

FURTHER INFORMATION ON THE PERCEPTION OF ESTONIAN LONG-OVERLONG QUANTITY BOUNDARIES



Pärtel Lippus^a, Liis Kask^b, Sofia Lutter^b, Nele Põldver^b, Kairi Kreegipuu^b

^aInstitute of Estonian and General Linguistics, University of Tartu, Estonia

^bInstitute of Psychology, University of Tartu, Estonia

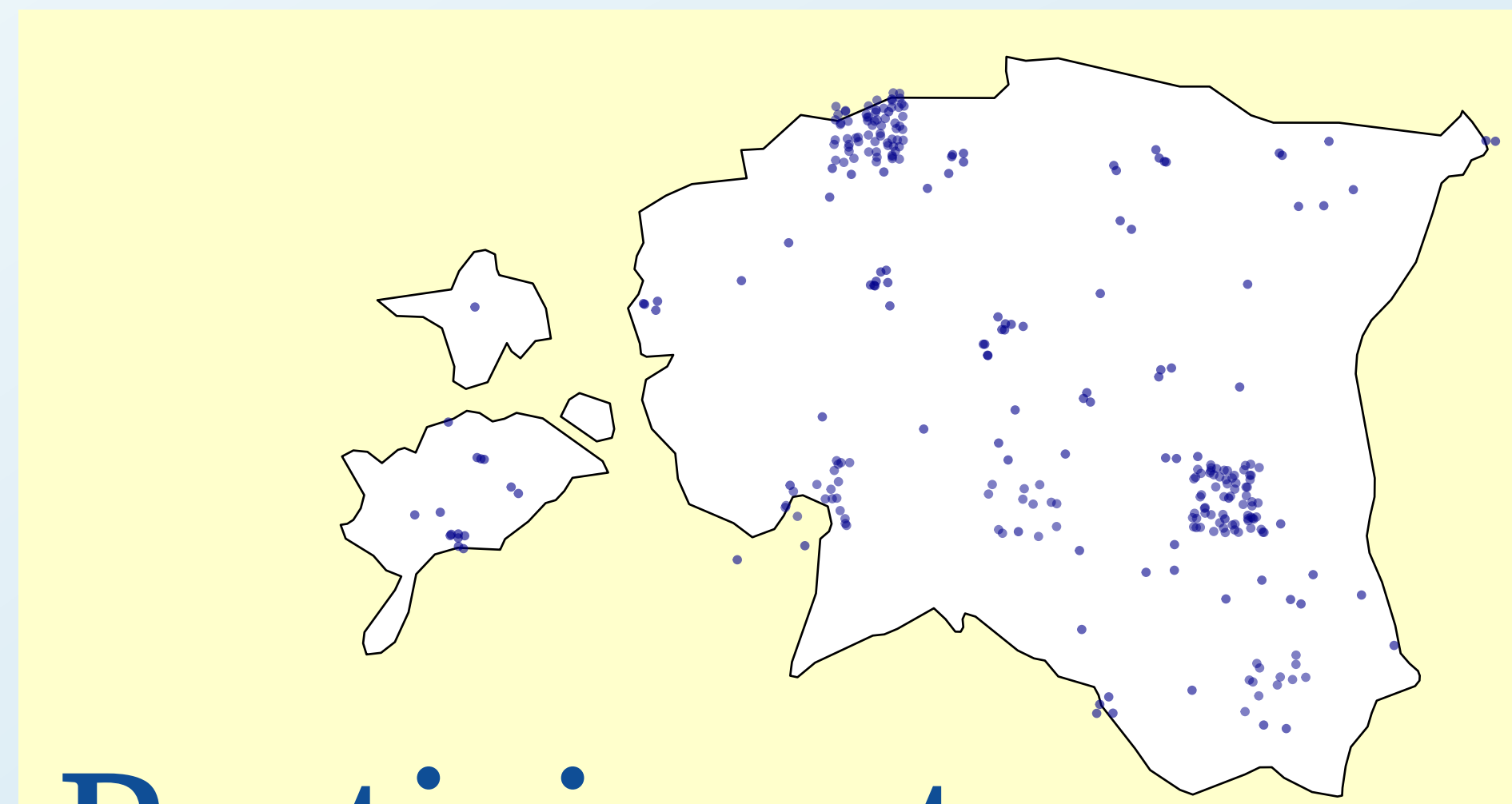
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Research questions

- Observe segmental quality (microprosody) effect on the quantity perception.
- Map the possible dialectal variability in Estonian quantity perception.

