

Morphosyntax and phonology condition primary prefix allomorphy in Lachirioag Zapotec

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1 Introduction

- This talk focuses on the allomorphy displayed by the perfective and irrealis prefixes in San Cristóbal Lachirioag Zapotec: ¹²

(1)	<i>Perfective</i>	<i>Continuative</i>	<i>Irrealis</i>
'eat'	gu-dau	dj-au	g-áu
'sing'	b-gul	dj-gul	gú-gul
'fly'	gu-ze	dj-ze	sé

→ The perfective prefix has two allomorphs: *b-* and *gu-*

→ The irrealis prefix is realized in many ways, including *g-*, fortition of initial lenis consonant, or no segmental realization at all

- The aim of this investigation is to propose that perfective allomorphy is primarily conditioned by morphosyntactic environment while irrealis allomorphy is primarily conditioned by phonological environment
- Roadmap:
 - Background on the language
 - Phonological conditioning of irrealis prefix allomorphy
 - Morphosyntactic conditioning of perfective prefix allomorphy
 - Conclusion

2 Background

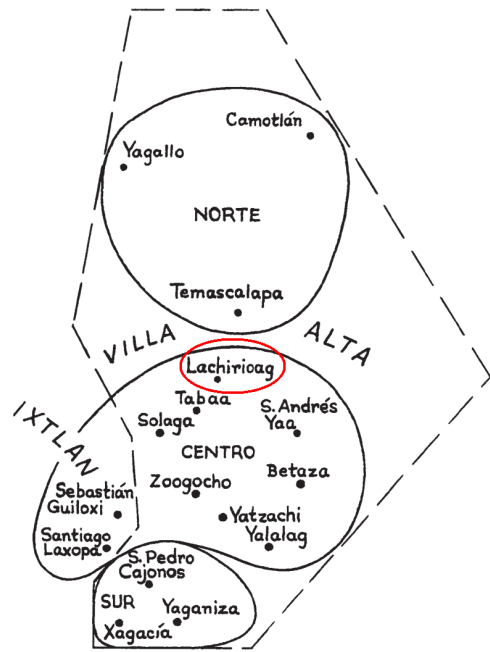
- San Cristóbal Lachirioag Zapotec (also SCLZ, Lachirioag Zapotec; endonym: *dizha xhon* 'Xhon words') is a North Sierra Zapotec language from the town of San Cristóbal Lachirioag, Villa Alta, Oaxaca, Mexico
 - The name *Lachirioag* (Sp. *Lachiróa*) is a rendering of *lash djiaj* 'rocky valley'
- Northern Zapotec languages can be divided into five dialect groups based on mutual intelligibility: Lhe'ja, Xidza, Xan, Welhab, and Xhon (Castellanos Martínez 1995); Lachirioag Zapotec is a member of the Xhon group
- Formal linguistic documentation of Lachirioag Zapotec began with the UCLA 2020 field methods class, though there has been some documentation within the community

1. A tremendous amount of thanks to my SCLZ consultants Minerva Mendez, Lucina Miguel, Mauricia Ambrosio, and especially to Julio Dominguez and Lucrecia Guzmán Cortés for all of the hours they have spent teaching me about their language. Thanks is also due to my advisors Harold Torrence, Ethan Poole, and Pamela Munro, and to the members of the UCLA AIS and syntax seminars for their feedback on previous presentations on this topic.

2. Glosses: AND = andative, CAUS = causative, CONT = continuative, IRR = irrealis, NEUT = neutral, PERF = perfective, REP = repetitive, VEN = venitive, 1SG = first person singular, 3FOR = third person human formal, 3INFOR = third person human informal.



