Prosodic and Non-Prosodic Cues to Prominence and Boundaries: Evidence from an RPT study in Albanian

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1. Introduction/Background

- Preliminary exploration of prominence and boundaries in Albanian & various factors affecting them
- It has been suggested that prominence in Albanian is marked by both the head and edge of phrase (Kapia et al, 2020 [4]):
  ➢ A pitch accent associates to the syllable with primary lexical stress
  ➢ A boundary tone associates with the word's right edge boundary.
- This study expands these results with: 1) spontaneous (vs. read) speech
     2) perception (vs. production) data 3) the effect of morpho-syntactic cues
        (vs. prosodic) on perception of prominences and boundaries

Research Questions

1. Do naïve listeners agree with a trained annotator on prosodic prominences and boundaries?

2. What prosodic and non-prosodic events influence listeners' judgments on prominences and boundaries?

2. Methodology

Stimuli: Short (~20-second) sound files extracted from longer interviews
- 2 male and 2 female speakers described 2-picture sequences (from QUIS [6])

Task: Used Rapid Prosody Transcription (RPT) [2]
- A text transcript of each file presented on screen, with no punctuation
- Listeners asked in separate trials to click words: a) if they perceived them as highlighted in relation to surrounding words or b) if they perceived a group boundary after them
- 26 naive listeners responded online via Percy [3]

Calculation of p-score and b-score: continuous-valued measures of perceived prosody
- Proportion of listeners who marked word as prominent or followed by a boundary

Further annotations: 1) PoLaR [1] PrStr by trained annotator 2) morpho-syntactic factors [5]

