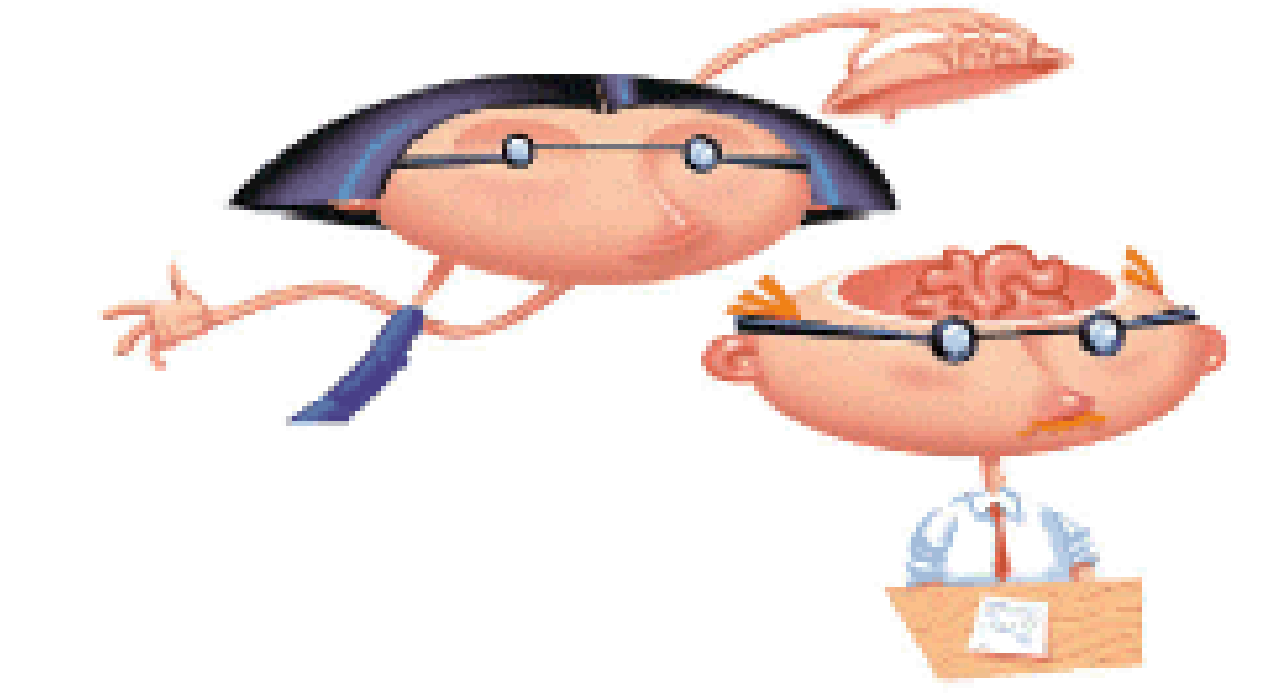


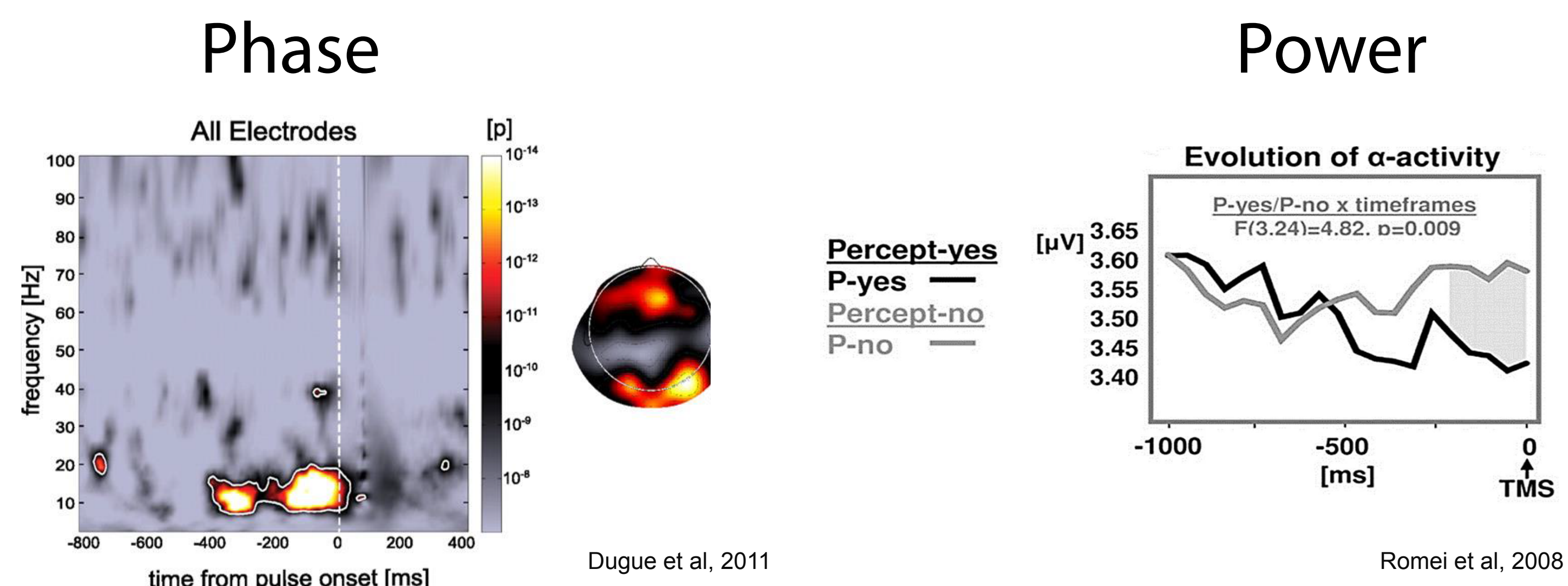
Exploring the neural dynamics of occipital and parietal phosphenes with combined TMS-EEG

Jason Samaha¹, Olivia Gosseries², Bradley R. Postle^{1, 2}