(a) Adapted from User:El.bart089 (Wikimedia Commons/GFDL 1.2)



(b) Adapted from Butler (1980)

Figure 1: Location of San Cristóbal Lachirioag

- It is spoken by about 1200 people in Oaxaca and Southern California (primarily around the Los Angeles region) (Solá-Llonch 2021)
- The data presented here was collected via structured elicitation sessions in one-on-one meetings mainly over Zoom. Sentences were elicited in both English and Spanish. The data presented here was collected primarily from three consultants from the LA community: Julio Dominguez (30M), Lucina Miguel (40F), and Lucrecia Guzmán Cortés (40F)

2.1 Phonology and orthography

- The consonant inventory is given below. Symbols marked with a star represent sounds found mainly in Spanish loanwords

	Labial	Alveolar	Postalveolar	Palatoalveolar	Velar	Labiovelar	Glottal
Plosive	p b	t d			k g	kw[k ^w]	'[ʔ]
Nasal	m*	nn[n:] n		ñ[n̄]			
Affricate				ch[tʃ] dj[dʒ]			
Trill		rr[r]*					
Tap		r[r]					
Fricative	f*	s z	x[s̺] xh[z̺]	sh[ʃ] zh[ʒ]	j[x]*		
Lateral		l[l:]					
Approximant				y[j]		w	

Figure 2: Lachirioag Zapotec consonant inventory

- There are six vowel qualities: [i, e, a, o, u] and a reduced central vowel often pronounced as [ə] or [ɪ] that occurs in unstressed syllables. This last vowel is written as *ë*, and the rest using their IPA

symbols.

- Four vowel qualities [í'i, e'e, a'a, o'o] display contrastive nonmodal phonation on vowels, variably realized as creaky voice, a glottal stop, or as the “rearticulated vowel” described in many Otomanguean languages (Teodocio Olivares 2009; Sonnenschein 2004)
- Lachirioag Zapotec has at least four tonemes (high, low, rising, falling), but work on tone is still ongoing and it is not represented exhaustively in the data presented here

(2) Low:	<i>yer</i>	‘night’
High:	<i>kwá</i>	‘corn masa’
Rising:	<i>bǎ</i>	‘tomb’
Falling:	<i>bêl</i>	‘fish’

- There is a uvular fricative that occurs in the closely related North Sierra Zapotec languages of (e.g., Betaza, Zoogocho, Yalálag, Santiago Laxopa Zapotec)

(3)	<i>Lachirioag Zapotec</i>	<i>Santiago Laxopa Zapotec</i>
‘yesterday’	<i>niá^ʰ</i>	<i>nɛ⁴ʰe²</i>
‘bathe’	<i>-gaza^ʰ</i>	<i>-gazχ⁴</i>

→ Analyzed as a distinct phoneme in Zoogocho and Betaza Zapotec (Sonnenschein 2004; Teodocio Olivares 2009) and as a word-final allophone of lenis /g/ in Yalálag Zapotec (Avelino Becerra 2004)

- In Lachirioag Zapotec, this sound is pronounced as [a^ʰ], with a very low F2 and a relatively high F1, causing the F1 and F2 formants to pinch together in a way characteristic of uvular sounds
- When a vowel-initial clitic is attached to the end of uvular-final verbs (4c), the uvularized vowel surfaces instead as [g]:

- (4) a. Leku [b- gaz[a^ʰ] =bë] beku=n.
 L. PERF- bathe =3INFOR dog=N
 ‘It’s Leku who bathed the dog.’
- b. [B- gaz[ag] =a’] beku=n.
 PERF- bathe =1SG dog=N
 ‘I bathed the dog.’

2.2 Verbal morphology

- The verbal template is given in figure 3:

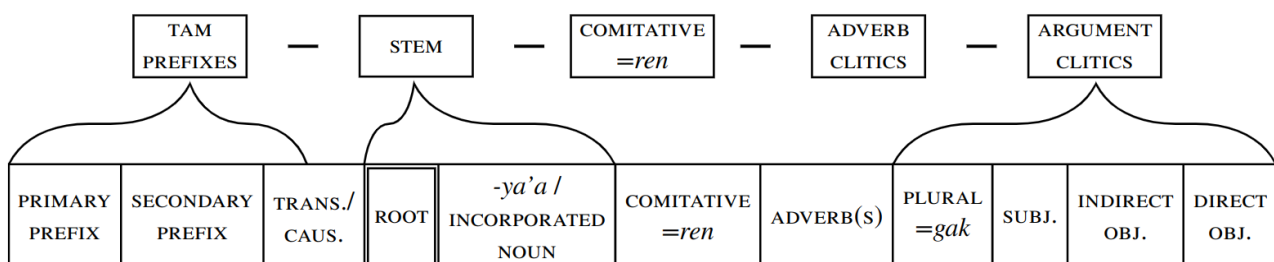


Figure 3: Lachirioag Zapotec verbal template (Solá-Llonch 2021:15)

