Laryngeal contrasts in first and second language speakers of Hul'q'umi'num'

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176th Meeting of the Acoustical Society of America and the 2018 Acoustics Week in Canada meeting of the Canadian Acoustical Association, Victoria, BC, Nov. 5-9

Introduction

This study investigates the Hul'q'umi'num' dialect of Halkomelem, which is a dialect spoken on Vancouver Island by 50 elders and a number of L2 learners.

Research questions:

1. What acoustic characteristics distinguish /t/ and /t'/ in Hul'q'umi'num'?

2. Is the /t/ - /t'/ contrast realized differently in L1 vs. L2 speakers?

Ejective stops:

- Stops produced with glottalic egressive airstream.

- Sometimes categorized as "strong" vs. "weak", although this classification is overly simplistic, not accounting for all patterns of variation (Wright et al., 2002). Nonetheless, it can be useful in distinguishing two different types of ejective (Kingston, 1985):

  - "strong": a loud burst, a long period of silence, and less coarticulation of the glottal release present at the vowel onset

  - "weak": quieter, shorter burst, which leads directly into the following vowel.

- These sounds are a salient feature of languages of the Pacific Northwest and speakers are concerned with maintaining them against pressures of language shift from English.

Previous research:

- Reports of difficulties for Hul'q'umi'num' L2 learners in perceiving and producing ejectives perhaps not unexpected given Best et al. (2002) who suggest that English listeners perceive Zulu ejectives as deviant /t/

- Bird (2015) on closely related SENĆOŦEN suggests that speakers involved in language teaching and revitalization do maintain the contrast between /t/ and /t'/, in fact hyperarticulating /t'/ in comparison to previous generations of speakers

Methodology

Participants

- an L1 elder (f) and twelve L2 learners (6 f, 6 m)

Data Collection Procedure

- recorded as part of a larger project investigating L2 pronunciation in Hul'q'umi'num'

- the task was an initial assessment of student's pronunciation of coronals and involved the elder reading a word from a wordlist and the L2 speaker repeating what they heard

- recordings were made in Audacity with a Yeti microphone

Data & Analysis

- three near-minimal pairs of /t/ vs. /t'/:

t	tey	netulh	tum'xuytl'
t'	t'en	kw'et'un'	t'un'uthut

- 144 tokens total

- annotations and measurements were made in Praat of duration and spectral properties of the stop release and spectral properties of the following vowel onset

- Statistics in R (linear mixed effects models)

