

# Length in Kannada alveolar and retroflex laterals: A preliminary acoustic study

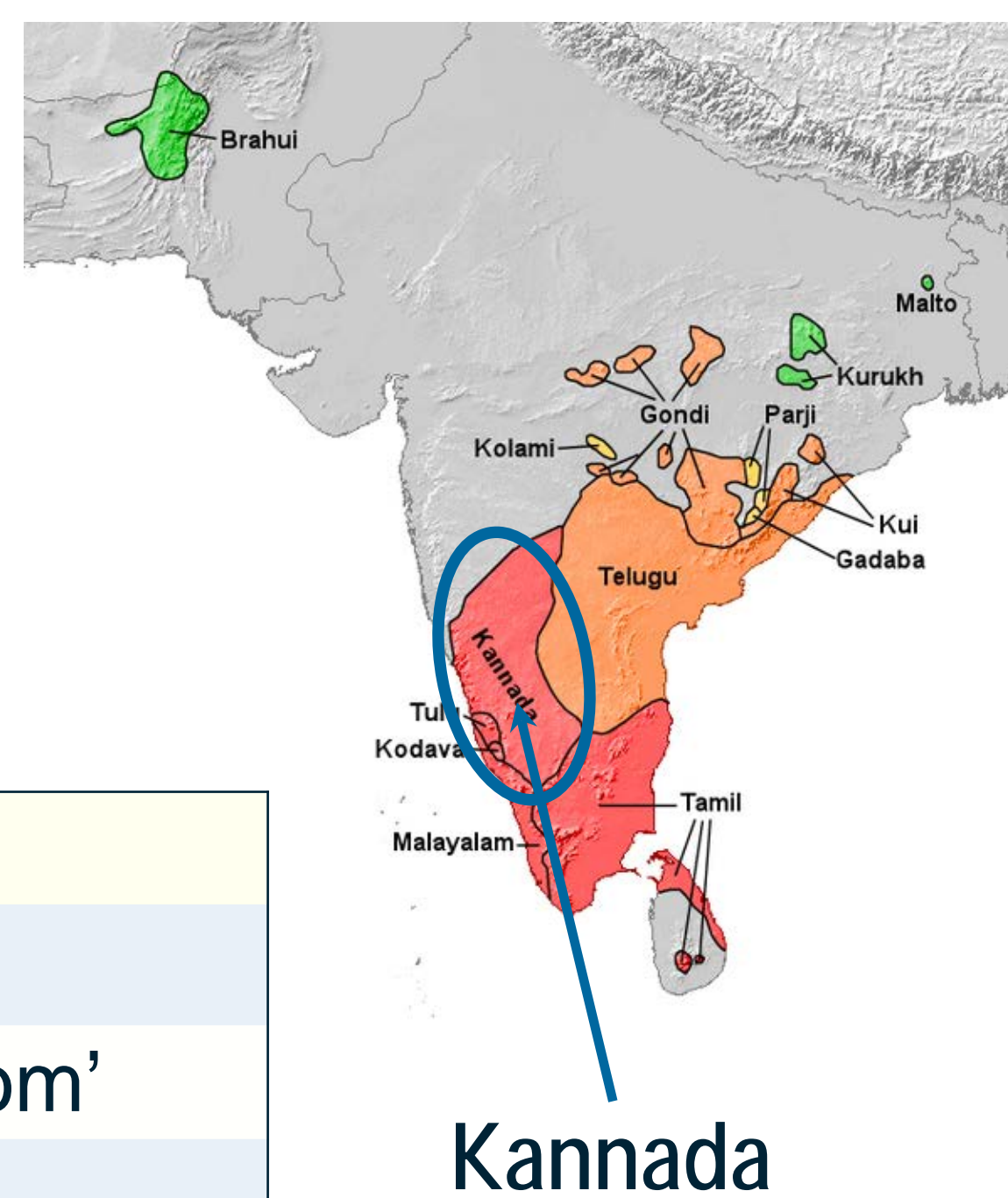
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## Introduction