- Verbs obligatorily occur with one of five primary TAM prefixes, which occur first in the verbal template

1. Continuative: *dj-*
2. Neutral: *n-*
3. Perfective: *b-*, *gu-*
4. Irrealis: high tone (+ *g-*, etc.)
5. Incomplete motion: *z-*

→ The incomplete motion prefix can only occur with motion verbs or with a motion-related secondary prefix

- (5) a. Maur [dj- guy =bë] nil na.
M. CONT- COOK =3INFOR nixtamal that
'Maur is cooking the nixtamal.'
- b. Maur [n- guy =bë] nil na.
M. NEUT- COOK =3INFOR nixtamal that
'Maur has cooked the nixtamal.'
- c. Maur [b- guy =bë] nil na.
M. PERF/B- COOK =3INFOR nixtamal that
'Maur cooked the nixtamal.'
- d. Maur [gú- guy =bë] nil na.
M. IRR/G- COOK =3INFOR nixtamal that
'Maur will cook the nixtamal.'
- e. Maur [z- d- guy =bë] nil na.
M. Z- VEN- COOK =3INFOR nixtamal that
'Maur comes to cook the nixtamal.'

- There are three secondary prefixes, which occur between the primary prefixes and the verb stem

1. Andative: indicates motion away from the speaker
2. Venitive: indicates motion towards the speaker
3. Repetitive: indicates that the action is repeated

- (6) a. Y- a- tas =bë.
PERF- AND- sleep =3INFOR
'She went and slept.'
- b. B- d- tas =bë.
PERF/B- VEN- sleep =3INFOR
'She came and slept.'
- c. B- a- tas =bë.
PERF/B- REP- sleep =3INFOR
'She slept again.'

3 Irrealis prefix

- The irrealis marking is always realized with high tone on the leftmost TBU, but the prefix is realized via a variety of strategies, including:

1. The prefix *g-*
2. The prefix *gu-*
3. The prefix *y(i)-*
4. Fortition of a root-initial consonant
5. No segmental change

(7) Irrealis marking

<i>Continuative</i>	<i>Irrealis</i>	<i>Gloss</i>
a. dj-au	g-áú	'eat'
b. dj-guy	gú-guy	'cook'
c. dj-sbizh	yí-sbizh ³	'make dry'
d. dj-de	té	'pass by'
e. dj-zed	zéd	'learn'

- Most of these strategies can be explained as various realizations of the prefix *g-*

⇒ The prefix *gú-* is actually *g-* followed by a second prefix *u-*

- * Other Zapotec languages (e.g., Teotilán Zapotec) have a causative/agentive prefix *u-* (Uchi-hara & Gutiérrez 2020)
- * The irrealis prefix *gú-* only occurs with transitive verbs

⇒ Fortition arises from historic *g-* + initial lenis sequence (Operstein 2014)

- * The Proto-Zapotec irrealis prefix has been reconstructed as **k-*, ancestor to modern Zapotec *g-*
- * Historic singleton consonants are the source of modern lenis consonants (**k > [g]*), while geminates are the source of modern fortis consonants (**kk > [k]*)
- * The Proto-Zapotec irrealis prefix **k-* assimilated to following lenis consonants, creating initial geminates, resulting in the modern fortition process

