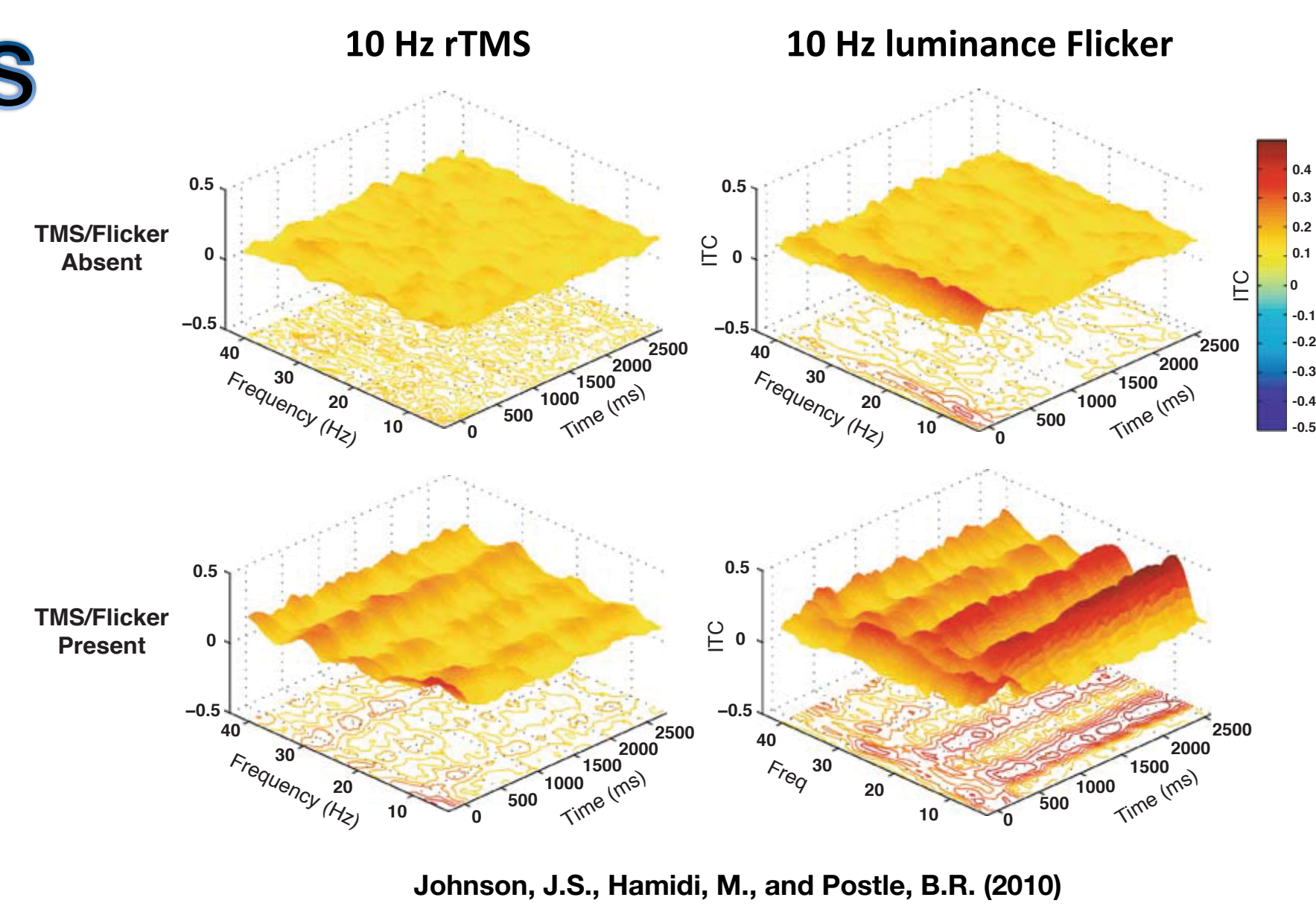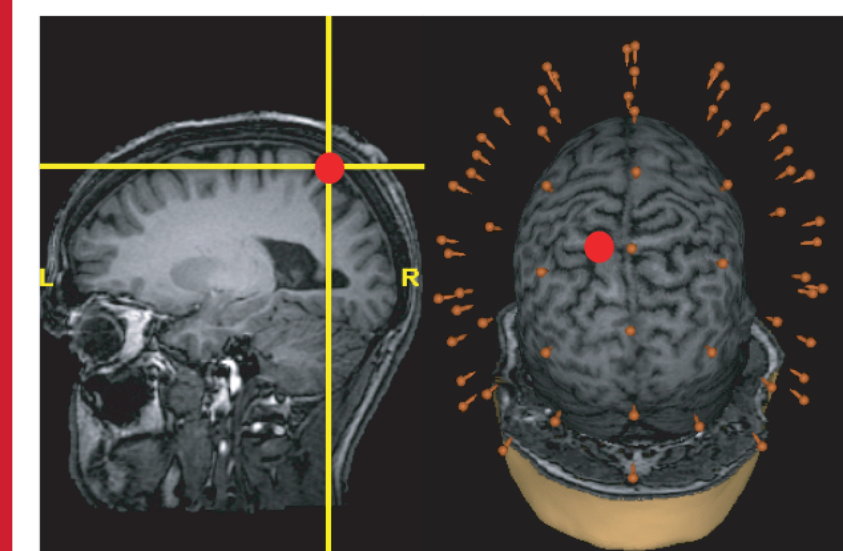# rTMS/EEG of MT+ During STM for Transparent Motion

Andrew D. Sheldon[3,4], Jason Samaha[1], Nathan