Chapter 3

Classification of Guébie within Kru Hannah Leigh Sande

Guébie, a Kru language spoken in Côte d'Ivoire, is currently doubly classified within Eastern Kru according to Ethnologue (Lewis et al. 2013). It is listed as a dialect of two distinct subgroups, Bété and Dida. This double classification is clearly problematic, and this paper provides the initial work towards addressing the correct classification of the language. Here I compare the phonological and syntactic properties of Guébie with surrounding Bété and Dida languages in order to determine its relatedness to each subgroup. I conclude that Guébie is more closely related to Vata, a Dida language, than to Bété.

1 Introduction

Kru is a branch of Niger-Congo languages spoken in Côte d'Ivoire and Liberia. There are two major subdivisions of Kru languages: Eastern and Western Kru (Marchese 1979); however, there has been very little work done on the internal classification of those two branches. Many 'languages' classified as either Eastern or Western Kru are in fact subgroups of related languages. For this reason, many Kru languages are grouped together as a single language for classification purposes, sometimes for empirical reasons and sometimes for political or geographic ones, leading to linguistic misclassifications and inadequate descriptions of individual Kru varieties. In this paper I address one such case, that of Guébie, an Eastern Kru language spoken in southwest Côte d'Ivoire. I attempt to provide an initial classification of this particular Kru language.

Guébie is a particularly interesting case of misclassification. It is currently classified twice in Ethnologue (Lewis et al. 2013),¹ and I argue here that neither classification is accurate. Lewis et al. (2013) calls Guébie both a dialect of Bété-Gagnoa (btg), and an alternative name for Dida-Lakota (dic). Bété-Gagnoa has 150,000 speakers according to Ethnologue (Lewis et al. 2013), and Dida-Lakota (dic) has 94,000 speakers. Based on my own observations during fieldtrips along with estimates from consultants, I estimate that Guébie, the language in question, has only 7,000 remaining speakers. Thus, classifying Guébie as a dialect of Bété-Gagnoa or an alternative name for Dida-Lakota is incredibly misleading in terms of the number of remaining speakers and vitality of the language.

¹The revised version of this chapter was completed in 2015. The version of Ethnologue cited throughout this paper is the 2013 edition, which was the most recent at the time of writing.



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The goal of this paper is to determine the appropriate classification of Guébie and advocate that it be classified separately from both Bété-Gagnoa and Dida-Lakota. I will demonstrate based on original Guébie data that Guébie is more closely related to Vata, a dialect of Dida-Lakota, than to Gbadi, a dialect of Bété-Gagnoa. I choose these two particular varieties as standards of comparison because there is more data available for Vata and Gbadi than for other Dida and Bété languages. I conclude based on this initial study that Guébie is more closely related to Dida languages than Bété ones, and further, that it is distinct from Vata (Dida-Lakota), thus it should be classified as a distinct Dida language.

I begin in §2 with background information on Guébie and its current classification within Kru. I turn in §3 to the methodology used here to determine relatedness of languages. In §4 I discuss the somewhat limited phonetic and phonological evidence that Guébie is more closely related to Dida-Lakota than to Bété-Gagnoa, and in §5 I discuss the more readily available syntactic data which supports the conclusion that Guébie is a Dida language, but is distinct from Dida-Lakota. I conclude in §6 with the implications and conclusions of the present study, arguing that Guébie be classified as distinct from both Bété-Gagnoa and Dida-Lakota, contra the current Ethnologue classification (Lewis et al. 2013).

2 Background: The current classification of Guébie

The current literature agrees that Kru is a branch of Niger-Congo (cf. Marchese Zogbo 2012). However, there have been many other contradictory proposals in the past. There have been claims that Kru is related to Gur (Vogler 1974), Kwa (Greenberg 1963), and Mande (Bennett & Sterk 1977). Welmers (1977) put forth the proposal that Kru is a distinct branch of Niger-Congo, and that has been corroborated by Marchese (1979) and later work. There are two major branches of Kru languages, Eastern and Western, which are geographically split near the country boarder of Côte d'Ivoire and Liberia. Guébie is an undescribed Eastern Kru language spoken in seven small villages in southwest Côte d'Ivoire about 30 kilometers southwest of Gagnoa and 30 kilometers east of Lakota. The largest of these villages, Gnagbodougnoa, has a population of 1000, about two thirds of whom are Guébie-speaking. The remaining third are Lobi speakers who were displaced during the national crisis of Côte d'Ivoire in the 1990s. Since Guébie is spoken in just seven villages, the largest of which has a population of 1000, I estimate that Guébie has at most 7000 speakers.

