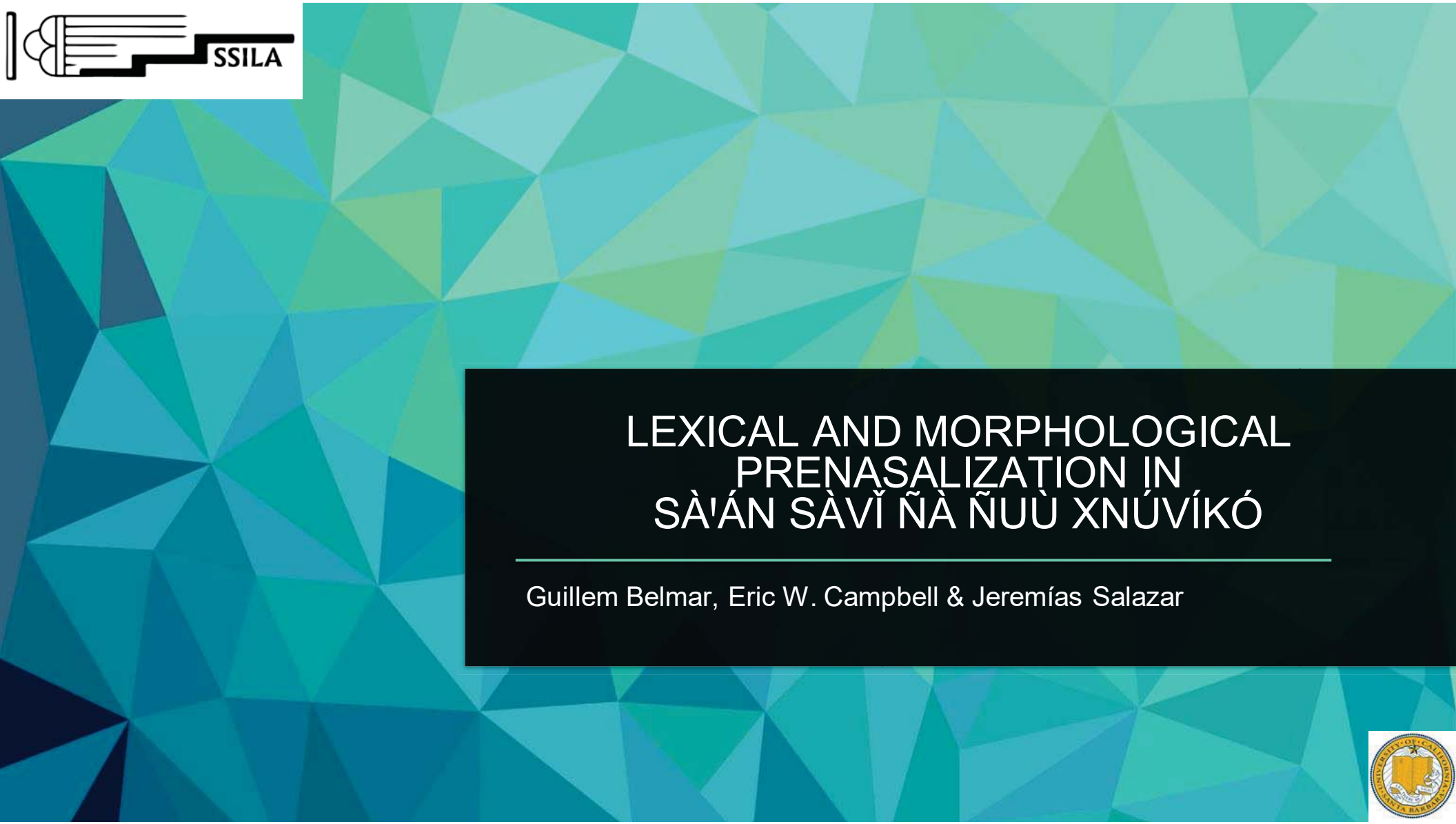
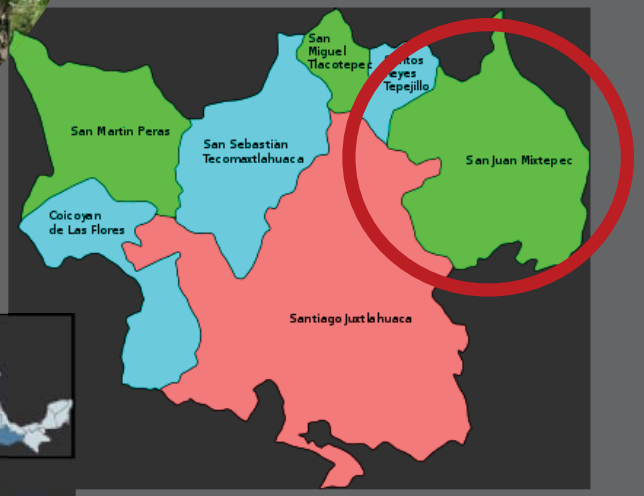


