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# Neural semantic effects of morphologically conditioned tones

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## Introduction

- Swedish tone accents are two types of pitch contours (accent 1 and accent 2) on the stressed syllable.
- Previous studies revealed that tone accents facilitate prediction for the upcoming morpheme via a decompositional route (Roll, 2015; 2022; Schremm et al., 2018; Söderström et al., 2016; Söderström et al., 2017).
- However, as the word tone is present at the lexical level, it can be assumed that tone accents have a strong association with the lexemes and semantic features.

## Methods

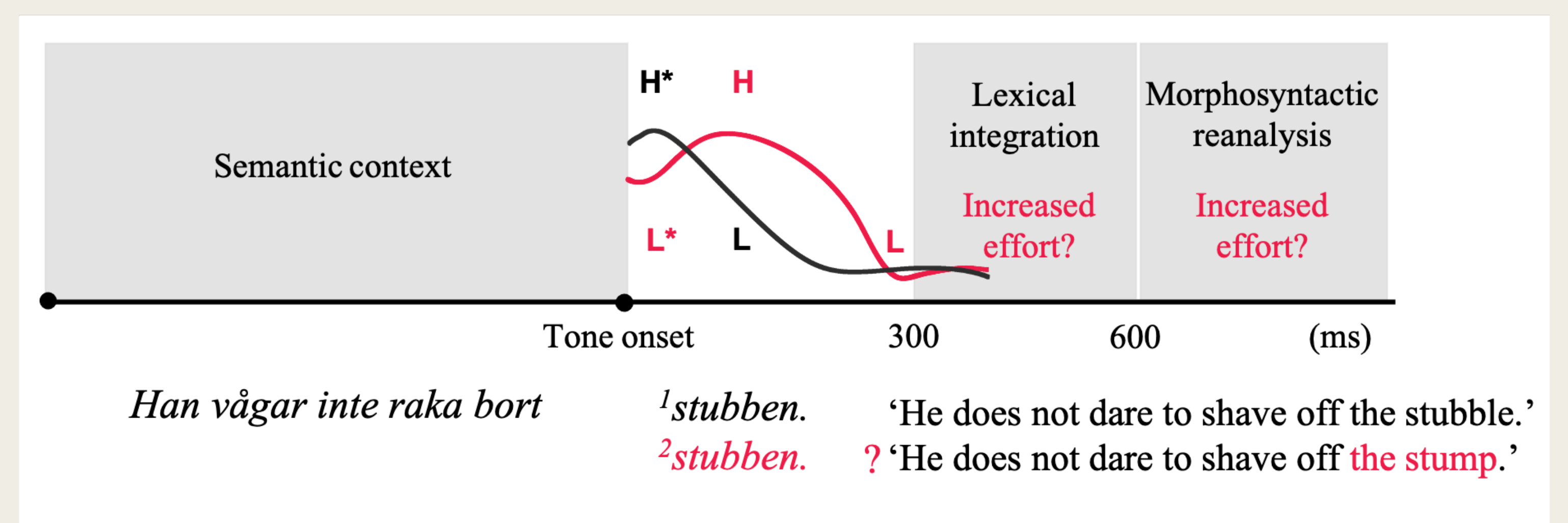
- Participants: Twenty native speakers of South Swedish
- Stimuli: Sentences with either congruent or incongruent final (target) word based on the tone accents. Each sentence led to a certain semantic expectation for the upcoming target word, either member of a minimal pair distinguished by tone.
- Task: Auditory comprehension, forced choice of the most relevant image to the sentence heard
- EEG was recorded using 32 channels.

## Results

- Tone accent incongruency in a sentence caused a longer reaction time, implying that tone accents contribute to sentence comprehension.
- An N400 effect was observed, indicating that the tones and the word forms can be stored together in one lexical unit in the mental lexicon.
- Functional difference between the tones: Accent 1 with a greater negativity compared to accent 2, resembling a pre-activation negativity (PrAN) (Roll, 2015; Hjortdal, Frid, & Roll 2022).

## Conclusion

- Swedish word accents are lexically distinctive.
- The prosodic contours are stored as part of the full form representations of words in the mental lexicon.
- Semantic integration of a sentence is hindered upon discrepancy between the expected prosodic form and the sensory input of the target word.
- Swedish pitch accents have dual functions: Contributing to lexical retrieval, as well as morphologically facilitative function.