Summary

- Online perception study with participants with various regional background.
- Q2 <> Q3 category boundary is located differently depending on the segmental quality.
- Majority of the listeners depend strongly on the pitch cue.
- Pitch vs. duration preference does not show clear regional patterns.



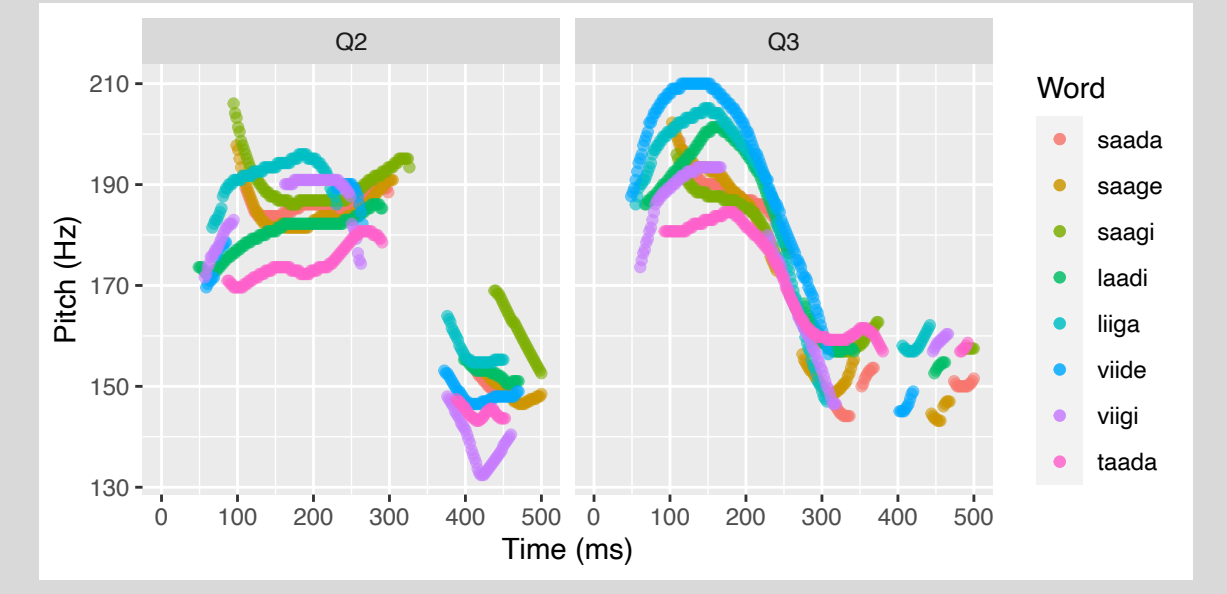
Participants

290 native Estonian participants:

- 250 female and 40 male
- mean age 33.9 (18 – 77 years)
- 86 secondary, 16 vocational education; 66 BA, 98 MA, 21 PhD

Stimuli

- 8 x Q2-Q3 word pairs
- 7 different segmental combinations + 1 nonce word
- Read by a native female speaker
- Three sets of stimuli re-synthesised using Praat



Q2	Q3
sa:ta 'send' sg2.imp	sa::ta 'get' inf
sa:ke 'get' pl2.imp	sa::ke 'saw' pl.part
sa:ki 'harvest' sg.gen	sa::ki 'get'
la:t'i 'style' sg.gen	la::t'i 'style' sg.part
li:ka 'league'	li::ka 'too'
vi:te 'reference'	vi::te 'five' sg.ill
vi:ki 'even score' sg.gen	vi::ki 'take' sg2.imp-clit
ta:ta -	ta::ta -

SET 1: V1 duration manipulated in 30 ms steps 5 stimuli (V1 duration ranging 170-290 ms).

SET 2: same as SET 1 but also V2 changed +30ms for Q2 and -30ms for Q3 base words.