¹Department of Psychology, ²Department of Psychiatry, University of Wisconsin-Madison



Introduction

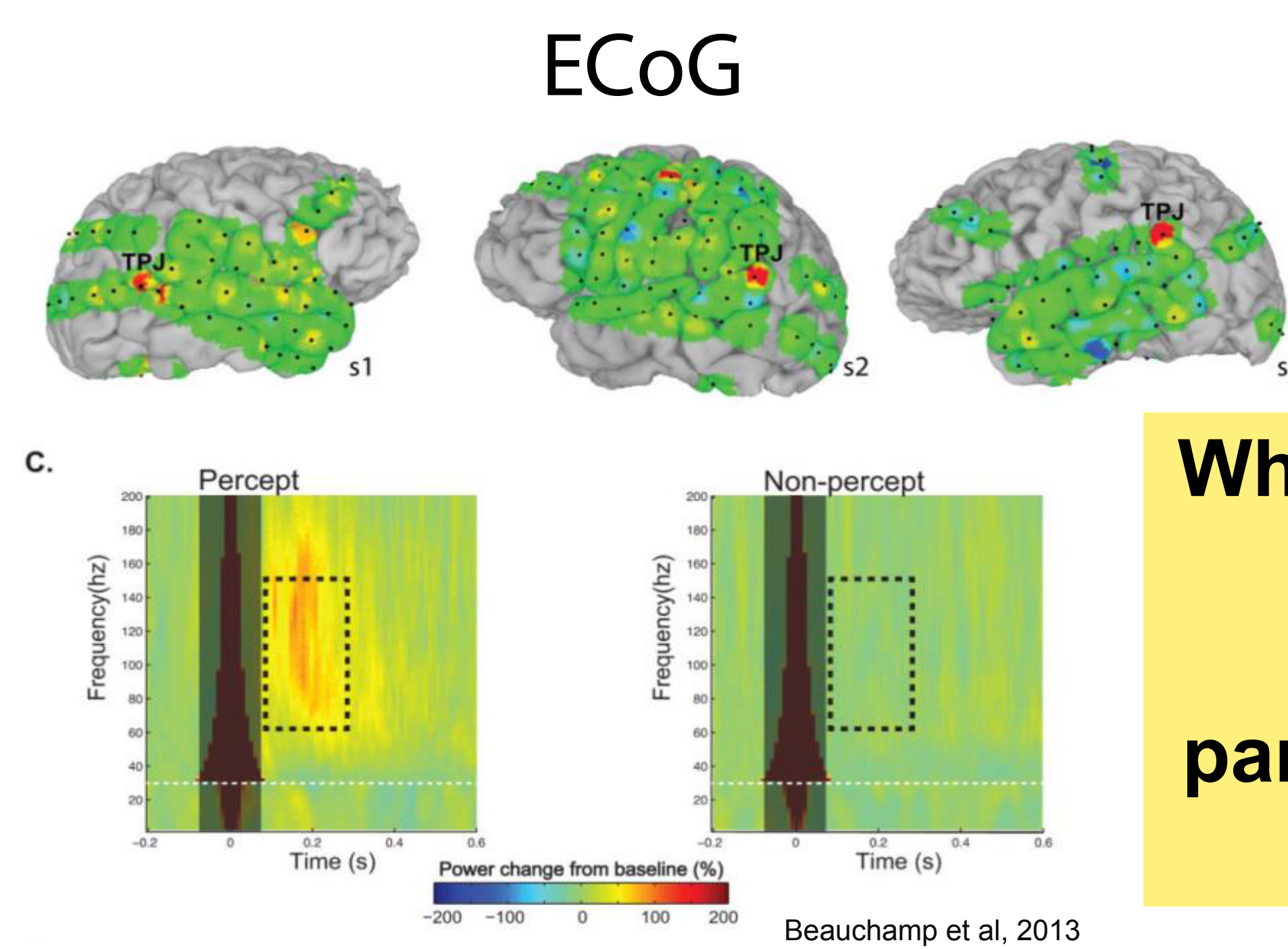
Previous research suggests that pre-stimulus alpha band phase and power are predictive of whether near-threshold occipital TMS will result in a conscious phosphenes.