The data presented in this paper comes from original work with native speakers of Guébie. For eight months I worked with a native speaker temporarily living in Berkeley, California. This was followed by fieldwork in Gnagbodougnoa, Côte d'Ivoire in the summer of 2014. My consultants are five in number, include both men and women, and range in age from 19–76. This paper presents the first published documentation and description of Guébie.

Guébie villages are situated amidst a dense rainforest where temperatures are high year-round and there are two rainy seasons, one in June and the other in December.

The community of Guébie speakers are subsistance farmers who grow cassava, rice, and plantains. Rarely are these plants farmed for profit. A small percentage of Guébie people farm and sell cacao and coffee. Only one third of children attend school, while the others work on their family's farm. There is only one known monolingual speaker, my consultant Serikpa Emil, who is 76 years old. The rest of the Guébie-speaking population is bilingual in French. Children are still learning Guébie, however within a single generation, I predict that children will no longer learn Guébie as a first language.

The Eastern Kru family tree in Figure 1 is adapted from Ethnologue (Lewis et al. 2013).



Figure 1: Eastern Kru family tree

Guébie, bolded in the tree above, is currently classified twice, as part of two distince Eastern Kru varieties. Due to geographic, historical, and possibly ethnic reasons, Guébie has been called a dialect of Bété-Gagnoa, spoken by about 150,000 people (Lewis et al. 2013). Due to linguistic similarity, Guébie is also listed as a second name for Dida-Lakota, an Eastern Kru language spoken by about 94,000 people in the city of Lakota, east of the Guébie-speaking area.

3 Methodology

The most widely accepted means of establishing genetic relationship between languages is the Comparative Method (cf. Bloomfield 1933 chapter 18, among others), which determines whether sound correspondences across languages are regular, thus the result of regular sound change. For the Comparative Method to be of use requires dictionaries or lists of lexical items in the languages in question to be used for comparison.

Ideally, we would compare sound correspondences across cognates in the lexicon of Guébie with the lexicon of Bété-Gbadi and Vata (Dida-Lakota) in order to determine relatedness. However, there has not been enough thorough documentation across Bété and Dida languages for comparing sound correspondences to be informative. The available resources for Guébie include only my own data elicted from September 2013 to July 2014. For Bété-Gbadi, there is a dictionary written by a native speaker linguist (Zogbo 2005). For Vata there is a small list of lexical items compiled from various works on the phonology and syntax of the language (Marchese 1979; Kaye 1981; Koopman 1984).

Amongst these resources, I have found fewer than 100 cognates to compare across the three languages. This number of cognates is not enough to determine relatedness based on sound change; however, I will present what minimal data exists in §4.

For each of the languages in question, Guébie, Bété-Gbadi, and Vata, there is some not insignificant amount of syntactic description in the literature. Basing genetic relationship on syntactic correspondences is less widely accepted than on sound correspondences and morphological paradigms (Garrett 2012; Ringe & Eska 2014, and citations therein). However, since there are no available lexicon lists for most Kru languages, I propose that we examine syntactic features of Bété and Dida languages, comparing them with Guébie to determine how these languages are related.

Lexical items are likely to be borrowed heavily from neighboring languages, and morphosyntactic correspondences are more likely to be conservative or undergo change less rapidly over time. Thus, if we can find convincing syntactic similarities between two languages, A and B (say, Guébie and Vata), but not between two others, A and C (say, Guébie and Bété-Gbadi), we may be able to tentatively say that the first two languages, A and B, are more closely related than the latter two. Comparing morphosyntactic features of languages has been crucial in determining the relatedness of Proto-Anatolian languages (Melchert 2013), and the place of Armenian within Indo-European (Hübschmann 1875). Thus, it is possible, however rare, for morphosyntactic similarity to influence decisions about language classification.

