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RESEARCH ARTICLE

Status of Velar Fricatives and Flap in Dagbanli

Abdul-Razak Inusah*

ABSTRACT

The study is cross-dialectal investigation of the velar fricatives [x, ɣ] and the flap [ɾ] in Dagbanli, a Mabia language spoken in the Northern Region of Ghana. The issues investigated and assessed for the purpose of Dagbanli phonology are the status of the velar fricatives [x, ɣ] and the flap [ɾ] across Dagbanli dialects. Ethnographic approach is employed to solicit the primary data from bucolic Dagbanli speech communities. Descriptive method is engaged for the analysis of the primary data available. The investigation reveals that Dagbanli dialects have the velar fricatives [x, ɣ] confined to specific segmental contexts with a particular inventory stricture. The flap [ɾ] is noticed to occur in mostly in intervocalic but entirely missing in Dagbanli indigenous words in word-initial. The velar fricatives [x, ɣ] and the flap [ɾ] are observed to be non-contrastive and only suffice as dialectal allophones in the language. The paper shows evidence of coalesce of non-coronal labial /m/ and coronal fricative /s/ to produce dorsal fricative [x] in intervocalic and coalesce of stem final stop /ɡ/ and suffix onset fricative /s/ to yield the dorsal fricative [x], a finding which shows the status of the segment [x] in Dagbanli phonology. The paper concludes that the segments [x], [ɣ] and [ɾ] are positional variants of /s/, /ɡ/ and /d/.

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Department of Humanities and Social Science Education, University for Development Studies, Ghana.

Corresponding Author:
e-mail: ainusah29@gmail.com

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1. Introduction

The paper aims at discussing the status of the velar fricatives [x, ɣ] and the flap [ɾ] in Dagbanli phonology cross dialectally. Dagbanli is a Mabia language spoken in the Northern Region of Ghana and it has three main dialects; Tomosili (Western Dialect (WD)), Nayahili (Eastern Dialect (ED)) and Nanunli (Southern Dialect (SD)). Each of these dialects has a sub-dialect, Gbanjonsili (WD), Zundusili (ED) and Jimansili (SD) as a result of alternative pronunciations (Inusah 2016, 2019, 2020, 2021, 2024a). Any conclusion drawn in this paper will be generally applicable to all the dialects since the differences between the dialects are mainly phonological.

The notion of what happen to the sounds in isolation and when they are connected into larger units have received some level of response as well as documentation in Dagbanli phonology (Blench 2006; Dakubu 1997; Inusah 2021, 2024a; Mahama & Inusah 2023; Olawsky 1999). Notice that the acoustic features of the voiced velar fricative [ɣ] show that its place of articulation in Dagbanli is in the vocal tract making it a velar sound. The early studies of Dagbanli phonology (Blench 2006; Dakubu 1997; Hudu 2014; Hyman 1993; Olawsky 1999) describe the segment [ɣ] as a variant of the velar stop /ɡ/. Olawsky (1999) refers to it as postvocalic variant while Blench (2006) calls it positional allophone. The issue here is that though the segment [ɣ] is accepted as a positional allophone of /ɡ/ between vowels (Inusah 2016, 2019, 2020, 2021), [ɣ] seems to be prominent in native speakers' pronunciation while /ɡ/ is head in non-native pronunciations, a situation which has influenced the use of /ɡ/ in Dagbanli transcriptions. Hudu (2018) mentions that for many decades, the segment [ɣ] has been part of Dagbanli orthography as <ɣ> in all written literature.

The voiceless velar fricative /x/ is a unique sound to Gbanjonsili as described by Inusah (2021), as a sub-dialect of the Western Dialect. The sound is restricted to only word-medial but does not surface in any word position (initial or final) in the dialect. Inusah (2021) argues that the velar fricative [x] is entirely not realized in any of the major dialects but surfaces as an alternative pronunciation in the sub-dialect, an issue which is investigated and addressed in this paper.