Recently, several groups have reported phosphenes arising from posterior parietal cortex stimulation.

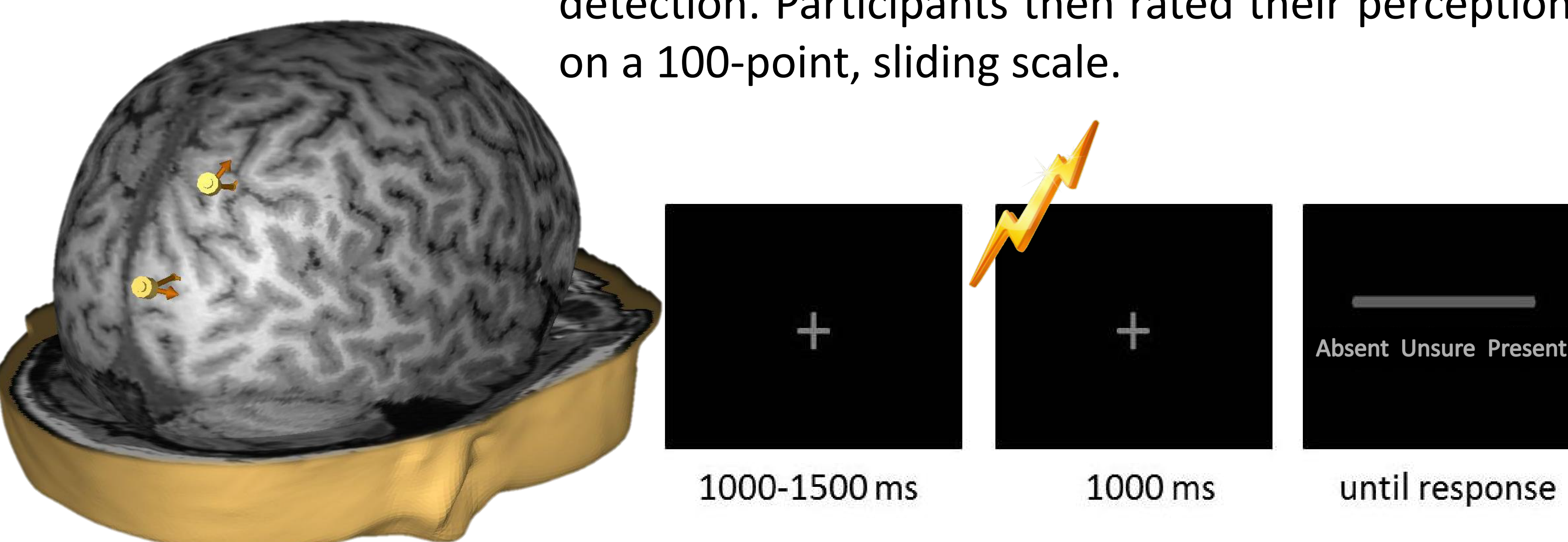
Do alpha-band dynamics relate to cortical excitability beyond early visual cortex?

