- c. *nyàmá* *kó* *tə* *kòŋ* *yès*
nyàm *ó* *kó* *tə* *kòŋ* *yès*
 c9.animal SM NEG P3 love 1p(EXCL)
 ‘The animal didn’t like us.’

In (21a)-(21b) *s* drops when the subject pronoun is followed by /ə/ and in (c)-(d) it does not drop when it occurs finally or is followed by a consonant.

The behavior of group 2 must be accounted for by allomorph selection because deletion targets only a few words. For example, *yès* ‘we’ must be listed with two allomorphs: [yɛ] and [yɛs] inserted as follows.

- (22) *Allomorphs:*
yes ‘we’
 [yɛ, yɛs]
 [yɛ] / [_ #ə]_[FRAME 1]
 [yɛs] elsewhere

In the next four sub-sections I show similar phonological contexts like those in group 1 where /ŋ/ is deleted but vowel raising does not occur. While this is accounted for using Frame 2 (15 above), it reveals a number of conditions which need further explanation.

4.3 Group 3: Deletion of /ŋ/ and /n/ in roots with special properties

Group 3 is made up of contexts where deletion is conditioned by special properties of the roots involved. First, note in (23a) that vowel raising is blocked when the input is /Cwəŋ/ or /Cwoŋ/.

- (23) a. *CwVŋ* sequence in both nouns and verbs
kəfwā: *kóm* ‘my animal tract’ /*kə-fwáŋ ə-kóm*/
shwó: *lāmsə* ‘sucking an orange’ /*shwóŋ ə lāmsə*/
- b. *Personal and animal names*
mənà: *ghóm* ‘my Menang’ /*mənàŋ ə-ghóm*/
ŋgô: *ghóm* ‘my Ngong’ /*ŋgóŋ ə-ghóm*/
- c. *Disyllabic roots*
kənsāŋsā: *kóm* ‘my sugarcane’ /*kə-nsáŋsáŋ ə-kóm*/
kəŋgəŋgə: *kóm* ‘my ant’ /*kə-ŋgóŋgóŋ ə-kóm*/

The failure of the resulting Cwa and Cwo to be raised after /ŋ/ deletion is related to the fact that the sequence [Cwu] is disallowed in the language. It appears that /Cwa/ could have been raised to [Cwo], but the inability of /Cwo/ to go to [Cwu] blocks the raising of both.

The examples in (23b) show that personal names resist raising, presumably to keep a name more faithful to its pronunciation in isolation. The restriction is such that a name should not be changed extensively because, if after consonant deletion, the vowel is also changed, the name will sound too different.¹²

The disyllabic roots in (23c) are reduplications and the constraint there is to keep the vowel identical in both the stem and the reduplicant. A personal or animal name or a reduplication can be viewed as a fixed form that cannot be tampered with and so do not contradict the diachronic analysis of vowel raising provided above. The examples in (24) show similar examples involving /CwVn/ stems, which would in any case not have been expected to undergo raising after /n/ deletion.

- (24) a. *CwVn* sequence in both nouns and verbs
 əfwā: ghómó ‘my stream’ /ə-fwán ə-ghómó/
 mà chwá: kətyí ‘I am cutting a stick’ /mà chwán ə kə-tyí’ /
- b. *Personal names*
 àbà: ghóm ‘my Abain’ /àbàn ə-ghóm/
 ŋgò: ghóm ‘my Ngoin’ /ŋgòn ə-ghóm/
- c. *Disyllabic roots*
 kəmbāmbā: kóm ‘my Adam fruit’ /kə-mbāmbán ə-kóm/
 fəŋgwòbà: fwóm ‘my monitor lizard’ /fə-ŋgwòbàn ə-fwóm/

4.4 Group 4: Deletion of /ŋ/ and /n/ before /a/

Group 4 contains a number of morphemes of the shape /á/. They include the post-nominal demonstrative pronoun *á-Ci*, the relative clause marker /á/ which also occurs after the noun, two prepositions: locative/adverbial /á/, indirect object /à/, and the yes-no question marker /à/. It is evident that what they have in common is that the vowel that follows the nasal is [a] rather than [ə]. In this case, there is deletion of the nasals without any vowel raising as shown in the following sets of data.

- (25) *Noun + demonstrative pronoun /á-Ci*¹³ the ‘one referred to’
- a. mbă yì ‘that walking stick’ /mbàŋ á-yì/
 ndǒ: yì ‘that potato’ /ndòŋ á-yì/
- b. wă: yì ‘that child’ /wàn á-yì/
 fǒ: yì ‘that fon (king)’ /fòn á-yì/

¹²The name ‘God’ as used by local Christians undergoes both ŋ deletion and vowel raising: nyèŋgù: ghòm ‘my God’ /nyèŋgù ə ghóm/. Jeff Good (personal communication) has suggested to me that this is probably so because this word was used to refer to pre-Christian traditional gods and it has retained common noun properties from its historical source (just as, in English, one can still use ‘god’ in lowercase to refer to a traditional god).

