

Ghost Consonants: The Glottal Stop in Kaansa

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1. Introduction

The Kaansa language is spoken by about 6000 people living in southwest Burkina Faso, in 20 villages in an area of about 500 square miles. It is a Gur language, classed as central southern Gur in the Gan-Dogosé group. Laryngeal occlusives, or glottal stops (GS), are used frequently in spoken Kaansa. Thus it has been important to understand the functions of this phonetically frequent segment as we develop an orthography and literacy materials in the language.

A typical complex utterance in Kaansa will manifest several GSs in its phonetic realization:

- (1) [thɪjaʔ aɾɪ nípí wá béɛʔ mɛʔ ɪ khaʔ hã ʔa jɔʔmɔ ʔá jǔʔ
greet wePFTV people POS all all and say give us water we drink
jɛ pɪ hãa ʔa wãʔ]¹
but they giveNASP us NEG²
'We greeted all the people and said "Give us water to drink", but they didn't give us any.'

How many of these GSs are predictably inserted in conditioning environments? How many are unpredictable (phonemic)? Do GSs ever mark lost segments? Even if some phonetic GSs are inserted under certain conditions, under other conditions can phonemic GSs undergo assimilation and thus 'disappear'?

2. Glottal stops in West African languages

Hyman (1988) provides a nice overview of functions of syllable- or utterance-final GSs in languages as disparate as Japanese, French, and Dagbani (Gur, Ghana), and reports quite a variety of functions, from phonetic to semantic, associated with this segment. Phonetically, GSs are common as boundary phenomena: they occur word-finally before pause, or after pause for vowel-initial words. They also demarcate word boundaries for vowel-initial words when preceded by vowel-final words. Hyman comments on the latter two of these phenomena:

Phonologists are especially familiar with rules that insert glottal stop . . . between vowels or before a word —or phrase-initial vowel. In such cases it can be argued that GS has the "prosodic" function of providing a minimal onset to a syllable that would otherwise not have an onset. While in some languages there are further restrictions on such rules (e.g. restricting their application only to stems or to stressed syllables), it is generally assumed that initial (or prevocalic) GS insertion

¹ Phonetic transcription is broad: a) only high tones and contour tones are marked, and only on the first vowel of a complex nucleus if tone remains the same on all vowels of the nucleus; b) nasality on vowels is only marked when vowel is preceded by a [-nasal] consonant; c) long vowels are marked by double vowels [aa], not vowel plus colon [a:].

² Abbreviations are as follows: ASTV assertive mode, CNTV continuative aspect, EMPH emphatic, FUT future, IMP imperative, INTRG interrogative, IPFV imperfective aspect, LOG logophoric, MVMT displacive aspect (movement before action of verb), NASP neutral aspect, PFTV perfective aspect, POS possessive (genitive), QTV quotative, SUB subordinate clause marker.

has to do with syllable structure, and ultimately, with the phonetic motivation for having an onset in every syllable. (1988:113)

Syllable-final GS, while still common, presents more of a theoretical puzzle:

On the other hand, when a vowel uttered before pause acquires a following GS, it appears that the syllable has gone from being “less marked” to “more marked”, since, as is well-known, the “unmarked” option is for a syllable to end with a vowel, not with a non-vocalic articulation such as a GS. (1988:113)

These cases are often motivated in Niger-Congo languages by the historical loss of a segment (Konni: Cahill 1992, Akan: Schachter and Fromkin 1968, Chumburung: Snider 1986), or by a pragmatic distinction between declarative and interrogative utterances (Dagbani: Hyman 1988, Pougouli: Warfel 2004), or by the need to distinguish between long and short vowels utterance-finally (Nawuri: Casali 1995).

3. The functions of the glottal stop in Kaansa

With GS as a common phonetic feature of spoken Kaansa, it became imperative to understand its functions in order to develop a practical orthography of the language. Should GS be written at all? If so, when? Should it be written in some cases even if phonetically absent (see section 4)? Investigations into the functions of GS in Kaansa led to important insights into the morphology of nouns and verbs, and thus to the simplification and regularization of the orthography.