The articulation of the post-alveolar approximant /r/ in Dagbanli is the constriction of the tip of the tongue approaching the alveaolar area in approximately the way it would for the sound /d/ (Inusah 2016, 2019, 2020, 2024a). The segment /r/ as observed by Olawsky (1999) is weakened to a flap [ɾ] in word-medial in Dagbanli. Previous description (Inusah 2019, 2020, 2024b; Inusah *et al*., 2019; Mahama & Inusah 2023; Olawsky 1999) classifies the flap [ɾ] as a surface variant of the alveolar stop /d/ in intervocalic position. Olawsky (1999) claims that there are cases where [ɾ] has a distinctive function in Dagbanli especially in preconsonantal position, this issue is argued here as inaccurate.

This paper explores Dagbanli sound system and provides summary of the current status of the segments [x], [ɣ] and [ɾ] cross dialectally and provides basic explanation of the controversies involving the segments. For the purpose of analyisis in this paper, the dialects are represented as Tomosili (WD), Nayahili (ED), Nanunli (ND) and Across Dialects (AD).

2. Method

The ethnographic approach was explored following Gumperz (1982) work on Belfast in which the researcher presents himself to a participant as a friend of a friend. The method is highly motivated by the variationist tradition which allows changing network structures on language choice in bilingual communities. The approach puts the researcher in the position to study peoples' style of living by way of life, beliefs, language, formal and informal relationships and ideologies as well as many other dimensions of a particular culture or speech community (Inusah 2021, 2024b).

Using ethnographic approach for collecting linguistics data should, at its base, aims to study the way in which a linguistic code is understood from the point of view of the society that uses that code. To solicit the data, the researcher had to spend a substantial amount of time in the selected communities for the study so as to document and make observations about how people's ideas, attitudes, motives and behaviour are motivated. Employing the ethnographic approach in the research areas, observations were unstructured. Note taking procedure and audio recorder was used to record some of the conversations. An indexing scheme was introduced during the process without predetermined categories where the indexing scheme was interpreted within the society that it specifically relates. Inusah (2021) explains that ethnographic method generally describes the everyday practices of members of society by using conceptual constructions to make events observable and understandable by 'constructing' everyday reality.

The data for this paper were largely primary elicited personally from the towns and villages in the Northern Region: Tamale for *Tomosili*, Yendi for *Nayahili* and the villages around Bimbila for Nanunli. Nine (9) field assistants were selected, three (3) from each area. They were trained to keep records of the natural language to prepare a wordlist by using the Summer Institute of Linguistics (SIL) Africa Area Word List 2 (SILCAWL 2) compiled by Douglas Boona. The secondary data used in this paper were collected from the existing works on Dagbanli phonology (Inusah 2019, 2021, 2024a; Olawsky 1999). Some elderly native speakers of Dagbanli were consulted to elicit their judgement on the meaning or pronunciation of words and phrases.

3. Issues in the Study of Dagbanli Phonology

Obviously, there are issues in the study of phonology of a language and for that matter that of Dagbanli where much is not studied. These issues in the study of phonology have drawn the attention of some scholars (Blench 2006; Dakubu 1997; Hudu 2014, 2018; Inusah 2016, 2019, 2021, 2024b; Olawsky 1999) who have engaged in addressing them with diverse opinions. This paper focuses on the status of the velar fricatives [x, ɣ] and the flap [ɾ] across Dagbanli dialects. Dagbanli has thirty-three (33) consonant sounds which include affricates, double articulated sounds and velar fricatives considering all the dialects (Inusah 2021).

Table I presents Dagbanli consonants across dialects and their surface variants in square brackets. Inusah (2021) introduces the voiced velar fricative [ɣ] as part of the surface variants. The segments [x, ɣ, ɾ,] are attested here not to be phonemic in Dagbanli phonology but surfaces as a variants of /s, g, d/ providing evidence of alternative pronunciations. This paper examines the status of [x, ɣ, ɾ] cross dialectally.

3.1. Status of [x, ɣ, ɾ] in Dagbanli

In accounting for the differences in the distribution of segments in Dagbanli phonology, it is attested that the segment [x, ɣ] and [ɾ] are not phonemic and for that matter there are no evidence of special cases of contrast with any segment. This section provides summary of the current status of the segments [x, ɣ, ɾ] in Dagbanli across dialects and summarises controversies involving them in terms of the distribution. The segments [x, ɣ, ɾ] do occur at word-initial position in any of the dialects except word-medial.