In the following two sections I compare the linguistic properties of Guébie with its two geographically closest documented neighbors, Bété-Gbadi and Vata. Bété-Gbadi is spoken in just north of the Guébie-speaking villages. The Bété-Gbadi data here comes from Marchese (1979); Zogbo (2005); Koopman (1984). Vata is a Dida language spoken east of the Guébie-speaking villages. The data here comes from Marchese (1979); Kaye (1981; 1982); Koopman (1984). Vata is a dialect of Dida-Lakota spoken slightly northeast of Lakota. Ideally we would compare Guébie with Dida-Lakota spoken in the city of Lakota; however, there is very little work on the Dida spoken in Lakota. Vata is slightly geographically further from Guébie; however, since it is a well documented and closely related to Dida-Lakota, I compare Vata, not the Dida of Lakota, with Guébie.

I demonstrate throughout the remainder of this paper that the linguistic properties of Guébie and Vata are too similar to be due to chance, and that Guébie is less closely related to Bété-Gbadi than to Vata. The words and sounds that do correspond in Guébie and Bété must be due to borrowing, or must have been present in Proto-Eastern-Kru. There is very little evidence that Bété and Guébie underwent any regular changes that other Eastern Kru languages did not undergo. Any assumptions made here about the features of Proto-Kru or Proto-Eastern-Kru come from Marchese (1979) and Marchese Zogbo (2012).

4 Phonetic and phonological evidence

There is very little, if any, phonetic or phonological evidence that can concretely determine the classification of Guébie as Bété or Dida. I present here some basic similarities and differences between Bété-Gbadi and Guébie, and Vata and Guébie.

4.1 Tone

The data in (1) shows that there are four contrastive tonal heights in Guébie. The words in (1a) are segmentally identical and are distinguished only by the height of their level tone. The data in (2) shows that Guébie also makes use of contrastive contour tones. There are two distinct rising tones and three distinct falling tones in Guébie.

(1)	Four contrastive tone heights in Guébie								
	a.	ko ¹	'line/row'	ko ²	'pestle'	ko ³	'skin'	ko^4	'cadavre'
	b.			no ²	'beverage'			no^4	'woman'
	c.	ј е ¹	'egg'		0	_Э е ³	'star'	$_{ m Je}^4$	'number'
(2)			xamples						
	Ja ³¹ 'coconuts'								
	vo^{13}	'ho	orns'						
	su ²	'tr	ee'						
	su ¹³	'to	shove'						

There are four contrastive tonal heights in Guébie. There are also four contrastive tonal heights in Vata (Marchese 1979; Kaye 1981; Koopman 1984). It is controversial whether there are three or four contrastive tonal heights in Bété-Gbadi. Zogbo (2005)'s dictionary lists four contrastive tones for Bété-Gbadi; however, Marchese (1979; 1989) says that the four tonal heights posited for Proto-Kru have collapsed into three heights in Bété. Tones throughout this paper are marked with numbers 1–4, where 4 is the highest tone and 1 is the lowest. A dot between tones separates syllables, and two numbers within a syllable signifies a contour tone.

4.2 Vowels

There are ten contrastive vowels in Guébie, distinguished by height, backness, rounding and ATR value. /a/ is the +ATR counterpart of /a/ in Guébie.

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(3) Guébie vowel inventory



There are also ten contrastive vowels in Vata, identical to those in the vowel inventory in the chart above. There are only seven contrastive vowels in Bété-Gbadi. Bété-Gbadi lacks an ATR distinction between the mid and low vowels. Marchese Zogbo (2012) posits seven contrastive vowels for Proto-Kru, which means that Vata and Guébie each separately underwent vowel splits resulting in a larger vowel inventory. Alternatively, Vata and Guébie share a common ancestor that Bété-Gbadi does not share, and that ancestor underwent regular phoneme splits, adding three vowels to the inventory. This ten-vowel inventory was then passed down to both Vata and Guébie. Without more information we cannot say for sure which path of development of these vowel systems is the correct one.

There are marginal nasal vowels in Guébie. The three vowels $[\tilde{\epsilon}, \tilde{o}, \tilde{a}]$ are found in a just a handful of words. Proto-Eastern-Kru did not have nasal vowels. However, nearby Kwa and Mande languages, frequently in contact with Kru languages, have these same three nasal vowels. This contact could have resulted in the borrowing of Kwa and Mande words into Guébie, so that the borrowed words but no native words contain nasal vowels in Guébie. The three Guébie words that I have found containing nasal vowels are given in (4).

