The morpheme-specific behavior of floating tones in Lobi*

Hannah Sande

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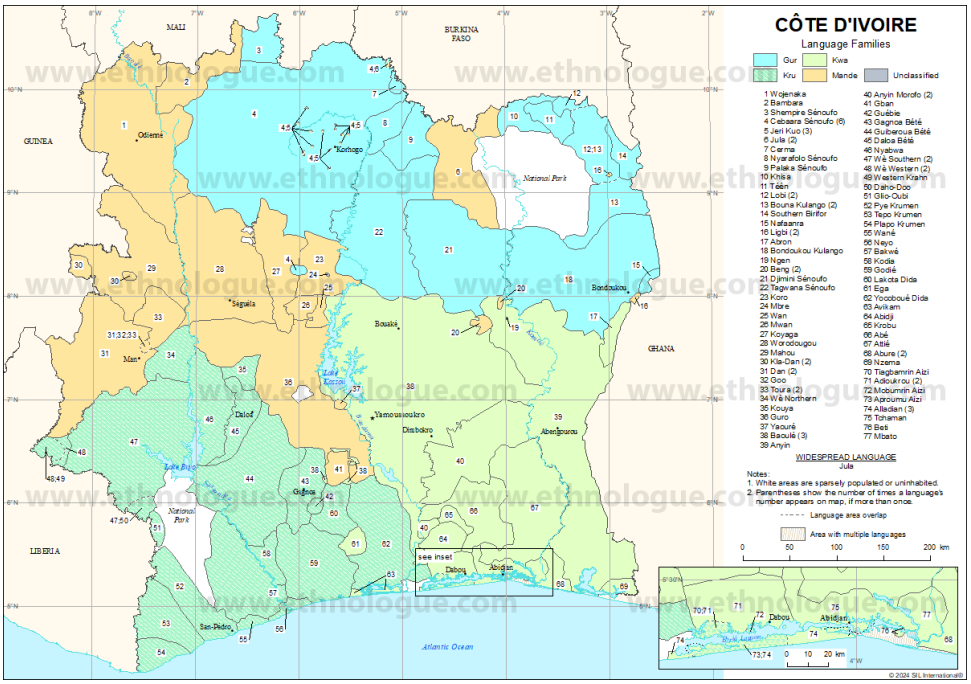
1 Introduction

Lobi (also called Lobiri) is a Gur (Mabia) language spoken in Burkina Faso, Côte d'Ivoire, and Ghana.



- All of the data presented here was collected between 2021-2025 with Sansan Claude Hien, a Lobi speaker from Côte d'Ivoire who now lives in the US.
- The data is available in the California Language Archive (Hien et al., 2023).

There are some previous descriptions of Lobi, though there are several descriptive and analytical gaps, which this work contributes to.

*Thanks to Lobi speaker Sansan Claude Hien for his time and insight, without which this project would not be possible. Thanks also to the Leipzig phonology working group for their very helpful comments on an earlier version of this work.

- Previous work: Labouret (1958); Lamothe (1964, 1966); Vaillant (1967); Becuwe (1982); Maïmouna Le Men (2007); Miehe and Tham (2007); Sib (2018); Sib and Yeo (2019); Sib (2020, 2016)
- Very little prior descriptive work on tone (with Becuwe 1982 as the exception).
- Little to no prior analytical work on any aspect of the phonology of the language.

In this talk: I present data on tone in Lobi, focusing on a puzzle that arises in the behavior of floating tones across contexts:

- There are tonal alternations in multiple distinct grammatical constructions that can each be analyzed as due to the presence of a floating H tone.
- The floating H interacts differently with surrounding tones depending on context. I consider how to best model these context-specific behaviors.

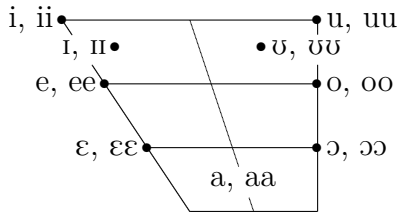
2 Background on Lobi phonology

2.1 Phonemic inventory

(1) **Consonant inventory**

	Bilabial	Labio-dental	Alveolo-palatal	Post-alveolar	Velar	Labial-velar	Glottal
Plosive	p, b p^h		t, d t^h	c, ɟ	k, g k^h	kp, gb k^w, g^w	
Glottalized	ɓ		l’	j’		w’	
Nasal	m		n	ɲ			
Fricative		f, v	s				h
Approx.			l, r	j		w	

(2) **Vowel inventory**



2.2 Syllable structure

(3) **Syllable structure**

Surface syllable shape	Example
CV	na ‘cow’
CVV	sí́í ‘snake’
CVC	k^hɛ́r ‘woman’
CCV	blo ‘white’
CVVC	cʊɔr ‘house’

- Licit coda consonants include /j, w, l, r, n, m, ɓ/.
- All phonemic consonants except /r/ can surface word-initially.
- VV sequences can consist of a long vowel or diphthong: [síí] 'snake', [bɪɛl] 'one'.