LEXICAL AND MORPHOLOGICAL PRENASALIZATION IN SÀ'ÁN SÀVÍ ÑÀ ÑUÙ XNÚVÍKÓ

Guillem Belmar, Eric W. Campbell & Jeremías Salazar

This presentation

- The language
- Prenasalized segments in Sà’án Sàvĭ ñà Ñuù Xnúvíkó
- Experiment
- Discussion & Implications



SÀ'ÁN SÀVÍ ÑÀ ÑUÙ XNÚVÍKÓ (MIXTEPEC MIXTEC)

Mixtec (Otomanguean) variety spoken in the municipality of Mixtepec (district of Juxtlahuaca, Oaxaca, Mexico)

About 9,000 speakers (Eberhard et al. 2019)

One of the main branches of Mixtec (Josserand 1983)

Little information on this variety, some on phonology (Pike & Ibach 1978; Paster & Beam de Azcona 2004)

CONSONANTS OF MIXTEPEC MIXTEC

		Bilabial	Alveolar	Palatal	Velar	Labio-velar	Glottal
Plosive	**Plain**	p	t		k	k^w	
	Prenasalized	^{m}p	^{n}t		^{ŋ}k	$^ŋ k^w$	
Nasal		m	n	ɲ			
Affricate	**Plain**		t͡s	t͡ʃ			
	Prenasalized		^{n}t͡s	^{n}t͡ʃ			
Fricative			s	ʃ	x		(h)
Approximant		β̞		j		(w)	
Tap			ɾ				
Trill			r				
Lateral approximant			l				

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Trill			r				
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MIXTEPEC MIXTEC HAS PRENASALIZED STOPS AND AFFRICATES

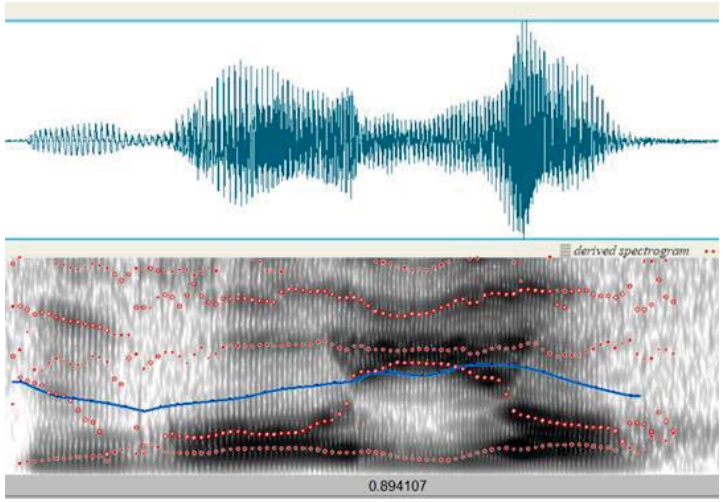
nkuii [ᵑgʷi²i³] ‘fox’

ncho'o [ⁿdʒo³ʔo³] ‘hummingbird’

ntintsìtsă [ⁿdi³ⁿdzi¹tsa¹⁴] ‘turtle’

ntuchĭ [ⁿdu³tʃi¹⁴] ‘bean’

Nkŏyô [ᵑgo¹³jo⁴¹] ‘Mexico’



Nkŏyô [ᵑgo¹³jo⁴¹] ‘Mexico’