- (4) Guébie nasal vowels
 - a. kãõ^{4.2} 'spine'
 b. _Jiẽ^{3.1} 'sea'
 c. kpãẽ^{4.4} 'very, a lot'

In Bété-Gbadi, nasal vowels are also found in a few, likely non-native, words. One of these is the same word, kpãẽ 'very', that contains a nasal vowel in Guébie. Because both Guébie and Bété-Gbadi have had contact with surrounding Kwa languages in the past, it seems likely that both languages borrowed words containing nasal vowels from those Kwa languages. Alternatively, one of the two, Guébie or Bété-Gbadi, could have borrowed the words in (4) and these words could have in turn been borrowed into the other. Either way, it seems unlikely that nasal vowels were an innovation via regular sound change shared by Guébie and Bété; borrowing seems like a more plausible option because there are so few words in each language that contain nasal vowels, and the words that do have nasal vowels overlap in Guébie and Bété-Gbadi.

Guébie has pervasive ATR harmony from roots to suffixes. Vata shares the same ATR harmony process, though Bété-Guébie does not (Koopman 1984). Guébie ATR harmony can be seen in (5) where the causative morpheme is a low vowel suffix on verbs. Verb roots that contain +ATR vowels take the +ATR causative suffix [-ə] while those containing -ATR vowels in the root take the -ATR causative suffix [-a]. The same process can be seen with the Vata definite marker, where +ATR root vowels result in +ATR suffix vowels. There is rounding harmony in the Vata data that does not occur in Guébie. The Gbadi data shows that +ATR roots do not result in +ATR suffixes. This is likely a factor of the limited vowel inventory of Gbadi, however, where only high vowels show an ATR distinction. There are no suffixes in Gbadi that contain high vowels, so we can not say for certain whether or not there would be ATR harmony between roots and suffixes in high vowels in Gbadi.

(5) Vowel harmony da	Vowel	harmony	data
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Guébie	ci-ə ^{3.1}	'to cause to learn'	jε-a ^{3.2}	'to cause to dance'
Vata	sle-e ^{2.3}	'the house'	gbʊ-ɔ ^{2.3}	'the cause'
Gbadi	li-a ^{2.2}	'to cause to eat'	jue-a ^{4.4.2}	'the children'

Without a high-vowel suffix in Bété-Gbadi, we cannot say for certain whether all three languages have ATR harmony, or whether only Vata and Guébie share this ATR harmony process. If the latter is true, either this harmony process arose separately in Vata and Guébie, or it was lost relatively recently in Gbadi. Alternatively, Vata and Guébie share a common ancestor that Bété does not share, and that ancestor acquired a harmony process that Bété did not. More data is needed to know for certain.

4.3 Consonants

There is too little lexical data available from documented Bété and Dida languages to show regular sound changes in consonants that led from a Proto-language to the currently spoken languages.

4.4 Summary

Until further data is collected, the existing phonological data on these languages do not tell us much about their genetic relationship. What we can conclude from the above is that there are no known shared changes between only Guébie and Bété-Gbadi. All of the features that Guébie shares with Bété are also present in Vata, or there is evidence that those features a result of borrowing (nasal vowels). In the following section I turn to syntactic evidence of relatedness.

5 Syntactic evidence

In this section I compare certain syntactic properties of Guébie with those of Bété-Gbadi and Vata (Dida). I am limited by the specific syntactic properties that have been described

for all three languages in question, though there are numerous syntactic features of Guébie that more closely resemble Vata than Bété-Gbadi and other Bété dialects.

Before describing the differences, it is important to note that all three languages share S AUX O V alternating with SVO word order. I turn now to those properties that are not shared amongst all three languages.

5.1 Aspect marking

The two major aspectual distinctions in Guébie, imperfective and perfect, are distinguished by tone. All imperfective verbs have tone one step lower on the four-tone scale than the corresponding perfect verb, (6).

(6) Perfective vs Imperfective in Guébie

- a. 3^{3} li² Ja^{31} 3.SG eat.IMPF coconuts 'He eats coconuts'
- b. b^{3} li³ b^{31} 3.5G eat.PERF coconuts 'He ate coconuts (recently)'

Vata (and Dida-Lakota, Kaye 1982) also distinguishes imperfective from perfective aspect with tone.