Results

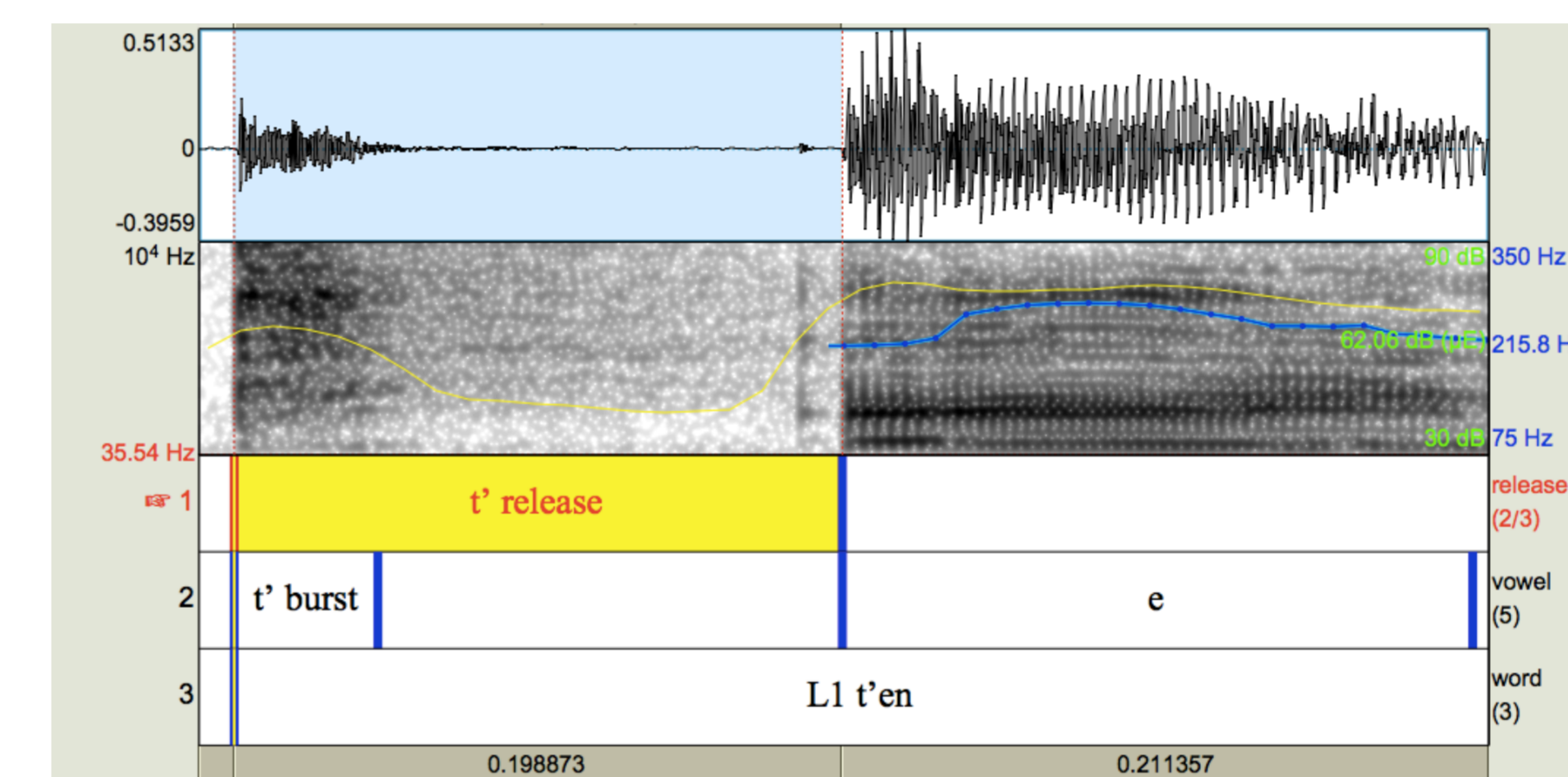### Stop measurements

Release duration (VOT)

- ejectives have longer releases than plain stops (p= 0.006) due to long periods of silence following the burst