The most frequent of these are ⁿt and ⁿtʃ

Phonetically, these are often voiced, or at least **partially voiced**

LEXICAL VS. MORPHOLOGICAL PRENASALIZATION IN MIXTEPEC MIXTEC

- **Lexical:**
  - No synchronic evidence for morphological complexity
  - Not followed by nasal vowels
  - Mostly inherited from Proto-Mixtec (Josserand 1983): ***ⁿduti?** > ***nt**uchǐ* [ⁿdu³tʃi¹⁴] 'bean'

- **Morphological:**
  - Due to likely recent processes of segmental erosion (Heine & Reh 1984) in grammaticalization: ***nt**ǐvì* [ⁿ**d**i¹²βi̤¹] 'PFV.blow' (compare with *tívì* [**t**i⁴βi̤¹] 'IPFV.blow')
  - Nasal vowels after these segments are possible: ***nt**àan* [ⁿ**d**ã¹ã³] 'PFV.quake' (compare with ***t**âan* [**t**ã⁴¹ã³] 'IPFV.quake')

MORPHOLOGICAL PRENASALIZATION IN MIXTEPEC MIXTEC

Perfective aspect

ch*áa* [**tʃ**a^{4}a^{3}] ‘IPFV.write’ vs. ***nch****àa* [$^{\mathbf{n}}$**dʒ**a^{1}a^{3}] ‘PFV.write’

Prospective aspect

k*ítsáá* [**k**i^{4}tsa^{4}a^{4}] ‘IPFV.start’ vs. *kú* ***nk****ìtsáá* [ku^{4} $^{\mathbf{ŋ}}$**g**i^{1}tsa^{4}a^{4}] ~ [ũ^{4} $^{\mathbf{ŋ}}$**g**i^{1}tsa^{4}a^{4}] ‘PROSP.start’

Negation

katsí [**k**a^{3}tsi^{4}] ‘POT.eat’ vs. ***nk****ătsí* [$^{\mathbf{ŋ}}$**g**a^{13}tsi^{4}] ‘NEG.POT.eat’

SIDE NOTE: PERFECTIVE ASPECT IN MIXTEPEC MIXTEC

IPFV	PFV	English
kíxì [ki^{4}ʃi^{1}]	***nì****kìxì* [ni^{1}ki^{1}ʃi^{1}]	Sleep
tsíka [t͡si^{4}ka^{3}]	***n****tsìka* [^{n}d͡zi^{1}ka^{3}]	Walk
nâa [na^{41}a^{3}]	*nǎa* [na^{13}a^{2}]	End

In Mixtepec Mixtec we find:
Forms with the prefix *nì-*

Prenasalized forms (probably due to the loss of *i* in the prefix *nì-*)

Tonal changes (probably due to the loss of the prefix *nì-*)
(see Hollenbach 2015; Uchihara & Mendoza Ruiz 2021)