2.3 Phontactics and segmental alternations

- Vowels are systematically nasalized before nasal codas (the nasal codas themselves are only optionally produced).
- Nasals show place assimilation to following consonants.
- There is left-to-right ATR and nasal harmony within a word (suffixes alternate in ATR and nasality).
- Vowel hiatus is resolved via gliding or vowel deletion, depending on the context and vowels present.
- Sonorants assimilate to a preceding sonorant across a morpheme boundary.

2.4 Tone

- Two contrastive levels: H and L
  - Here, H is marked (e.g., [á]) and L is unmarked; both are marked in contours (e.g., [áà])

(4) **Contrastive tone melodies**

H	lúú	'forest'
	síí	'snake'
	gbón	'mortar'
	sɛ́bɛ́	'paper/book'
	jí-rɛ́	'see-RE'
	tíblí	'person'
L	bʊ	'goat'
	na	'cow'
	sin	'urine'
	ca-r	'run-RE'
	kpɛnɟɛr	basket'
	tɔmɪn	'blood'
LH	kpòó	'heart'
	pàá	'leafy green vegetable species'
	mà-ń	'laugh-RE'
	ɓɛɓɛ́	'Kpekpe (male name)'
	cincín	'cloth'
	manɟín	'papaya'

- Underlying tone melodies can be H, L, or LH. The same set of melodies is found on monomoraic and longer morphemes.

- Interestingly, there are no monomoraic (CV) H-toned nouns (though there are H-toned CV morphemes in other categories).
- Contour tones are only possible on heavy syllables (CVV, CVL).
  - For this reason, I assume the tone-bearing unit is a mora.
- Most morphemes are specified underlyingly for tone.
- Tone on a toneless affix (e.g., plural, imperfective) is determined by the stem (5).

(5) **Tone on toneless affixes is determined by the stem**

a. kʰɛ́r-á
   woman-PL
   'women'

b. kʰʊɓ-a
   bone-PL
   'bones'

- Lobi displays downstep when a morpheme containing a H tone follows another morpheme containing a H tone in the same domain.

(6) **Downstep between possessor and possessee**

a. na-a kpóò
   cow-GEN heart
   'cow's heart'

b. míǹ ↓lú
   1SG.POSS forest
   'my forest'

c. sansán-n ↓dú
   Sansan-GEN room
   'Sansan's room'

(7) **Downstep between two nouns in a compound**

a. na kʰuɓ
   cow bone
   'a cow bone'

b. na lɔ́ɔ́
   cow farm
   'a cow farm'

c. sí kʰuɓ
   snake bone
   'a snake bone'

d. sí ↓lɔ́ɔ́
   snake farm
   'a snake farm'

(8) **Downstep between a noun and definite enclitic**

	Bare	Definite	Gloss
a.	cʊɔr	cʊɔr=rá	'the house'
b.	kʰɛ́r	kʰɛ́r=ꜜrá	'the woman'
c.	bɪsáàn	bɪsáàn=ꜜnán	'the child'

- But there is NO downstep between nouns and following modifiers.

(9) **No downstep between nouns and modifiers**
  a. bén bʊ̀ɔ́ 'a good dog'
  b. ɔɲɔ́l dɛ̀ɛ́ 'an ugly/bad cat'
  c. j'á pʰáà 'a new market'

- While the question of how to define the downstep domain is very interesting, it is outside the scope of this talk.

3 Floating tones

There are several grammatical constructions that co-occur with an immediately following H tone, no matter the underlying tone of the following morpheme:

- Possessors
- Future markers
- Progressive markers
- The verbal suffix /-re/

Interestingly, the exact realization of the floating H tone, and its interaction with surrounding lexical tones, differs slightly across contexts.

