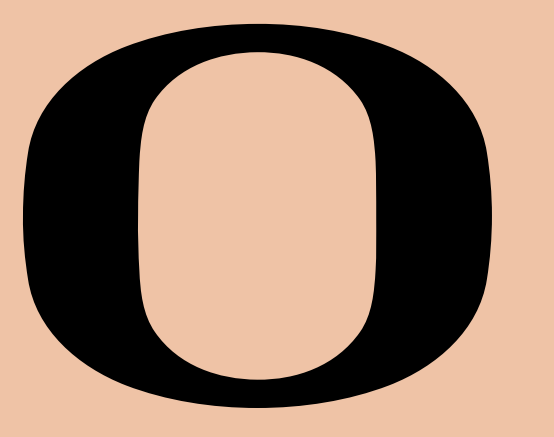




Brain oscillations may represent a continuum from healthy to impaired movement speed

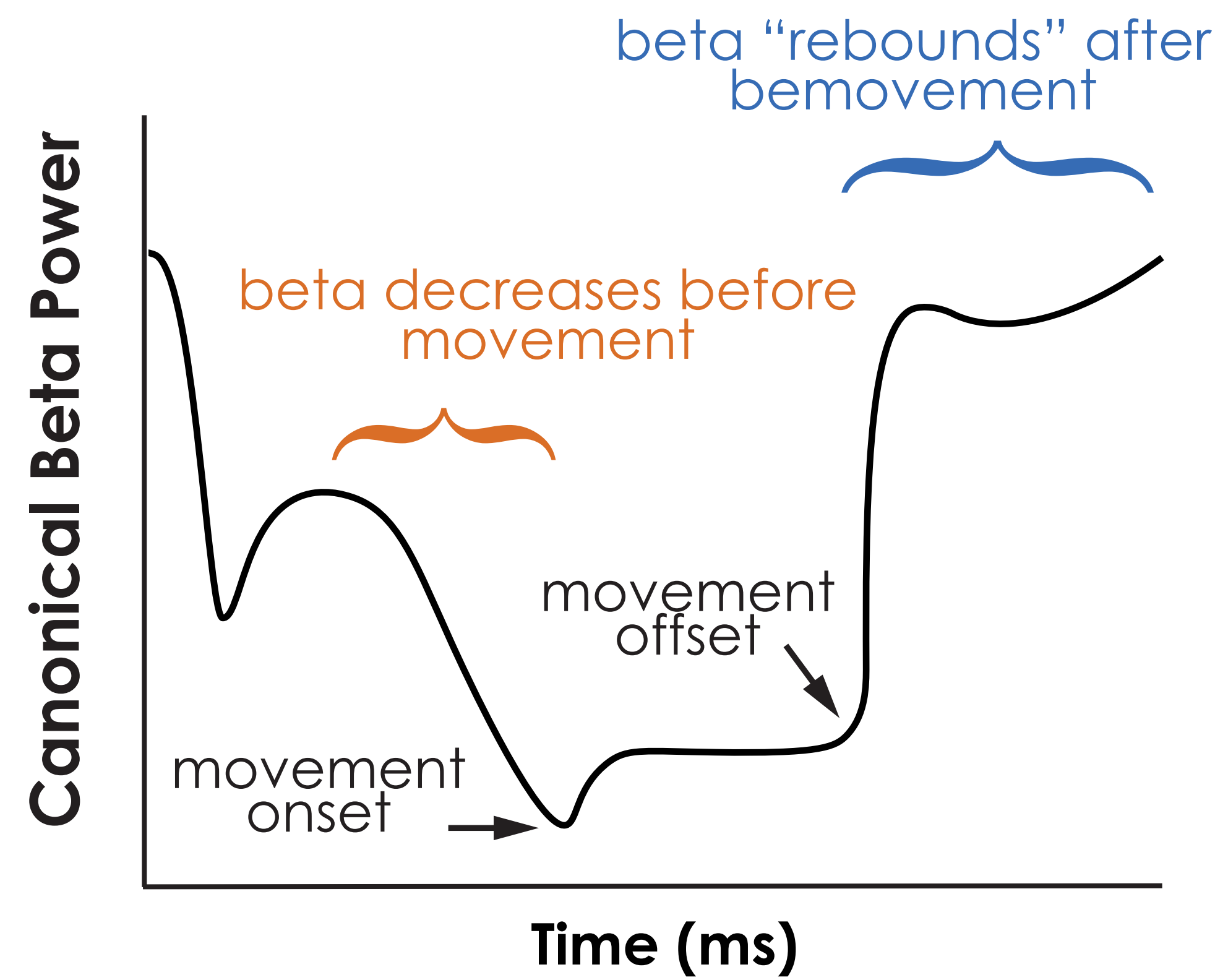


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Introduction: brain waves and movement

brain waves in the "beta band" fluctuate at 13-30 cycles per second (Hz) over the sensorimotor cortex throughout movement.

