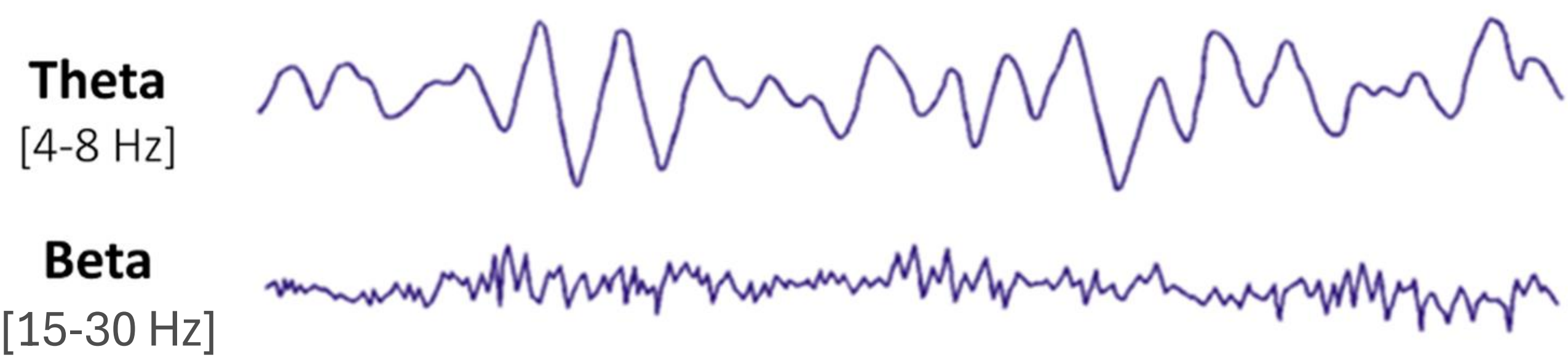


The influence of theta and beta synchronization on reward and motor learning in music

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BACKGROUND

- Music cognition recruits a broad range of brain areas¹
- Synchronization of neural oscillations is a potential mechanism of communication between distant brain areas²
- Right frontotemporal synchronization in theta has been positively associated with pleasure during music listening³
- Musical pleasure has been shown to influence motor learning of short melodies⁴
- Beta band activity has been associated with motor learning⁵
- How do beta and theta synchronization in frontotemporal and motor areas influence performance and pleasure for short piano melodies?