3.1 Possessive

In possessive contexts, the possessed noun appears after the possessor, and always begins with a H tone, no matter its underlying tone melody.

- An underlying /H/ noun maintains its H tone (10a).
- Underlying /L/ surfaces as H (10b).
- Underlying /LH/ noun as HL (10c).

That is, all possessed nouns surface with a H tone at their left edge.

(10) **H, L, and HL nouns after a L possessor**

  a. na-a lɔ́
  cow-POSS farm
  'a cow's farm' (cf. /lɔ́ɔ́/, 'farm')

b. na-a kʰúɓ
cow-POSS bone
'a cow's bone' (cf. /kʰuɓ/, 'bone')

c. na-a kpóò
cow-POSS heart
'a cow's heart' (cf. /kpòó/, 'heart')

- If the possessor contains a H tone, the initial H tone on the possessed noun is downstepped as discussed in section 2.4.

(11) **H, L, and HL nouns after a H possessor**

a. sɪ́ɪ́-ɪ̀ ꜜlɔ́
snake-POSS farm
'a snake's farm' (cf. /lɔ́ɔ́/, 'farm')

b. sɪ́ɪ́-ɪ̀ ꜜkʰúɓ
snake-POSS bone
'a snake's bone' (cf. /kʰuɓ/, 'bone')

c. sɪ́ɪ́-ɪ̀ ꜜkpóò
snake-POSS heart
'a snake's heart' (cf. /kpòó/, 'heart')

- Vowel shortening on possessed nouns is a separate, regular process.
- The same alternations apply after possessive pronouns as after full noun possessors.

(12) **Tonal alternations on possessed nouns after a pronoun**

	Bare	Possessed	Gloss
a.	lúú (H)	míǹ ꜜlú (H)	'my forest'
b.	duu (L)	míǹ ꜜdú (H)	'my room'
c.	pàá (LH)	míǹ ꜜpáà (HL)	'my leafy green vegetable'

3.2 Progressive

The like possessives, the progressive morpheme is followed by a H tone.

- Tense/aspect/mood/negation auxiliaries appear either between the Subject and Verb (SAuxVO), or are co-realized with the subject pronoun as STAMP (portmanteau subject + TAMP) morphs (StampOV).
- After a progressive Aux or STAMP morph, the verb always begins with a H tone, no matter its underlying tone.
- Just as in possessive contexts, verbs surface with the following tones after a progressive:
  - An underlying /H/ noun maintains its H tone (13).
  - Underlying /L/ surfaces as H (14).

  - Underlying /LH/ noun as HL (15).

- The tone of the progressive marker itself is unaffected (always L).

(13) **H-toned verbs surface as H after progressive**

a. maan ín-nɛ́n
1SG.PROG come-RE
'I am coming' (cf. ín-nɛ́n, HH)

b. maan ɲí-rɛ́
1SG.PROG write-RE
'I am writing' (cf. ɲí-rɛ́, HH)

c. maan gáá-lɛ́
1SG.PROG go-RE
'I'm going' (cf. gáá-rɛ́, HHH)

(14) **L-toned verbs surface as H after the progressive**

a. mɪ ca-r
1SG run-RE
'I ran'

b. maan cá-r
1SG.PROG run-RE
'I am running'

(15) **LH-toned verbs surface as HL after progressive**

maan má-ǹ (mántin)
1SG.PROG laugh-RE laugh
'I am laughing' (cf. mà-ń, LH)

3.3 Future

In future contexts, like the progressive, the verb (or auxiliary) immediately following the future marker surfaces with a H tone.

- Just as in progressive and possessive contexts:
  - /L/ verbs surface as H in the future, while the future marker (in this case, the 1SG pronoun [ma]) surfaces as L.
  - /LH/ verbs surface as HL in the future, while the future marker itself is L-toned.

(16) **Tone in future contexts**

a. *L verbs surface H*
ma cá-r
1SG.FUT run-RE
'I will run.' (cf. ca-r, L)

b. *LH verbs surface HL*

ma má-ǹ
1SG.FUT laugh-RE

'I will laugh.' (cf. mà-ń, LH)

- However, unlike the progressive and possessive:
  - Underlyingly /H/ verbs surface as downstepped H in the future, while the future marker surfaces with a H tone.
    - This leftwards/self-docking of the floating H when followed by a /H/ verb is not found elsewhere in the language.