EXPERIMENTAL STUDY

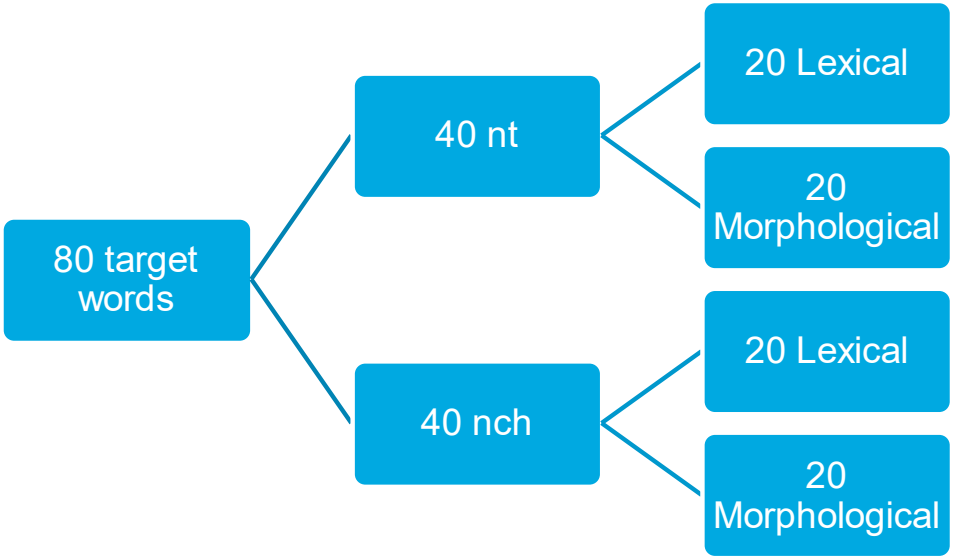
Elicitation task

- 6 participants
- 3 male and 3 female
- ages of 20 to 60
- Self-identified as native speakers of Mixtepec Mixtec
- Due to background noise (and breathiness) data for one male speaker was dropped

(recorded using a Tascam Dr-40X and a Shure WH20XLR Dynamic Headset microphone)

EXPERIMENTAL STUDY: Elicitation task

- Focusing on ⁿt <nt>and ⁿtʃ <nch> (by far the most common in lexical items)
- Similar words that present lexical and morphological prenasalization (minimal pairs, or near-minimal pairs as necessary):



Morphological: we used prenasalized PERFECTIVE forms of verbs (PROSPECTIVE varies in the realization of a preceding prefix)

PROCEDURE

Jeremías Salazar (speaker) recorded the audio for the stimuli sentences: the 80 target words

Participants watch a video presenting the stimuli sentences and see the image (illustrating the meaning of the target words)

Participants then say the carrier sentence twice

SCAN ME

*Yesterday he **broke** the plate*

Takuni **ntà'vĭ**-rà kò'ŏ

Vàtsi tù'un ká'vi-rà _____ sàtă iin líbrù

Appears in the words he is reading X in this book

Audio: Claudia Salazar

MEASUREMENTS

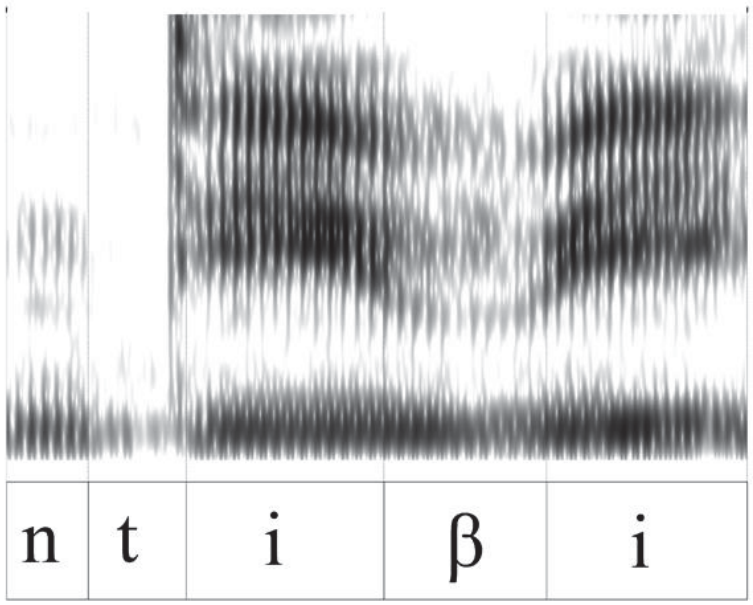
Duration of the nasal closure (%)

Duration of the oral closure (%)