### Kannada geminates

- Kannada (Dravidian, 35 mln. speakers)
- A robust singleton-geminate contrast
  - obstruents and sonorants in V\_V
  - CC:C ratio: 2:1 (impressionistically; Schiffman, 1983).

kaṭe	'story'	kaṭ:e	'donkey'
giḍa	'plant'	giḍ:a	'short'
maga	'son'	mag:a	'handloom'
beṇe	'peg'	beṇ:e	'butter'
bele	'price'	bel:a	'jaggery'
kuḷa	'party'	kuḷ:a	'short person'



(from Upadhyaya, 1972)

### Goal

- An acoustic investigation of the contrast *in laterals* – alveolars /l/-l:/ and retroflexes /ɭ/-ɭ:/.
- *Hypothesis*: the length contrast is affected by place differences.
  - Retroflexes: a dynamic tongue tip closure (flapping out; Narayanan et al., 1999) → shorter.
  - Alveolars: a spatially stable tongue tip closure → longer → a 4-way durational contrast: /l:/ > /ɭ:/ > /l/ > /ɭ/.

## Methods

### Speakers

- 9 males, in their 20s, from Mysore, Karnataka, India.

### Materials

- A near-minimal set of words with /l l: ɭ ɭ:/, among other items.
- 3 repetitions.

alveolar	singleton	ಬಲಿ	<b>bali</b>	'victim'
	geminate	ಪಲಿ	<b>pal:i</b>	'lizard'
retroflex	singleton	ಬಳಿ	<b>baɭi</b>	'side'
	geminate	ಬಳಿ	<b>baɭ:i</b>	'creeper'

### Analysis

- Duration of lateral closures and preceding vowels in Praat (Boersma, 2001).