(17) **H verbs surface ˡH, with H on future marker**

má ˡɲí-rɛ́
1SG.FUT write-RE

'I will write.' (cf. ɲí-rɛ́, HH)

3.4 /-re/

In most clause types, the verb has a /-re/ suffix, which seems to be sensitive to information structure and extraction facts.

- No matter what kind of morpheme follows /-re/, that morpheme always surfaces with an initial H tone.
- This includes the object in S (Aux) V-/re/ O clauses (18)

(18) **H-toned object following verbal /-re/**

a. mɪ jí-rɛ́ ná na bʊ
1SG see-RE cow COM goat
'I saw a cow and a goat.'

b. mɪ jí-rɛ́ bʊ́ na na
1SG see-RE goat COM cow
'I saw a goat and a cow '

- Adverbs surface with an initial H when following /-re/ (19).

(19) **Adverbs alternate following /re/**

a. mɪ ca-r dɪ́ɪ́
1SG run-RE yesterday
'I ran yesterday.'

b. mɪ sá-r bínan dii
1SG dance-RE dance yesterday
'I danced yesterday.'

- When a pronoun is focused, -RE occurs on the fronted pronoun, not on the verb.

- We still see the same /-re/-triggered tonal alternation on the following element (20).

(20) **Subjects alternate after /-re/ on focused pronouns**

f-rɛ́ mí jí
2SG-RE 1SG see

'I saw YOU.'

- /L/ surfaces as H after /-re/.
- /H/ surfaces as H after /-re/.
- Different from other contexts, /LH/ surfaces as H$^{\downarrow}$H after /-re/ (not HL as in other floating tone contexts)

(21) **LH becomes H$^{\downarrow}$H after /-re/**

a. oló jí-m-nɛ́n
Holo see-1SG-RE
'Holo saw me.'

b. mɪ jí-rɛ́ ó$^{\downarrow}$ló
1SG see-RE Holo
'I saw Holo.'

3.5 Floating tone data summary

We have seen four grammatical morphemes that are required to be followed by a H tone on the next TBU.

- These morphemes can be analyzed as contributing a floating H, which (typically) docks onto the following TBU–the left edge of the following morpheme.
- However, we saw that the realization of the floating H interacts with the surrounding lexical tones differently depending on grammatical context.
- These patterns are summarized in (22).

(22) **Summary of floating tone patterns**

	Possessive	Progressive	Future	/-re/
/H/	[H]	[H]	(H) [$^{\downarrow}$H]	[H]
/L/	[H]	[H]	[H]	[H]
/LH/	[HL]	[HL]	[HL]	[H$^{\downarrow}$H]

Question: If left-edge H-tone requirements in (22) are analyzed as due to the presence of a floating H, why are there differences in their surface realizations across contexts?

4 Analyzing morpheme-specific floating tone effects

There are several analytical possibilities for why a floating H might surface differently in one context than another:

- Differences in type of (prosodic) boundary
- Differences in underlying representation of the surrounding elements
- Differences in underlying representation of the triggering elements
- Morpheme-specific phonological grammars

Here I consider each of these in turn.

4.1 Differences in boundary type

Across languages, different kinds of phonological operations, or different repairs to undesirable phonotactic structures, apply at different types of morphosyntactic or prosodic boundaries.

- Stem- vs word- vs phrase-level phenomena as analyzed in Lexical Phonology or Stratal OT (Mohanan, 1982; Kiparsky et al., 1982; Kiparsky, 2000, 2015; Bermúdez-Otero, 1999, 2012).
- Prosodic domain-specific phenomena as analyzed in Match Theory or other prosodic theories (Selkirk, 2009, 2011; Elfner, 2018).
- Syntactic phase-bounded phonology as in Cophonologies by Phase (Sande, 2019; Sande et al., 2020; Sande, 2020).

In Dagaare, another Gur/Mabia language, Anttila and Bodomo (2022) describe three different repairs to HH (OCP-violating) sequences across domains:

- HH → HL within a stem (e.g., between a noun and singular suffix)
- HH → H$^{\downarrow}$H within a word (e.g., between a noun and focus enclitic, or between members of a compound)
- HH → HH across words

The domains of different tonal repairs to HH sequences correspond cleanly to differences in domain or strata in Dagaare, so one might wonder whether this is also true in Lobi.

- The four places we see floating Hs all seem to involve word boundaries, and not word-internal boundaries:
  - Harmony applies within words, but does not apply between a possessor + possessed noun, between a future or progressive morpheme and verb, or between a verb and following word.
- /-re/ alone can appear at the end of many different syntactic and prosodic boundary types, but in all cases, it triggers the same effect on the following word.