S. Rose[2], Adam C. Riggall[2], X. Huang[3], Bradley R. Postle[1,2]

Departments of [1]Psychology and [2]Psychiatry, [3]Neuroscience Training Program, [4]Medical Science Training Program, University of Wisconsin-Madison
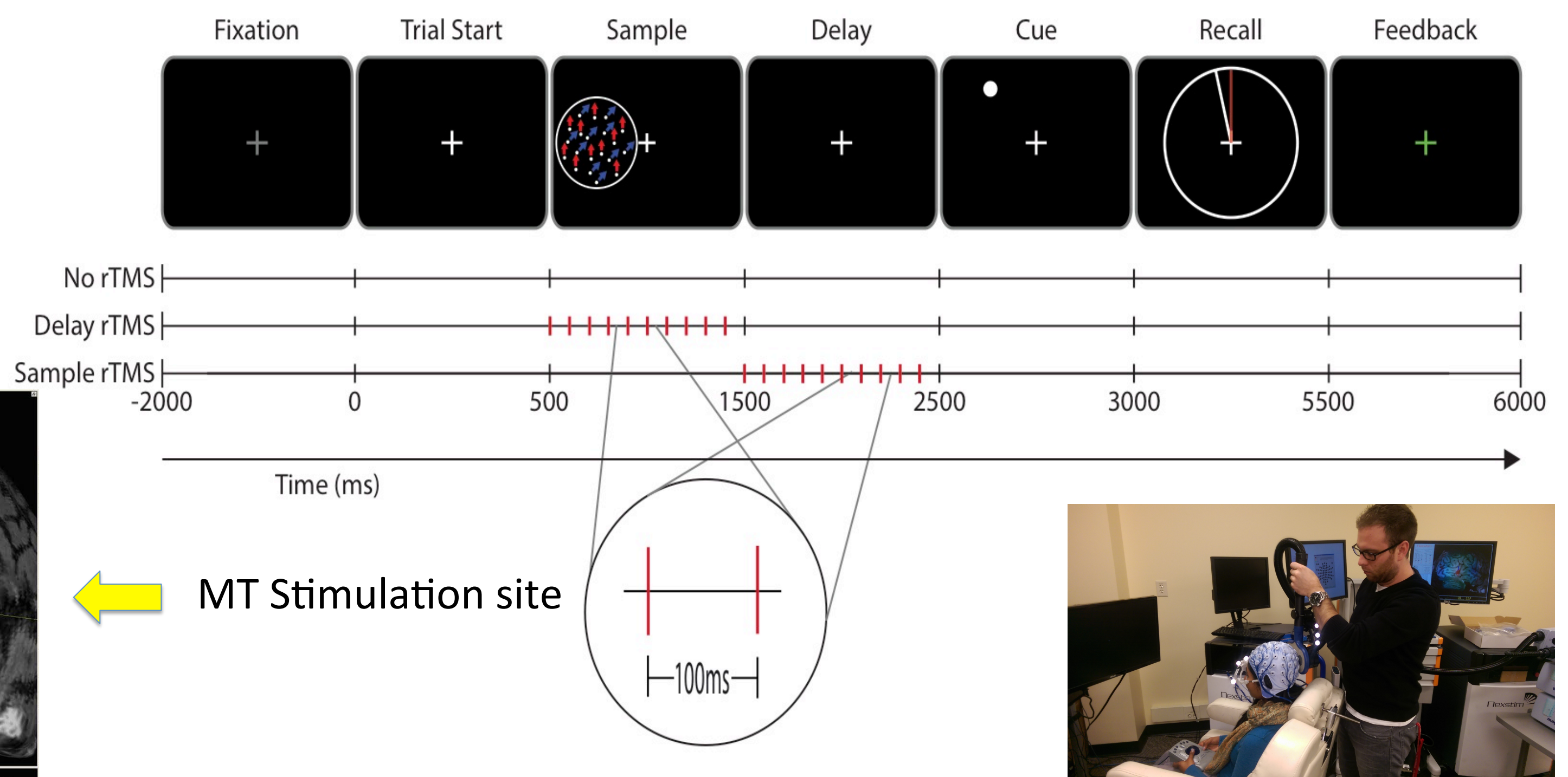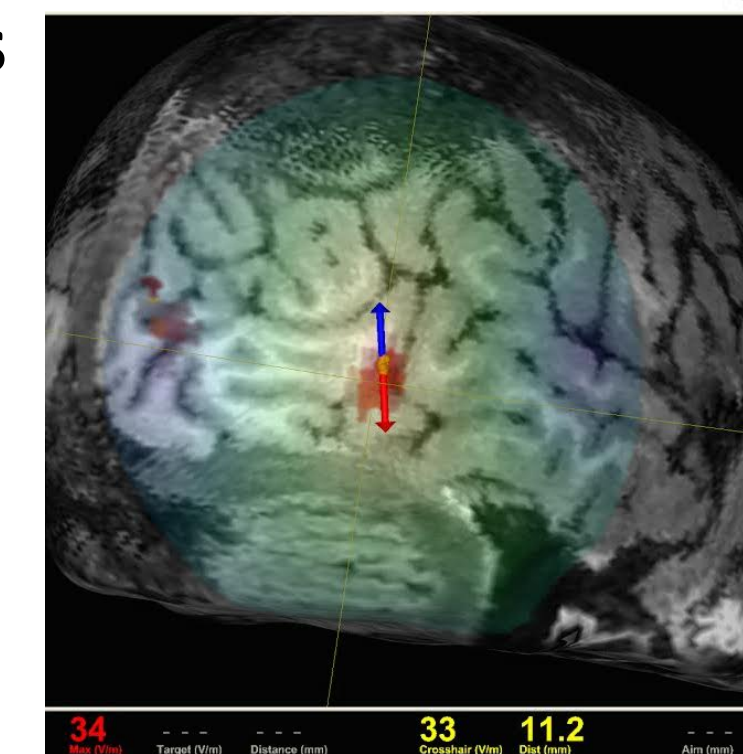
Introduction

How Does rTMS Alter Neural Activity?