¹³The consonant depends on the noun class of the modified noun. It is [y] for classes 1, 3, 5, 6, and 9; [v] for classes 2 and 8; [m] for class 6a; [k] for class 7; [ʃ] for class 10; [t] for class 13; and [f] for class 19.

(26) *Relative clauses*

- a. àsā: ghō: fójkè
 à-sáj á ghó fój-kè
 c6-corn REL SM fall-EXT
 ‘the corn that is falling’
- b. ntō: mà bá?lè
 ntòn á mà bák-lè
 c9.pot REL 1S sell-EXT
 ‘the pot that I am selling’
- c. kètám á mà bá?lè
 kè-tám á mà bák-lè
 c7-trap REL 1S sell-EXT
 ‘the trap that I am selling’

(27) *Prepositional phrases*

- a. mà yì tòm ághó: kó⁺bój
 mà yì tóm à-ghój á kè-bój
 1S P2 shoot c6-spear PREP c7-outside
 ‘I shot spears outside.’
- b. kû: nà: mò
 kú è-nàn à mò
 give c3-happiness PREP me
 ‘Give me happiness.’

(28) *Locative and adverbial phrases*

- a. fá: shè
 fáj á shè
 stay PREP here
 ‘Remain here.’
- b. só: ñkàyn
 sòn á ñkàn
 fight PREP well
 ‘Fight well.’

(29) *Indirect object*

- a. kú: sâ: mò
 kú è-sáj à mò
 give c5-corn PREP me
 ‘Give me corn.’
- b. kú ntò: mò
 kú ntòn à mò
 give c1.pot PREP me
 ‘Give me a pot.’

(30) *Yes-no questions*

- a. wù tẹ̀ v̄ì nẹ̀ mbà:
 wù tẹ̀ v̄ì nẹ̀ mbàŋ à
 2s P3 come PREP c9.stick QUES
 ‘Did you come with a stick?’
- b. mà kú: ntò:
 mà kú ntòn à
 1s P3 c1.pot QUES
 ‘Should I give a pot?’

Vowel raising probably fails to apply here because of the complex nature of the structures involved. Note that the demonstrative pronoun in (25 above) is the only one that has the *á-Ci* bimorphemic structure, the others being CV(C) as in (31).

(31) *Demonstrative pronouns*

- mbàŋ yèn ‘this stick (near speaker)’
 f̄on yì ‘that fon (near listener, far from speaker/listener)’
 nyàm áyì ‘that animal (the ‘one referred to’’)

The rest of the constructions that make up group 4 are considered to have phrasal boundaries between them and therefore are postlexical, disallowing raising, which is a lexical process.

4.5 Group 5: Deletion of /ŋ/ and /n/ in major argument relations

Group 5 contains instances of deletion between a subject and its agreement marker, between a verb and its object, and in serial verbs.

(32) *Subject pro(noun) + agreement*

- a. gh̄ǎ: v̄ì
 gh̄èŋ é kùm ə
 2P SM touch PROG
 ‘You are touching.’
- b. tsǎ: v̄ì
 tsòŋ é kùm ə
 c1.thief SM touch PROG
 ‘A thief is touching.’
- c. nyàmé v̄ì
 nyàm é kùm ə
 c9.animal SM touch PROG
 ‘An animal is touching.’
- d. kǎ: f̄óŋkè
 kàn é f̄óŋ-kè
 c1.monkey SM fall-EXT
 ‘A monkey is falling.’
- e. ntǎ: f̄óŋkè
 ntòn é f̄óŋ-kè
 c1.pot SM fall-EXT
 ‘A pot is falling.’

(33) *Immediate future tense*¹⁴

- a. ̀̀sá: fwè
 ̀̀-�áŋ á fwè
 c5.corn F1 rot
 ‘The corn will rot.’
- b. ntɔ́: bòŋ
 ntòn á bòŋ
 c1.pot F1 good
 ‘The pot will be nice.’

(34) *Verb + object*

- a. mà kɔ́: ká: ʹsáŋ
 mà kóŋ ə káŋ à-�áŋ
 1S want PROG fry c5-corn
 ‘I want to fry corn.’
- b. mà kɔ́: tí: ʹlém
 mà kóŋ ə tím à-lém
 1S want PROG cut c6-yam
 ‘I want to cut yams.’