Kaansa GS have five functions in the spoken language:

- phonetic delimiter between vowels at word boundaries
- marker of short vowels before pause
- word-initial consonant in two personal pronouns
- marker of diminutive status in noun class suffixes 1-4³
- root-final marker of a lost consonant in nouns and verbs

The first two functions are widespread in West African languages and are somewhat trivial; the last three are unpredictable and therefore contrastive (phonemic). All of the functions will be examined here, for it is often difficult to distinguish between them in any isolated utterance.

3.1. *Phonetic delimiter*

3.1.1. *Between vowels at word boundaries*

GS is inserted between word final and word-initial vowels when they are juxtaposed. This functions simply to prevent assimilation or coalescence of the vowels. Contrast these pairs of highlighted words:

³ Table of Kaansa Noun Class Suffixes

SG		PL		GENDER
Class 1	-V, -∅	Class 2	-bV, -pV	animate things, people, most loan words
Class 3	-rV, -nV	Class 4	-jV	small things
Class 5	-gV, -kV	Class 6	-sV	large things, abstract ideas, nominal forms of some verbs
Class 7	-mV			mass nouns, nominal form of most verbs

Vowel quality is determined by vowel harmony and vowel weakening rules. Some class 1 nouns have a null (-∅) suffix.

- (2) KWH.002⁴
 [kasu? ú pɪ jĩ sĩmbɛ.]
 Kasiya whom they call Simbe
 ‘The Kasiya whose name is Simbe.’
- (3) KWH.001
 [kasu wá mĩjã ?a bɛɛ dé? a sɛɛ?]
 Kasiya POS matter we wish that we speak
 ‘It’s regarding the Kasiya that we would like to speak.’
- (4) KWH.003
 [ɔ khíɛ? ʊ jaari kó jábkárikɔ...]
 one day he got.up one second.market.preparation.day
 ‘One day he got up on the day before market day...’
- (5) LH.001
 [ɔ wájé kha? ɔ khíɛ ma jóorá jábgo....]
 other guy said one day I had.gone to.market
 ‘another guy said one day I had gone to the market...’

However, in section 3.2 we will see that coalescence does occur at intervocalic word boundaries with certain object pronouns. This, in fact, helps distinguish between the simple phonetic insertion of GS as a boundary delimiter and its use as a contrastive word-initial consonant in these pronouns.

3.1.2. *Word-finally after a short vowel before pause*

Kaansa inserts GS after a short vowel utterance-finally, or before pause, as illustrated in the highlighted words in these examples:

- (6) DWM.003
 [dohage khiri kí hã?ama dogri ?á kí di?].
 shea.nut.tree in.advance CNTV gives.us shea.nuts we CNTV eat
 ‘Early on the shea-nut tree gives us its fruit so that we can eat.’

With the same morpheme /di/, a GS is not there when the root takes a suffix or is followed by a word starting with CV:

- (7) [a *dima* suuga]
 we eat.ASTV millet
 ‘We eat millet.’
- [táfírbe wónní *di gi* ja?]
 white.folks can eat it NEG
 ‘White folks can’t eat it.’

This set of utterances from natural texts shows the same behavior:

⁴ These are references to transcribed natural texts and the line numbers of the utterances cited.

(8) IWB.038

[pí thāamina pɪ khé hã pí jǔʔ]
 ... their beer they take give they drink
 ‘It’s their beer they give them to drink.’

(9) MWS.037

[mí khaʔ mɪ wêɛ jǔ gɪ jaʔ]
 I said I NEG.IPFV drink that NEG
 ‘I said “I’m not going to drink that.”’

(10) NPPTK.007

[Ú kpórí khaarɪ jêɛ baŋ ʔú jé khaʔ ma ná jǔma nɪnã]
 he picked.up the.animal and.IPFTV bring it and said I MVMT drink in.the.village
 ‘He picked up the slain animal and started to carry it, and he said “I’ll get a drink in the village.”’

The locative [*fɪ*] ‘here’ will take GS before pause, but will not have it elsewhere:

(11) ODWHY.046

[khaʔ khoró pí patrǔ wá ʒo fɪʔ, úrá sɛɛɪjɛ pɔɔɪ khaʔ khoró
 QTV he.said their boss POS one here he.EMPH said the.others QTV he.said
 pɪ jɛɛ ĩbíra]
 they leave us
 ‘He said, “One of their bosses is here,” and he spoke to the others saying “Leave us alone.”’