SET 3: F0 swapped between Q2<>Q3 within word pairs. No manipulations in duration.

- A total of 2x8x5 + 2x8x5 + 2x8 = 176 different stimuli
- 1-2 repetition of one stimulus per listener

Results

Pitch vs duration

In SET 1 & 2 (manipulated duration)

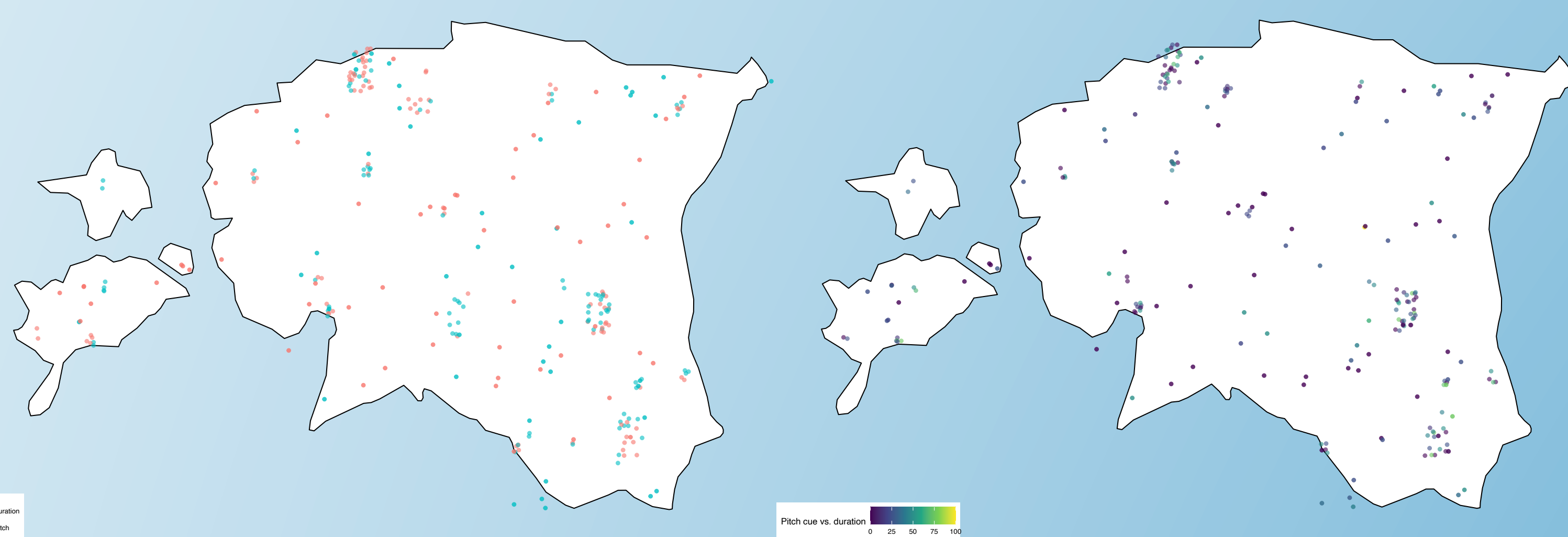
- 23 (8%) listeners based the decision only on pitch cue and 153 (53%) mainly on pitch (i.e. >90% of responses)
- 137 (47%) of the listeners decided based on temporal cues

In SET 3 (manipulated F0)