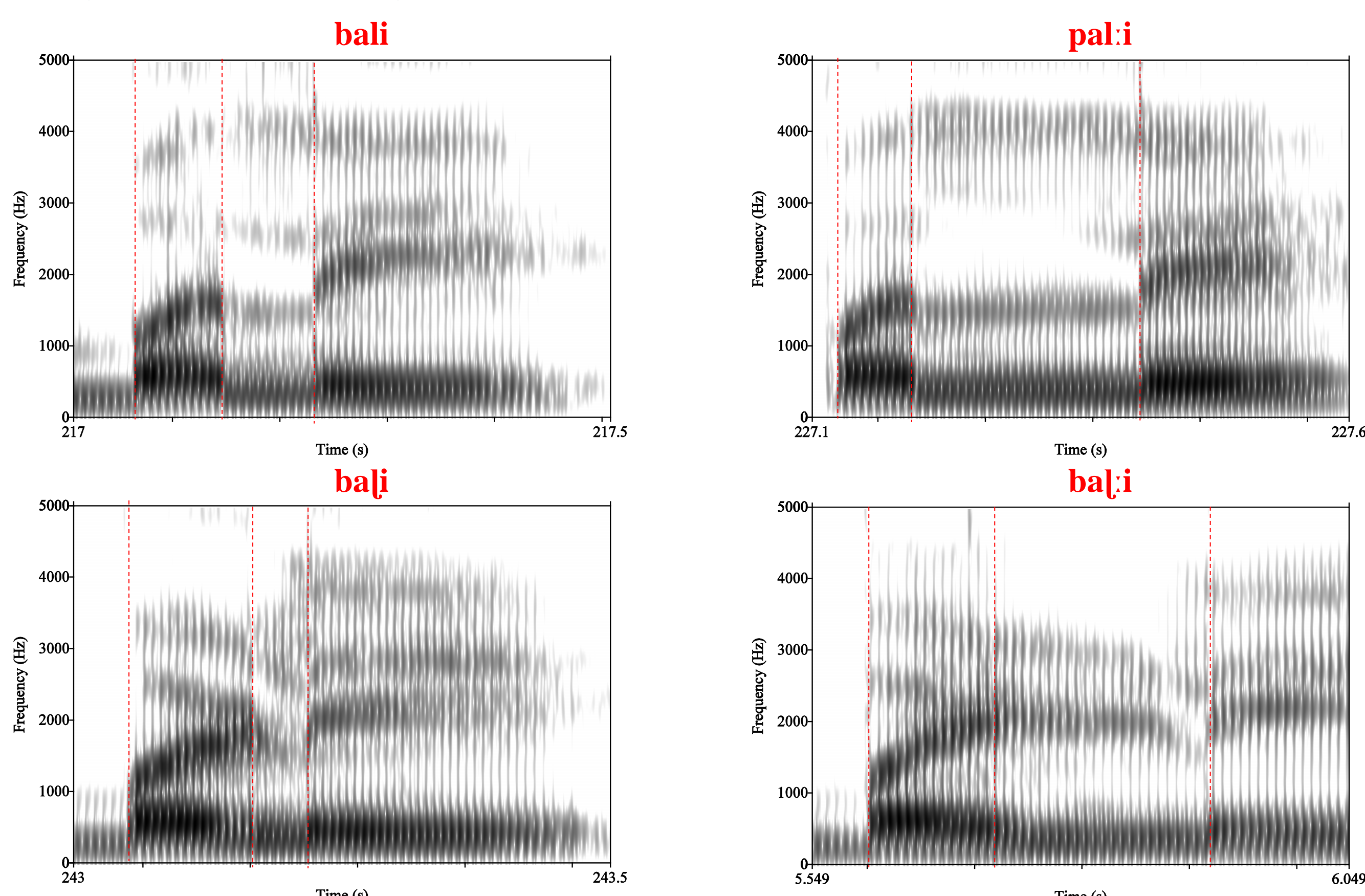


Fig. 1: Sample segmented spectrograms, speaker K7

## Results

### Consonant duration

- RM ANOVA effects:
  - Length ( $p < .001$ ): geminates > singletons.
  - Place ( $p = .001$ ): alveolars > retroflexes.
  - Place \* Length interaction n.s.
- Duration differences:
  - /l:/ (182 ms) > /l/ (82 ms)
  - /ɭ:/ (160 ms) > /ɭ/ (57 ms)
- CC:C ratio
  - 2.22 for alveolars
  - 2.81 for retroflexes.

### Vowel duration

- RM ANOVA effects:
  - C Place ( $p = .021$ ): \_retroflex > \_alveolar
  - C Length n.s. (a tendency to VC > VCC).