(12) [mí fɪma jêɛ déegée]

I here.ASTV and.IPFV working
 ‘I am here working.’

(13) [ɔ fɪ nɪnã]

she here in.the.village
 ‘She is here in the village.’

The Kaansa phonological system contrasts short and long vowels, and in many verbs with CVV roots this contrast signals the marking of imperfective vs. perfective aspect. In pre-pause position, the use of GS thus helps mark the aspect on this type of verb: the imperfective form (i.e. the short vowel form) is marked with GS word finally. Compare the forms for ‘eat’:

(14) [mákín tɪɪ ná pɪ diʔ]

measure it.PFTV if they eat
 ‘It would be good for them to eat.’

(15) [hĩtam bírimaʔ ĩ diʔ]

sit they.PFTV.ASTV CNJ ate
 ‘They sat down and ate.’

This is also an important phonetic contrast for the negative particles, *wa* and *ja*, which are also used as question markers. Sentence finally or before pause, the word-final GS is quite noticeable:

(16) AWM.002

[mí ba núu ná pɪ khaʔ ú jákɔo kooníngo waʔ]
 I FUT heard that they said his grandmother feeling.well NEG
 ‘I then heard people say that his grandmother was not doing well.’

But a question in Kaansa can be signaled by the use of the negative particle, with the final vowel lengthened rather than truncated with GS:

(17) SWM.025

[dé sĩmbĩrĩ pĩ fɛɛ dusirá bú waa]
 so fetishes they today in.the.house exist NEG.INTRG
 ‘You do have fetishes in your houses now, don’t you?’

3.2. Marker of word-initial consonant in pronouns

Kaansa has four pronouns that until recently we have interpreted as single vowels:

- (18) *u* 3rd pers sg/class 1 (sg)
a 1st pers pl
ĩ 2nd pers pl
ɪ class 4 (pl)

The behavior of these pronouns in the post-verbal object position leads one to suspect that the 1st and 2nd person plural personal pronouns have GS in the initial position. In the following examples, each pronoun is substituted into the same imperative sentence. Note how the verb form (highlighted) changes in some cases but not others:

- (19) a. [hã míné jé *bu* ʔa waʔ]
 let problem NEG.IPFV overcome us NEG
 ‘Let no trouble overcome us.’
- b. [hã míné jé *buwo*⁵ waʔ]
 let problem NEG.IPFV overcome.her NEG
 ‘Let no trouble overcome her.’
- (20) a. [hã míné jé *bu* ʔĩ jãʔ]
 let problem NEG.IPFV overcome you(pl) NEG
 ‘Let no trouble overcome you (pl).’
- b. [hã míné jé *buwe*⁶ jaʔ]
 let problem NEG.IPFV overcome.it NEG
 ‘Let no trouble overcome it (the village).’

When the pronouns [*u*, *ɪ*] follow the verb, they cliticize and induce changes in surface verb morphology, including coalescence with the final vowel of the verb. This does not happen to the pronouns [*ʔa*, *ʔĩ*]. One way to account for this behavior is to posit GS as the initial consonant for these words, giving them a syllable structure of CV rather than V.

⁵ The suffixed class 1 object pronoun *u* ‘her’ coalesces with the verb root *buu* ‘overcome’ to create the surface form *buwo*.

⁶ The suffixed class 4 object pronoun *ɪ* ‘it’ (as in, ‘the village’, for example) coalesces with the verb root *buu* to create the surface form *buwe*.

3.3. *As a sign of the diminutive*

GS can be added to the class suffix on a noun to communicate a sense of the diminutive. The classic example is for the word ‘stone’ or ‘rock’, for which Kaansa uses the root *púra*.