Bété-Gbadi, on the other hand, distinguishes imperfective from perfective aspect with auxiliary particles, and the verb surfaces finally: S AUX O V.

(7) Comparing aspect distinctions

Language	Perfective	Imperfective
Guébie	Tonal	Tonal
Vata	Tonal	Tonal
Gbadi	Particle	Particle

This difference means that in Proto-Eastern-Kru there was either an aspect-marking auxiliary that was reduced to a tonal morpheme in Guébie and Vata, or there was historically a tonal morpheme that was replaced by an auxiliary in Bété-Gbadi, but not in all Eastern Kru languages.

5.2 Causation

There are two methods of adding a causative meaning to a verb in Guébie. One of these is suffixal, shown in (8).

(8) Guébie suffixal causative

a.	ci ³¹	'to learn'	ci-ə ^{3.1}	'to cause to learn, to teach'
b.	jɛ ³	'to dance'	jε-a ^{3.2}	'to cause to dance'

The second means of causativization in Guébie is with a clausal construction meaning literally "X speaks and Y Zs," where X is the causer, and Y is the subject of the verb Z.

(9) Clausal causative in Guébie

kəgəlinə-wa^{4.2.2.2.3} gba² ne⁴ ju-wa^{4.4} ə³ li² farmer-DEF speak and boy-DEF 3.SG eat.PERF 'The farmer is making the boy eat'

The suffixal causative in (8) is present in both Vata and Bété-Gbadi as well. However, the clausal causative is only found in Vata and Guébie, not Bété-Gbadi.

(10) Clausal causative in Vata

 n^3 gba² le³ yɔ-ɔ^{3.3} li² I speak and boy-def eat 'I made the boy eat.'

It is possible that the clausal causative construction was borrowed into Guébie from Vata or vice versa; however, it is also possible that the two share a common ancestor that Bété does not share, and the clausal causative was innovated in that ancestor language, inherited into both Guébie and Vata. All we can say is that there is no commonality between Bété and Guébie that Vata does not also share.

5.3 WH-questions

Wh-questions in Guébie are formed with a clause-final question marker and a clauseinitial question word meaning literally 'person, place, thing' for 'who, where, what,' respectively.

(11)	Wh	-questions in Guébie				
	a.	pəkpa ^{3.3} touri ^{1.1.3} ji ³ letri ^{3.2} kəpa ^{3.23} na ³				
		who Touri.NAME will letter send Q				
	'To whom will Touri send a letter?'					
	b.	b ϵ ba ^{2.2} touri ^{1.1.3} ji ³ Jaci ^{2.2} kopa ^{3.23} na ³				
		what Touri.NAME will Djatchi.NAME send Q				
	'What will Touri send to Djatchi?'					

According to (Koopman 1984: 87), Wh-questions are formed in Bété-Gbadi with an initial Wh-word and a clause-medial question marker, while in Vata they are formed with an initial Wh-word and a final question marker. This means that once again the Vata construction (12) is identical to the Guébie construction, while the Bété construction is distinct. The chart in (13) shows the similarity between the Guébie and Vata but not the Guébie and Bété Wh-construction.

(12) Wh-questions in Vata al $\mathfrak{d}^{1.4} \mathfrak{d}^1 le^2$ saka^{3.4} la¹ who he eat rice WH 'Who eats rice?'

(13)	Comparing Wh-constructions				
	Language	Initial	Medial	Final	
	Guébie	Wh	-	+Q	
	Vata	Wh	-	+Q	
	Gbadi	Wh	+Q	-	

Much like the causative construction in the previous section, we see a similarity between Guébie and Vata that could be the result of borrowing or common inheritance. More data, prefereably historical data, is needed to know for certain.

5.4 Gerunds

There are two types of gerund formation in Guébie. One form of the gerund is formed by reduplicating the verb and adding the suffix /-je/. The other is formed by adding the suffix /-li/ to the verb². The former gerund construction is found in Bété-Gbadi and not Vata, while the latter gerund construction is found in Vata but not Bété-Gbadi (Koopman 1984).