METHODS

Participants

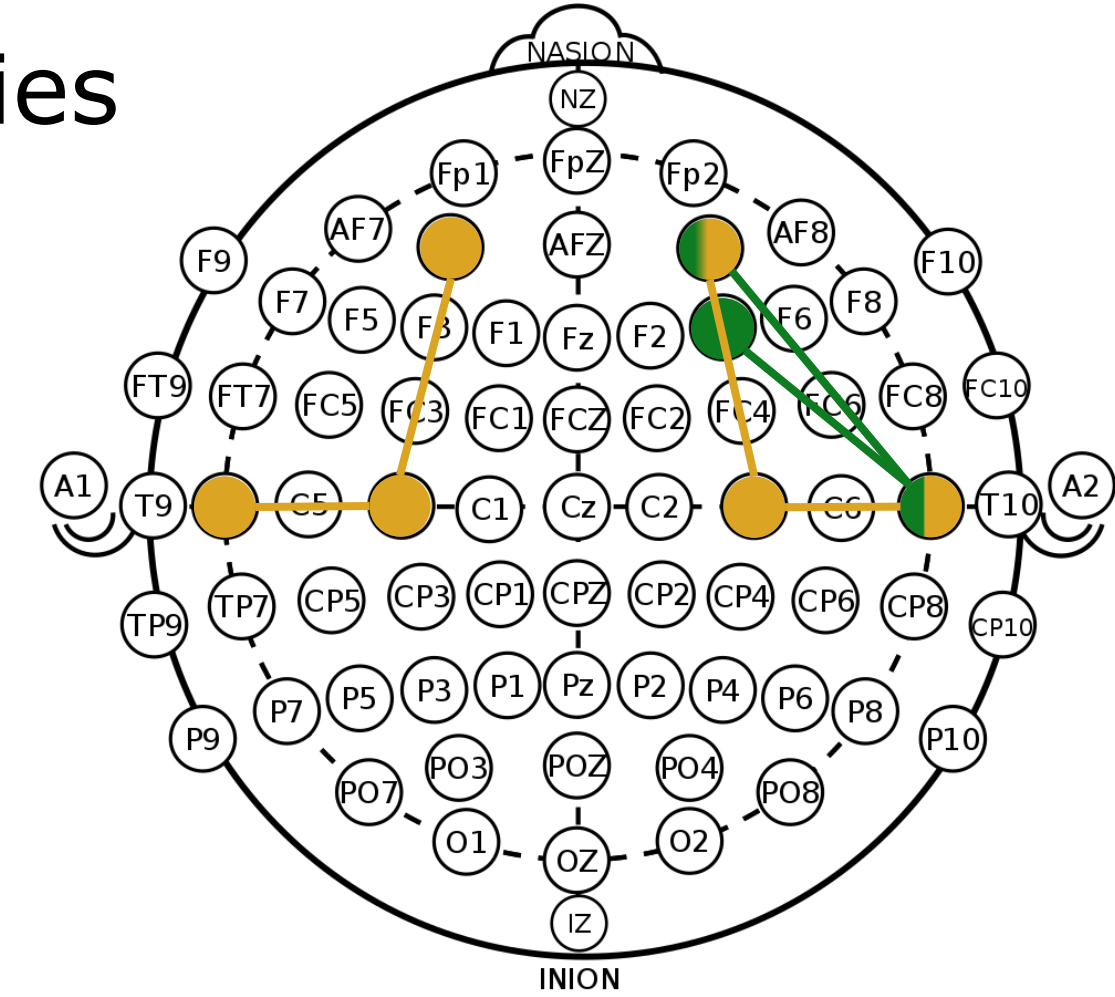
- 30 right-handed non-musicians

Stimuli

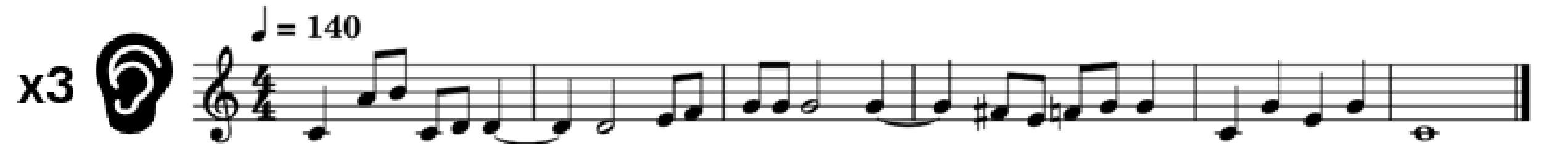
- 9 probabilistically generated melodies
- 4 bars of context; 2 bars played
- 5-note patterns

Analysis

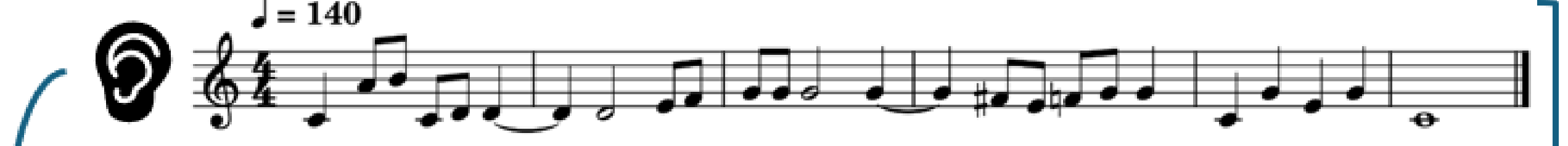
- Inter-site Phase Coherence (**ISPC**)
- Reward: **Theta**
- Motor: **Beta**
- Liking ratings (1-7) x theta ISPC
- Accuracy and beta ISPC change over time