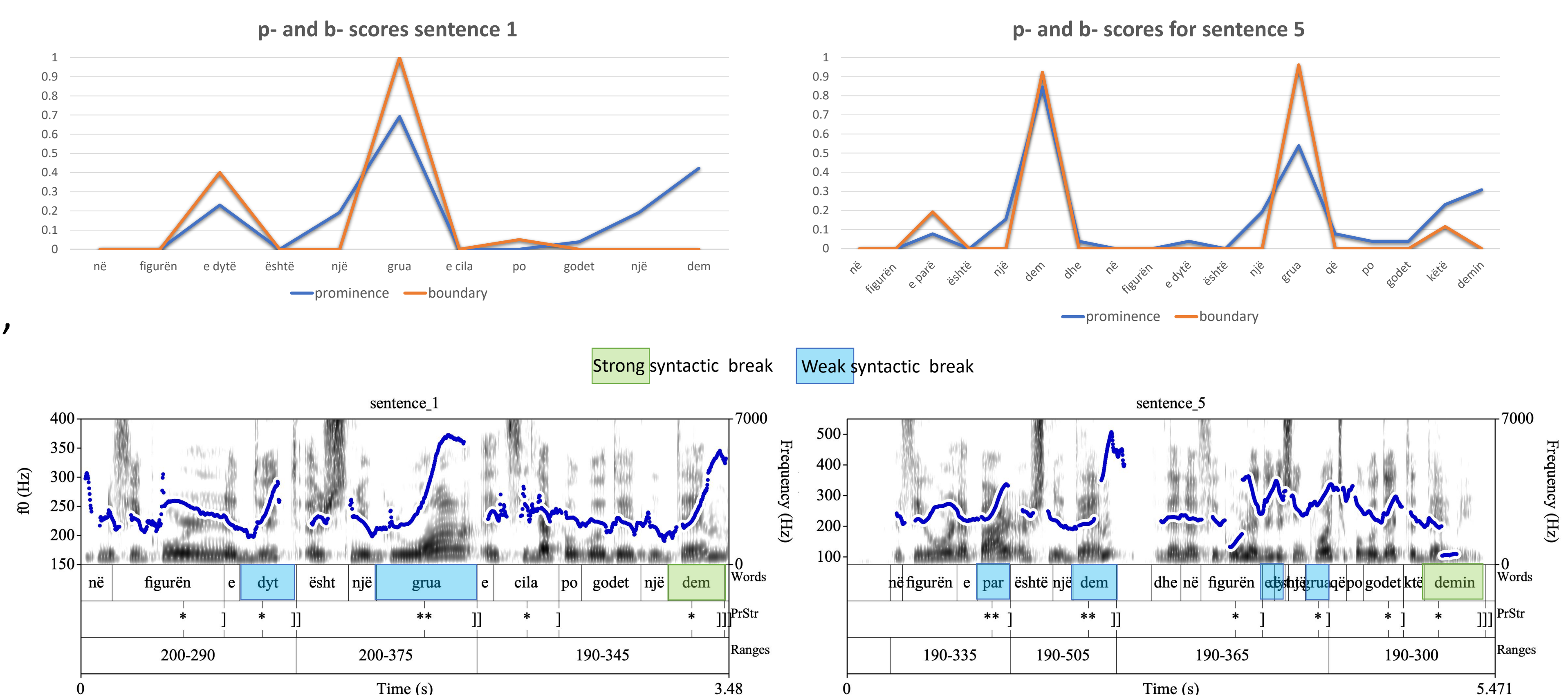## 3. Analysis & Results

Figure 1: Graphs showing p- and b- scores for two sentences (top), and speech display with partial PoLaR labels (bottom). Labels for 3 levels of prominence (none, strong, extra strong) and 4 levels of phrasing (none, and 3 levels of boundary.) Words with weak syntactic break highlighted in blue, and strong syntactic break in green.
Sentence 1 (left) translation: "In the second picture there is a woman who is hitting a bull"
Sentence 5 (right) translation : "In the first picture there is a bull and in the second picture there is a woman who is hitting this bull"
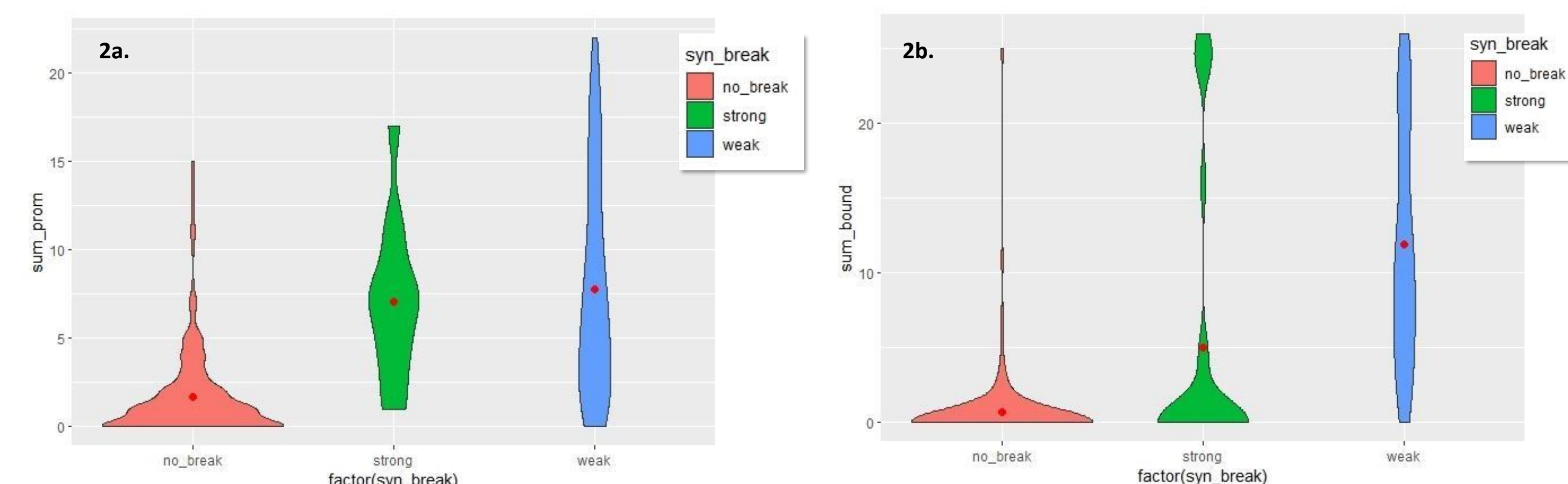