- no sig. difference in duration between L1 and L2 speakers

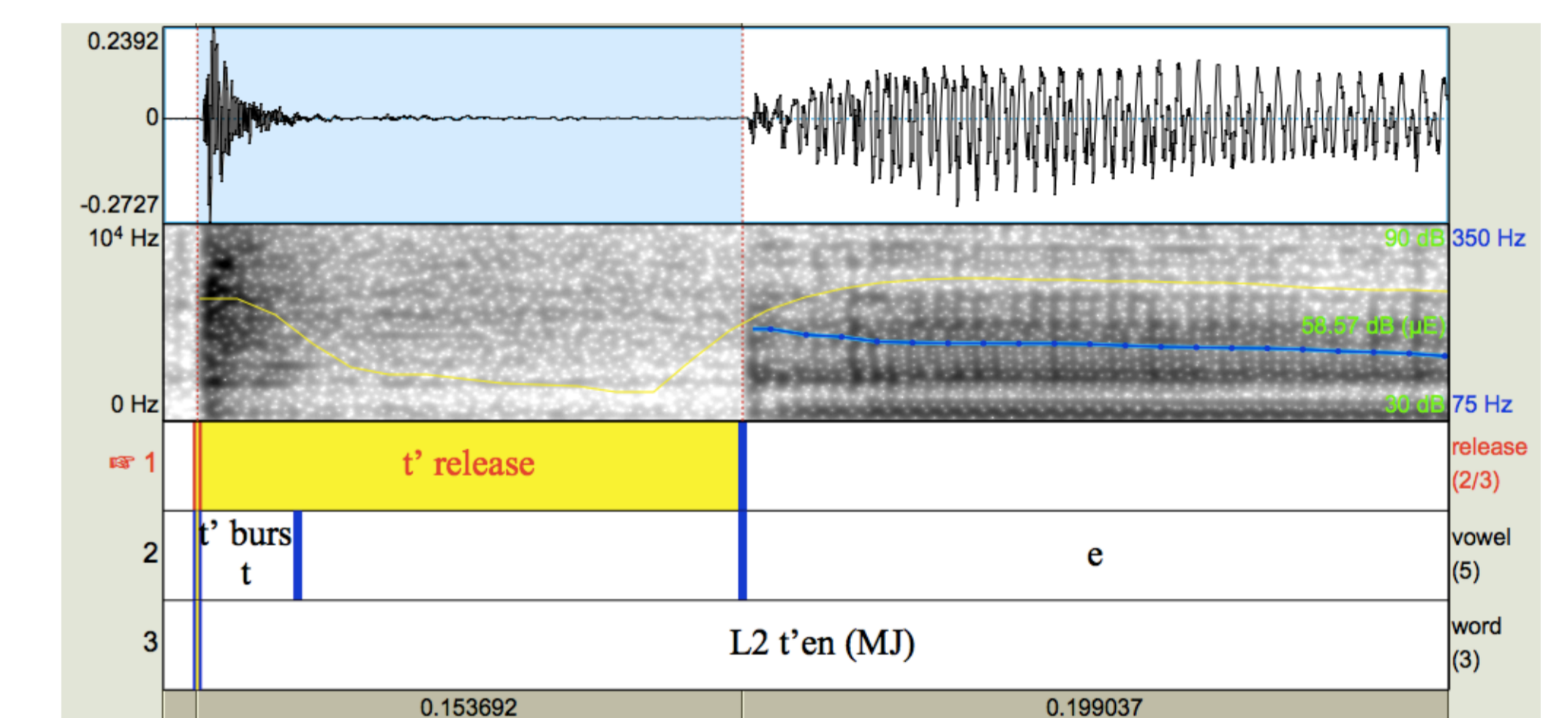- VOT is longer with full vowel than with schwa (0.029)