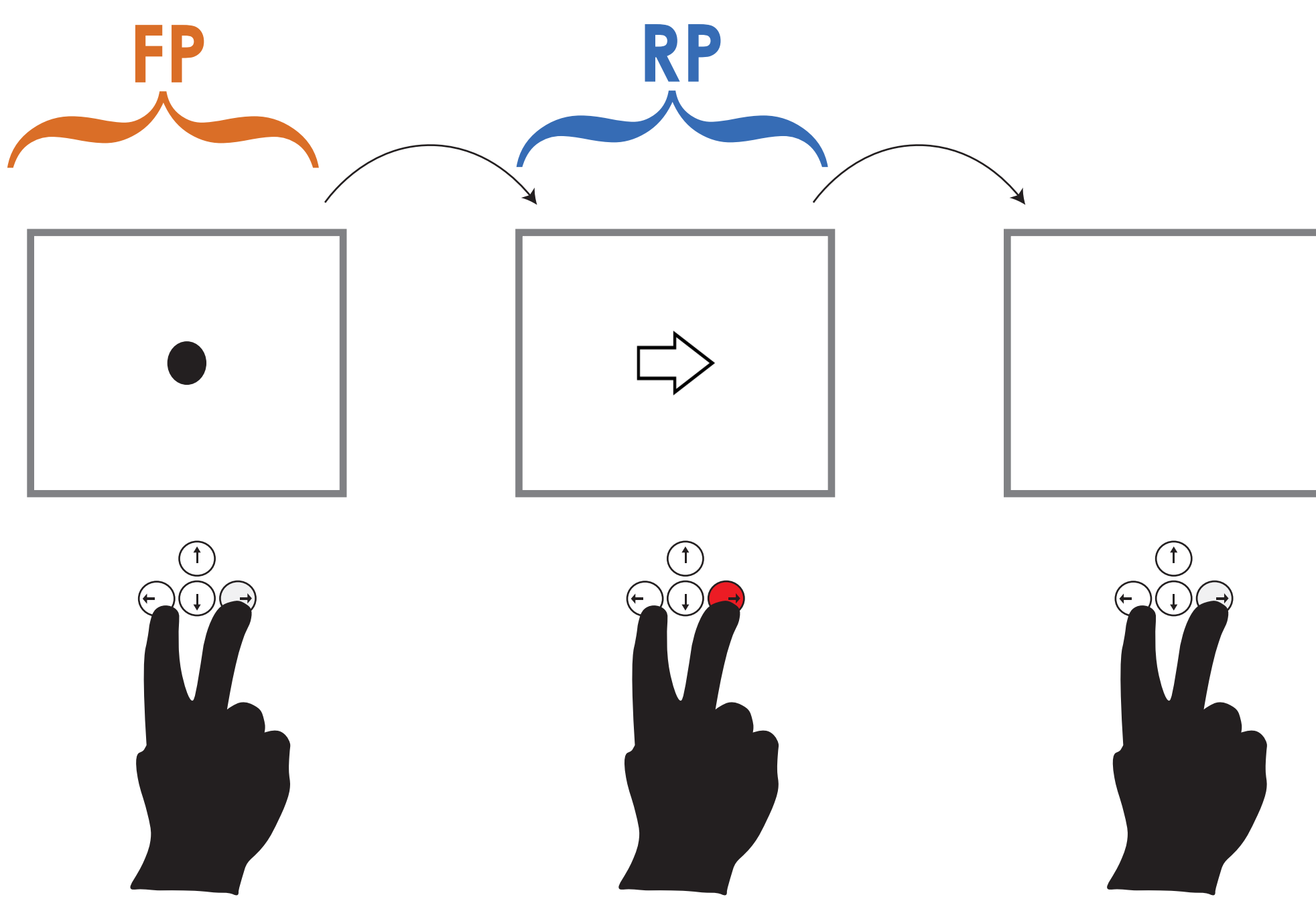


Parkinson's Disease patients have
(1) characteristically slowed movement
and
(2) elevated beta band synchrony in thalamo-cortical-basal ganglia networks.²

Question: How is beta power modulated by movement speed in healthy participants?