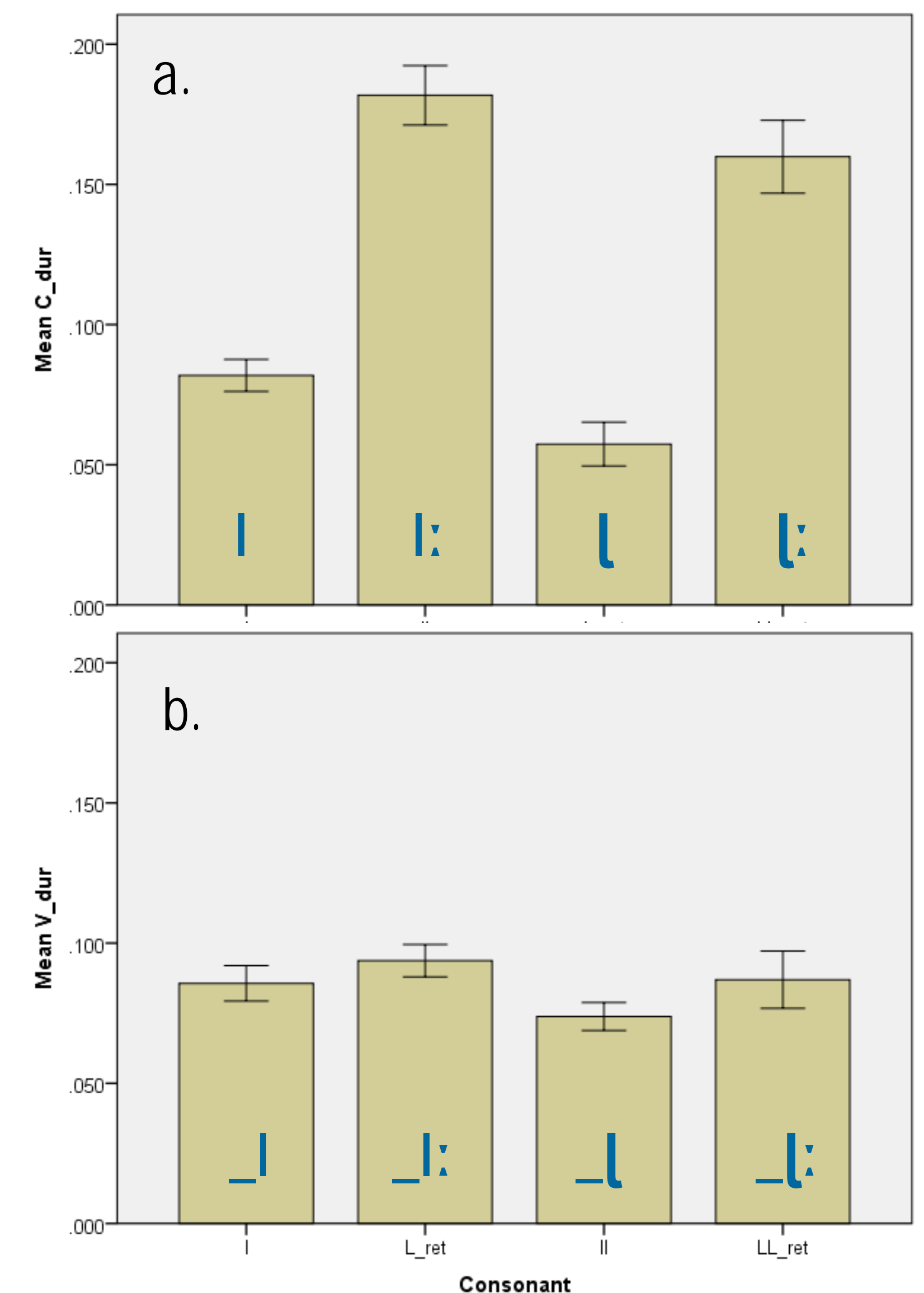


Fig. 2: Mean duration (in sec.) of (a) the lateral closure by consonant and (b) the preceding vowel /a/ by context

## Discussion

### The Kannada laterals

- Robust phonetic realization of length in laterals – *confirmed*.
- CC:C ratio
  - greater than previously described (Schiffman, 1983)
  - yet comparable to sonorant length contrasts in other languages (Aoyama & Reid, 2006).
- Predicted place differences
  - retroflex > alveolar in both singletons and (less) geminates.
  - due to the dynamic vs. static nature of retroflex and alveolar closures (Narayanan et al., 1999); evident in spectrograms.
- The preceding vowel duration
  - not clearly affected by consonant length (cf. Maddieson, 1985).

### Other manners

- Preliminary results from one of the speakers (K1)
  - CC:C ratio varies with manner:
    - higher for retroflexes than for dentals/alveolars
    - more so for the flapping-prone voiced stops /d d:/ and laterals (/l l:/).
- More work is under way.