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(14) Gerunds in Guébie
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- a. saka^{3.3} la² li-li-je^{2.2.1} rice дем eat-eat-NOM 'Rice-eating'
- b. saka^{3.3} la² **pi-li^{3.1}** rice GEN cook-NOM 'Rice-preparing'
- (15) Gerunds in Vata saka^{3.4} la² pi-li^{2.1} rice GEN cook-NOM 'Rice-preparing'
- (16) Gerunds in Bété-Gbadi li-li-je^{2.2.1} eat-eat-NOM 'Eating'

The Guébie construction in (14b) is identical to the Vata construction in (15). Likewise, the Guébie construction in (14a) is shared by Bété-Gbadi, as shown in (16). Without knowing which gerund formation strategy was present in the proto language, we cannot make

²The two gerund formation strategies described here have distinct distributions that I cannot yet cleanly define.

any conclusions about whether each of these gerund constructions was inherited or borrowed. Without further information, gerunds do not shed light on the classification of Guébie.

5.5 Summary

We have seen that Guébie syntax is similar to Vata in aspect marking, causation, and wh-question formation. It shares ones gerund construction with Vata and another with Gbadi. However, there are very few other syntactic similarities between Guébie and Bété-Gbadi. Vata and Guébie share further syntactic properties not presented here for purposes of space. For example, they have identical applicative constructions, similar negation marking, and they both can undergo long-distance wh-movement while Bété-Gbadi cannot.

The table in (17) below summarizes the phonological and syntactic features compared here in Guébie, Vata, and Bété-Gbadi.

(17)	Summary table			
	Feature	Bété	Guébie	Vata
	# of tones	3	4	4
	# of vowels	7	10	10
	Aspect	particle	tone	tone
	Clausal causation	-	yes	yes
	Wн-question particle	medial	final	final
	Gerunds	verb-verb-je	verb-verb-je, verb-li	verb-li

The Vata and Guébie columns above are nearly identical. The two share the same number of contrastive tones and the same vowel inventory. They both mark aspect distinctions with tone, they have clausal causative constructions, they have final Wh-particles, and they share a gerund construction. Guébie shares a gerund construction with Bété-Gbadi but in all other respects there are key differences between the two.

Based on the limited phonological and syntactic data available for Guébie, Vata, and Bété-Gbadi, it seems that Guébie shares far more features with Vata, a Dida language, than with Bété-Gbadi, a Bété language. In the following section I argue that we should classify Guébie as a distint language in the Dida subgroup of Eastern Kru.

6 Implications and conclusions

We have seen evidence from the phonological and prosodic systems, and the morphosyntax of Guébie, that it resembles Vata, a Dida language, more closely than Bété-Gbadi, a Bété langauge. Further research on Bété and Dida languages will allow for lexical and sound-correspondence comparison as well, which will confirm or deny the claims made here.

I return here to the problem defined in §1 of this paper: where within in Eastern Kru should Guébie be classified. We saw that in Ethnologue (Lewis et al. 2013) Guébie is

currently classified twice, once as a dialect of Bété-Gagnoa, and once as an alternative name for Dida-Lakota. Dida and Bété are distinct subgroups of Eastern Kru with distinct histories and distinct lingusitic features. The goal of this paper is to make an initial step towards determining whether Guébie is a Bété or Dida language. No firm conclusions can be made without further research; however, Guébie is culturally distinct from both of its neighboring Bété and Dida languages, and I argue here that it is also linguistically distinct. Guébie should be classified as a distinct language, and based on the data presented throughout this paper, I tentatively conclude that Guébie is a Dida language, closely related to Dida-Lakota and Vata, though not synonymous with either of them. This conclusion is based on the fact that there are many phonological and syntactic features shared between Guébie and Vata that are not present in Bété-Gbadi. It seems unlikely that all of the similarities between Guébie and Vata are due to chance or borrowing; thus, inheritence is a more plausible history.



Figure 2: My proposed classification of Guébie within Kru

The tree in Figure 2 shows my proposed classification of Guébie, as a Dida-Lakota language related to but distinct from Vata. Crucially, I claim that Guébie is *not* a dialect of Bété-Gagnoa, and in fact it is not a Bété language at all.

Far more data is needed to prove the above classification and the further internal classification of Kru; however, this paper provides and initial step towards a more detailed understanding of the Kru languages and how they are related to each other. Arguing for the classification of Guébie at least provides a strong argument that can be argued for or against in future work when further data becomes available.

Finer grained classification than that shown in the tree above will require extensive further research. Comparative work such as Kaye (1982), "Les dialects dida," is a start toward this kind of comparative research in Kru.

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