Hypothesis: the magnitude of beta power modulation will be reduced in slow blocks

Methods and task: manipulating movement speed

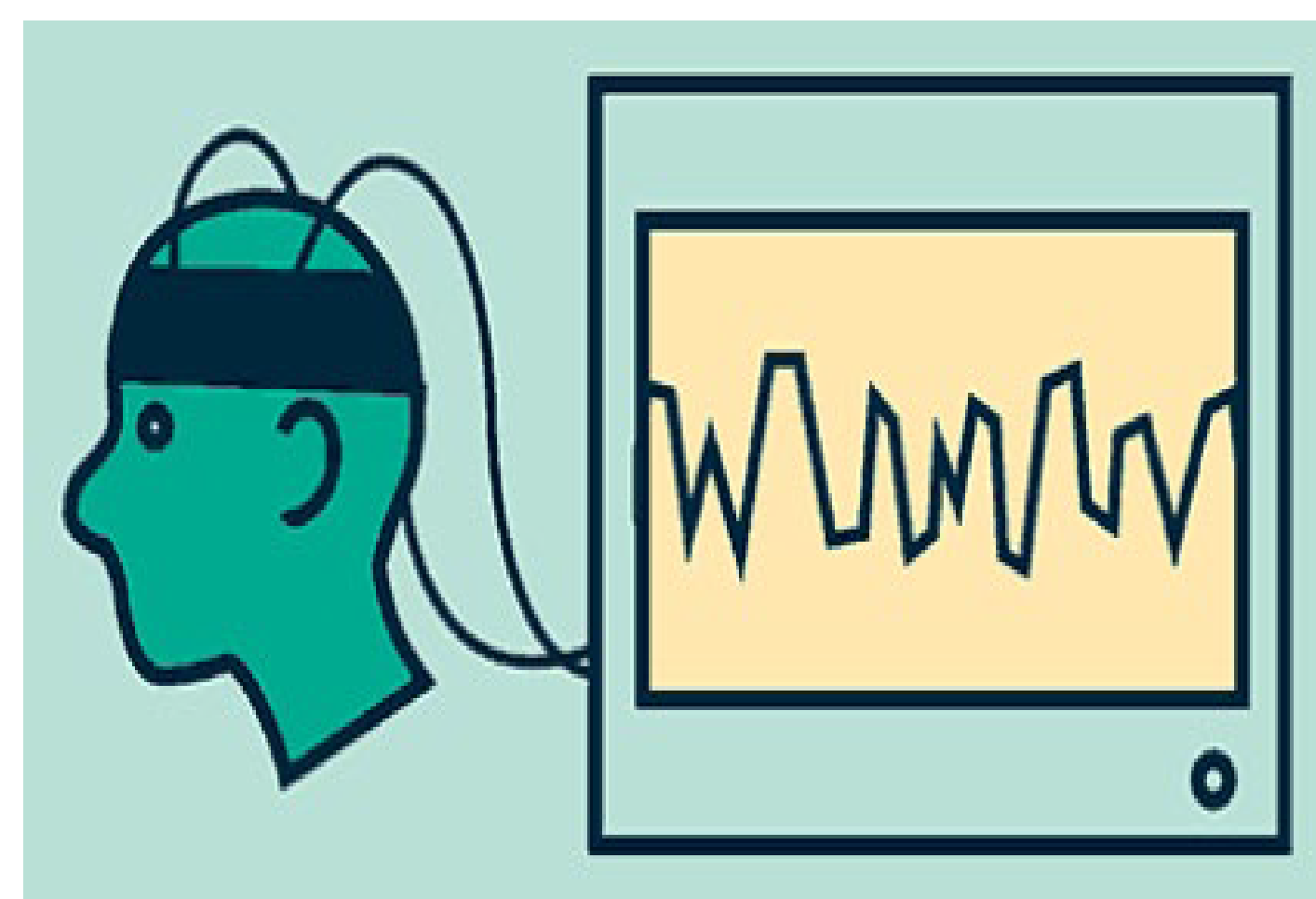
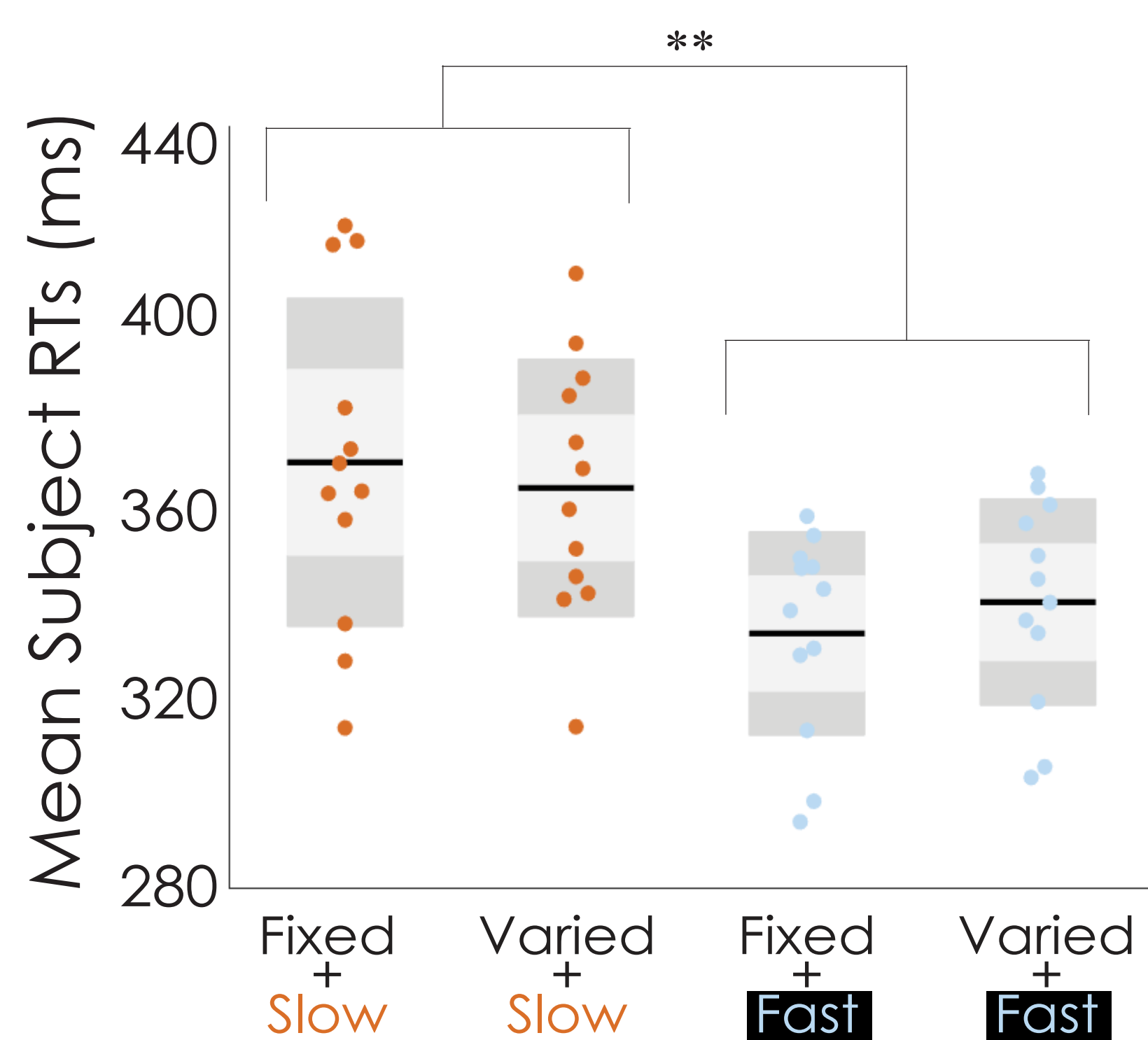