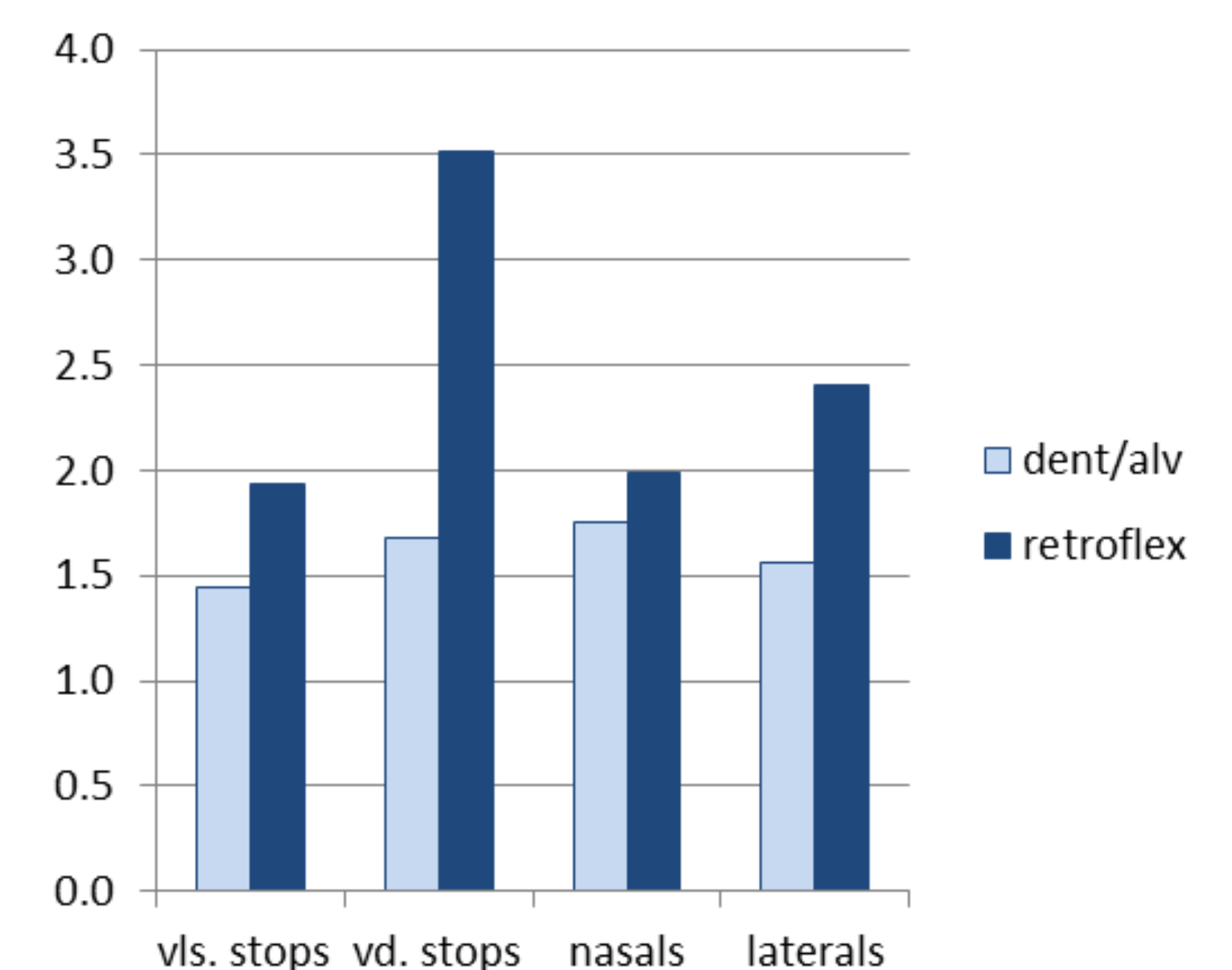


Fig. 3: CC:C ratio values for dental/alveolars (/t d n l/ vs. /t: d: n: l:/) and retroflexes (/t̪ d̪ ɳ ɭ/ vs. /t̪: d̪: ɳ: ɭ:/)

## Acknowledgements

Thank you to Mahadeva Bogadi and Sarah Truong. Work supported by a grant from the *Social Sciences and Humanities Council of Canada*.