Using near-threshold stimulation also provides a contrast for studying the neural correlates of consciousness under matched stimulation conditions.

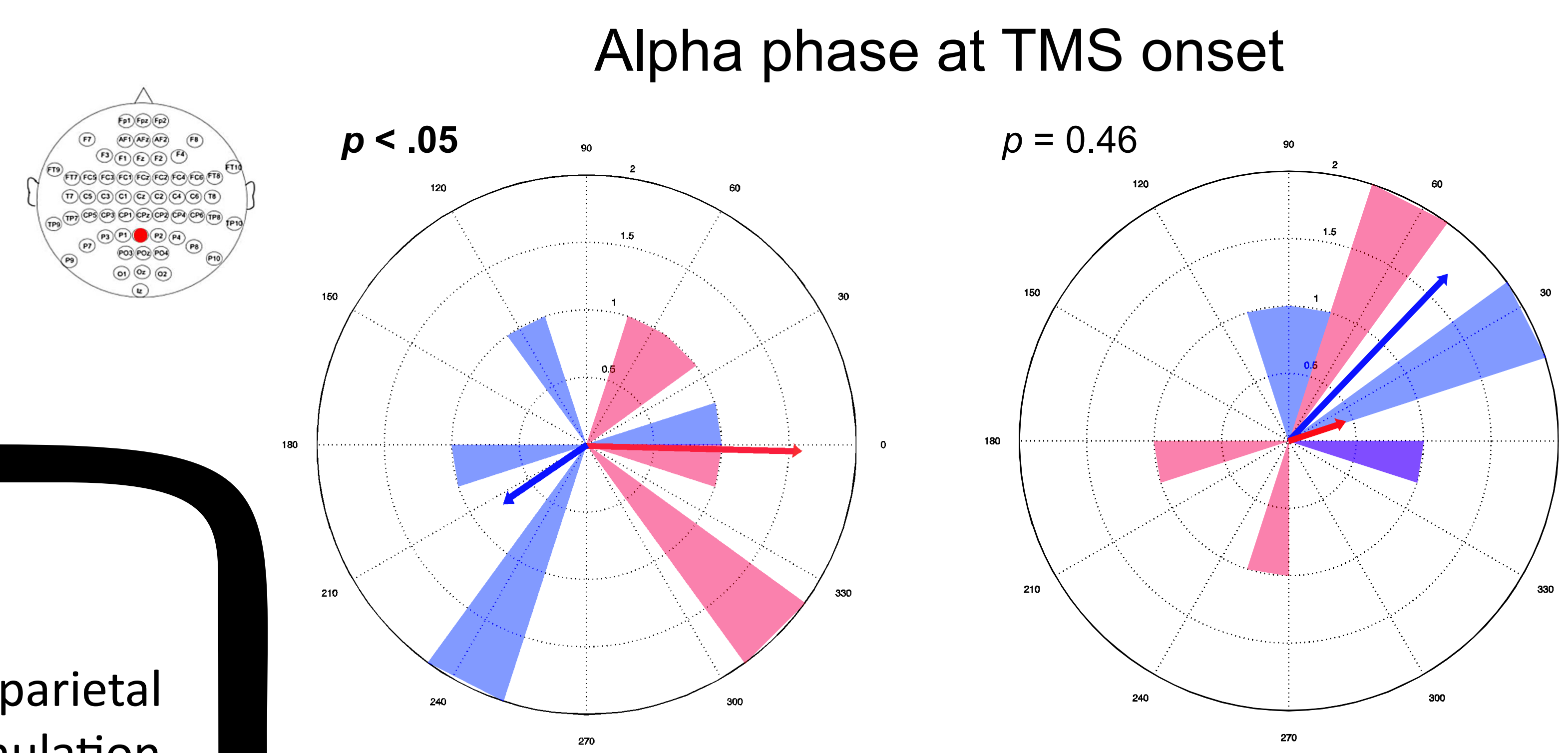
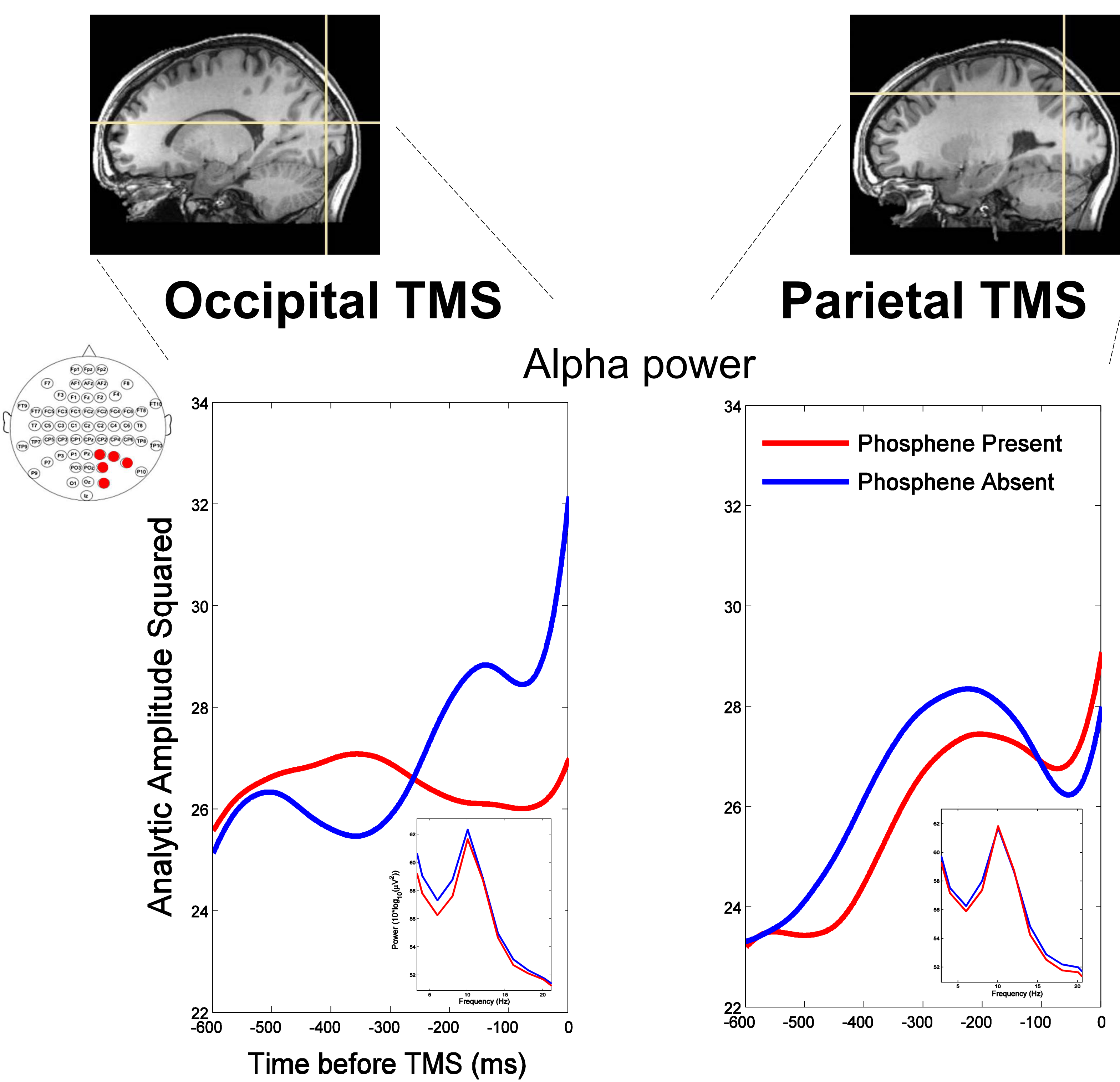