Response Period (RP): time window to press arrow

longer RP = slow block
shorter RP = fast block

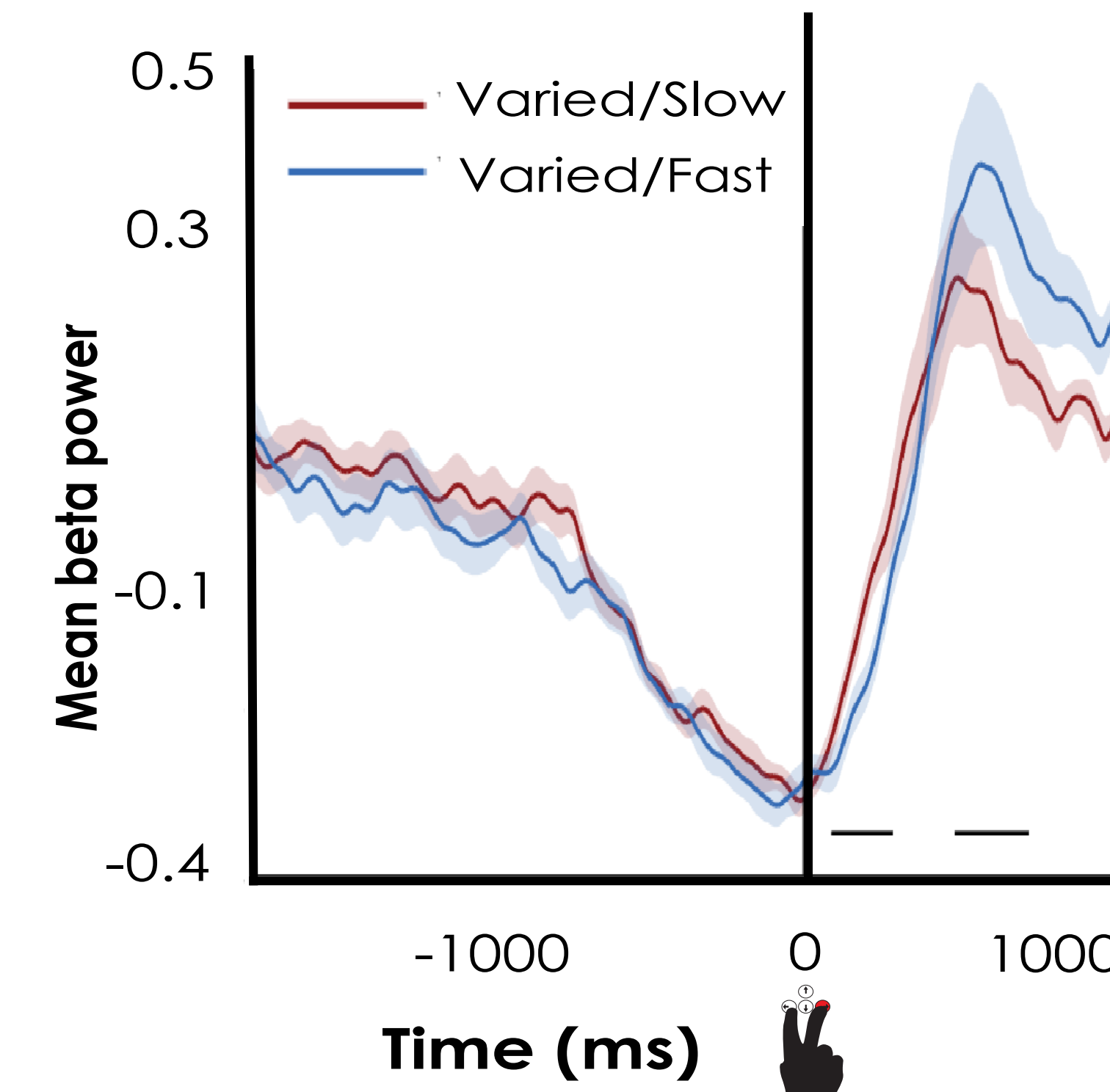
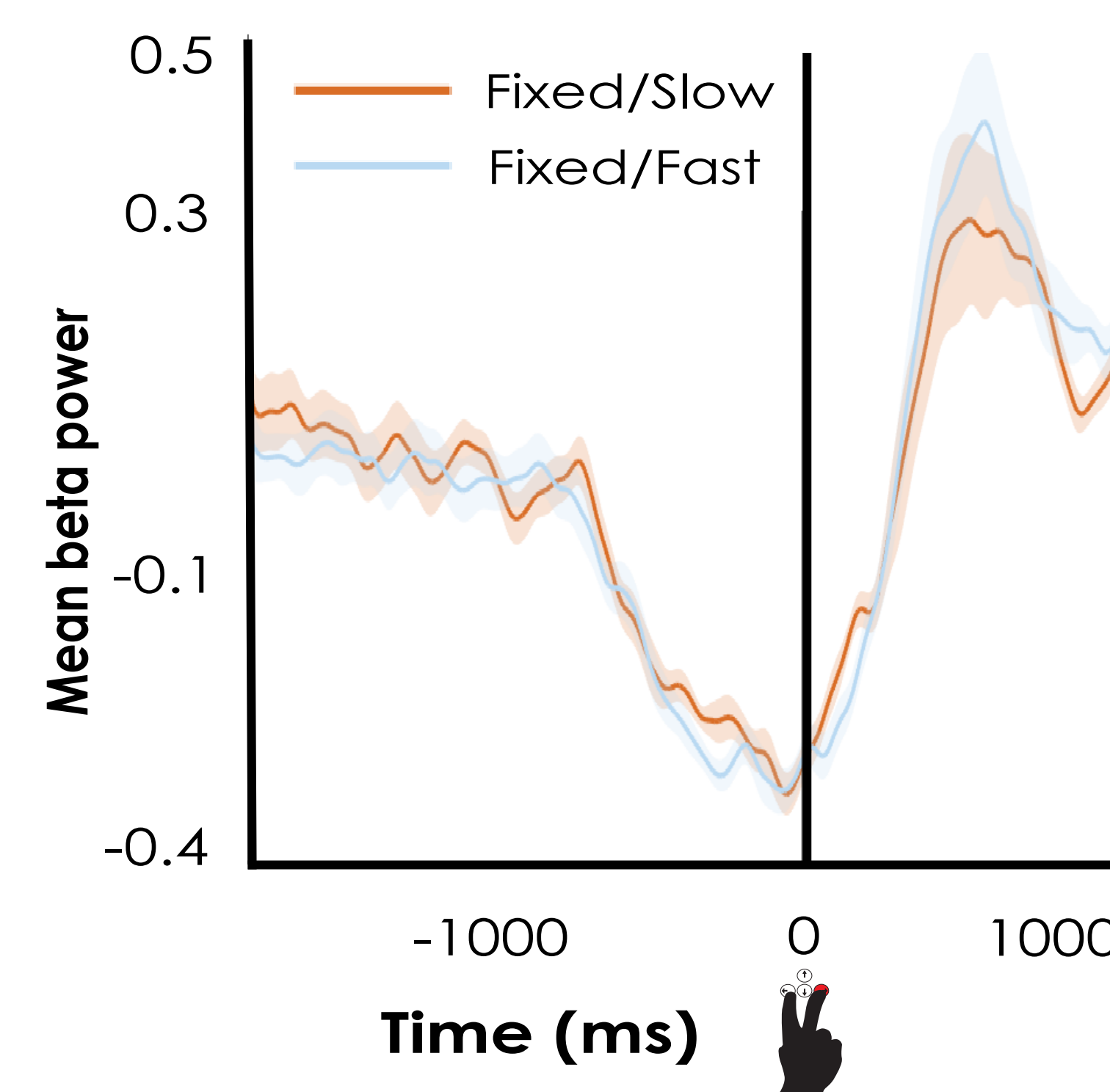
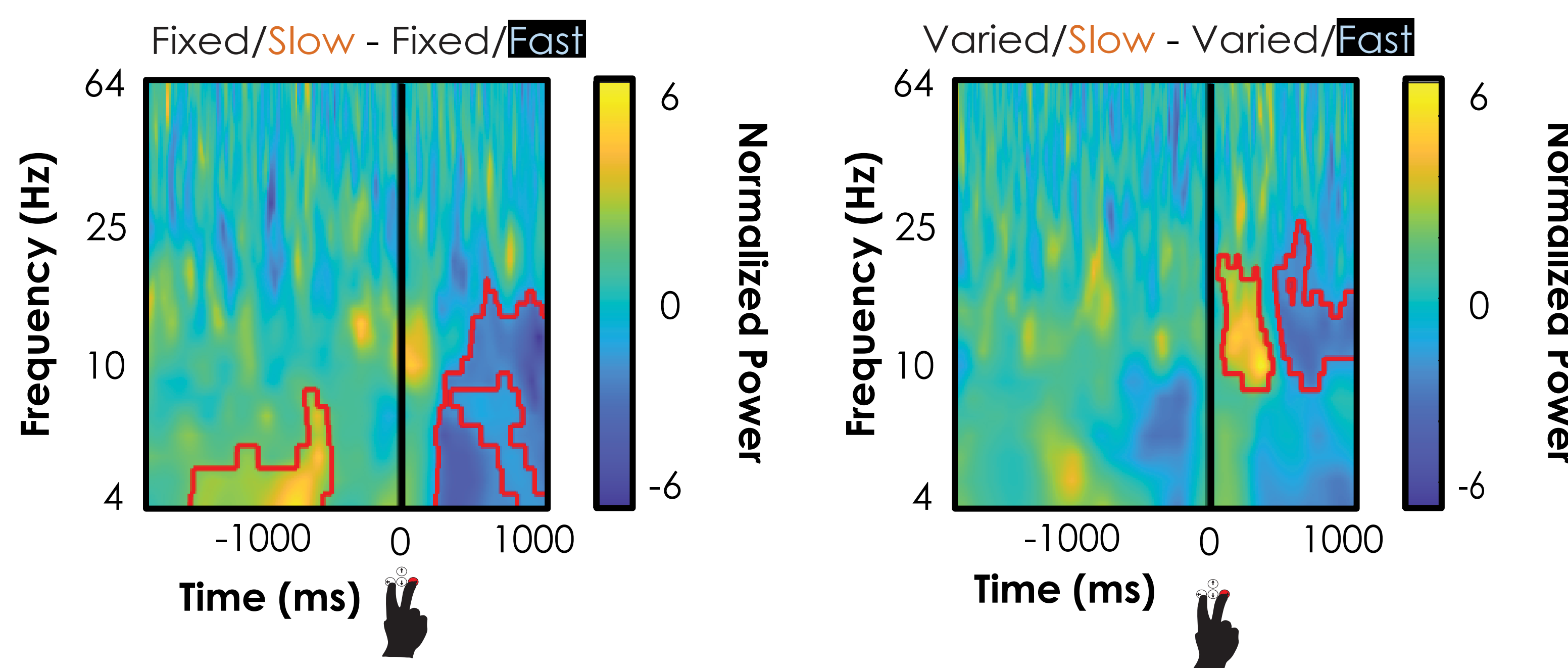