- The progressive and future morphemes show different tonological behavior before a /H/ tone, so we might expect them to involve different kinds of boundaries. However...
  - They are both monosyllabic:
    * /na/ FUT
    * /nan/ PROG.
  - They both fuse morphophonologically with subject pronouns:
    * [ma] 1SG.FUT
    * [man] 1SG.PROG.
  - They both sit in the same morphosyntactic slot (they cannot co-occur):
    * SFutVO
    * SProgVO.
- There is no independent motivation for saying that the progressive-verb boundary and future-verb boundary are distinct.
- There is no language-internal reason to believe that morphosyntactic or phonological boundary type systematically correlates with floating H realization across contexts.

4.2 Differences in underlying representation of the surrounding elements

One possible reason for a difference in surface tone behavior might be if there are different underlying tones surrounding the triggering morpheme.

- This option is easy to rule out, since the future and progressive can occur in exactly the same morphosyntactic and phonological environment, but still differ in their floating tone behaviors.

(23) **Progressive versus future realization before a /H/ verb**

a. sansán nan íí-rɛ́
Sansan PROG walk-RE
'Sansan is walking.'

b. sansán ná ↓íí-rɛ́
Sansan FUT walk-RE
'Sansan will walk.'

4.3 Differences in underlying representation of the triggering elements

Perhaps one of the most tempting analyses of the differences between floating tone behaviors is to adopt a difference in underlying representation of the target morphemes.

- For example, the behavior of the floating H in future and progressive contexts might be due to differences in the underlying tone of the future and progressive morphemes themselves.

- The future could be underlyingly toneless with a floating H, and the the progressive could be underlyingly L with a floating H.
  - This is appealing for a few reasons:
    1. We need to say there are toneless morphemes in the language anyway (see the plural examples in §2.4).
    2. The floating H is able to dock onto the (toneless) future morpheme but not the (L-specified) progressive morpheme (cf. 23a vs. 23b).
  - However, if the future morpheme were underlyingly toneless, we would expect it to pattern in the same way as other toneless morphemes in the language, whose tone is predictably determined by the *preceding* word or stem.
    * Recall that toneless plural morphemes surface as H after H stems and L after L stems.
    * However, the tone of the future marker is independent of the preceding tone, and depends solely on the underlying tone of the following verb.
    * So, even if we did adopt this analysis where the underlying tone of FUT is distinct from that of PROG, we'd still have to rely on morpheme-specific phonological rules to derive the differences in the behavior of the toneless plural morpheme from the toneless future morpheme.

4.4 Morpheme-specific phonological grammars

The final option, and the only one that seems viable to me, is to adopt morpheme-specific phonological grammars.

- In this type of approach, the same set of phonological inputs can surface differently in different morphosyntactic contexts due to the application of distinct phonological grammars sensitive to context.
- By reordering a basic set of tonal faithfulness and markedness constraints, sensitive to morphosyntactic context in Cophonology Theory (Anttila, 2002; Inkelas and Zoll, 2005) or Cophonologies by Phase (Sande et al., 2020), we can derive the differences across contexts.
- In Sande (2022) I proposed a set of diagnostics for determining whether a given tonal phenomenon is best analyzed as item-based, process-based, or suppletive (24).

(24) **Diagnostics for items, suppletion, and processes**

	Consistent realization	Phonologically derivable	General phonology
Item	X	X	X
Suppletion	–	–	–
Process	(X)	X	–

- Adopting a morpheme-specific approach to Lobi tone is in line with these diagnostics: Floating tone realizations are phonologically derivable but not part of the general phonology of the language.

5 Conclusions

I've described the tone system in Lobi, with a focus on the behavior of floating H tones across contexts.

- **Floating H tones** seem to be contributed by particular morphemes, and always result in an immediately following H:
  - Possessive
  - Progressive
  - Future
  - /-re/
- While the overall surface patterns resulting from the floating Hs across contexts are similar, there are slight differences across contexts that suggest the need for morpheme-specific phonology.

References

Anttila, Arto. 2002. Morphologically conditioned phonological alternations. Natural Language & Linguistic Theory 20:1–42.

Anttila, Arto, and Adams Bodomo. 2022. Tone and morphological level ordering in Dagaare. Phonology 39:443–471.

