



## Prosodic or initial strengthening?

Word-initial lengthening is expected (Fougeron & Keating 1997, Katz & Fricke 2018, Keating et al. 2004, White et al. 2020), though *stress-initial* strengthening also occurs in different languages (Bouavichith & Davidson 2013).

Shorter duration correlates with the more lenition (DiCano et al, submitted, Lavoie 2001, Parrell & Narayanan 2018).

Obstruents in Itunyoso Triqui undergo variable lenition (DiCano 2012), but **not word-medially**.

Two triggering contexts:

- (a) Prosody/stress (final stress)
- (b) Singleton/geminate contrast

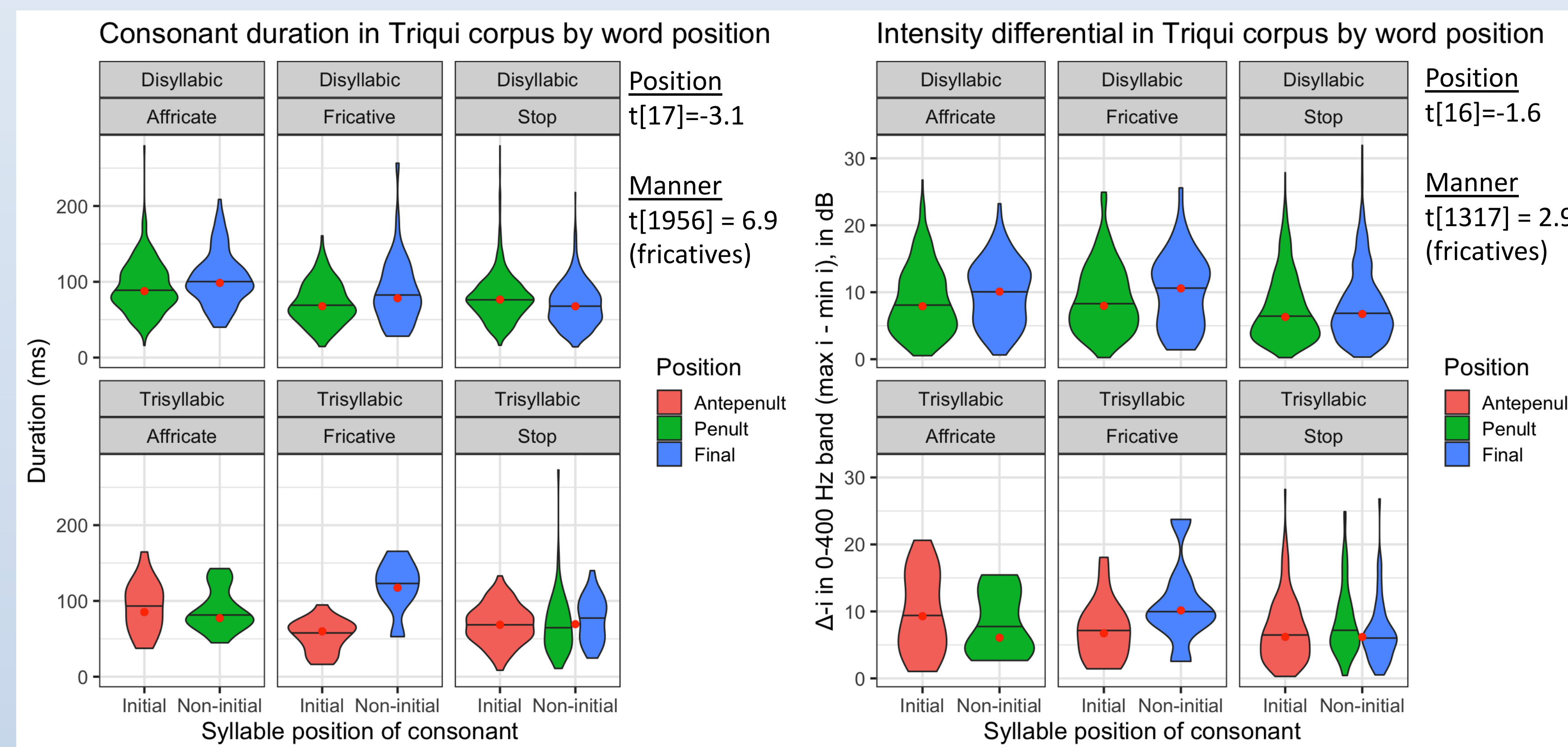
## Itunyoso Triqui ['triki] (Otomanguan: Mexico)

Spoken in San Martín Itunyoso, Oaxaca by 2,500 people; **mostly polysyllabic** word structure; tonal (9 tones); **root-final prominence**; CV(h/?) syllables (DiCano 2008, 2010, DiCano & Hatcher 2018).