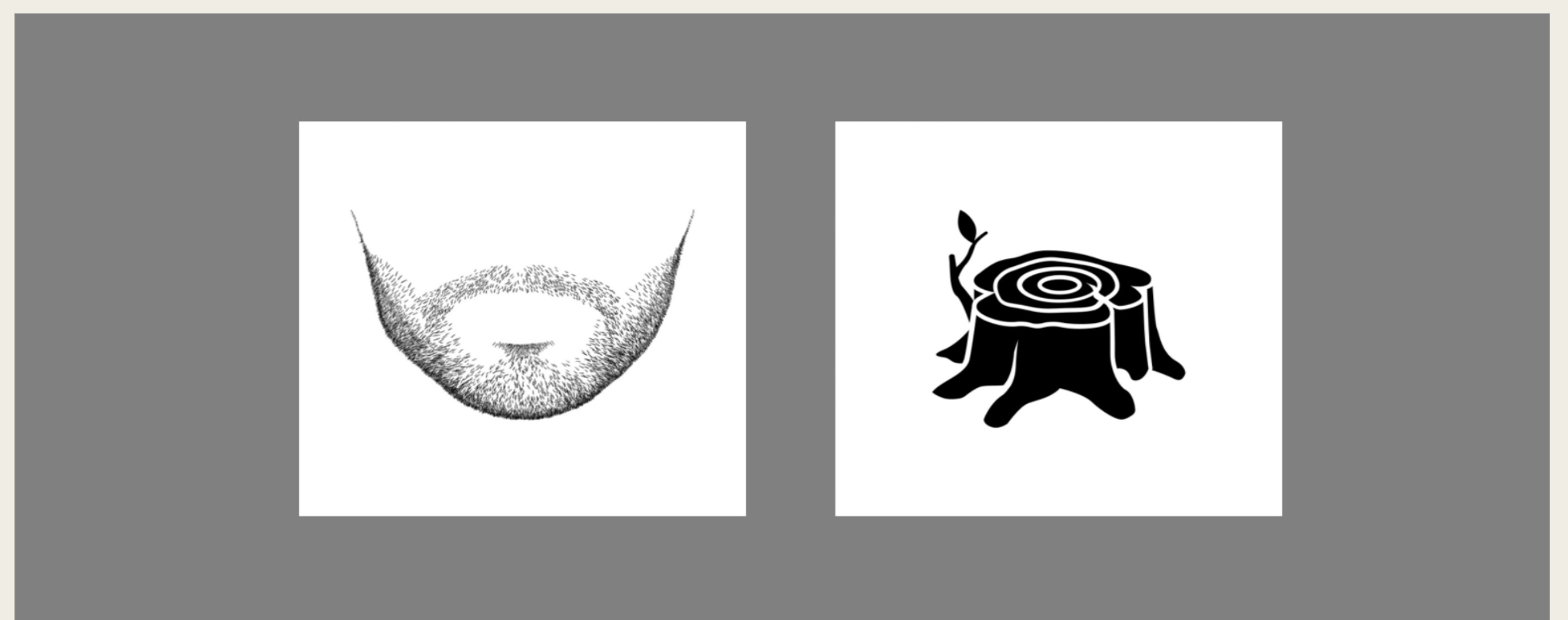


Pitch contours of accent 1 (black line) and accent 2 (red line) in South Swedish

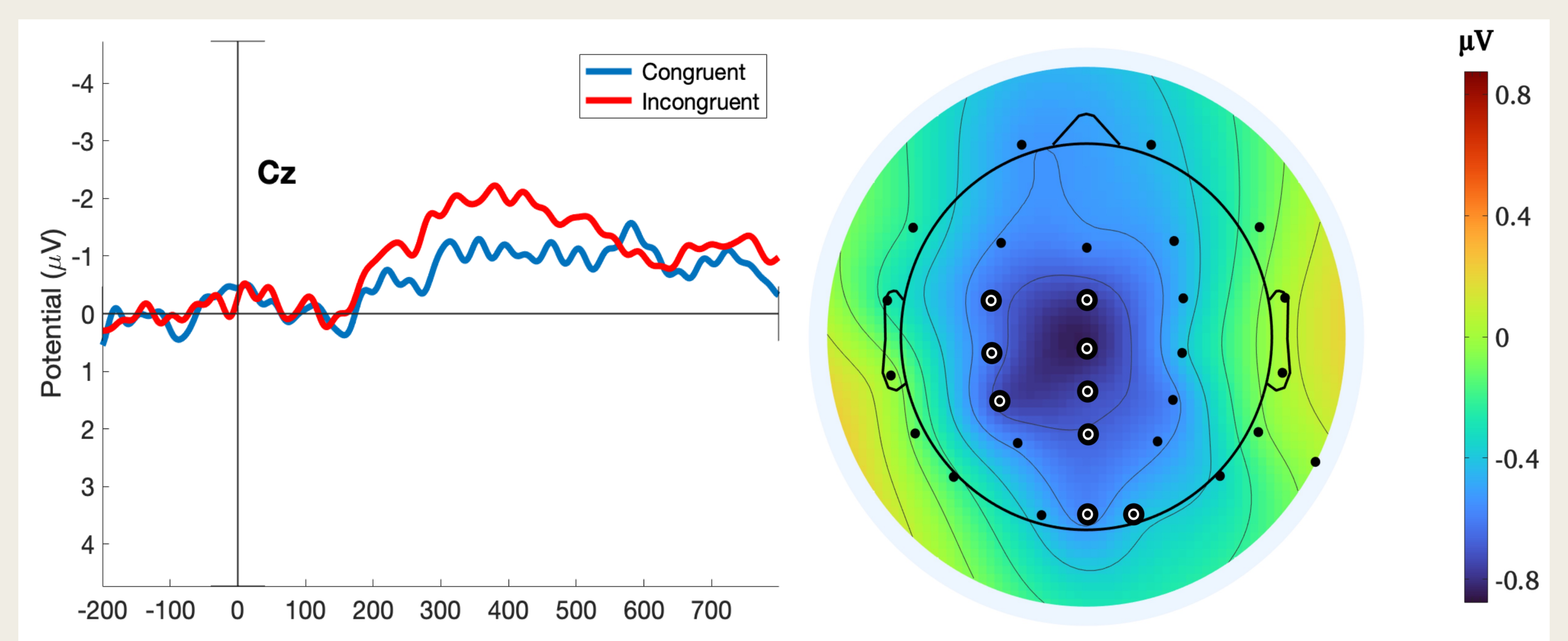
Han vågar inte raka bort <sup>1</sup>stubben.  
He does not dare to shave off the stubble.

\* Han vågar inte raka bort <sup>2</sup>stubben.  
\* He does not dare to shave off the stump.

Sample stimuli



Example screen for image choice task



Incongruency between context and target word tone resulted in increased N400 amplitude but no P600.

Subtraction of average between 300 – 500 ms after tone onset

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