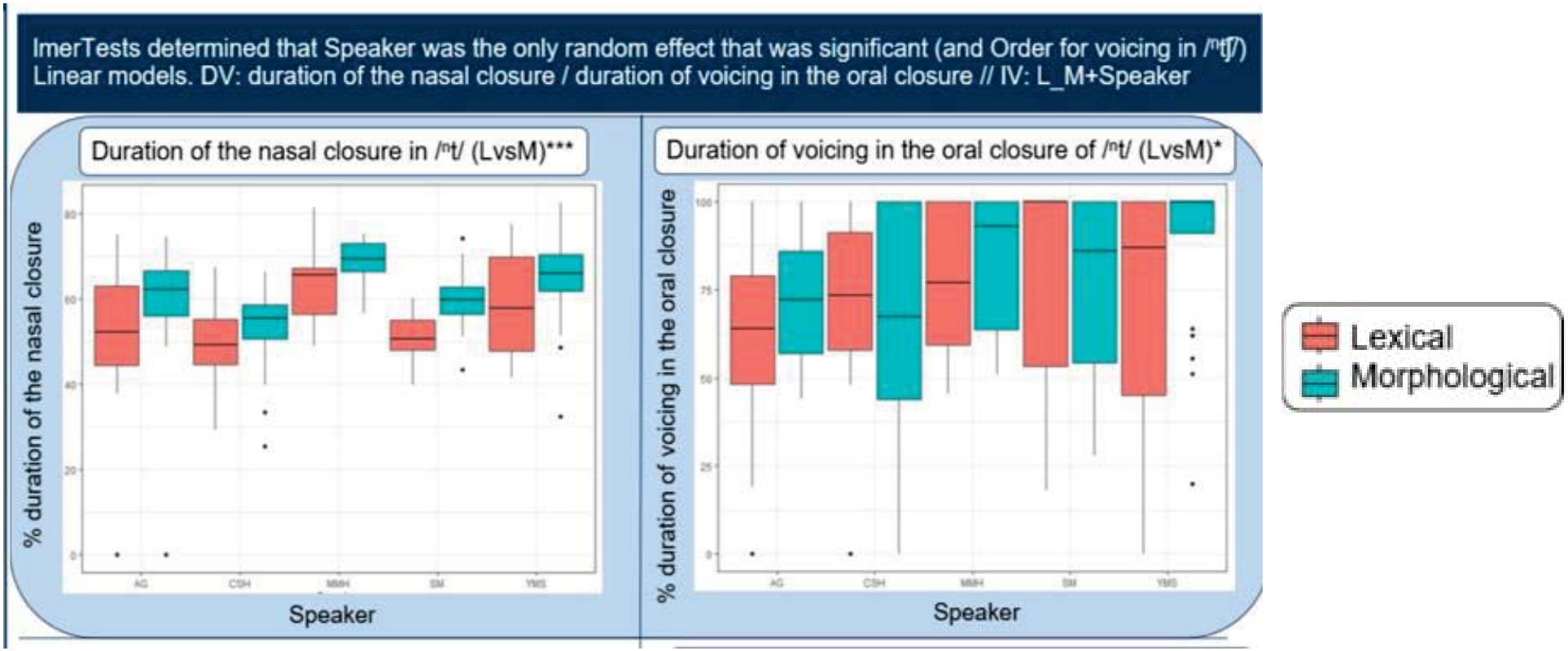
Duration of voicing in the oral closure (%)

Additional coding for:

- Speaker
- Order (first or second time uttering the carrier sentence)
- Vowel following the prenasalized segment
- Number of syllables of the Word