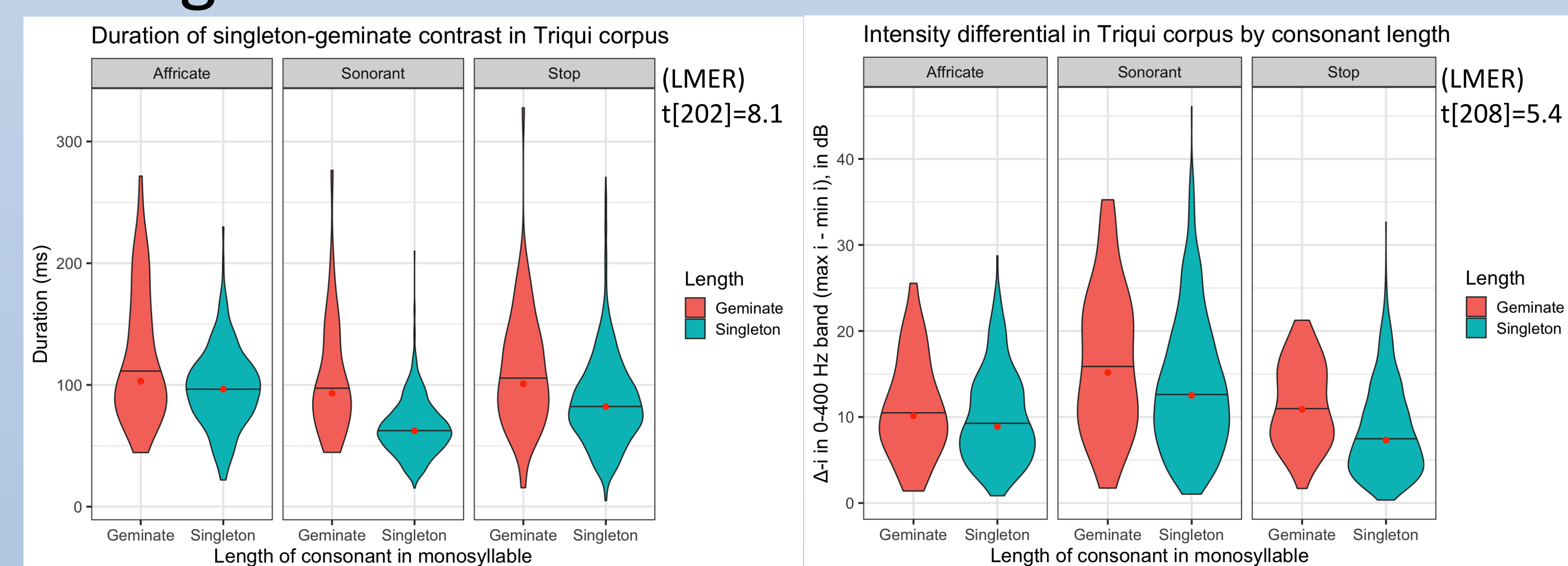
Singleton-geminate contrast occurs in onsets of monosyllabic words (DiCano 2008, 2012).

ʔaʔi <sup>3</sup>	'light blue'	ʔaʔi <sup>3</sup>	'cataracts'
kaʔ <sup>3</sup>	'candle'	kaʔ <sup>3</sup>	'lifting stick'
ʔsa <sup>3</sup>	'tortilla'	ʔsa <sup>4</sup>	'neck'
ʔʃeʔ <sup>2</sup>	'short'	ʔʃeʔ <sup>3</sup>	'outside'
βe <sup>4</sup>	'hair'	βe <sup>4</sup>	'TOP'
jaʔi <sup>32</sup>	'flower'	ja <sup>32</sup>	'tongue'
mi <sup>32</sup>	'sweet potato'	mi <sup>43</sup>	'thousand'
nũ <sup>32</sup>	'epazote'	nũ <sup>32</sup>	'to be inside'