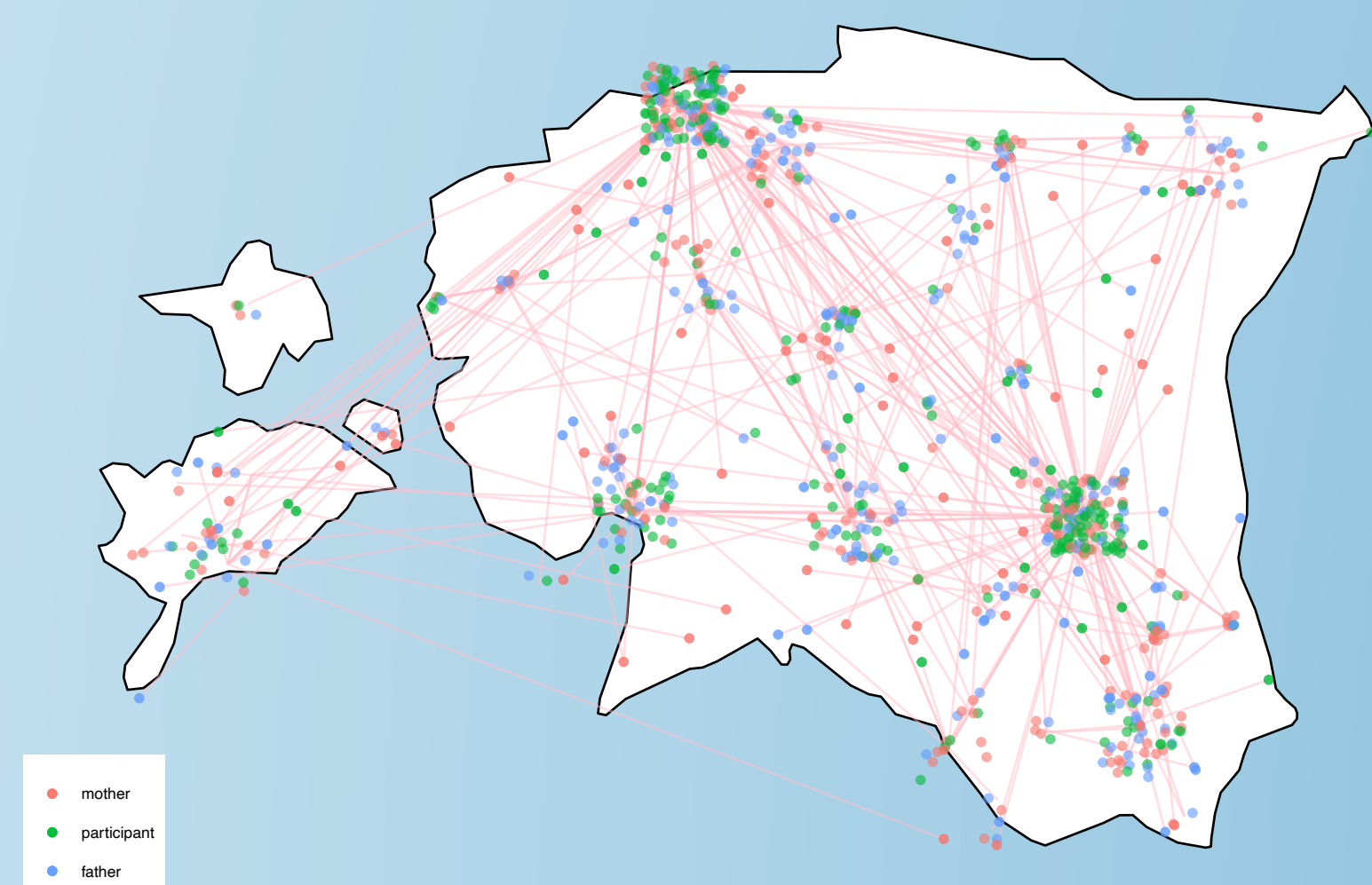
- 79% of the listeners decided based on the pitch cue
- 12% based on temporal cue

Regional background

Figure shows the listener's mother's place of habitation by pitch vs. duration based on SET 1&2 (left) and SET 3 (right).