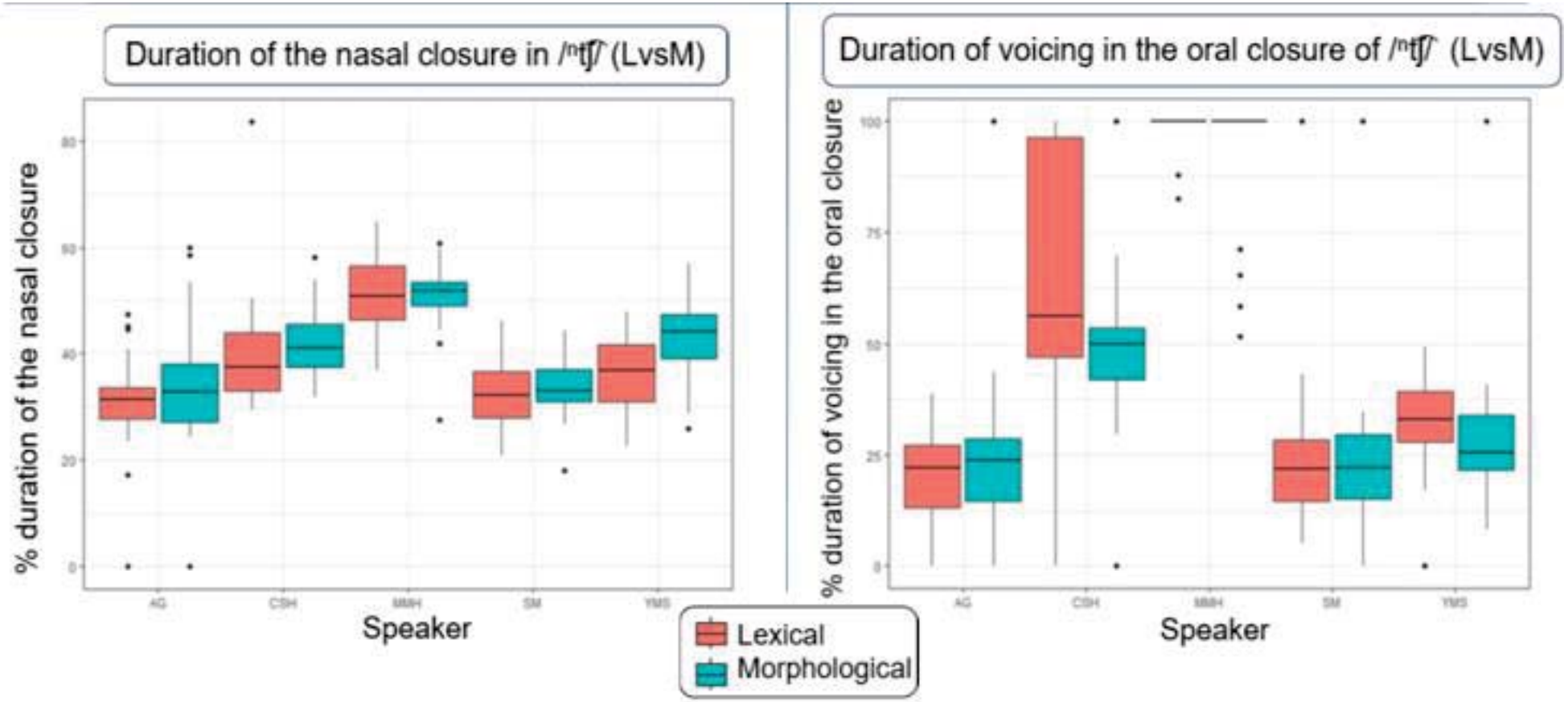


ntivǐ [^{n}di^{3}βi^{14}] ‘egg’



Significant difference in the duration of the nasal closure between lexical and morphological pre-nasalization ($\beta = 7.65$, $p<0.001$), and no interaction with Speaker.

Slightly longer duration of voicing in the oral closure for morphological pre-nasalization ($\beta = 8.78$, $p<0.05$)



No significant difference in the relative duration of the nasal closure OR the duration of voicing in the oral closure as a function of L_M, and no interaction with Speaker

Huge variability among Speakers

DISCUSSION – LEXICAL VS. MORPHOLOGICAL?

For /ⁿt/ the duration of the nasal closure was **significantly longer** (61.2%) for morphological pre-nasalization than for lexical pre-nasalization (54.15%).

Segmental erosion (grammaticalization process):

- from *nì* to *n+C* to *prenasalized C?*
- Compensatory lengthening
- Informativity (Cohen Priva 2008)
  - But pre-nasalization is not the only marker of aspect in these forms (tone) and the segment /ⁿt/ is not particularly infrequent
    - *Tíín* [tĩ⁴ĩ⁴] 'IPFV.grab' vs. *ntǐin* [ⁿdĩ¹³ĩ³] 'PFV.grab'

DISCUSSION – LEXICAL VS. MORPHOLOGICAL?

For /ⁿtʃ/ there is no significant difference in the duration of the nasal closure between morphological pre-nasalization (40.05%) and lexical prenasalization (38.1%), but below 50%

- Duration of voicing: It is harder to maintain voicing through an affricate (Ohala & Solé 2008; Zygis et al. 2012)
- Duration of the nasal stop: the already complex articulation of the affricate = less time to do more things

PRENASALIZATION IN MIXTEC (AND OTHER OTOMANGUEAN LANGUAGES)

- Prenasalized voiced segments (Longacre 1957: 9; e.g., Cortés et al. 2023)
- Allophones of nasal consonants? (Marlett 1992) = post-oralized nasal stops?
- Hypervoicing? (Iversons & Salmons 1996)
- Clusters?