TABLE I: Dagbanli Consonants (cf. Inusah, 2021)

Labial		Labiodental		Alveolar		Palatal	Palato-aveolar		Velar		Labial-velar		Glottal
p	b			t	d[ɾ]				k	g	kp[tp]	gb[db]	[ʔ]
	m				n	ɲ				ŋ		ŋm[nm]	
		f	v	s	z		ʃ	ʒ	[x]	[ɣ]			[h]
							ʧ	ʤ					
					l								
						j						w[ʊ]	

3.2. Voiced Velar Fricative [ɣ]

The velar fricative [ɣ] is marked in Dagbanli as a surface variant in intervocalic position. Notice that the speakers of Dagbanli tend to realise this segment as velar fricative in normal speech except non-speakers who pronounce it as velar stop [g]. I argue here that [ɣ] is a segment in Dagbanli as noted by Inusah (2021) and it only occurs in word-medial in intervocalic position. As observed in the early works of Dagbanli phonology, a non-native speaker of Dagbanli in a normal speech, would substitute the velar fricative /ɣ/ for a velar stop /g/ in intervocalic as in the data in (1) due to pronunciation difficulties of /ɣ/ in Dagbanli words, which informed the prominence of /g/ in many Dagbanli transcriptions. A finding in this paper proves that there is no evidence of a monolingual native speaker of Dagbanli pronouncing /g/ in any of the words in (1) and many others.

1.	dàɣʊ́	→	*dàgʊ́	‘stick’
	vɔ́ɣʊ́	→	*vɔ́gʊ́	‘leaf’
	kɔ́ɣʊ́	→	*kɔ́gʊ́	‘antelope’
	báɣá	→	*bágá	‘soothsayer’
	jɔ́ɣʊ́	→	*jɔ́gʊ́	‘bush’
	dɔ́ɣɨm	→	*dɔ́gɨm	‘family’

The data in (1) present [ɣ] which is mostly realized as /g/ in intervocalic position in Dagbanli transcriptions, a case which is not accurate. The data provides evidence to support the fact that the velar fricative [ɣ] only occurs in intervocalic and also surfaces as variant of /g/ in the speech of non-native speakers. There is no evidence in Dagbanli and its dialects to show that [ɣ] and [g] are in complementary distribution across dialects. Phonologically, both sounds in different context occur between vowels. For instance, indigenous words that names towns and villages that have /g/ in intervocalic position are pronounced as /g/ while those that have /ɣ/ in intervocalic position are pronounced as /ɣ/ as illustrated in the examples in (2) and (3).

2. /g/ in indigenous names of towns and villages in Dagbanli

kʊ̀mbʊ̀ŋ-gʊ̂	*kʊ̀mbʊ̀ŋ-ɣʊ̂	‘a town in the north’
káɾ-gá	*káɾ-ɣá	‘a town in the north’
kátáɾ-gá	*kátáɾ-ɣá	‘suburb of Tamale’
gʊ̀ɾ-gʊ̀	*gʊ̀ɾ-ɣʊ̀	‘suburb of Tamale’
gbɨ́n-gbál-gá	*gbɨ́n-gbál-ɣá	‘name of a village around Yendi’

3. /ɣ/ in indigenous names of towns and villages in Dagbanli

zábzʊ́ɣʊ̂	*zábzʊ́gʊ̂	‘a town near Yendi’
gʊ̀ndɔ́ɣʊ́	*gʊ̀ndɔ́gʊ́	‘village close to Yendi’
gʊ̀ʃɛ̀ɣʊ́	*gʊ̀ʃɛ̀gʊ́	‘a town near Yendi’
làmàʃɛ̀ɣʊ́	*làmàʃɛ̀gʊ́	‘suburb of Tamale’
báɣábáɣá	*bágábágá	‘suburb of Tamale’
ʧɔ́ɣʊ̂	*ʧɔ́gʊ̂	‘suburb of Tamale’
ná:bɔ́ɣʊ̂	*ná:bɔ́gʊ̂	‘suburb of Tamale’

Crossdialectally, native speakers of Dagbanli do not alternatively pronounce the velar fricative /ɣ/ and velar stop /g/ in intervocalic position as seen in (2) and (3). [ɣ] only surfaces as /g/ in the speech of non-native speakers in intervocalic position in words as illustrated in (3). It is very rare to hear [ɣ] in the onset of a syllable being pronounced in any of the dialects but very common between vowels. The alternative pronunciation and description maybe influenced by words in which such sounds occur between vowels. It is also noted that in words which are nouns and verbs, there is no evidence of /g/ becoming [ɣ] in onset of a syllable; this is illustrated in (4).