Task and Methods

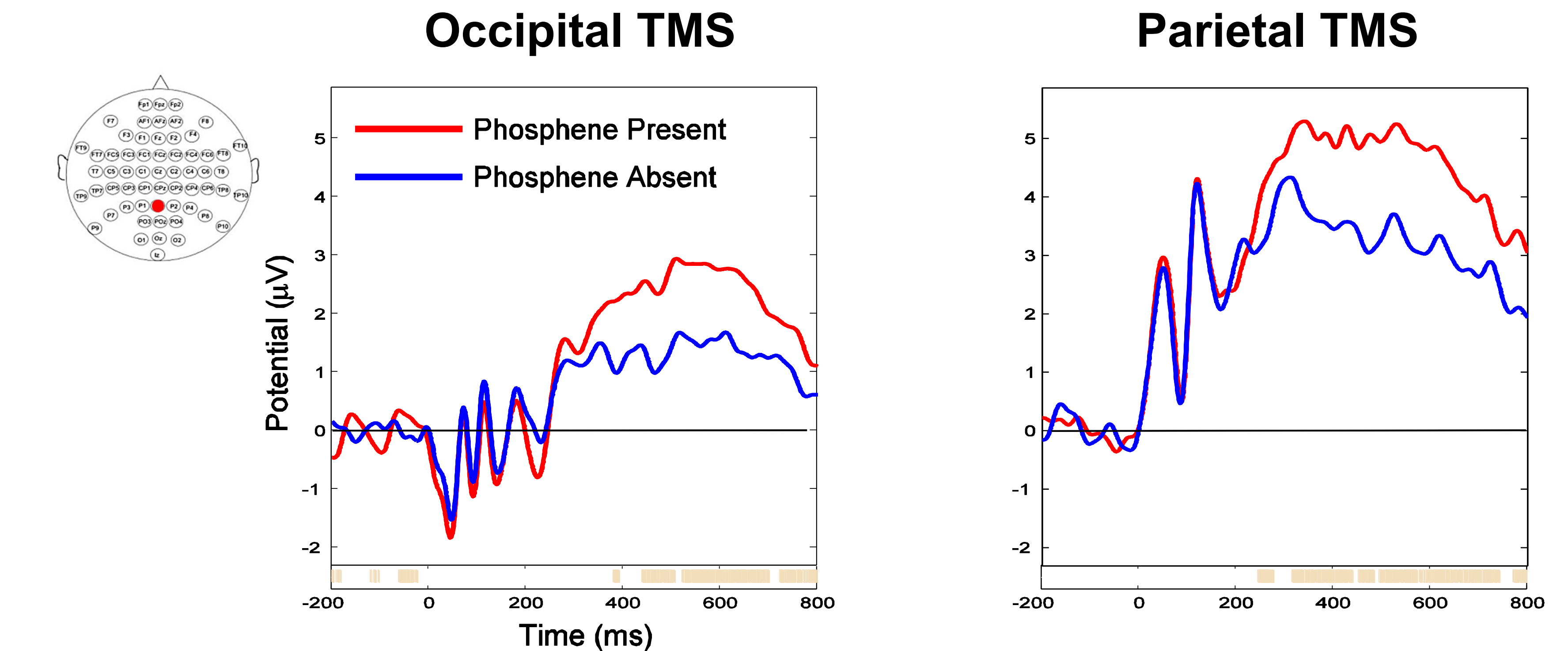
Participants (n=5) performed counterbalanced blocks of occipital and parietal TMS (400 trials each) while EEG from 60 channels was recorded. Stimulation intensity was individually thresholded to approximately 50% phosphenes detection. Participants then rated their perception on a 100-point, sliding scale.



