Decomposition of EEG reveals a diversity of beta-band responses to a single pulse of TMS
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Background
Single-pulse TMS briefly reinstates multivariate decodability of an unprioritized memory item (UMI) from concurrently measured EEG, localized to the beta-frequency band.¹

Spatially Leave-one-trial-out cross-validation
The time-frequency representation spectrogram for the whole trial timecourse from Experiment MVPA was performed in MATLAB using the EEG An

Advantages of SPACE:
• A signal decomposition application of parallel factor analysis that extracts phase-coupled oscillatory networks
• Identifies neurobiologically plausible rhythms
• Not a source localization method; separates and characterizes signal at the scalp level attributable to discrete coupled oscillators
• Not subject to non-physiological statistical constraints (e.g., orthogonality, maximum variance, statistical independence).
• Provides the strength of the component on each trial (“trial loadings”) for analysis of task modulations

Spatially-distributed PhAsE Coupling Extraction with a Frequency-Specific Phases model²³

Do TMS effects arise from de novo evoked responses or modulation of existing oscillations?
Enhancement with TMS
Suppression with TMS
Are there candidate “TMS Reactivation”-related components?

Are there candidate components related to cue 1 prioritization operations?
Are there candidate components related to cue 2 stay/switch operations?

Conclusion
• SPACE decomposition of EEG data reveals a diverse array of responses to single-pulse TMS and retrocues during a dual-serial retrocue working memory task.
• These results are consistent with the idea that dynamics in the beta band accompany transitions between activation states in working memory and support the ability of TMS to reactivate UMIs through diverse responses in those dynamics.
• These results comprise a promising first step towards understanding the neurophysiology underlying previously-reported findings using multivariate approaches.

References and acknowledgment

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