4.	gɔ́b-gá	*gɔb-ɣa	‘left’
	gɔ́ɾ-gʊ́	*gɔɾ-ɣʊ	‘sickle’
	ŋmàl-gí	*ŋmal-ɣɨ	‘turn’
	ɲɛ́b-gà	*ɲɛb-ɣa	‘crocodile’
	bàɾ-gí	*baɾ-ɣɨ	‘lost’
	bál-gí	*balɣɨ	‘slow’
	kʊ́l-gá	*kʊl-ɣa	‘stream’

The data in (1–4) provide evidence to support the behavior of the velar fricative [ɣ]. It is shown that /g/ occurs before a vowel in an onset of a syllable (#___v) but crucially, [ɣ] never occur in that environment but instead occurs only between vowels (v___v) because it has such a highly restricted distribution. The pattern in the data suggests that /g/ occurs at syllable initially before a vowel and in onset position of a final syllable as seen in the data.

3.3. Voiceless Velar Fricative [x]

The voiceless velar fricative /x/ is the product of coalesce of a stem-final velar stop /g/ and a suffix onset alveolar fricative /s/ as in (5) in a sub-dialect of Tomosili (Gbanjonsili). Interestingly, there is no evidence of the segment /s/ occurring in intervocalic position in the sub-dialect. The following data present the occurrence of the sound /x/ in word-medial in the sub-dialect of WD.

5.		/g + s/ → [x]	
tɔ̀g-sì	→	tɔ̀xɨ	‘speak’
ɲàg-sím	→	ɲàxɨm	‘sweetness’
zàg-sì	→	zàxɨ	‘refuse’
lág-sí	→	láxɨ	‘put together’
wág-sí	→	wàxɨ	‘slacken’

The fusion of /g/ and /s/ to realise [x] is a case of preservation which is similar to the resistance of the dorsal to nasal place assimilation. The dialect also show evidence in some cases that [x] is the product of the fusion of non-coronal labial nasal /m/ and the coronal fricative /s/ in intervocalic position as in (6) in contrast to the observation that a sequence of labial and alveolar does not coalesce into one segment. This proves that there is also labial-coronal coalescence in the dialect.

6.		/m + s/ → [x]	
wʊ́m-sí`	→	wʊ́xɨ	‘train/nurse’
wʊ̌m-sím	→	wʊ́xim	‘tiresomeness’
wʊ́m-síbʊ́	→	wʊ́xɨbʊ́	‘train/nurse’
ɲɨm-sá	→	ɲɨxá	‘neem tree’
ɲɔ̀m-sá	→	ɲɔ̀xá	‘lime’

3.4. Voiced Alveolar Flap [ɾ]

The flap /ɾ/ is very common in Dagbanli pronunciation in word-medial. Previous studies (Olawsky 1999) attest that [d] is weakened to become a flap [ɾ] in intervocalic position in Dagbanli loan words confirming its loan status as illustrated in (7).

7.		/d/ → [ɾ]	
kɔ̀dʊ̀	→	kɔ̀ɾʊ̀	‘banana-sg’
jɛ́dà	→	jɛ́ɾà	‘trustworthy’
fádá	→	fáɾá	‘priest’
gádó	→	gáɾó	‘bed’

Olawsky (1999) classifies the sound as a surface variant of /d/ in intervocalic; this conclusion is accurate mostly in loan words as seen in (7) but cannot not be considered in Dagbanli words in word-initial since most of its occurrence is limited to certain predictable environments. The issue is that the [r] does not occur in word-initial position in indigenous Dagbanli words (Inusah *et al*., 2019) as seen in (8). The sound is more pronounced in word-medial in all dialects. In word-medial (intervocalic position), [r] is weakened to a flap [ɾ] and realised as a proper trill [ɾ] in word-initial only in loan words as seen in (8).