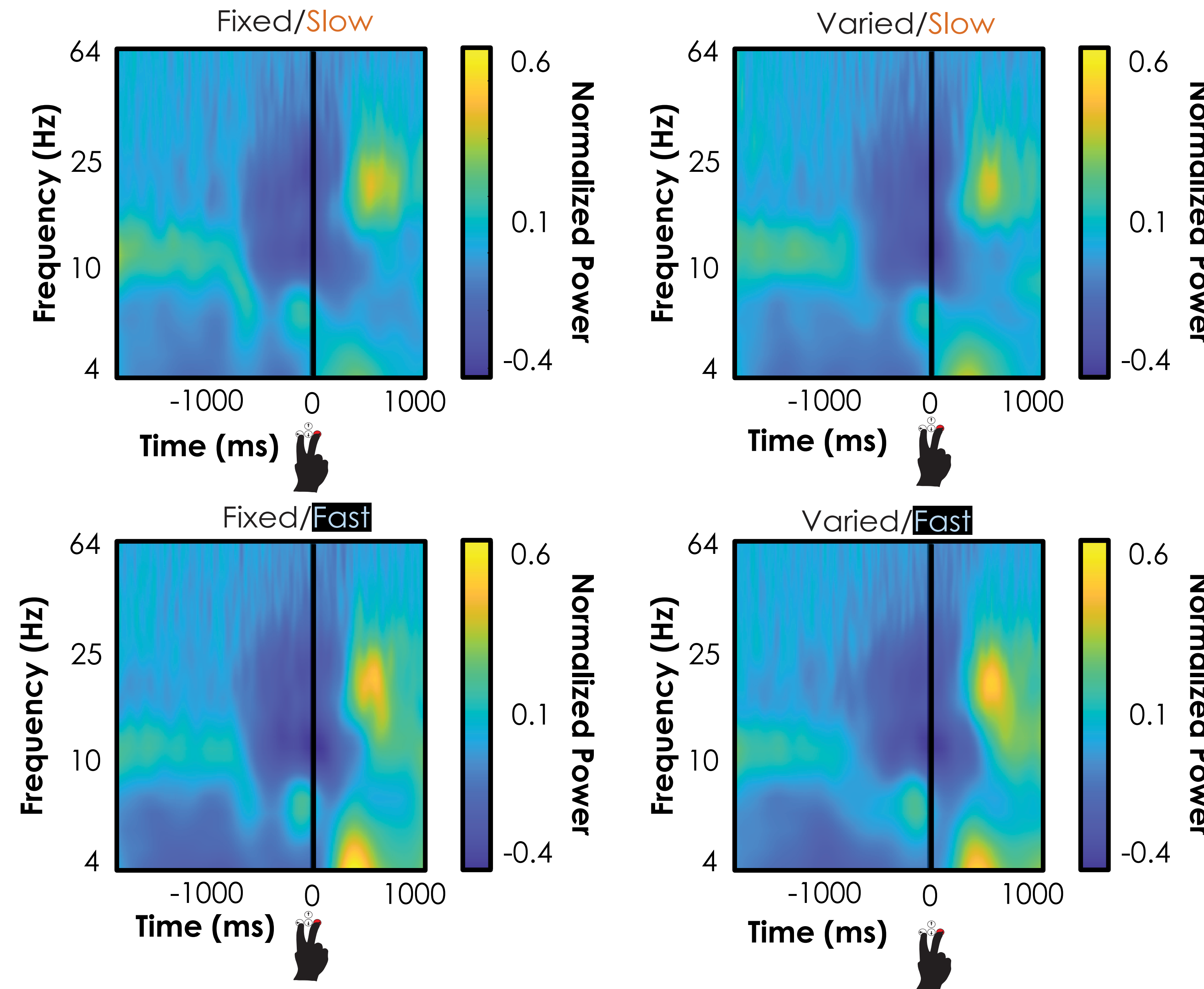
Fore Period (FP): time window before movement