Listen Rating



Listen Preview

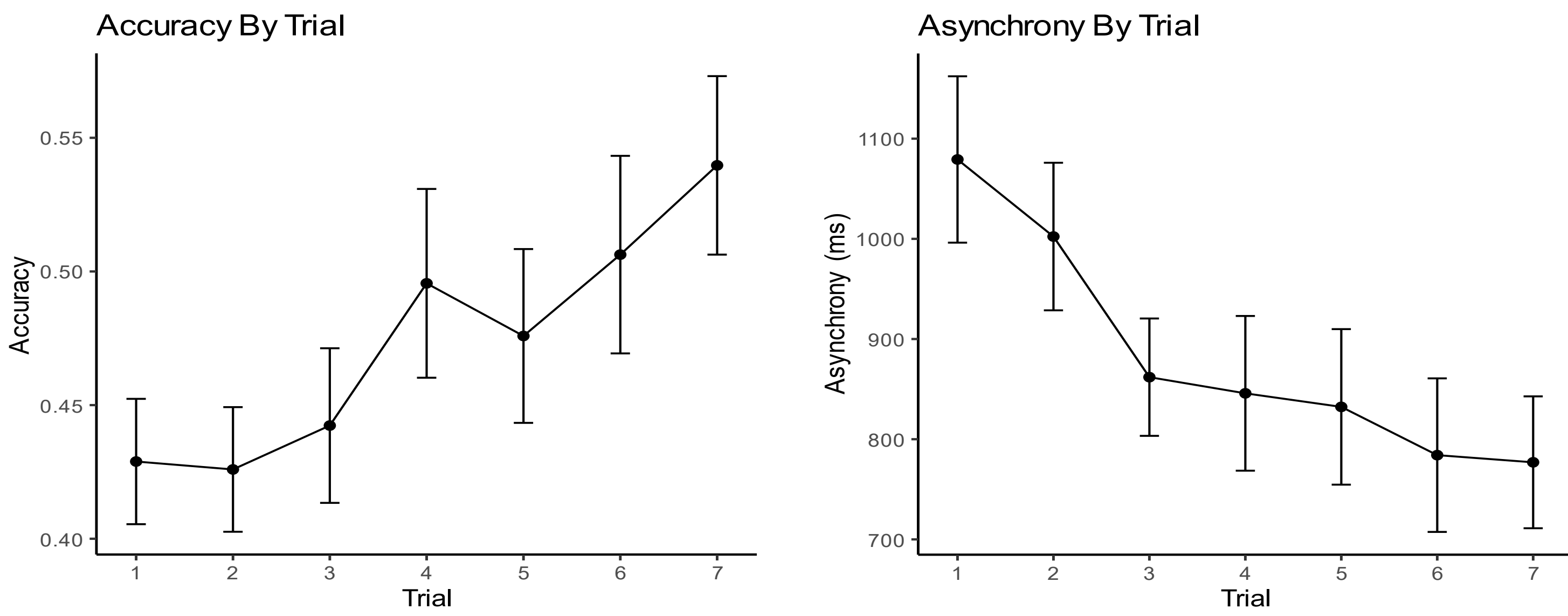


Listen Play

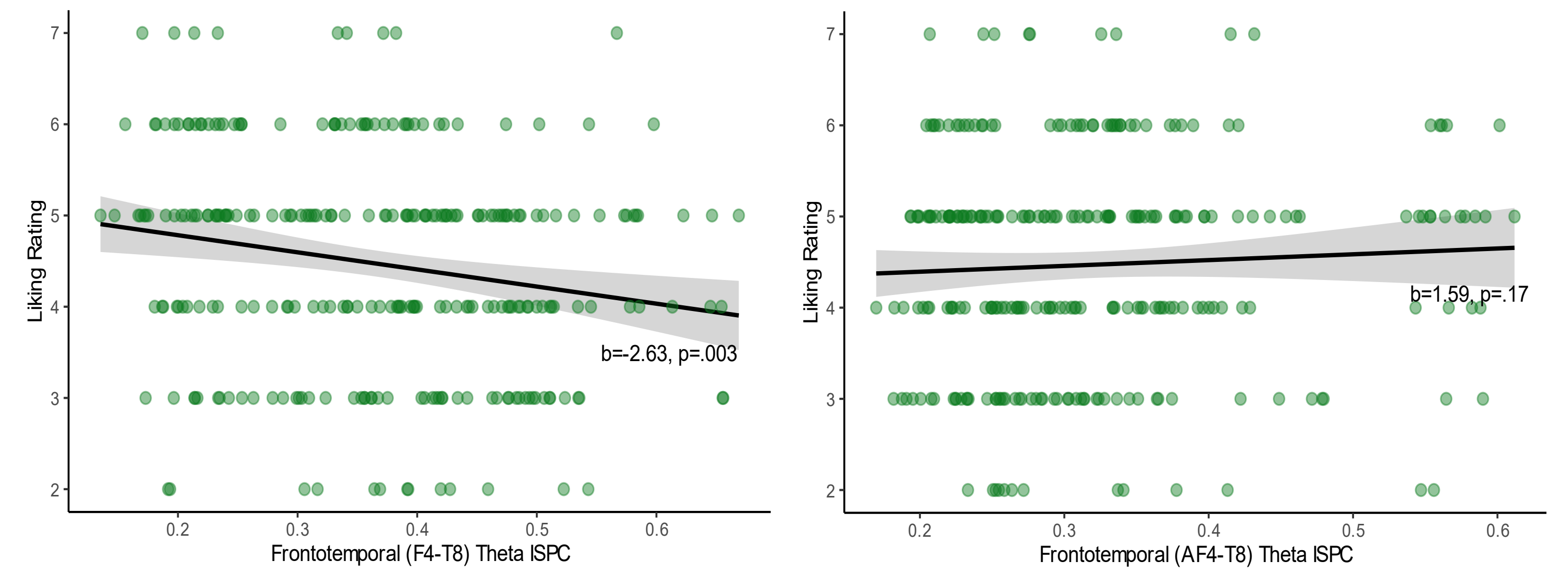


RESULTS

Motor Learning

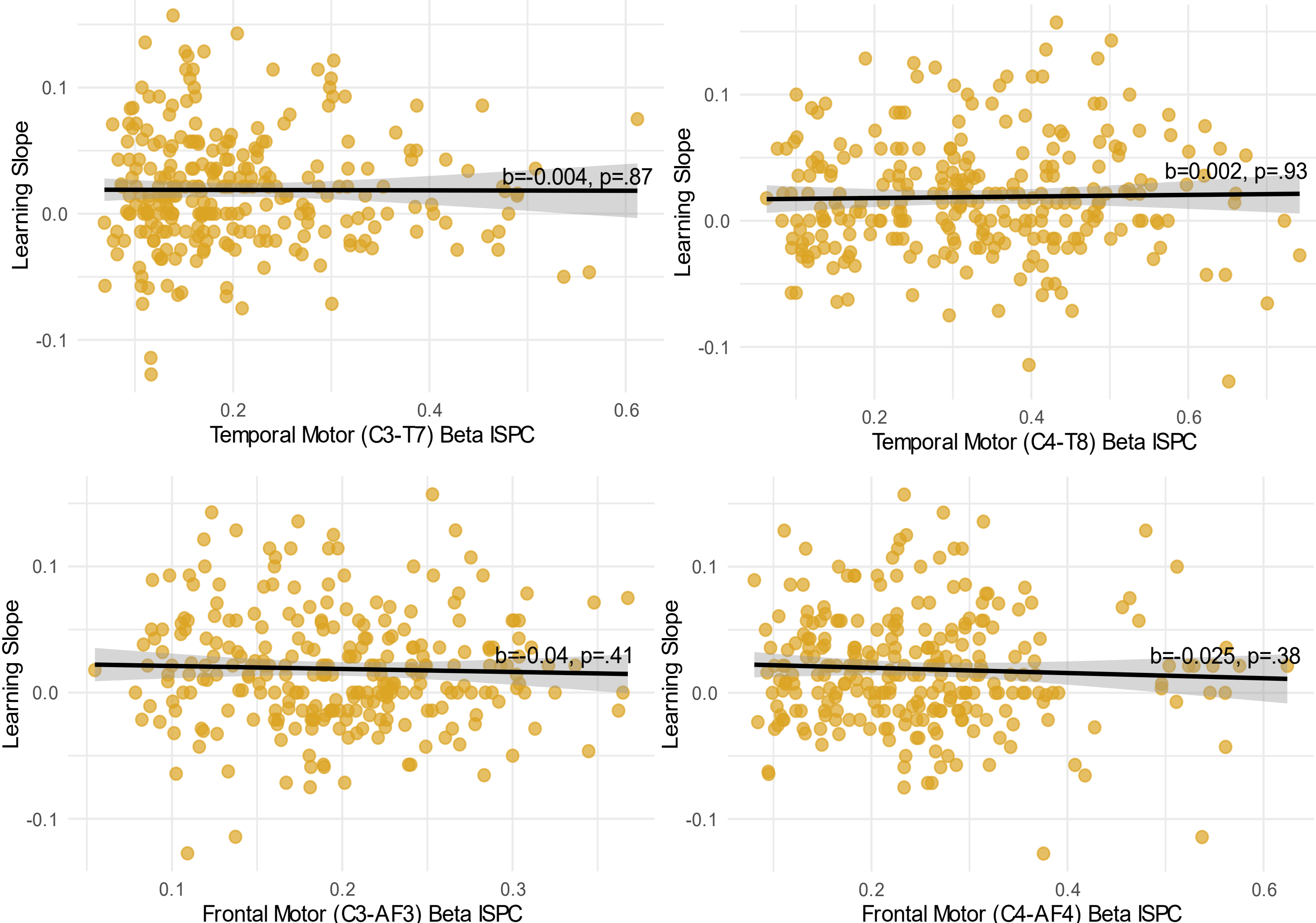


Effects of Right **Theta** Synchronization on Liking

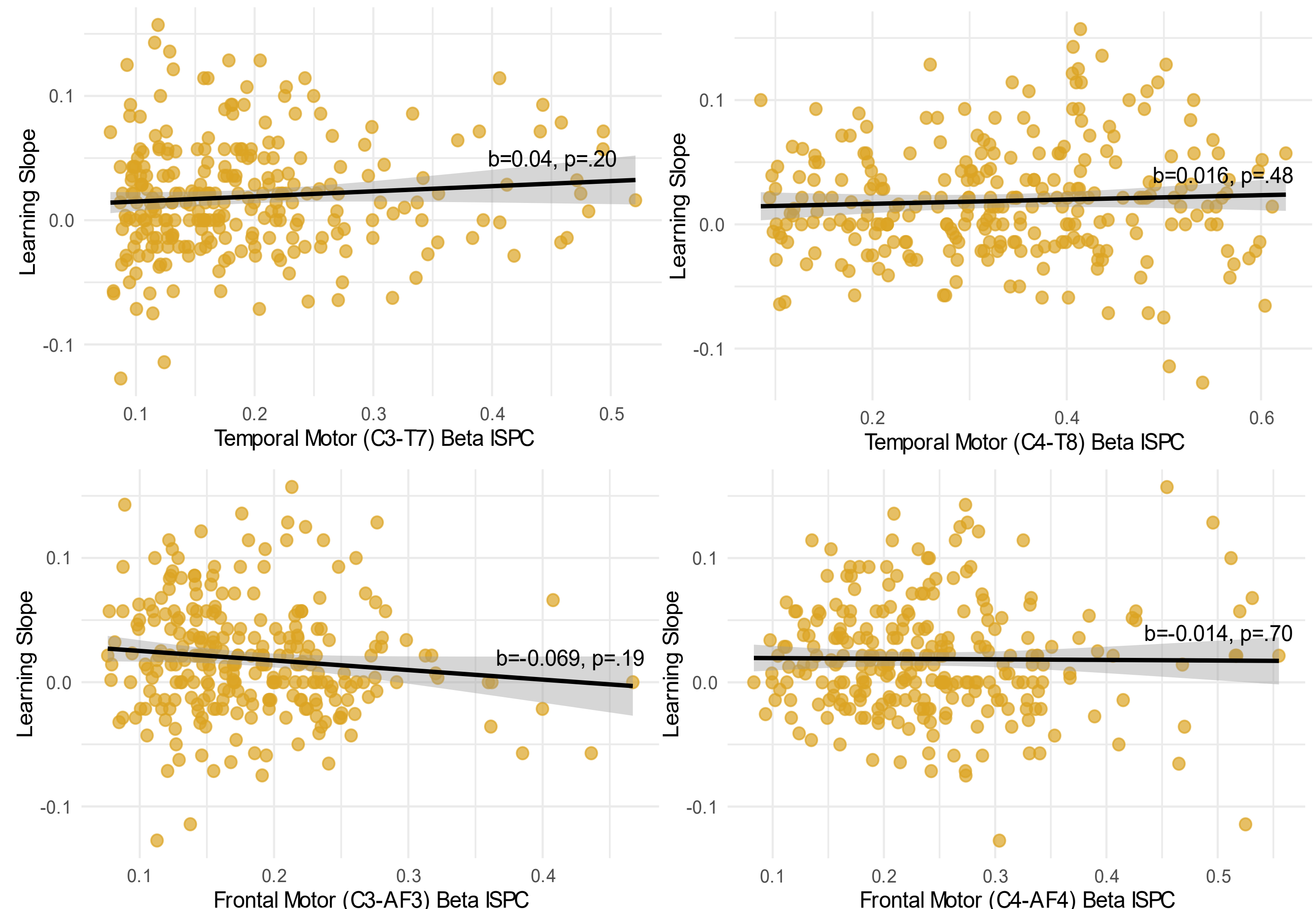


Effects of **Beta** Synchronization on Piano Learning (Accuracy Slope Across Trials)

Listen Preview



Listen Play



REFERENCES:

- ¹Vuust et al. (2022) Music in the brain
²Buzsáki & Draguhn (2004). Neuronal oscillations in cortical networks
³Ara & Marco-Pallares (2020). Fronto-temporal theta phase-synchronization underlies music-evoked pleasantness
⁴Bianco et al. (2019). Music predictability and liking enhance pupil dilation and promote motor learning in non-musicians
⁵Stegemöller et al. (2018). The influence of moving with music on motor cortical activity