⇒ The prefix *y(i)-* is the result of the palatalization of *g-*

- * The lenis velar stop /g/ is produced as [j] before front vowels [i, e], an alternation characteristic of Northern Zapotec languages (Operstein and Sonnenschein 2015)
- * This prefix only ever occurs (1) before a front vowel-initial verb, or (2) before the venitive secondary prefix *d-* or the causative prefix *s-*
 - For the second environments there is always the vowel [i] intervening between the irrealis *y-* and the following prefix
- * All instances of *y(i)-* are due to a regular phonological process

- We can collapse the list of irrealis allomorphy into:

1. The prefix *g-*
 - (a) Realized as *g-* before non-front vowels
 - (b) Realized as fortition before (some) lenis consonants
 - (c) Realized as *y-* before front vowels [i, e]

3. For one of my consultants, the irrealis form of *djsbizh* 'make dry' is *gú-sbizh* rather than *yí-sbizh*.

2. No segmental change

• No segmental realization of irrealis

- This may occur with both fortis- (8a) and lenis-initial (8b, c) verbs:

- (8) a. *djtas* ‘sleeps’ → *tás* ‘will sleep’
 b. *djzed* ‘learns’ → *zéd* ‘will learn’
 c. *djred* ‘looks at’ → *réd* ‘will look at’

- It is still unknown whether there is some characteristic that defines the class of verbs that have no segmental realization of the irrealis, though it should be mentioned that these verbs are overwhelmingly intransitive

4 Perfective

• There are three allomorphs of the perfective prefix, though *y-* only occurs with a secondary andative prefix (9c)

- (9) a. [Gu- dau] beku na.
 PERF/GU- eat dog that
 ‘That dog ate.’
- b. [B- wau =bë] beku na.
 PERF/B- feed =3INFOR dog that
 ‘She fed that dog.’
- c. [Y- a- wau =bë] beku na.
 PERF- AND- feed =3INFOR dog that
 ‘She went and fed that dog.’

• The prefix *gu-* never occurs when there is a secondary prefix intervening between the primary prefix and the verb stem

- (10) a. Pelz [gu- tas =e].
 P. PERF/B- REP- sleep
 ‘Pelz slept.’
- b. Pelz [b- a- tas =e] yito.
 P. PERF/B- REP- sleep =3FOR again
 ‘Pelz slept again.’
- c. *Pelz [gu- a- tas =e] yito.
- d. Pelz [b- d- tas =e].
 P. PERF/B- VEN- sleep =3FOR
 ‘Pelz came and slept.’
- e. *Pelz [gu- d- tas =e].

- Similarly, when there's overt argument structure morphology, only the *b-* perfective prefix occurs

- (11) a. [Gu- bizh] yichaj Leku.
PERF/GU- dry head L.
 'Leku's hair dried.'
- b. Pelz [b- s- bizh =e] yichaj Leku.
P. PERF/B- CAUS- dry =3FOR head L.
 'Pelz dried Leku's hair.'
- c. *Pelz [gu- s- bizh =e] yichaj Leku.

- There is a strong correlation between perfective *b-* and transitive verbs. A very common causativity alternation involves a change in the perfective prefix, where the intransitive verb occurs with *gu-* and the transitive verb occurs with *b-*

(12) Perfective allomorphy in causative alternations

<i>Intransitive</i>	<i>Transitive</i>
a. gu-yey 'burn'	b-zey 'burn'
b. gu-djezh 'cry'	b-kwezh 'make cry'
c. gu-zozhd 'be drunk'	b-sozhd 'make drunk'
d. gu-xono 'be wrinkled/pleated'	b-xono 'wrinkle, pleat'

- Zapotec languages are heavily transitivizing languages (Operstein and Sonnenschein 2015; Uchi-hara and Gutiérrez 2020)

→ Intransitive verbs tend to be morphologically simpler

→ Transitive verbs, which are derived from intransitives, are more morphologically complex

⇒ Taken together, these facts suggest that verbs that take the *b-* prefix have additional structure intervening between the primary prefix and the verb root, even when there is no overt (synchronic) realization of this structure

- Two further pieces of evidence supporting this theory:

1. Complementary distribution of perfective and irrealis *gu-*

- The causative/agentive prefix *u-* only ever occurs with the irrealis primary prefix. For some verbs, the irrealis prefix may reveal structure that is not overtly realized with other primary prefixes