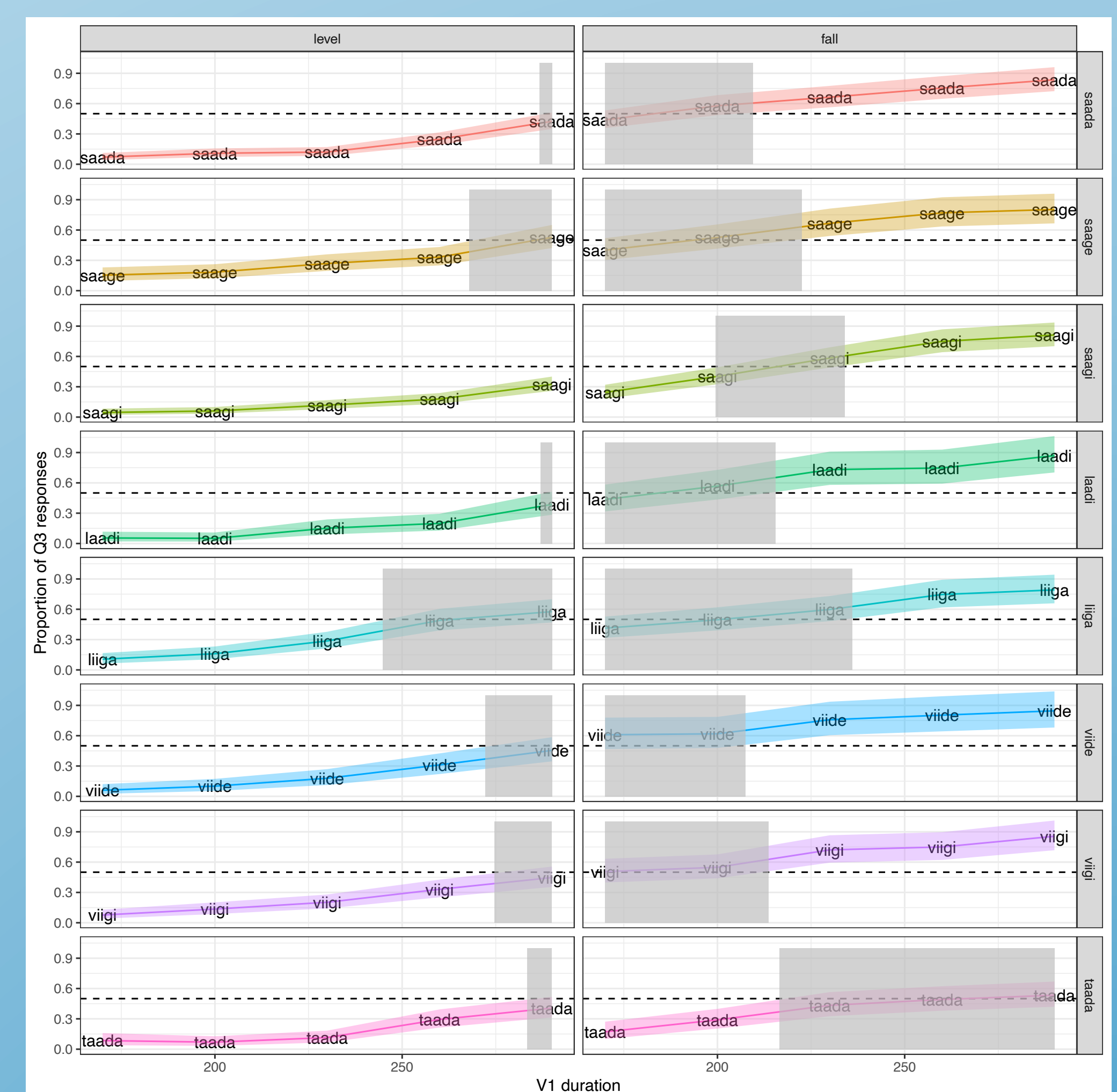
Mapping the listeners based on their own and their parents' place of habitation shows no patterns related to the pitch vs. duration perception. The figure below shows the connections between the locations of listeners and their parents.



Q2-Q3 boundary and V1 duration based on the 137 listeners who showed temporal sensitivity in SET 1&2.

The category boundary has a different temporal location depending on V1 & V2 quality:

- With level pitch, the boundary for Q2 is earlier if V1 is /i/ and later when V1 is /a/
- With falling pitch less clear pattern, but lower for V1 /i/ and latter for V1 /a/



The nonce word *taada* is perceived as Q2 with shorter V1 duration but no clear distinction between Q2 and Q3 when V1 is longer regardless of the pitch cue.

The factors explaining pitch vs. duration sensitivity

Random forest model explains 13% of the variance.

- Strongest predictors: (self-assessed) sense of rhythm, age, education and mother's place of habitation in East-West dimension
- Less important: (self-assessed) speech rate and language skills
- Least significant: knowledge of dialects and gender