Figure 2 (a & b): Violin plots showing syntactic break size: (a) listeners are more likely to perceive a boundary where there is a weak syntactic break, (b) listeners are likely to perceive a prominence both where there is a weak syntactic break and where there is a strong syntactic break.
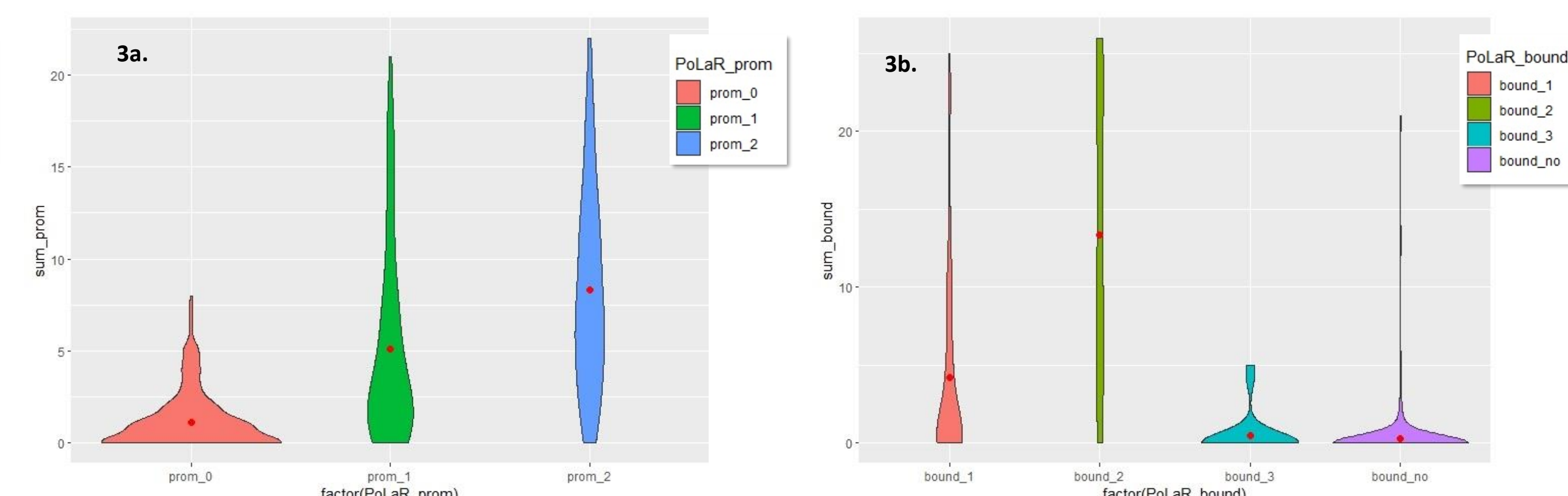
Figure 3 (a & b): Violin plots showing PoLaR labels: (a) listeners are more likely to mark a boundary where PoLaR labels show boundary 1 and 2 (with stronger tendency for boundary 2) (b) Listeners are equally likely to mark a prominence at PoLaR label strong & extra strong prominence

4. Discussion & Next Steps

- Listeners take their cues for prominence and boundary perception from prosodic and non-prosodic factors
  - Syntactic break type affects both p-scores (at all levels) and b-scores (only at weak level)
  - Lack of listeners' boundary marking at IP level likely connected to task (listeners tended not to mark end-of-file boundary)
  - RPT is a helpful tool in probing the prosodic system of a language, but need to consider changes to instructions
- Results support that Albanian has head-edge prosodic structure (Kapia et al. 2020)
  - Listeners showed sensitivity to boundary level 1 and 2, suggesting multiple levels of phrasing, such as proposed accentual phrase
- Future will look at interrelation between boundary and prominence and different factors that influence them
  - Prosodic cues as operationalized through PoLaR labels (Local ranges, f0 excursions associated with prosodic structure)
  - as well as additional prosodic cues (timing and voice quality)

Selected References: [1] Ahn et al. (2019). *PoLaR Annotation.* [2] Cole & Shattuck-Hufnagel (2016). New methods for prosodic transcription: Capturing variability as a source of information. *LabPhon* 7(1): 8, 1–29. [3] Draxler, C. (2011). Percy – an HTML5 Framework for Media Rich Web Experiments on Mobile Devices. *Interspeech 2011.* [4] Kapia et al. (2020). An Autosegmental-Metrical Analysis of Rising Contours in Standard Albanian. *Sp Pros 2020.* [5] Riesberg et al. (2020). Using Rapid Prosody Transcription to probe little-known prosodic systems: The case of Papuan Malay. LabPhon11(1), 8. [6] Skopeteas, S. et al (2006). *Questionnaire on information structure (QUIS): reference manual* (Vol. 4).