8.	liga	riga	'dress'	*(Hausa)*
	lɔba	rɔba`	'rubber'	*(English)*
	le:mu	re:mu	'orange'	*(Hausa)*
	labi	rabi	'female name'	*(Hausa)*
	laŋ	*raŋ	'net-N'	*(Dagbanli)*
	lu	*ru	'fall-V'	*(Dagbanli)*
	lana	*rana	'owner'	*(Dagbanli)*

In indigenous Dagbanli words, /d/ is substituted for the flap [ɾ] only in postvocalic position as in (9). The segment is one of the consonants which only occur in word-medial and in few instances in word-final of a root-final with a surffix marker as seen in (10). The occurrences of /d/ in such position gives an alternative pronunciation of the word in Dagbanli by non-native speakers but the meaning remain unchanged as illustrated in (9).

9.	ʃíɾí	→	ʃɨdɨ	'honey'
	pɨɾ-gílí	→	pɨdɨgɨlɨ	'half'
	fàɾà	→	fada	'poverty'
	kɔ̀ɾ-gílí	→	kɔdɨgɨlɨ	'slaughter'
	kɔ̀ɾɨnʧí	→	kɔ̀din-ʧɨ	'grass'

10.	pɨɾ-bá	→	pɨd[ɨ]ba	'father's sister'
	pɨɾ-gí	→	pɨd[ɨ]gɨ	'to divide'
	dɨɾ-gʊ́	→	dɨd[ɨ]gʊ	'spoon'
	jáɾ-gá	→	jad[ɨ]ga	'rascally'
	sáɾ-gí	→	sad[ɨ]gɨ	'to slide'
	kpáɾí	→	kpad[ɨ]	'tassel of corn'

As seen in the data in (9) and (10), the sound [ɾ] is restricted to word-medial position in Dagbanli indigenous words. An attempt to substitute it with /d/ in a similar position gives the construction a different pronunciation in all the dialects suggesting that the two sounds might be in complementary distribution.

3.5. Determining the Status of the Segments [x, ɣ, ɾ]

The status of the segments [x, ɣ, ɾ] in Dagbanli is, therefore, determined by considering the following questions following Hayes (2009) and Hawkins (1992):

1. Are there are any minimal pairs in which these sounds contrast?
2. Are there any noncontrastive sounds in complementary distribution?
3. If noncontracting phones are found, what are the phonemes and their allophones?
4. What are the phonological rules by which the allophones can be derived?

To analyse the status of the segments [ɾ, x, ɣ] in Dagbanli based on the questions above, consider the data in (11), (12), and (13).

11.	**[s]**		**[x]**	
	sɨ̀m	'friend'	tɔ̀xɨ	'speak'
	sàm	'mix'	ɲàxɨ́m	'sweetness'
	sóm	'bitter'	zàxɨ	'refuse'
	sàb	'write'	ɲàxà	'palatable'
	sɨŋ	'pot'	*xɨŋ	'pot'
	sɔ̀ŋ	'mat'	*xɔ̀ŋ	'mat'

12.	**[d]**		**[ɾ]**	
	dáɾá	'buying'	báɾá	'riding'
	dá-á	'market'	kɔ̀ɾê	'desire'
	dám	'alcohol'	dóɾ-ó	'sick'
	dôŋ	'enemy'	làɾ-gí	'untie'
	kʊ́ndʊ́ŋ	'hyna'	*kʊ́nɾʊ́ŋ	'hyna'
	kʊ́dɔ̀lkʊ́	'bridge'	*kʊ́ɾɔ̀lkʊ́	'bridge'

13.	**[g]**		**[ɣ]**	
	gɔ́b-gá	'left'	dʊ́ɣʊ́	'pot'
	gɔ́ɾ-gʊ́	'sickle'	ʄʊ́ɣʊ́	'festival'
	gáɾ-gá	'snake'	ɲàxà	'palatable'
	gáɣám	'unique	*ɣáɣám	'unique'
	gám	'large'	*ɣám	'large'