- | | | | |
|------|------------------------|-----------|----------------------|
| (21) | [pónna] | [púríja] | ‘stone/s’ |
| | /púra.rV/ ⁷ | /púra.jV/ | |
| (22) | [púr'ga] | [púr'sa] | ‘rock/s’ |
| | /púra.gV/ | /púra.sV/ | |
| (23) | [púra?ra] | [púra?ja] | ‘very small stone/s’ |

When nouns of classes 5 and 6 (large things) are diminished in this way, they change class suffixes to classes 3 and 4, plus GS:

- | | | | |
|------|--------------|--------------|-----------------|
| (24) | [khāmar'ga] | [khāmar'sa] | ‘field/s’ |
| | /khāmara.gV/ | /khāmara.sV/ | |
| (25) | [khāmara?ra] | [khāmara?ja] | ‘small field/s’ |

Animate things can be diminished as well using GS. In this case, the noun root does not take marker from classes 3 and 4, but add GS to the normal class 1 and 2 markers:

- | | | | |
|------|---------------|----------------|-------------------------|
| (26) | [bikhoo] | [bikhoobo] | ‘male child/-ren’ |
| | /bii.khoo.Ø/ | /bii.khoo.bV/ | |
| (27) | [bikhoo?jo] | [bikhoopo] | ‘small male child/-ren’ |
| | /bii.khoo.?V/ | /bii.khoo.?bV/ | |

Notice how the addition of GS induces surface changes for the class 1 and 2 suffixes in examples (26) and (27). Even though the normal class 1 suffix *-V* is suppressed in nouns with CVV roots (*bi* + *khoo* ‘child’ + ‘man’), when GS is added to express the diminutive, the *-V* suffix reappears, and even takes on a glide, apparently to prevent a word-medial *V?V* sequence.⁸ For the class 2 suffix, the combination */?b-/* coalesces to *[p]* to express the plural: *bikhoo?bo* > *[bikhoopo]*.

3.4. *Root-final marking of a lost consonant*

The most frequent and contrastive use of GS in Kaansa is in certain verbs. Consider these contrastive sentences involving ‘forget’ and ‘sweep’:

- | | | |
|------|----------------------|---------------|
| (28) | [pha? urima] | ‘She forgot.’ |
| | forget she.PFTV.ASTV | |

⁷ The penultimate weak syllable is reduced, creating the surface form *pónna*.

⁸ It is interesting that Kaansa does this while its closest related variety, Dogosé, does allow word-medial *V?V* sequences in similar situations: *[wɔɔɛ]* ‘faces’, *[wɔɔ?ɛ]* ‘small faces’ (Ouattara 2002:24). Kaansa does in fact allow a *V?V* sequence in a context of syllable reduction/weakening, as in this title for a natural text: *[ɔ dɔo?bikhoo?i wá hɔrgi jóogo]* ‘When a Lobi child went to the Ivory Coast.’

- (29) [phaʔ urima] ‘She swept.’
sweep she.PFTV.ASTV
- (30) [ú ba pha sɪ jaʔ] ‘She will not forget it.’
she FUT forget it⁹ NEG
- (31) [ú ba pha sɪ jaʔ] ‘She will not sweep them (houses).’
she FUT sweep them NEG
- (32) [ú wónní pha bɪ jaʔ] ‘She can not forget them (snakes).’
she can forget them NEG
- (33) [ú wónní pha pɪ jaʔ] ‘She can not sweep them (snakes) up.’
she can sweep them NEG
- (34) [ú ba pha míni wãʔ] ‘She will not forget anything.’
she FUT forget thing NEG
- (35) [ú ba phaʔ míni wãʔ] ‘She will not sweep anything.’
she FUT sweep thing NEG
- (36) [u phaa míni wãʔ] ‘She did not forget anything.’
she forget.PFTV thing NEG
- (37) [u phagi míni wãʔ] ‘She did not sweep anything.’
she sweep.PFTV thing NEG

The phonetic realizations of the Kaansa verbs meaning ‘forget’ and ‘sweep’ seem to be complete homophones in some contexts, in others to be distinguished merely by the presence of GS, and in others to have distinct realizations, such as in examples (36) (*phaa*) and (37) (*phagi*). The surface forms of these verbs in examples (28) and (29) could be explained simply by the insertion of GS at a word boundary before a word starting with a vowel, as already discussed under section 3.1.1. Examples (30) and (31) might be explained most easily by simply assuming the two verbs are indeed homophones, but (32) through (37) cannot be explained at all except by positing an underlying morphological difference in the roots of the two verbs.