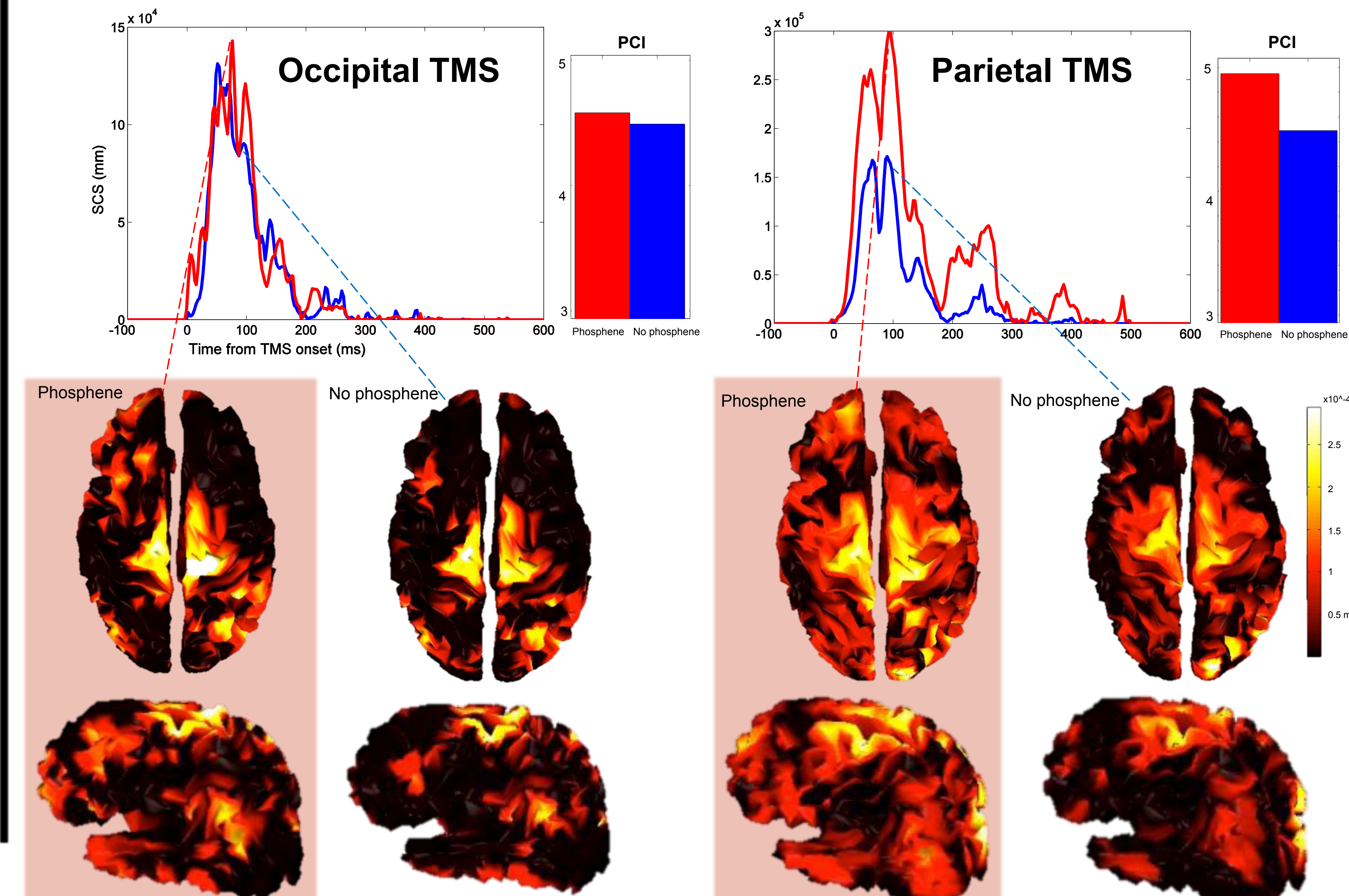
Results: Pre-stimulus Awareness Dynamics



Post-stimulus Awareness Dynamics



Source Connectivity $n = 1$
Significant current scatter (Casali et al. 2010)
Perturbational complexity index (Casali & Gosseries et al. 2013)



Conclusions

Preliminary results suggest that alpha dynamics related to cortical excitability may not extend to parietal cortex.

Scalp ERPs indicate relatively late (>300ms) activity related to phosphenes awareness, whereas source connectivity measures reveal early differences in the propagation of the TMS-evoked response related to awareness, in line with the timing of ECoG findings.

The perturbational complexity index quantifies connectivity and complexity in TMS-evoked responses and has been shown to correlate well with clinical gradations of consciousness. Our data suggest that PCI may also discriminate aware from unaware perceptual states

References
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