Notice that there is no evidence of minimal pairs that would conclusively show that the segments [ɾ, x, ɣ] represent separate phonemes as seen in the data in (11), (12), and (13). Here, one can say that the non-contracting phonemes [x]-[s] as in (11); [d]-[ɾ] as in (12) and [ɣ]-[g] as in (13) are in complementary distribution because their environments are different. In the data in (11), (12), and (13), the pair of segments occurs in different environments: /s, d, g/ in word-initial and [x, ɾ, ɣ] in only word-medial in intervocalic position. The distribution of /s, d, g/ and [x, ɾ, ɣ] are different and they complement each other, for [x, ɾ, ɣ] are not found in /s, d, g/-type environment, nor /s, d, g/ in [x, ɾ, ɣ]-type. When this happens, the two sounds are analysed to be in complementary distribution or non-contrastive.

It is known that two allophones can be derived from one phoneme in which one is selected as the underlying segment form (Corder 1993; Hawkins 1992). The allophone then makes the rules and the phonemic feature matrix as simple as possible. In Dagbanli, the segments /s d, g/ occurs in both word-initial and word-medial in all the dialects and surfaces as [x, ɾ, ɣ] in word-medial between vowels. Thus, the segments /s, d, g/ is selected as the underlying phoneme because they are set up here as the elsewhere allophones while [s d, g] and [x, ɾ, ɣ] are the allophones.

Conclusively, one may now state the retaliation rules by which the segments [x], [ɾ], [ɣ] are derived from the segments [s], [d], [g] between vowels. Using feature notation (Chomsky & Halle 1968) the rule is stated as: [s, d, g] → [x, ɾ, ɣ]/v___v. In the realization rule, [x] is a variant of /s/, [ɾ] is a variant of /d/ and [ɣ] is a variant of /g/ in intervocalic position. The whole processes are summarised in the Table II. It is important to note that this analysis describes the data at hand and further data may oblige one to re-analyse the situation.

TABLE II: The Status of [x, ɣ, ɾ] in Dagbanli

Minimal pair	Complementary distribution	Segments and their variants	Phonological rules by which variants are derived	Dialect
[x] vs. [s] ? ?	[x] vs. [g + s]	Phoneme: /s/	/s/→[x]/v___v	WD
	/ɲàgsɨ́m/ 'sweetness'	Variant: [x]		
	[ɲàxɨ́m] 'sweetness'			
[ɣ] vs. [g] ? ?	[ɣ] vs. [b]	Phoneme: /g/	/g/→[ɣ]/v___v	ED
	/vɔ́gʊ́/ 'leaf'	Variant: [ɣ]		
	[vɔ́ɣʊ́] 'leaf'			
[ɾ] vs. [d] ? ?	[d] vs. [ɾ]	Phoneme: /d/	/d/→[ɾ]/v___v	AD
	/kɔ́dʊ́/ 'banana'	Variant: [ɾ]		
	[kɔ́ɾʊ́] 'banana'			

4. Conclusion

This paper demonstrated how segments interact to shape the surface inventory of Dagbanli segments. It provided summary of the current status of the velar fricatives [x, ɣ] and the flap [ɾ]. The segment [ɣ] in intervocalic position is used independently cross dialectally. A non-native speaker of Dagbanli in a normal or fast speech may substitute /ɣ/ for [g] as there is no evidence of a monolingual native speaker pronouncing [g] in indigenous words. There is no evidence to show that native speakers of Dagbanli pronounce /ɣ/ instead of /g/; they do not alternatively pronounce the velar fricative /ɣ/ and velar stop /g/ in intervocalic position. It is very rare to hear such sounds being pronounced in any of the dialects but very common in the speech of non-native speakers who of course were the first to describe the phonology of Dagbanli.

The paper argued that the flap /ɾ/ is substituted for the stop /d/ only in the context of loan words. The sound is described to be restricted to word-medial position and does not occur in word initial. The paper revealed that the velar fricative [x] is a product of the fusion of stem final velar consonant /g/ or nasal consonant /m/ and the suffix onset alveolar consonant /s/ in the subdialect of the Western Dialect. The paper concludes that the segments [x], [ɣ] and [ɾ] are not phonemic in Dagbanli but only suffice as positional variants of /s/, /g/ and /d/ in intervocalic.

Conflict of Interest

The author declares that there is no conflict of interest.

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