Non-native prosody perception in cochlear-implant-simulated speech

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Research question

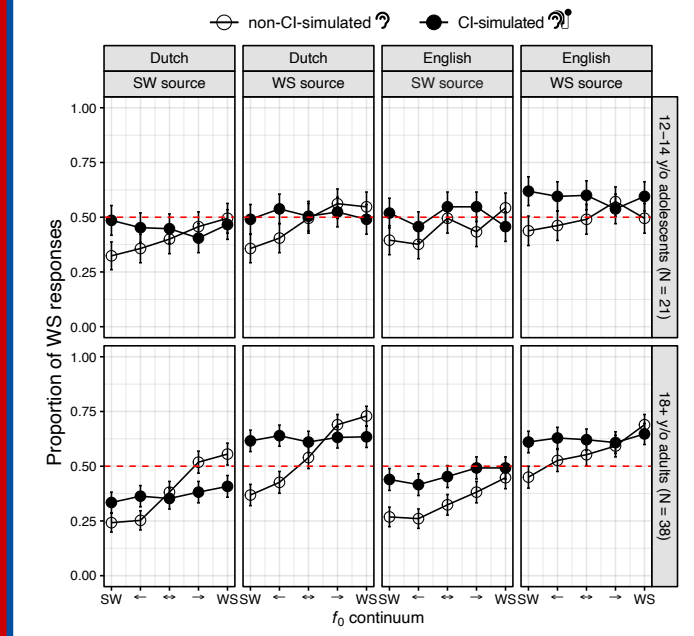
How does a **cochlear implant simulation** influence the perception of **prosodically marked stress / focus** at ***word-level*** (experiment 1) and at ***sentence-level*** (experiment 2) in a **non-native language**?

Background

- Stress at word-level can convey a lexical contrast between words comprised of the same phonemes, e.g. *contrast* (N) / *contrast* (V)
- Focus at sentence-level serves to highlight new, important, or contrasting information and is related to the context of the discourse, e.g.
  - *Who kicked the ball?* 👉 *[JOHN]$_F$ kicked the ball* (SF)
  - *What did John do with the ball?* 👉 *John [KICKED]$_F$ the ball* (VF)
  - *What did John kick?* 👉 John kicked [the BALL]$_F$ *(OF)*
  - *What happened?* 👉 [John kicked the BALL]$_F$ *(BF)*
- Prosodic cues (f_0, intensity, duration) can signal stress / focus ➞ localized phonetic prominence
- In English, lexical stress can also have vowel quality consequences ➞ more centralized vowels in initial weak syllables (usually reduced to schwa)
- Non-native listeners process prosodic patterns less accurately compared to native listeners
- More proficient non-native listeners show more native-like perception strategies
- Cochlear implant (CI) users and vocoder simulation listeners process prosody with greater difficulty than normal hearing (NH) listeners

Experiment 1

- 10 lexical stress pairs x 2 languages
- 5 native Dutch & 5 native English speakers (♀)
- 5-step f_0 continuum & vowel contrast manipulation
- 6 channels, 100 Hz cut-off (noise-band vocoder)
- Native Dutch learners of English (12-14 y/o adolescents & 18+ y/o adults)
- 1I-2AFC task
- Generalized additive mixed-effects model



Experiment 2

- 24 sentences x 4 focus types
- 4 native English speakers (♀/♂)
- 8 channels, 160 Hz cut-off (noise-band vocoder)
- Native Dutch learners of English (12-14 y/o adolescents & 18+ y/o adults)
- Online experiment
- 1I-4AFC task
- Generalized linear mixed-effects model

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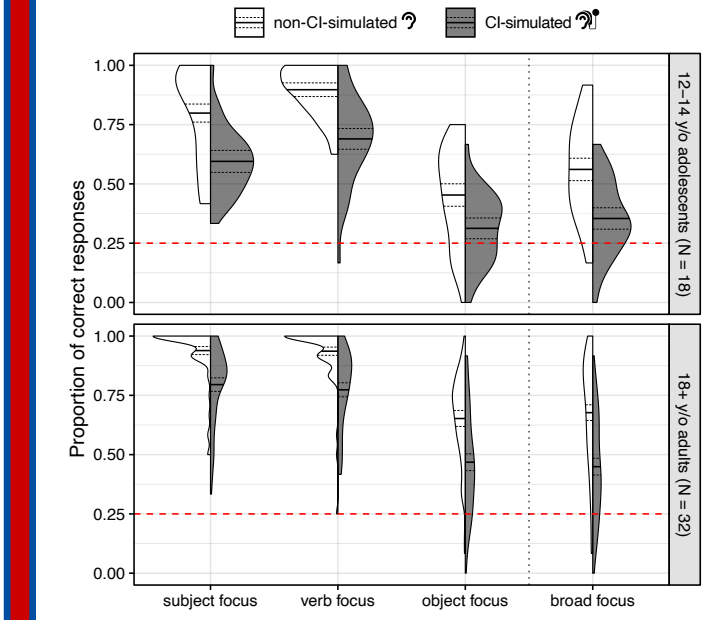

*The research presented here is part of my ongoing Ph.D. project titled "Perception of L2 prosody in cochlear implant simulations"

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