To make sense of the confusing (dis)appearances of GSs in Kaansa verbs, we need to understand paradigmatic verb morphology. Verbs in Kaansa are marked primarily for variations in the perfective aspect. Imperfective is not marked, and both perfective and imperfective verbs can take a modal suffix *-ma*, which indicates the assertive, and which often marks the main verb in a sentence, be it simple or complex. Perfective aspect can be marked in three ways: a) with the suffix *-rɪ*, b) with the affixation of the subject pronoun between the verb and the aspect or modal suffixes, or c) with a simple vocalic suffix *-V* attached to the verb root. These forms are illustrated in the examples below:

Imperfective:

- (38) [u fɔuma] ‘He’s crying.’
he cry.ASTV
- (39) [u ba jóoma bɪgrá í fɔu] ‘He’s going to the funeral to cry.’
he FUT go.ASTV to.the.funeral CNJ cry

⁹ The class 6 referential pronoun here (*sɪ*) could be referring to an abstract idea, such as *fóriiso* ‘fatigue’.

Perfective:

- (40) [khi bíſãá u fúuri] ‘For three days he cried.’
 day three he cry.PFTV
- (41) [foó ʔurima] ‘He cried.’
 cry he.PFTV.ASTV
- (42) [mú u nanni búgirá weri, ú fúwa]
 when he arrive.PFTV at.the.funeral SUB he cry.NASP
 ‘When he arrived at the funeral, he cried.’

The form in (42) is a neutral aspectual form most commonly used to express the narrative perfect, used once actions are established to be in the perfective aspect. This form is then used primarily until a major scene change or turning in the discourse. The same form is also used for conditionals, for imperatives, and for negative propositions in the perfective aspect.¹⁰ The following verbs demonstrate the morphophonemic changes that may occur with suffixation in the various forms of the perfective:

Root	Perf - Foc ¹¹	Perf - NonFoc ¹²	Perf -Narr ¹³	Gloss
bɛu	bɛu ʔuri	bɛuri	bɛwɛ	‘fold’
dái	dái ʔuri	dáuri	dája	‘stay, endure, remain’
Súu	súu ʔuri	Súuri	súwo	‘steal’
Keu	keu ʔuri	Keuri	kewe	‘break, shatter’
phii	phii ʔuri	Phiiri	phije	‘cover’

Table 1. Kaansa verb forms with perfective aspect

Verbs with CVV roots with the mid vowels *e*, *ɛ*, *o*, *ɔ* and the low central vowel *a* take a simpler form in the narrative perfect:

Root	Perf - Foc	Perf – NonFoc	Perf -Narr	Gloss
bɛɛ	bɛɛ ʔuri	bɛɛri	Bɛɛ	‘want, seek’
boo	boo ʔuri	Boori	boo	‘spread’
Tée	tée ʔuri	Téeri	tée	‘disappear’
dɔɔ	dɔɔ ʔuri	dɔɔri	Dɔɔ	‘mix together’
Daa	daa ʔuri	daari	daa	‘set alight, set on fire’

Table 2. VV roots with mid vowels and low central vowel

For a small group of CVV verbs the root shortens in the imperfective form:

- (43) [pha, phama] ‘forget’

But compare the perfective forms:

- (44) [pha ʔuri, phaari, phaa] ‘forgot’

¹⁰ In Kaansa this includes verbs of perception, such as ‘see’, ‘feel’, ‘hear’, ‘understand’, ‘know’.

¹¹ Perfective aspect, focused (primary verb of sentence).

¹² Perfective aspect, non-focused (secondary or subordinate verb of sentence).

¹³ Perfective aspect, narrative or neutral form.

Verbs that shorten the root tend to be high-use CVV verbs such as ‘set’, ‘burn’, ‘know’, ‘fall’, ‘obtain’, ‘do’, ‘hear/feel’, ‘cut’, ‘kill’, ‘eat’, etc. In contrast to ‘forget’ in (43) and (44), ‘sweep’ in the examples below manifests GS in most suffixed forms:

Imperfective	
(45) [phaʔ, phaʔma]	‘sweep’
Perfective	
(46) [phaʔorima, phaʔri, phaga]	‘swept’

It is the narrative perfect form *phaga*¹⁴ that interests us here. One might be tempted to parse this form as *pha-ga* or *phaʔ-ga* and posit a variant narrative perfect suffix of *-gV*. Would this variant apply to only verb roots with root-final GS? Does the same or similar form occur for all verbs manifesting GS? Let us look at some more examples:

Root	Perf - Foc	Perf – NonFoc	Perf -Narr	Gloss
siʔ	siʔ uri	siʔri	sige	‘lie flat’
siʔ	siʔ ʊri	siʔri	siga	‘fry in oil’
seʔ	seʔ uri	seʔri	sege	‘sculpt, shape’
fɛʔ	fɛʔ ʊri	fɛʔri	fɛge	‘hide something’
saʔ	saʔ ʊri	saʔri	saga	‘vomit’
suʔ	suʔ uri	suʔri	sugo	‘pound yams’
tʊʔ	tʊʔ ʊri	tʊʔri	tuga	‘crash, hit against’
hoʔ	hoʔ uri	hoʔri	hogo	‘gather, collect’
sɔʔ	sɔʔ ʊri	sɔʔri	sɔgo	‘measure out (grain)’

Table 3. Narrative perfect forms for verb roots ending in GS

All of these show that the *-g-* in the narrative perfect form appears regardless of the vowel of the root. However, the examples below show that it is not just *-g-* that appears in this context:

Root	Perf - Foc	Perf – NonFoc	Perf -Narr	Gloss
kɔʔ	Kɔʔ ʊri	kɔʔri	kɔrɔ	catch
khɪʔ	khɪʔ ʊri	khɪʔri	khɪra	hit
khaʔ	khaʔ ʊri	khaʔri	khaba	say
daʔ	daʔ ʊri	daʔri	daba	miss, lack
boʔ	boʔ uri	boʔri	boso	be sick
kuʔ	kuʔ uri	kuʔri	kuso	leave, go out
jiʔ	jiʔ ʊri	jiʔri	jiʔsa	call
wúʔ	Wúʔ ʊri	wúʔri	wúsa	wash the face

Table 4. Variant consonants in narrative perfect forms

Table 4 shows cases where the consonants *r*, *b*, *s* appear in the narrative perfective form. This variation occurs in this form for all roots and stems with GS. Mieke, in her earlier work (1996a, 1996b, 2001), posited variant narrative perfect suffixes *-V*, *-gV*, *-rV*, *-bV*, *-sV* with no conditioning factor for the variation. It seems historically more realistic to posit a simple suffix *-V* for all verbs and attribute the variation to an underlying consonant of the root that has weakened over time but has left GS as a place marker. We might call these ‘ghost consonants’: consonants which appear under certain

¹⁴ Intervocalic *g* here varies phonetically with *ɣ*. For simplification in this article, I’ll transcribe this broadly as *g*.

conditions (in this case, when followed by a vowel-initial suffix)¹⁵, but are normally marked only by a glottal stop.

3.4.1. *When the ghost disappears*

In some morphological contexts, GS disappears completely in the phonetic realization of the utterance. We saw in examples (31) and (33) above some cases of this disappearance (repeated here):

- (47) [phaʔ ʊrɪma] ‘She swept.’
 (48) [ú ba pha sɪ jaʔ] ‘She will not sweep them (houses).’
 (49) [ú wónní pha pɪ jaʔ] ‘She can not sweep them (snakes) up.’

Example (48) can be explained by observing that the voiceless root final GS of [phaʔ] is easily assimilated into the initial voiceless fricative in the following word. There is also a kind of progressive spreading of the [-voice] feature, which is demonstrated in Example (49) where we see the referential pronoun *bi* changed to *pi* following the verb with root final GS. Here is the same sentence with its underlying form:

- (50) [ʊ wónní pha pɪ jaʔ]
 /ʊ wónní phaʔ bɪ ja /
 she can sweep them NEG

We will see below in section 3.5 that this progressive spreading of the [-voice] feature of GS also affects noun suffixes.

3.5. *In noun roots*

The interpretation of GS in verb roots as a ghost consonant that appears when suffixed by a vowel-initial affix, and which spreads the [-voice] feature to voiced consonant-initial suffixes, helps us to interpret certain nouns of the animate gender marked by class 1 (sg) and class 2 (pl) suffixes: *-V* and *-bV*. A small number of nouns have the following singular and plural forms:

- | | SG | PL | |
|------|------|------|----------------|
| (51) | boro | bopo | ‘hare, rabbit’ |
| (52) | nína | nípa | ‘person’ |
| (53) | sura | supa | ‘flea’ |

An initial interpretation, without consideration of verb morphology, would be to posit the following underlying forms:

- (54) boro = bo -rV bopo = bo -pV
 (55) nína = ní -rV nípa = ní -pV
 (56) sura = su -rV supa = su -pV

¹⁵ Aside from the suffixing object pronouns *o* and *ɪ* mentioned in section 3.2, the only other vowel-initial suffixes in Kaansa are *-oŋ*, which is a reflexive object pronoun for verbs, and *-Vŋ* which transforms the verb root to a verbal participle as in the following:

- horoʔ ‘to run’
 horg.o (narrative perfect or neutral form)
 horg.oŋ ‘running (adj)’
 tá.horg.oŋ.go ‘running thing (bicycle, motorcycle, car, means of transportation)’

Similarly with these multi-syllabic roots:

(57) dariga ¹⁶ = dara -gV	darapa = dara -pV	‘blind person/s’
(58) khariga = khara -gV	kharapa = khara -pV	‘red monkey/ies’
(59) torigo = toro -gV	toropo = toro -pV	‘fly/ies’

This is indeed how Mieke analyzed noun classes in Kaansa and related varieties in her early work (1994, 1996a).¹⁷ However, in light of the verbal analysis presented above, we can posit just one class 1 and one class 2 suffix for these forms:

Root	Class 1 (sg)	Class 2 (pl)	Gloss
boʔ	-V = boro	-bV = bopo	‘hare, rabbit’
níʔ	-V = nína	-bV = nípa	‘person’
suʔ	-V = sura	-bV = supa	‘flea’
daraʔ	-V = dariga	-bV = darapa	‘blind person’
kharaʔ	-V = khariga	-bV = karapa	‘red monkey’
toroʔ	-V = torigo	-bV = toropo	‘fly’

Table 5. Proposed noun class 1 and 2 suffixes

The *-r-*, *-n-*, and *-g-* that appear with the class 1 suffix would be the manifestation of the ghost consonant that we saw in the verb roots.

GS in these roots can be heard when the root is modified by an adjective with a voiced consonant in the initial position, as in these examples:

(60) [boʔ mǐjǎma]	‘a real rabbit’
(61) [níʔ mǐjǎma]	‘a real person’
(62) [daraʔ mǐjǎma]	‘a real blind person’
(63) [toroʔ mǐjǎma]	‘a real fly’

Note that there is no spreading of the [-voice] feature to the initial consonant of the adjective. However, GS is lost in pronunciation when the noun root is followed by a voiceless consonant:

(64) [bo kpóroo]	‘a big rabbit’
(65) [ní kpóroo]	‘a big person’

3.6. *The glottal in the negative particle*

GS is pronounced in most cases as a part of the negative particle that usually occurs at the end of a sentence:

(66) [hǎʔ ú jóo waʔ]	‘He must not go.’
IMP he go NEG	

¹⁶ In Kaansa a penultimate light syllable is normally reduced. Thus, words with syllable structure CVCVCV are realized as CVCiCV, where the penultimate vowel is weakened to [i] or [ɪ], depending on the vowel harmony, and sometimes it is elided. The fact that it is not reduced in the forms *darapa*, *kharapa*, *toropo* argues in favor of the interpretation that the underlying structure is *daraʔ -ba*, etc. with spreading of the feature [-voice].

¹⁷ In Mieke (to appear) she proposes an analysis similar to this one.

In this context, *mɛ* does not have GS word finally, and thus we interpret this GS as the same prepausal phenomenon after short vowels cited above.

This can be contrasted to the adverb *mɛʔ*, which means ‘like so, in this manner’. For this word, GS does not disappear, but remains in all contexts. Some utterances from an ethnographic text illustrate the contrast between *mɛ* and *mɛʔ*:

(73) SWM.048

[ʔa sɛɛɾjɛ sɪ́ sekóra, pí sɛɛɾjɛ sɪ́ ɪra, ɪrá sũɪɪ]
 we told this to.the.grandfather they told it to.the.king.the.king sent
 [níɾɪ wá bɛɛʔ mɛʔ]
 people POS all all.EMPH

‘We told this to the elder, it was told to the king, and the king sent [to] all the people,’

(74) [ʔĩ sɛɛɾjɛ níɾɪ wá bɛɛʔ mɛ khaʔ]

and told people POS all all.EMPH saying
 ‘and told all the people saying’

(75) [ʔĩ ja ʔĩ píŋgɪ́n fɛɛ ʔĩ dé mɛʔ ná mɛʔ.nɛ,]

you arise and meet.together today and do like.so and like.so
 “‘Arise and come together today and do like this and like that...’”