Becuwe, Jacques. 1982. Eléments de phonologie et de grammaire du lobiri (parler de Bouna, Cote-d'ivoire). Doctoral Dissertation, Université de la Sorbonne Nouvelle (Paris 3).

Bermúdez-Otero, Ricardo. 1999. Constraint interaction in language change: quantity in English and Germanic. University of Manchester.

Bermúdez-Otero, Ricardo. 2012. The architecture of grammar and the division of labour in exponence. In The morphology and phonology of exponence, ed. Jochen Trommer, volume 41, 8–83. Oxford University Press, Oxford.

Elfner, Emily. 2018. The syntax-prosody interface: Current theoretical approaches and outstanding questions. Linguistics Vanguard 4:20160081.

Hien, Sansan Claude, Shweta Akolkar, Amber Galvano, Rebecca Jarvis, Aurora Kane, Julianne Kapner, Franco Liu, Anna Macknick, Hannah Sande, Masi Santos, and Mingyu Yuan. 2023. Berkeley field methods: Lobi, 2022-15. `http://dx.doi.org/doi:10.7297/X2VT1R4V`.

Inkelas, Sharon, and Cheryl Zoll. 2005. Reduplication: Doubling in morphology, volume 106. Cambridge University Press.

Kiparsky, Paul. 2000. Opacity and cyclicity. The linguistic review 17:351–367.

Kiparsky, Paul. 2015. Stratal OT: A synopsis and FAQs. Capturing phonological shades within and across languages 2:1–45.

Kiparsky, Paul, et al. 1982. From cyclic phonology to lexical phonology. The structure of phonological representations 1:131–175.

Labouret, Henri. 1958. Notes grammaticales sur le lobi. In Nouvelles notes sur les tribus du rameau lobi: leurs migrations, leur évolution, leurs parlers et ceux de leurs voisins, volume 54 of Mémoires de l'IFAN, 101–125, 178–209, 210–275. Institut Français de l'Afrique Noire.

Lamothe, Charles PB. 1964. Esquisse du système verbal lobi. CNRS ua.

Lamothe, Charles PB. 1966. Esquisse du système grammatical lobi. CNRS ua.

Maïmouna Le Men, Fané. 2007. Parlons Lobiri: Langue et culture des Lobis du Burkina Faso. L'Harmattan.

Miehe, Gudrun, and Florian Tham. 2007. Noun class systems in Gur languages. In Gur monographs, volume 1, Southwestern Gur Languages (without Gurunsi). Rüdiger K opper Verlag.

Mohanan, Karuvannur Puthanveettil. 1982. Lexical phonology. Doctoral Dissertation, Massachusetts Institute of Technology.

Sande, Hannah. 2019. A unified account of conditioned phonological alternations: Evidence from Guébie. Language 95.3:456–498.

Sande, Hannah. 2020. Morphologically conditioned phonology with two triggers. Phonology 37:453–493.

Sande, Hannah. 2022. Is grammatical tone item-based or process-based? Phonology 39:399–442.

Sande, Hannah, Peter Jenks, and Sharon Inkelas. 2020. Cophonologies by ph(r)ase. Natural Language and Linguistic Theory 1–51.

Selkirk, Elisabeth. 2009. On clause and intonational phrase in Japanese: The syntactic grounding of prosodic constituent structure. Gengo Kenkyu 136:35–73.

Selkirk, Elisabeth. 2011. The syntax-phonology interface. The handbook of phonological theory 2:435–483.

Sib, Sié Justin. 2016. Réduplication verbale en lobiri de Bouna: cas d'un procédé répétitif. In Cheminements linguistiques: Mélanges en hommage à n'guessan jérémie kouadio, ed. Aimée-Danielle Lezou Koffi, Kallet Abréam Vahoua, and Kouakou Appoh Enoc Kra, 50–61. Éditions universitaires Européennes.

Sib, Sié Justin. 2018. Étude typologique et syntactico-sémantique des verbes en lobiri. Studii de gramatică contrastivă 66–77.

Sib, Sié Justin. 2020. Étude des ideophones en lobiri. Revue Djiboul 191–208.

Sib, Sié Justin, and Kanabein Oumar Yeo. 2019. Le syntagme adjectival et le qualificatif en lobiri. Revue Akofena 195–204.

Vaillant, Par M. 1967. Esquisse grammaticale du lobiri. Doctoral Dissertation, Universite de Dakar.