IMPLICATIONS

- If treating this prenasalization as **hypervoicing** (Iversons & Salmons 1996):
  - In our study, avg. voicing in stops >71% vs. in affricates <50%
    - This could be explained articulatorily
  - However, the nasal closure is longer than the oral closure (as in DiCanio et al. 2019 on Yoloxóchitl Mixtec) *disfavoring an analysis as phonologically voiced simple segments.

IMPLICATIONS

- The results for /ⁿt/ <nt> could support a synchronic analysis of a **cluster** *n*+*C* in morphological cases only
- This is inefficient because support for this structure is non-existent for morphological instances of ⁿtʃ <nch>

  - Pointing at post-stopped nasals (DiCanio et al. 2019, on Yoloxóchitl Mixtec)
    - Same duration as other consonants

IMPLICATIONS

- If treating these (lexical prenasalization) as **post-oralized nasal stops** (Marlett 1992)**:**
  - Are there post-oralized nasal stops (L) & prenasalized oral stops (M)?
    - Mixtec oral vs. nasal vowels
    - Vowels after nasal stops are nasal
    - Post-oralization of the nasal stops; no nasal vowels after these segments
  - Observed in Yoloxóchitl Mixtec (DiCanio et al. 2019)
  - Also true in Mixtepec Mixtec, BUT ONLY lexical
  - Words with morphological prenasalization can be followed by nasal vowels:
    - *Ntǐin* [^{n}dĩ^{13}ĩ^{3}] ‘PFV.grab’ (see *tíín* [tĩ^{4}ĩ^{4}] ‘IPFV.grab’)

IMPLICATIONS

Synchronically, however, these segments are not perceived as different sounds by speakers, and there seems to be no reason to overcomplicate the analysis

The practical orthography we have developed is neutral and compatible with any of the possible phonological analyses

OUR ANALYSIS

We suggest that the best synchronic analysis for these segments in Mixtepec Mixtec is to see them as **prenasalized stops** because:

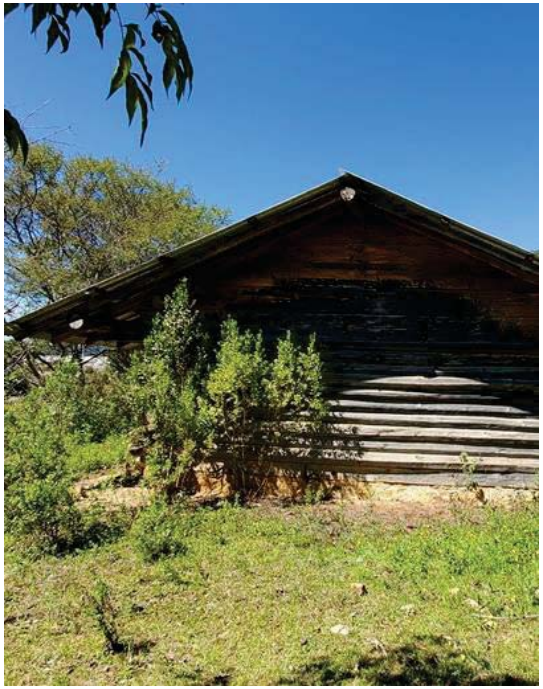
I. they arise in morphological processes as sequences of nasal followed by plain stop
II. speakers do not consider them separate segments/sequences from lexical prenasalized stops
III. this analysis does not necessitate more complex phonotactics or phonological inventory
IV. the phonetic differences in morphological vs. lexical prenasalized stops possibly reflect compensatory lengthening due to segmental erosion, for which there is evidence in the morphology of the language

Acknowledgements

We want to acknowledge

- Alejandra Garcia, Claudia Salazar, Francisco Bautista, Miguel Martinez, Silverio Garcia and Yuridia Garcia for agreeing to doing this experiment and sharing their language with us.
- To the Chumash people, whose unceeded lands we work on
- To everyone in the Phonetics Lab and the Phonetics Circle at UCSB, our discussions helped shape much of the experimental design and the analysis

¡Tá tsà'vǐ-kue-ní!



¡TÁ TSÀ'VĬ-KUE-NÍ ÑÀÀ CHÁA SÒ'O-NÍ!