(13) Perfective *b-*/irrealis *gu-* alternation

	<i>Perfective</i>	<i>Irrealis</i>	<i>Gloss</i>
a.	b-wau	gú-wau	'feed'
b.	b-gul	gú-gul	'sing'
c.	b-guy	gú-guy	'cook'
d.	b-ze	gú-ze	'cause to fly'

- Verbs that occur with perfective prefix *gu-* never also occur with irrealis prefix *gú-*; if a verb occurs with irrealis *gú-*, it must occur with perfective *b-*

2. Distribution of andative fortition

- The andative secondary prefix is derived from the verb *-iaj* ‘to go’

(14)		AND-‘sleep’	<i>ziag</i> ‘go’
	Perfective:	<i>y-a-tas</i>	<i>gu-yiaj</i>
	Continuative:	<i>dj-a-tas</i>	<i>dj-iaj</i>
	Incompl. motion:	<i>z-a-tas</i>	<i>z-iaj</i>
	Irrealis:	<i>sh-á-tas</i>	<i>sh-íaj</i>

- In other closely-related languages, the andative prefix is uvular-initial (e.g., *ja-* [χa-] in Santiago Laxopa Zapotec). However, in Lachirioag Zapotec, the andative prefix is uvular-final

(15) *Andative prefix before a vowel-initial verb*

- a. [W- i =a’] nis.
 PERF/GU- drink =1SG water
 ‘I drank water.’
- b. Y- ag- i =a’ nis.
 PERF- AND- drink =1SG water
 ‘I went and drank water.’

- Like the fortition caused by the irrealis prefix *g-*, the uvular-final andative prefix may cause fortition of a lenis-initial verb:

- (16) a. Gu- de =bë.
 PERF/GU- PASS =3INFOR
 ‘She passed by.’
- b. Y- a- te =bë.
 PERF- AND- PASS =3INFOR
 ‘She went and passed by.’

- However, some lenis-initial verbs remain unaffected like *-gul* ‘sing’:

- (17) a. B- gul =bë.
 PERF/B- sing =3INFOR
 ‘She sang.’
- b. Y- a- gul =bë.
 PERF- AND- sing =3INFOR
 ‘She went and sang.’
- c. *Y- a- kul =bë.

- While I have only just begun to elicit on andative fortition, in general, the lenis-initial verbs that undergo it are the ones that occur with perfective *gu-* and the ones that do not occur with perfective *b-*

- This may suggest that the TAM prefixes occur closer to the verb stem with the verbs that take perfective *gu-*

5 Conclusion

• Summary:

- The allomorphy of the irrealis prefix can be explained by phonological processes undergone by the prefix *g-*, except when the irrealis prefix has no segmental realization
- The allomorphy of the perfective prefix appears to be driven primarily by morphosyntactic context: perfective *gu-* can only surface when the prefix is adjacent to the verb stem, while

perfective *b-* occurs when structure (overt or not) intervenes between the primary prefix and the verb stem

- What implications does this have for speakers' representations?
 - How synchronic are the phonological processes behind the irrealis allomorphy, especially w.r.t. fortition? If the irrealis prefix is underlyingly *g-*, then how can we explain the verbs with no segmental realization? What conditions the *g-/∅-* allomorphy?
 - Is the perfective *b-/gu-* alternation productive in speakers' grammars? Or is it the case that *gu-* is lexically selected by a set of verbs while *b-* the only truly "productive" perfective allomorph? If new verbs were borrowed into Lachirioag Zapotec, would they ever occur with perfective *gu-*?
- ⇒ These are questions which I am working on answering by closer examination of more data and (hopefully) future psycholinguistic experiments (e.g., wug tests)
- Analyses of the perfective and irrealis allomorphy in Lachirioag Zapotec are relevant to theories of lexical syntax (e.g., Travis 2010): morphosyntactic structure within VP projections tends to be more lexicalized/less productive and tends to have more irregular phonological processes

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