Burst intensity

- mean burst intensity – no sig difference between t and t' for L1 or L2

- normalized max intensity - t' is louder than t (p=0.04)
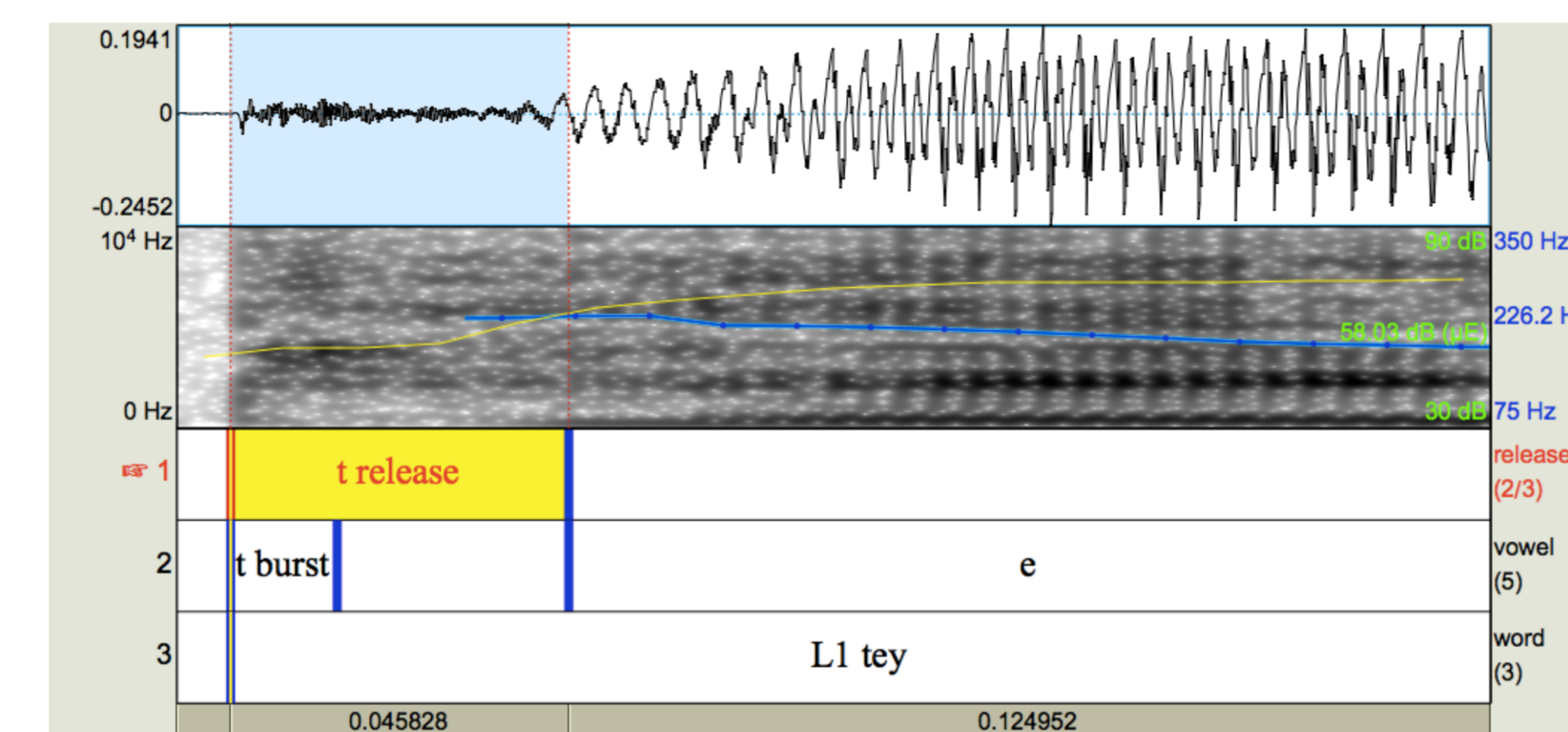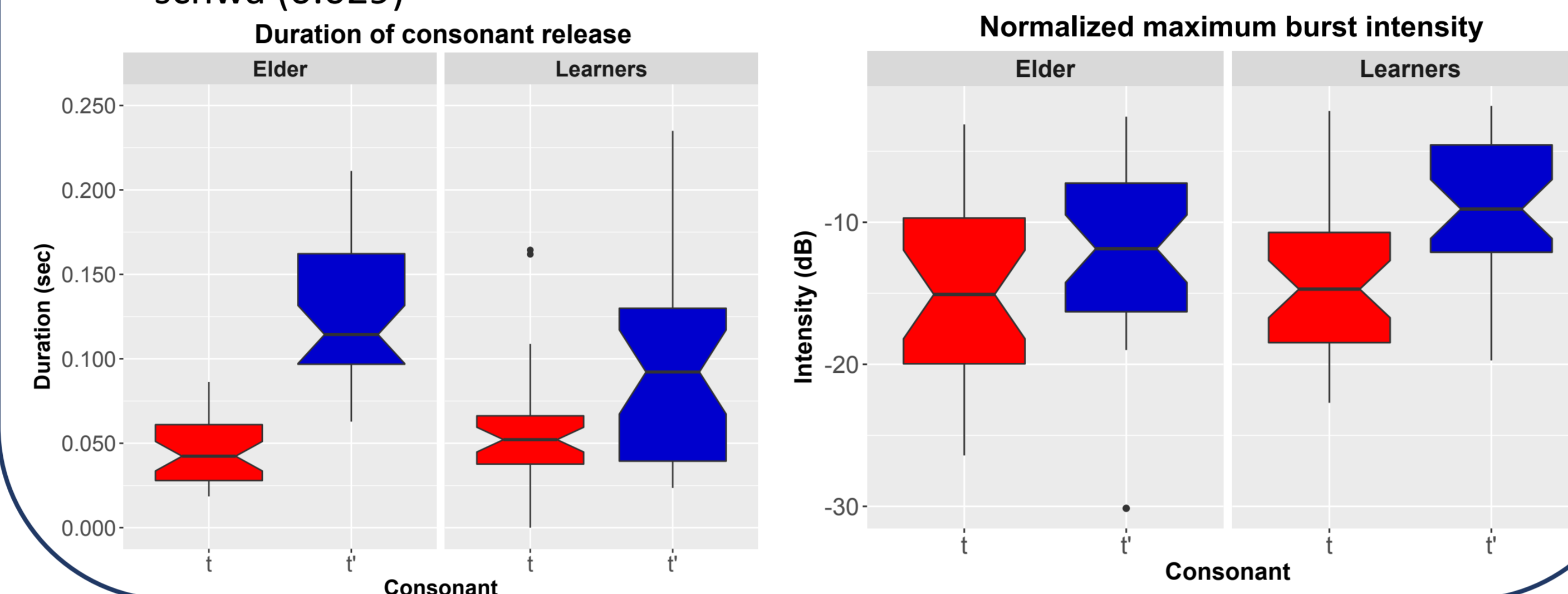
Vowel onset measurements