(35) *Serial verbs*

- a. ká: pfiʔ ‘fry and chew’ /káŋ è pfiʔ/
 bô: pfiʔ ‘pick and chew’ /bóŋ è pfiʔ/
 bô: ká: pfiʔ ‘pick, fry, and chew’ /bóŋ è káŋ è pfiʔ/
- b. chwá: pfiʔó ‘cutting and chewing’ /chwán è pfiʔó/
 ló: pfiʔó ‘begging and chewing’ /lón è pfiʔó/
 chwá: ló:pfiʔ ó ‘cutting, begging, and chewing’ /chwán ə lón è pfiʔó/

The nasals (except /m/ in 32c) are deleted as expected, but vowel raising does not occur with ŋ-deletion even when the nasals are followed by schwa. This further shows that vowel raising can be predicted by a consistent difference in syntactic structure. Otherwise, how can one explain raising in ̀̀sú: nyàm ‘tooth of animal’ from /̀̀sóŋ é nyàm/ but not in tsɔ́: kùmə ‘a thief is touching’ from /tsòŋ é kùm ə/ with identical phonological composition? In the case of ‘noun of noun’ and ‘noun my’ expressing possession (as in 9 above), the schwa goes onto the preceding noun, suggesting that there is a word boundary between the noun and its possessor. On the other hand, in arguments (32)-(34) there is a phrase boundary between the verb and the argument of the clause. This relationship is expressed in the former allowing raising and the latter prohibiting it.

4.6 Group 6: Deletion of /ŋ/ and /n/ in the imperative

Group 6 contains imperative forms where the schwa that causes the deletion of the nasal is not underlying.

¹⁴The immediate future is the only tense in Babanki marked by [a]. The tense markers in the language are immediate past [lí], hodiernal past [yì], distant past [tè], remote past [N], present tense [∅], immediate future [á], hodiernal future [né] and remote future [lú].

(36) *Imperatives*

- a. sǎ: ŋkòʔ ‘dry wood’ /sàŋ ´ ŋkòk/
 bǎ: wìʔ ‘hate someone’ /bàn ´ wìk/
 b. kǎfó wìʔ ‘beckon someone’ /kǎf ´ wìk/
 kòsò ntòn ‘take off pot’ /kòs ´ ntòn/
 c. chúŋ byí ‘tether a goat’ /chúŋ ´ byí/
 bén kǎbén ‘dance’ /bén ´ kǎ-bén/
 d. wáf kǎmbò° ‘carry a bag’ /wáf ´ kǎ-mbò´/
 tóf nǎntô ‘become very wise’ /tóf ´ nǎntô/

As I show in the derivation below, the schwa that is after the nasals in low-toned verbs is epenthetic, inserted to take the imperative high tone and avoid a rising tone in closed syllables. High-toned verbs do not require the schwa, since the imperative high tone merges with that of the root (35c)-(35d). It seems that raising is blocked in order to maintain the distinction between progressive and imperative forms. The imperative is derived as follows.

- (37) a. sàŋ ŋkòk → sàŋ ó ŋkòk → sǎó ŋkòk → sǎ: ŋkòʔ ‘dry wood’
 b. chúŋ byí → chúŋ byí ‘tether a goat’

4.7 No deletion of /m/

I have mentioned that /m/ is the only coda consonant in Babanki that is not deleted under any circumstance. The data below confirm that it fails to drop in similar contexts where the other coda consonants are deleted.

- (38) a. *Noun + possessives*
 èghámó nyàm ‘mat of animal’ /èghàm ó nyàm/
 jòmè ghóm ‘my dream’ /jòm è-ghóm/
 b. *Progressive*
 nyàmé tsámé
 nyàm ó tsám ə
 kc9.animal SM chew PROG
 ‘An animal is chewing.’
 c.
 kǎfó †kǎ fwómé: †kǎ
 kǎ-fó` kǎ fwóm ə kǎ
 c7-thing SM nice PROG AM
 ‘a nice thing’
 d. *Deverbal adjective*
 nyàm sè nyímè
 nyàm sè nyím ə
 animal PRES green PROG
 ‘An animal is becoming green.’

- e. *Imperative*
 bàámé ɲkòʔ
 bàám ʼ ɲkòk
 heat IMP c6a.wood
 ‘Heat wood.’
- f. kóm kèlàɲ
 kóm ʼ kè-làɲ
 clean IMP c7-cocoyam
 ‘Clean a cocoyam.’

4.8 Summary

The two frames and different contexts where 1) coda consonant deletion is accompanied by vowel raising, and 2) coda consonants are deleted without vowel raising are exemplified in (39).

It is seen in the table that vowel raising accompanies /ɲ/ deletion in Frame 1 contexts but not in identical phonological Frame 2 contexts. A rule- or constraint-based approach would have to consider all the contexts in group 3-6 as exceptions whereas the allomorphy approach proposes to list the allomorphs with separate frames for their insertion as follows.