In (75) the adverb *mɛʔ* occurs twice, once without suffix and the other with definite and focus suffixes. GS remains in both contexts. We can compare this to the emphatic particle *mɛ* in (73) and (74) where in the first instance, before pause, it manifests a final GS, but in the second instance, where it is followed by another word, it does not manifest a final GS.¹⁸

4. The orthography of GS in Kaansa

To summarize, the five functions of GS in Kaansa are:

- a phonetic delimiter between vowels at word boundaries
- a marker of short vowels before pause
- a word-initial consonant in two personal pronouns
- a marker of diminutive status in noun class suffixes 1-4
- a root-final marker of a lost consonant in nouns and verbs

A committee of Kaansa native speakers and non-native speaking consultants has decided to represent just two of these functions orthographically using an apostrophe: when the GS marks the diminutive, and when it marks a ‘ghost’ consonant. Thus, the original sentence at the beginning of this article repeated in (76) would be written orthographically as shown in (77):

(76) [thɪjaʔ arɪ níɾɪ wá bɛɛʔ mɛʔ ɪ́ khaʔ hã ʔa jɔʔmɔ ʔá jũʔ
 greet we.PFTV people POS all all and say give us water we drink
 jɛ ɾɪ hã ʔa wãʔ]
 but they give.NASP us NEG

‘We greeted all the people and said “Give us water to drink”, but they didn’t give it to us.’

(77) Thɪya’-arɪ níɾɪ wá bɛɛ’ mɛ ɪ́ kha’ hã a jɔʔmɔ á jũ, yɛ ɾɪ hã a wã.

¹⁸ This is not the clearest example because in the second instance, the following word begins with a voiceless stop, so even if GS were present in the underlying structure, it may not be audible here because of voiceless assimilation. Nevertheless, this naturally occurring example was too good to not present in this paper.

In this utterance ten GS are pronounced phonetically, but only four are written orthographically. Generally, the predictable, phonetic delimitation functions are not written, while the contrastive markers of ‘ghost’ consonants are written.¹⁹ Thus, our two verbal examples *pha* ‘forget’ and *pha* ‘sweep’ are distinguished orthographically even though pronunciation in some contexts is identical:

- (78) *pha*-uruma [phaʔ urima] ‘she forgot’
 (79) *pha*’-uruma [phaʔ urima] ‘she swept’
- (80) ú ba *pha* sɪ ya [ú ba *pha* sɪ jaʔ] ‘she will not forget it’
 (81) ú ba *pha*’ sɪ ya [ú ba *pha* sɪ jaʔ] ‘she will not sweep them (houses)’

5. Summary

While many languages of West Africa manifest phonetic GS, most often as boundary phenomena, Kaansa, a Gur language of Burkina Faso, also uses GS contrastively to mark root-final lost consonants which, in verbs and nouns, can re-appear as ‘ghost consonants’ when followed by a vowel-initial suffix. This dual phonetic/phonemic role creates a confusing set of phonetic manifestations of GS in changing contexts which only careful morphological analysis has been able to clarify. Phonetic GS only occurs before pause following weak syllables (CV), or at intervocalic word boundaries (...CV##V...) and is completely predictable. Phonemic GS occurs only root- or stem-finally, or, in just two cases, root-initially for two personal pronouns. These GS are ever-present but are assimilated to voicelessness in a voiceless environment (? → Ø/ ____ C[-voice]) which GS sometimes creates through spreading of the [-voice] feature to following voiced stops. These cases of GS, we theorize, are remnants of lost consonants, which still appear as ‘ghosts’ when the root is suffixed by vowel-initial suffixes.

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¹⁹ The one exception is for the first and second person plural pronouns *a*, *i*, for which we have posited the phonemic forms /ʔa, ʔi/. GS is not written in these forms simply because of habit already established after fifteen years of orthography development. While these word-initial GS never reveal ‘ghost’ consonants, they do influence the contextual behavior of the word in ways consistent with their existence as phonemic consonantal segments.

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