Spectral tilt (H1 – H2)

- vowels following t' - lower than t in the first third of the vowel for the L1 elder (p = 0.006), suggesting a period of creaky voice

- L2 had sig. higher values with schwa (p = 0.044)

Rise time

- no sig. difference between t and t' in how quickly the intensity rises within the vowel

F0 Perturbation

- vowel after t' produced with lowered pitch for the L1 elder but not the L2 learners (p=0.004)

L1 t L1 t' L2 t'
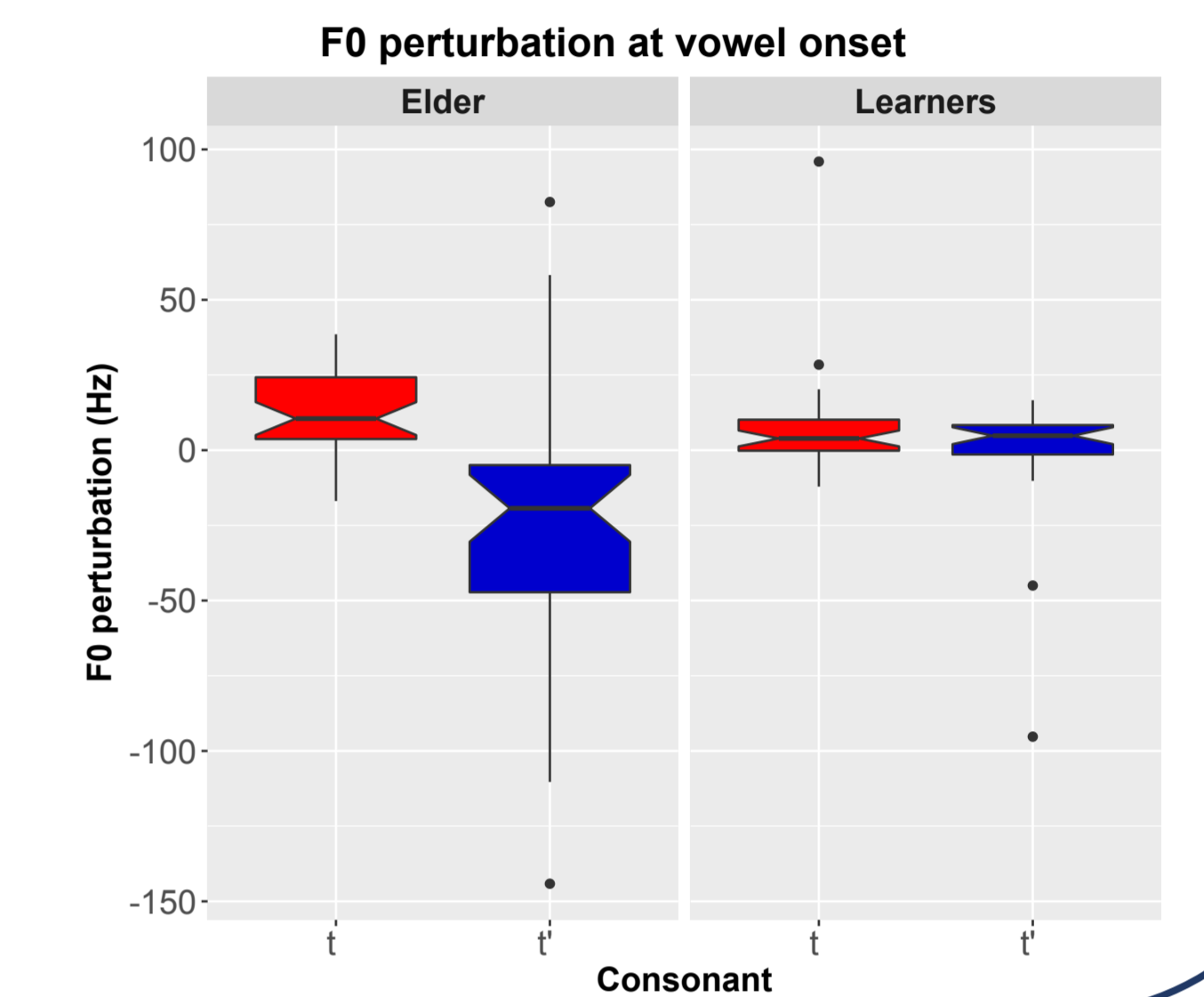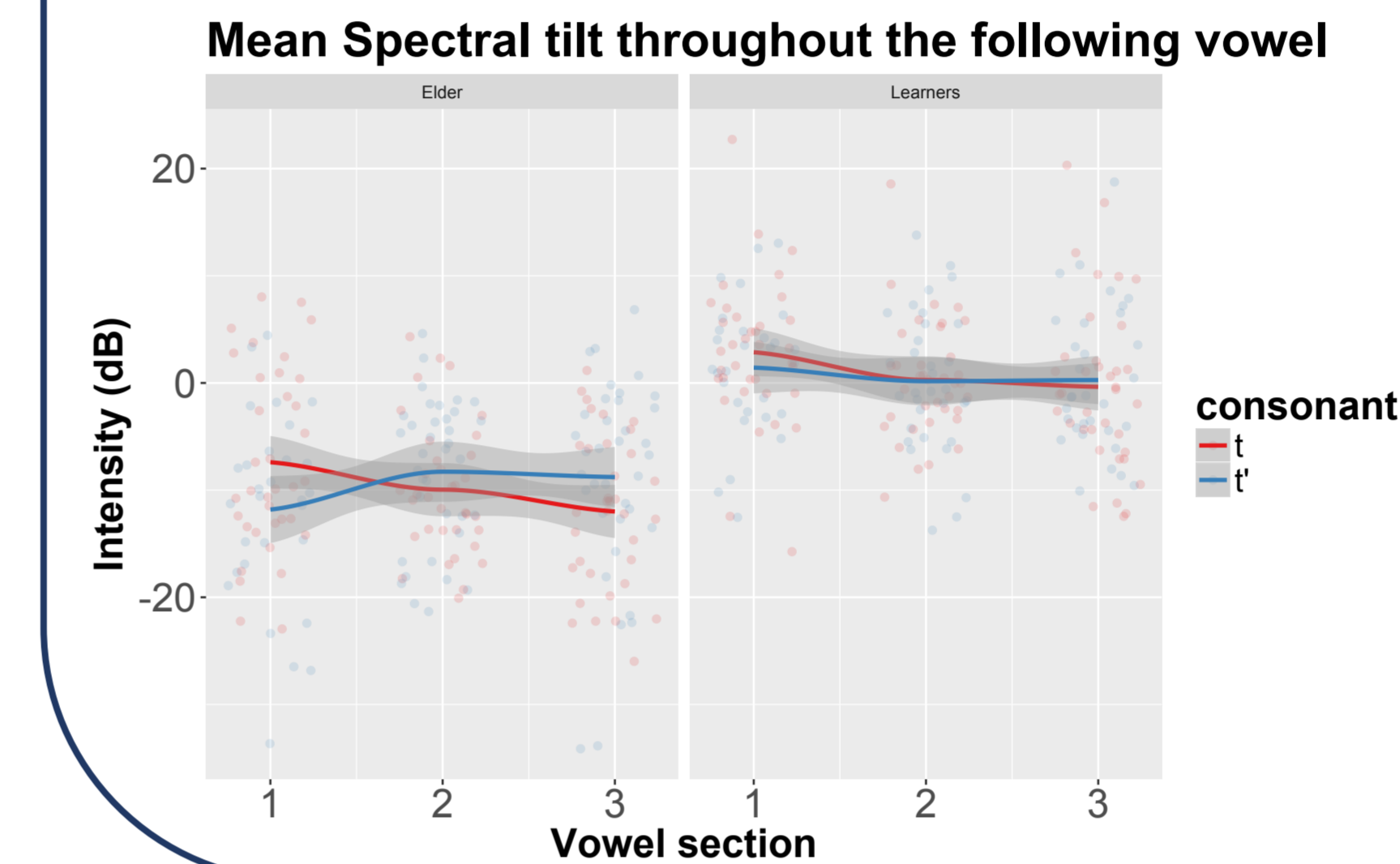
Discussion

L1 elder

Characteristics of "strong" and "weak" ejectives

- Long release duration characteristic of "strong" ejectives

- lowered pitch and lower H1-H2 suggestive of creaky coarticulation on the following vowel characteristic of "weak" ejectives

Vowel quality

- Schwa correlated with shorter VOT

- Future work may include more tokens of ejectives with different vowels across different word positions, as duration

- Positional effects have been found in a number of languages (e.g. Dene)

Hyperarticulation?