- (39) ++ -sáj ‘corn’
Allomorphs:
 [so, saɲ]
 [so] / [_ #ə]_[FRAME 1] əsō: mùʔ ‘one corn’ /ə-sáj ə-mùk/
 [saɲ] elsewhere pǃíʔ əsáj ‘eat corn’ /pǃíʔ ʼ əsáj/
- (40) + -ɲgan ‘story’
Allomorphs:
 [ɲga, ɲgan]
 [ɲga] / [_ #V]_[FRAME 2] ɲgà: ghóm ‘my story’ /ɲgàn ə-ghóm/
 [ɲgan] elsewhere ɲgàn yì ‘that story’ /ɲgàn yì/

5 Conclusion

In this study, I have shown that there are many contexts in Babanki where five of the six coda consonants are deleted in intervocalic position. In certain contexts, the deletion of /ɲ/ is accompanied by the raising of /a/ to [o] and, separately, /o/ to [u]. It has also been demonstrated that four of the coda consonants /n, k, f, and s/ are deleted only in a few words in the language. Because these morphophonological processes select a wide range of contexts where they apply, it is particularly difficult to specify the phonological or morphological conditions for their application. I have therefore proposed a solution that lists allomorphs with appropriate instantiation frames, thereby providing support for precompiled phrasal phonology (Hayes, 1990).

(41) *Coda consonant deletion (and vowel raising) contexts*

Frame	Context	Illustration
Frame 1 (Group 1-2) 1. Deletion of /ŋ/	Noun + possessive pronoun	ə̀sò: ghómé 'my corn' /ə̀-`sáj ə̀-ghómé/
	Noun + noun possessor	ə̀sú: nyàm 'tooth of animal' /ə̀-`sój é nyàm/
	Noun + 'a certain'	ə̀sò: tsé: 'a certain corn' /ə̀-`sáj ə̀-`tséné/
	Noun + all	ə̀sú: tsəm 'all the teeth' /ə̀-`sój ə̀-`tsəm/
	Noun + numeral	ə̀sú: tá? 'three teeth' /ə̀-`sój ə̀-`ták/
	Noun + interrogative 'which'	ə̀sò: kò 'which corn' /ə̀-`sáj ə̀-`kò /
	Noun + interrogative 'how many?'	ə̀sò: shə? 'how many corn?' /ə̀-`sáj ə̀-`shək/
	Noun + interrogative 'whose'	ə̀sú: ndé 'whose tooth?' /ə̀-`sój é ndé/
	Noun + deverbal adjective	ə̀sú:f ʔghá 'new tooth' /ə̀sój ə̀-`fghá/
	Progressive aspect	mà sò: ŋkò? 'I am drying wood' /mà `sáj ə̀ ŋkòk/
	In the words vòwéné 'them', zéné 'when'	vòwé: kúʔé zé: 'When are they coming up?' /vòwéné kúk ə̀ zéné/
	Deverbal adjective ghó? 'big'	nyàmó ʔghó: 'a big animal' /nyàm é ghók ə̀/
	Deverbal adjectives dyəf 'long' & byíf 'bad'	wʔʔó dyə: 'a tall person' /wík é dyəf ə̀/
	First person plural exclusive pronoun yès	yě: kù: 'we are loving' /yès é kòŋ ə̀/
Frame 2 (Group 3-6) Deletion of /ŋ/ and /n/	CwVN Sequence in nouns and verbs	mbwò: ghóm 'my maggot' /mbwóŋ ə̀-ghóm/
	Disyllabic roots	kə̀ŋgə̀ŋgə̀: kóm 'my ant' /kə̀-ŋgə̀ŋgə̀ ə̀-`kóm/
	Personal and animal names	mènà: ghóm 'my Menang' /mènəŋ ə̀-ghóm/
	Noun + demonstrative pronoun ácu	wá: yí 'that child' /wàn á-`yí/
	Subject (pro)noun + agreement	ə̀sá: fwè 'the corn will rot' /ə̀-`sáj á fwè/
	Verb + object	mà kə̀: ká: ká: 'I want to fry corn' /mà kə̀ŋ ə̀ káj ə̀-`sáj/
	Indirect object	kú ntò: mò 'give me a pot' /kú ntòn à mò/
	Yes-no questions	mà kú: ntò: 'Should I give a pot?' /mà kú ntòn à /
	Serial verbs	bò: ká: pfi? 'pick, fry and chew' /bóŋ ə̀ káj ə̀ pfi/
	Imperative with low toned verbs	bá: wi? 'hate someone' /bàn ' wík/

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