Adaptation to Temporal Auditory Feedback Perturbation and its Relation to general Motor Stability and Auditory Acuity

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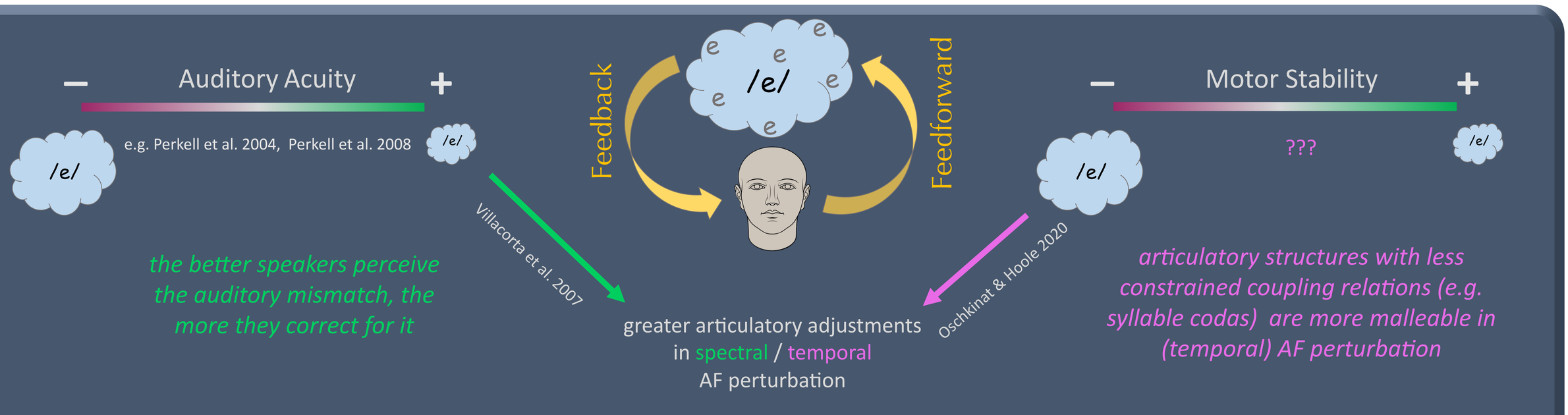
Background



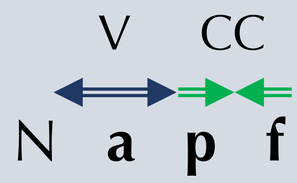
How do individual (non-speech) motor stability and perception affect sensorimotor adaptation in temporal AF perturbation?

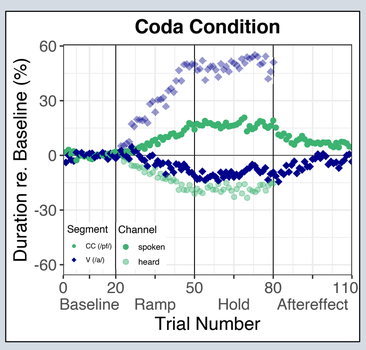
Methods

1. Temporal AF Perturbation

(Onset Manipulation)

Coda Manipulation





Compensation / Adaptation

2. Finger Tapping

BAASTA Tasks (Dalla Bella et al. 2017) and more

(Paced Tapping Tasks)

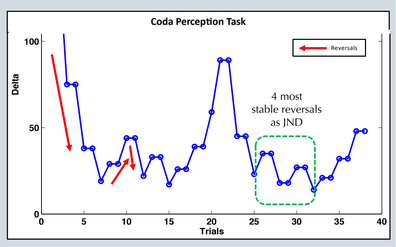
Unpaced Tapping Task

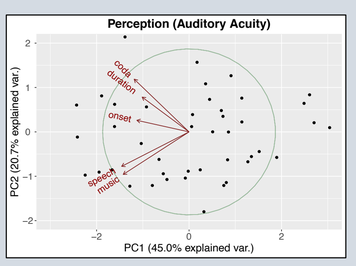
Motor Variability
(cv of the inter-tap-interval)

3. Perception Staircase Tasks

Duration Discrimination & Beat Alignment Tasks

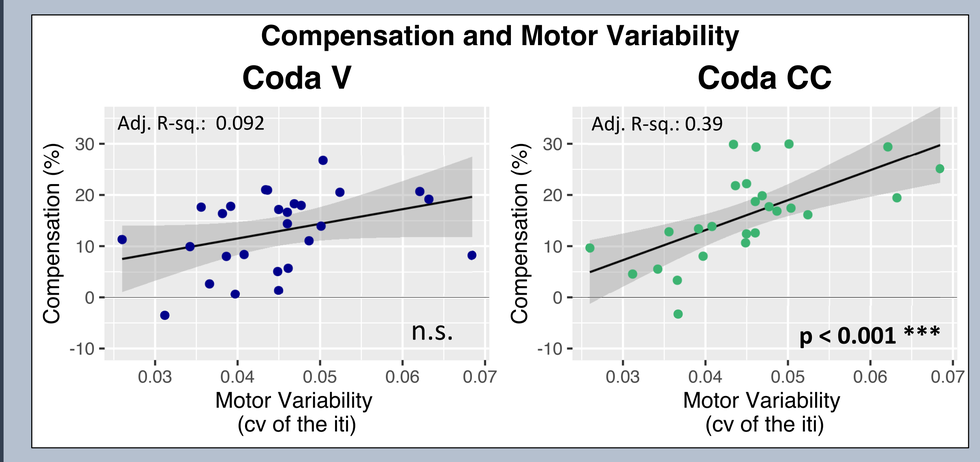
- pure tones, onset, **coda** (dur discr.)
- metronome + music / speech (BAT)