- The elder may have been hyperarticulating so that the L2 learners could more easily identify the sounds

- Long releases and vowel coarticulation give give two regions with cues to the ejective contrast – less chance of misidentification

- A question for further research is whether the L1 elder would pronounce ejectives the same in other contexts, e.g.:

  - a reading task not in the presence of L2 speakers

  - when conversing with other L1 speakers in a context outside of language teaching?

- This would allow us to better evaluate whether there is a shift in the language towards "stronger" ejectives

L2 learners

- Generally produced ejectives like the L1 speaker, with long releases

- Vowel characteristics were also reminiscent of "strong" ejectives

- A few mispronunciations occurred: usually as /t/ or /tʰ/but sometimes as ejective affricates

- Having such "strong" ejectives as models may have helped the L2 learners to perceive and produce ejectives in this context
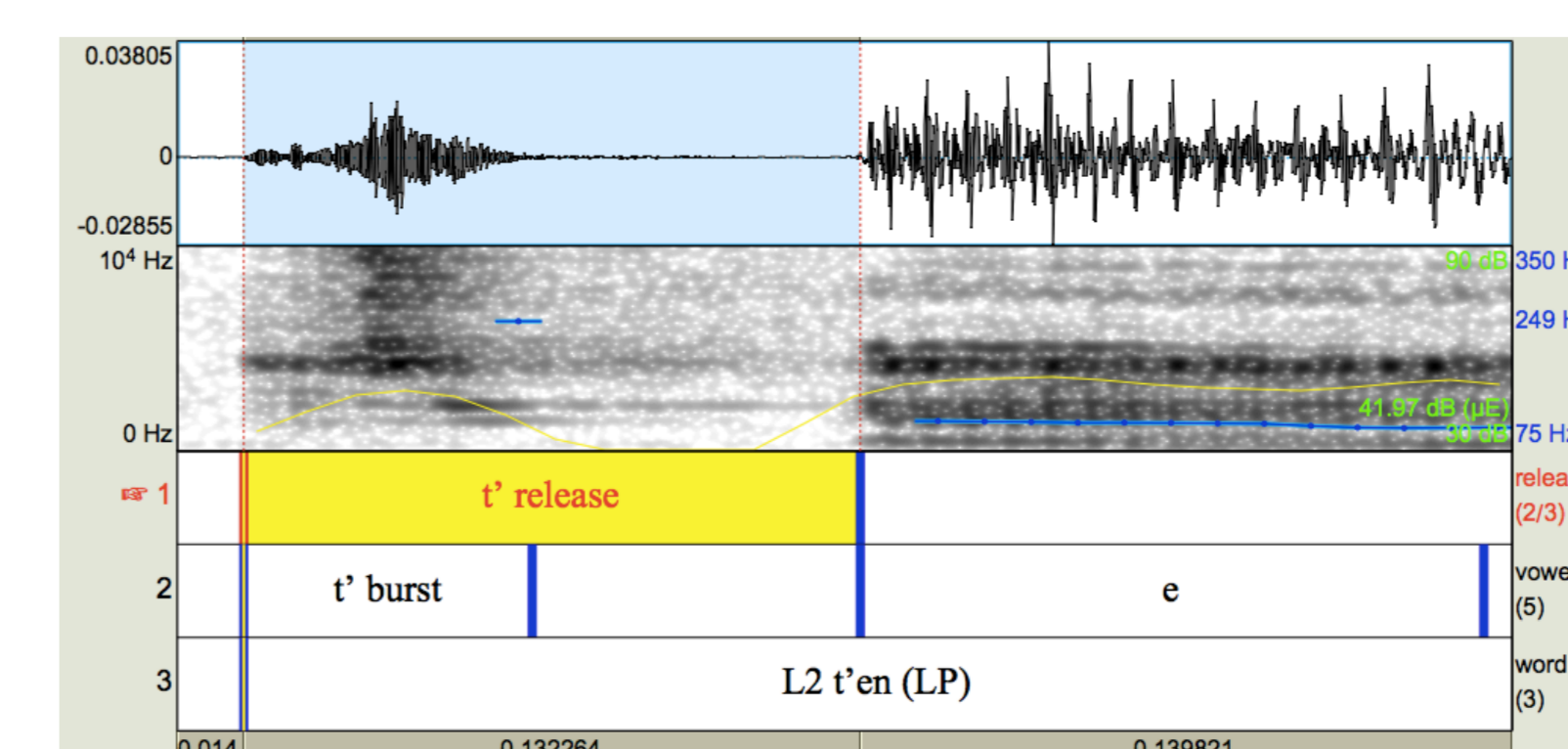
L2 t' as t
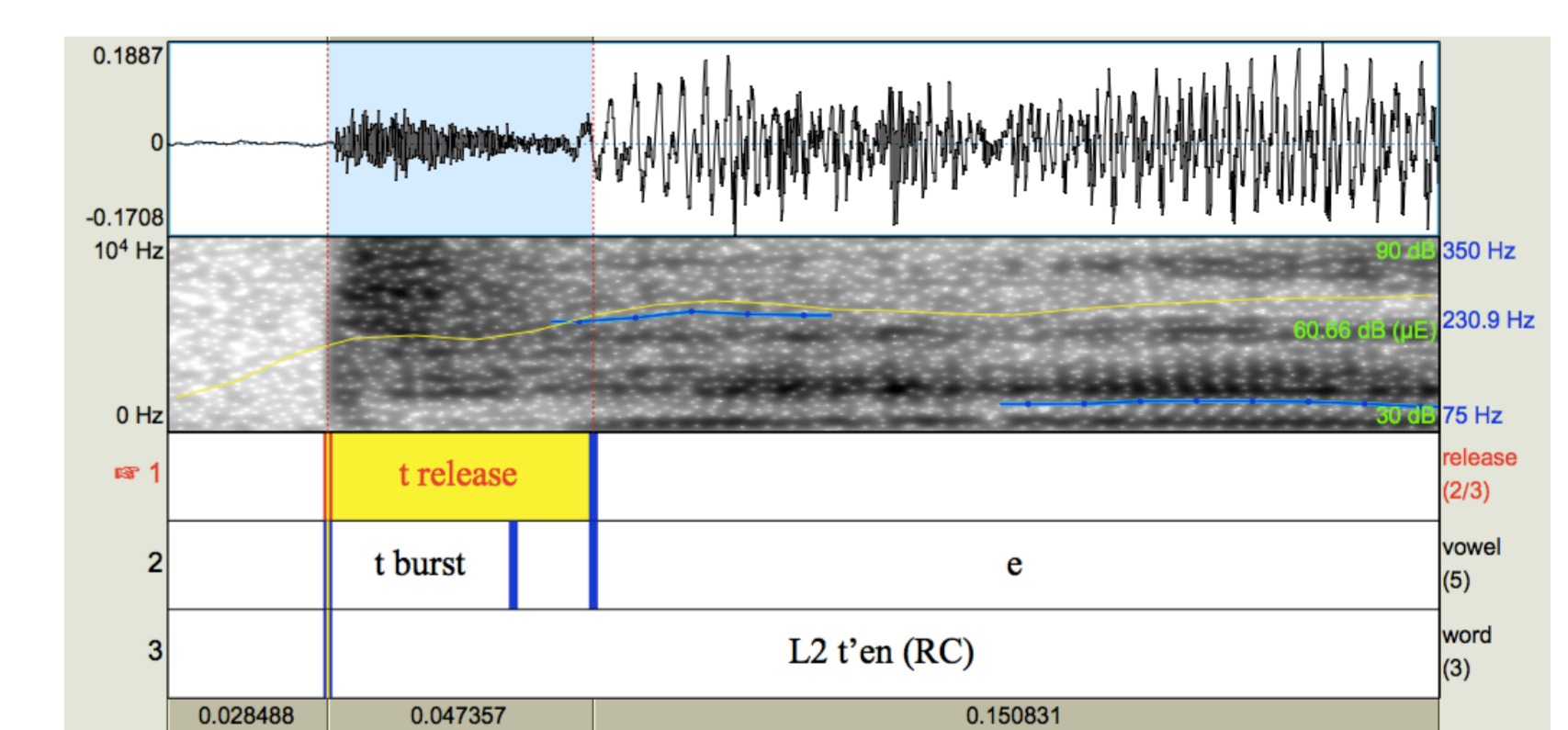
L2 t' as ts'

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