consistent FP = fixed block
changing FP = varied block

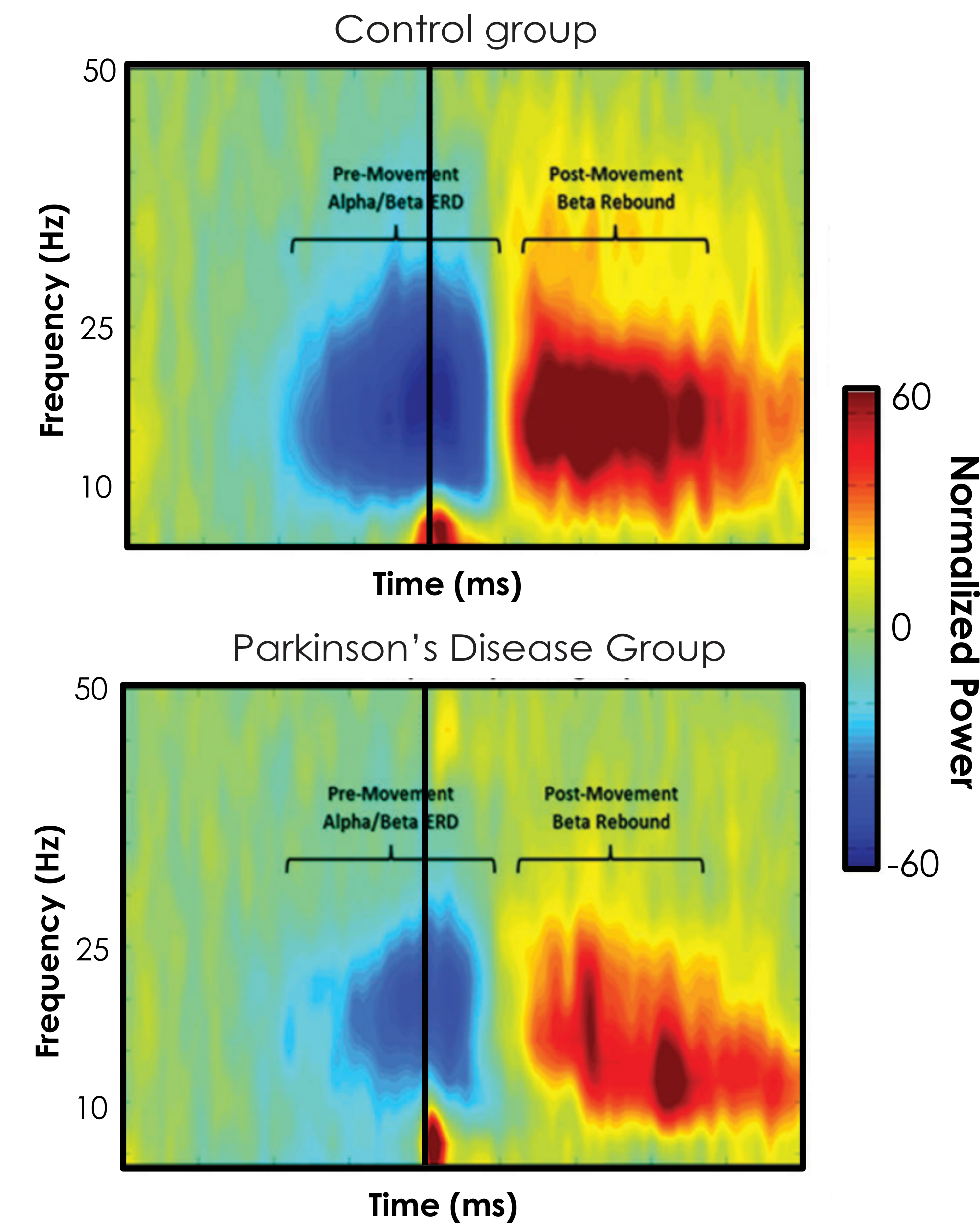


electroencephalography (EEG) recorded electrical brain activity

Results: The beta rebound was reduced in slow blocks



Discussion: we saw Parkinson's Disease like beta activity



reduced beta rebound seen in Parkinson's Disease³ is analogous to our slow blocks

suggests subjects were in a "slowed movement state" due to relaxed task restraints

References and Acknowledgments

1. Pfurtscheller et. al., *Electroencephalogr. Clin. Neurophysiol.* (1981). 2. Kilavik, et. al., *Exp. Neurol.* (2013). 3. Heinrichs-Graham, et al., *Cerebral Cortex* (2014)

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