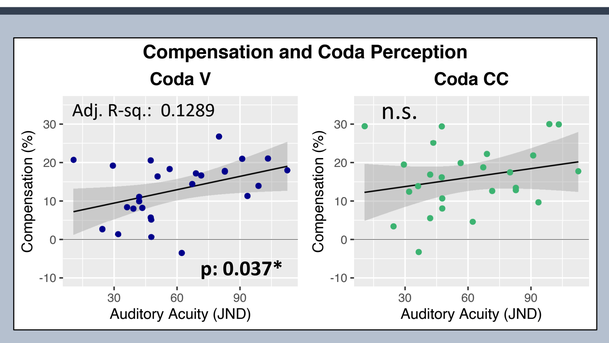


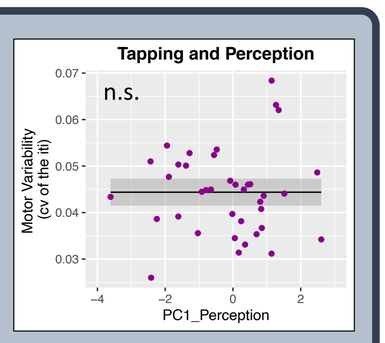
Auditory Acuity
(just noticeable difference)

Results



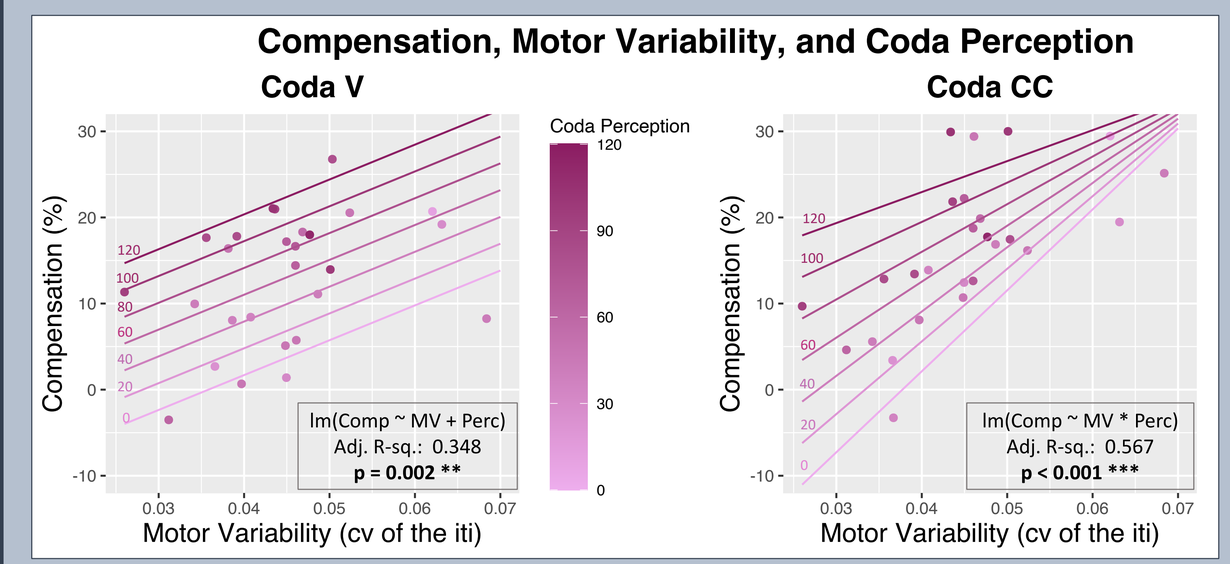
➢ **higher motor variability related to stronger CC compensation**





Weak relation between Perception and Vowel Compensation

No relation between Perception and Tapping



BUT

adding perception as predictor increases model fit
(coda discrimination most relevant perception test)

➢ higher motor variability and ***lower perceptual abilities*** predict stronger compensation to temporal AF perturbation
🤔 (⚡Villacorta et al. 2007)

➢ for speakers with higher auditory acuity the perturbation more likely lies outside the area of possible self-generated errors which may lead to weaker compensation
(see e.g. Subramaniam et al. 2018)

➢ **Well-entrenched motor representations might resist adapting to errors**
(Oschkinat & Hoole 2020),
especially if those lie outside the distributional patterns of internally generated errors
(Jones & Keough 2008, Subramaniam et al. 2018)

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