## Duration of word-initial consonants was shorter than word-final consonants, but no effect on lenition was found.



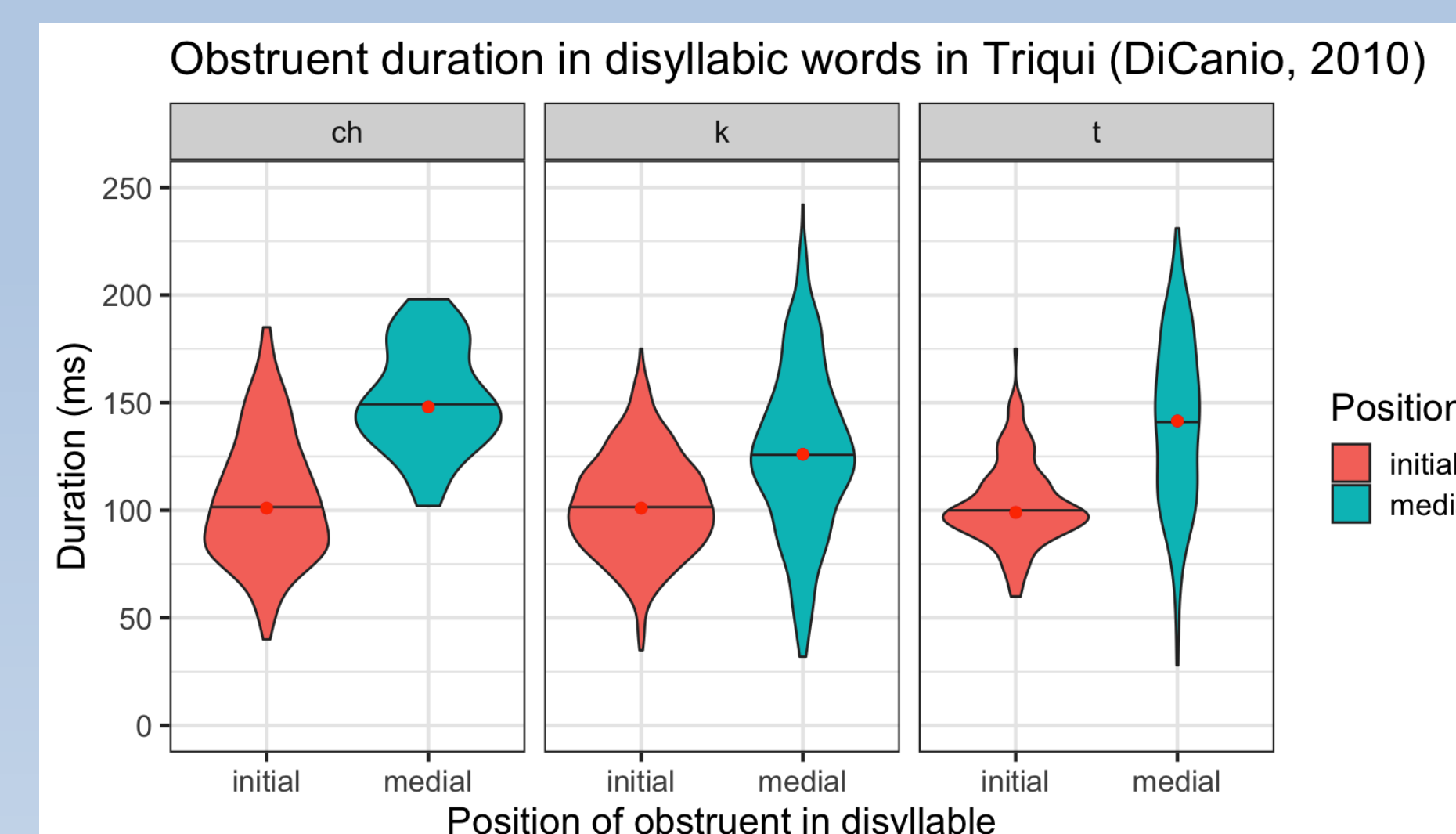
## Onset singletons are shorter and more lenited than geminate consonants are.



## Previous findings – word-medial lengthening

In carrier sentences in Itunyoso Triqui, **word-initial** obstruents are **shorter** than word-final ones.

Similar findings observed in Yoloxóchitl Mixtec - a related language (DiCano et al 2018, 2019, 2020, submitted).



## Methods/Statistics

### Spontaneous speech corpus

- 81.4 minutes of spontaneous speech from 11 native speakers (7 male - 39 minutes; 4 female - 42 minutes).
- Aligned using the Montreal Forced Aligner, constructed on 9 hours of Triqui speech (McAuliffe et al 2017).
- Automatic alignment corrected by hand by both co-authors.
- Clitics, function words, and loanwords were excluded from the analysis here.
- A total of 6,081 obstruents were analyzed.

### Acoustic analysis

- Duration values extracted via a custom script written for Praat (Boersma & Weenink 2020).
- Δ-intensity values extracted via a custom script adapted to Praat, following Kingston (2008) and Hualde & Nadeu (2011).
- Intensity contour for 0-400 Hz band pass filtered signal was extracted over a window consisting of the segmented target and 50 ms adjacent offset windows.
- Δ-i values reflect the maximum intensity difference over this window.

### Statistics

- For both the analysis of duration and intensity in the positional data, we constructed a linear mixed effects model with standardized duration as the dependent variable and with the fixed effects of Finality (non-final/final) and Manner of articulation (Affricate /tʃ, ts/, Fricative /s/, Stop /t, k, kʷ/). A random slope for Finality was specified along with random intercepts for Speaker and Word.
- For the analysis of the geminate-singleton data, we constructed a similar linear mixed effects model as above for both duration and intensity, but instead of Finality, we specified Length (geminate/singleton) as a fixed effect. No random slopes were set, but random intercepts for Speaker and Word were used.
- Sum contrast coding and standardization used for all factors.
- For all models, we maximized the random effects structure; more complex random effects structure did not converge.

## Discussion

- Singleton obstruents in monosyllables are more likely to be lenited in speech than geminates; and word-initial obstruents in polysyllabic words are shorter than word-final obstruents in polysyllabic words, but not lenited.
- Patterns of lenition closely correspond with durational changes (c.f. Lavoie 2001, Parrell & Narayanan 2018).
- Where is initial strengthening? Perhaps stress is relevant - Triqui and Yoloxóchitl Mixtec have root-final stress.
- Past studies (Keating et al. 2004, White et al. 2020) have excluded languages with root/word-final stress. See DiCano et al (submitted) for a discussion.