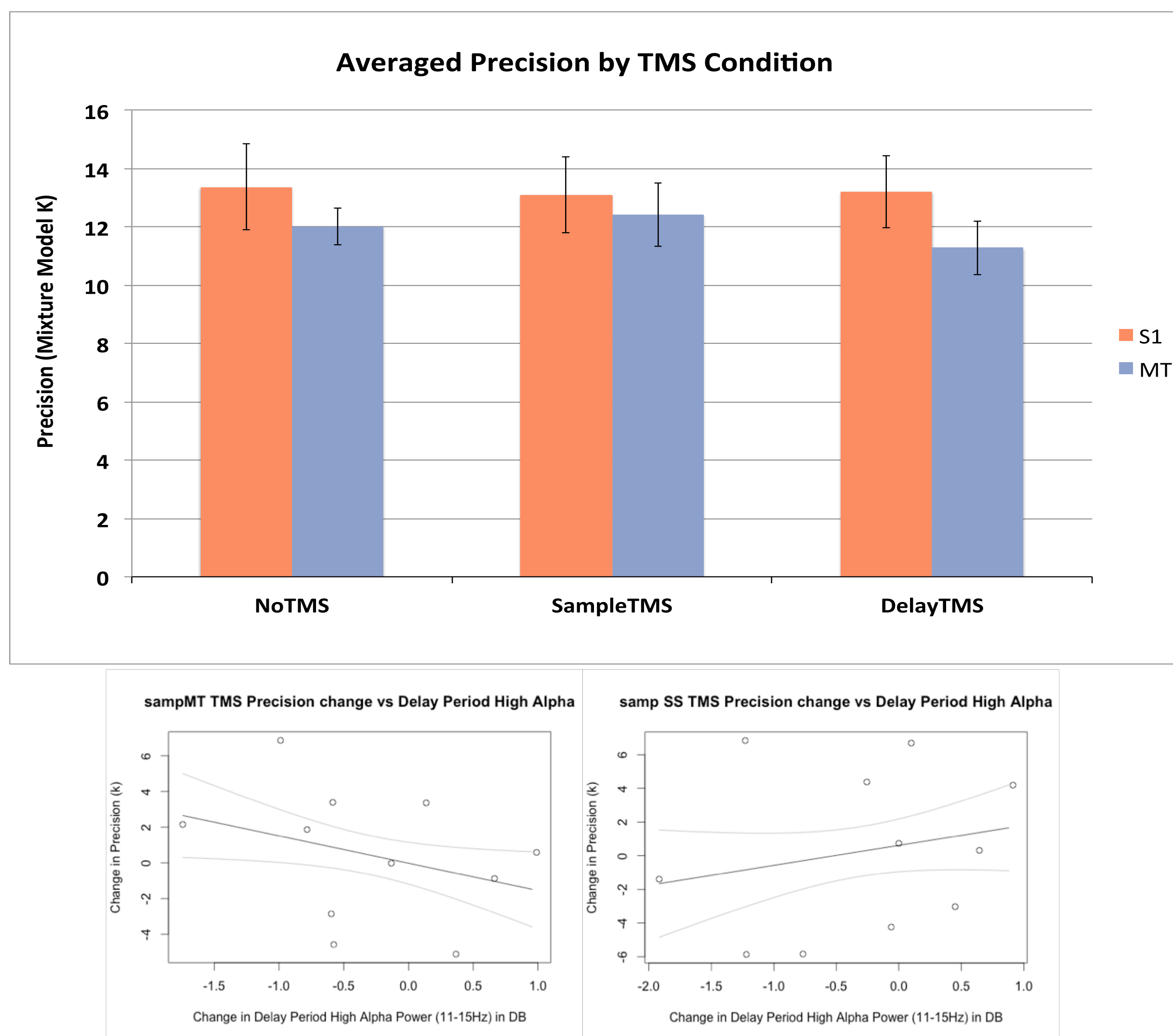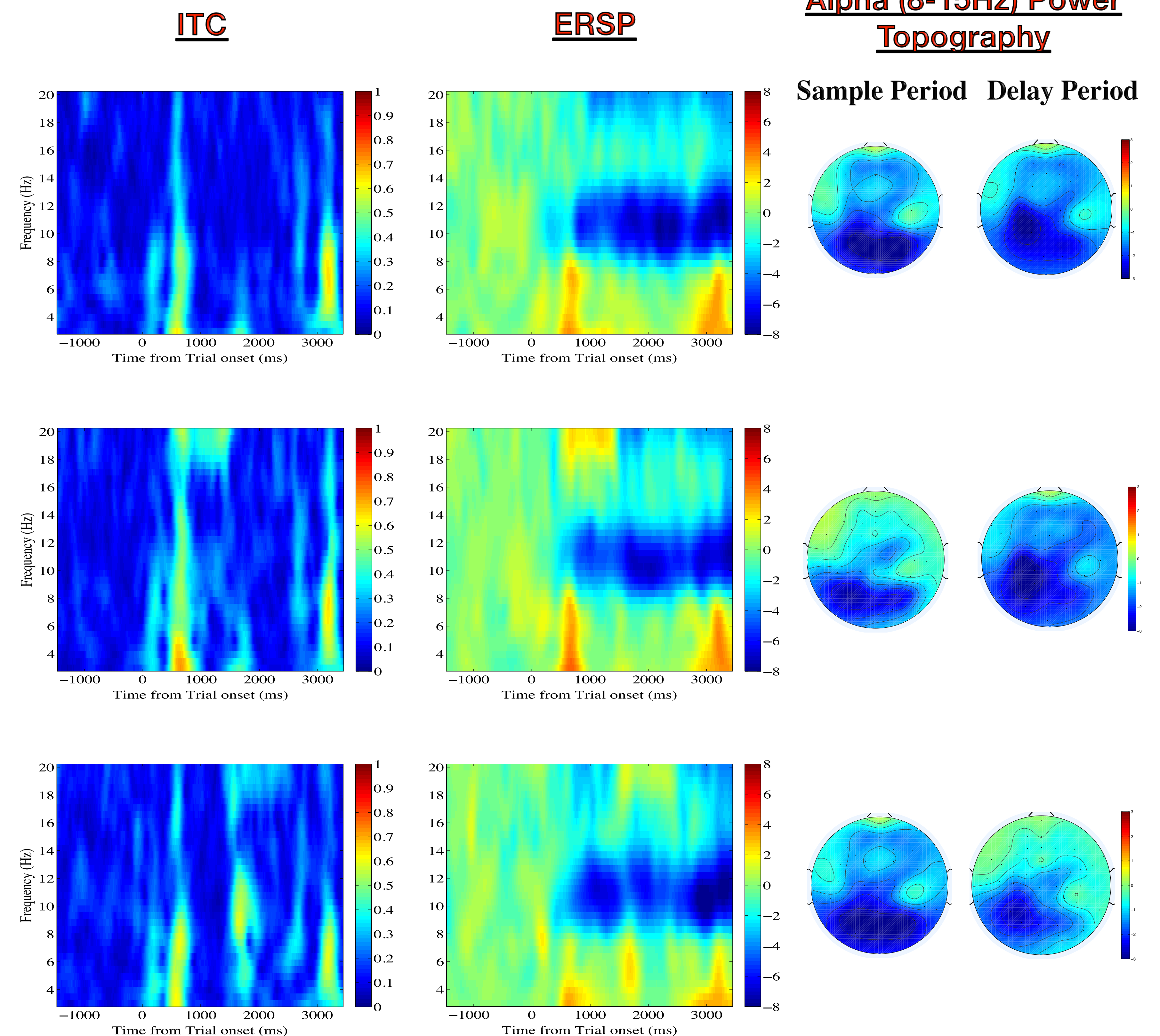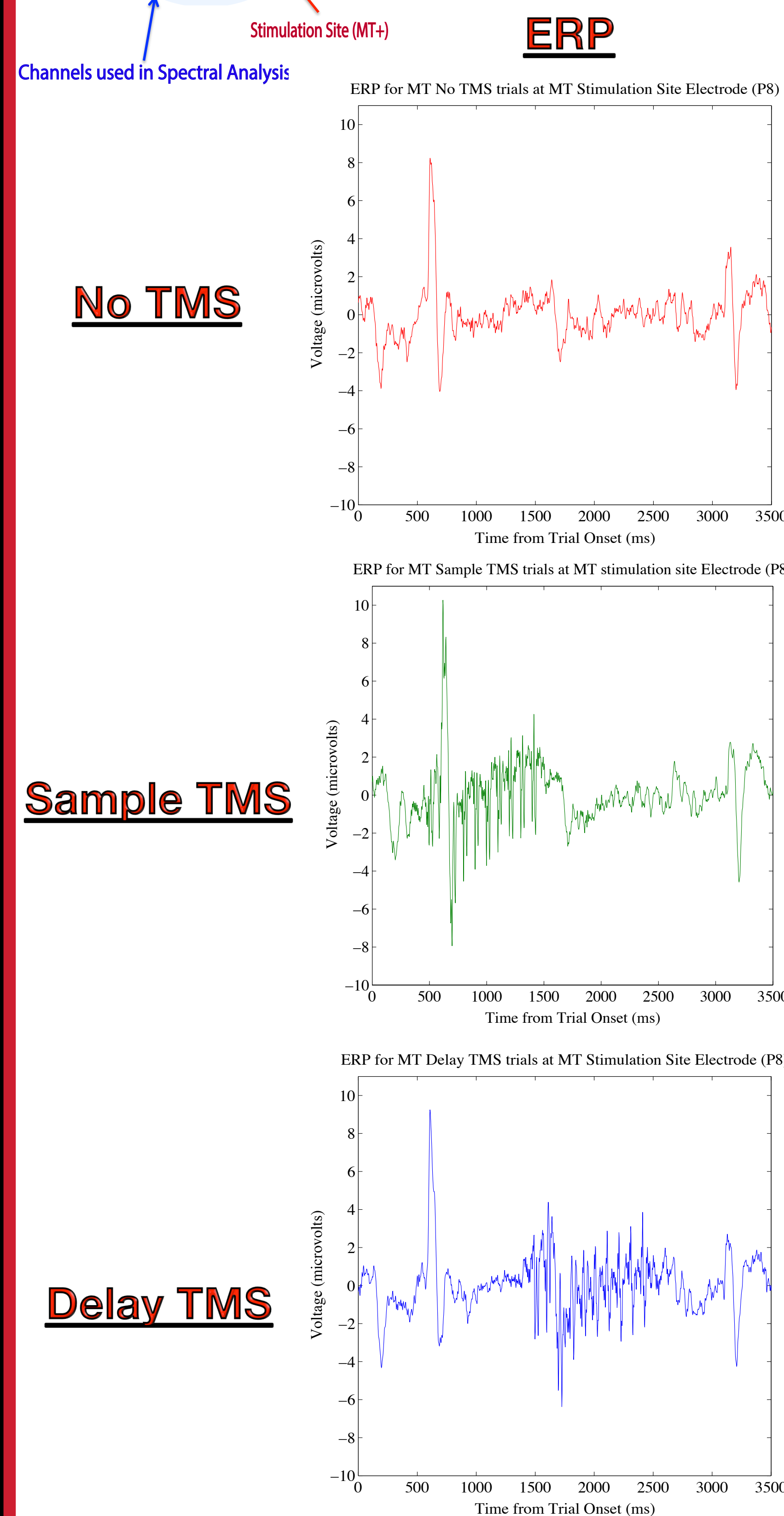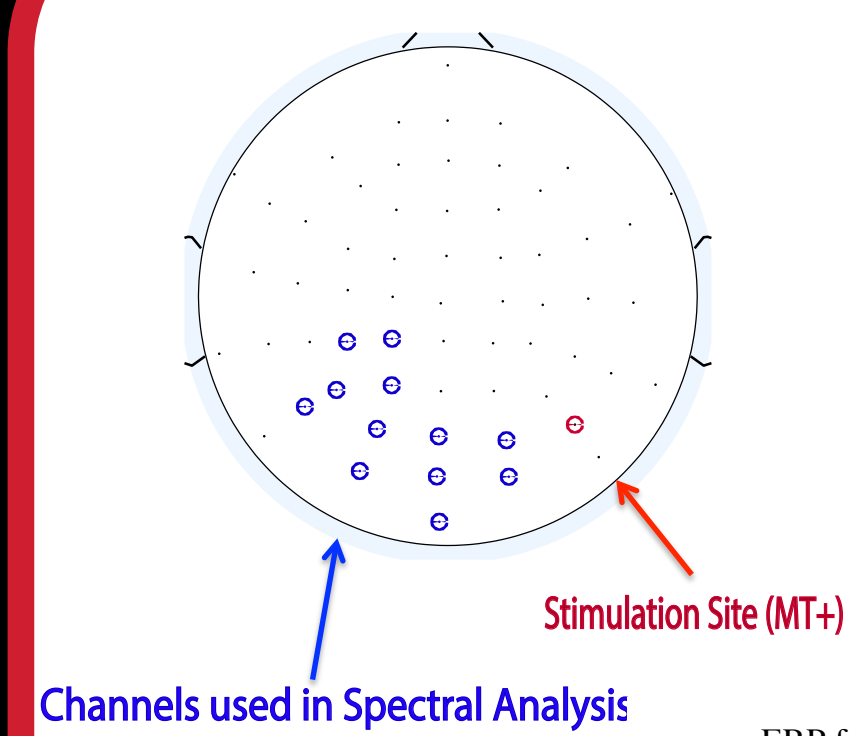Johnson, J.S., Hamidi, M., and Postle, B.R. (2010)

Methods

- We used a transparent motion working memory task with a continuous measure of recall
- We then applied rTMS to MT+ (defined by fMRI localizer task) or a control site (S1) during either the task delay period or sample presentation while recording simultaneous EEG.
- We utilized ICA as well as a median filter as methods of TMS artifact reduction

MT Stimulation site

Behavior Results (N=11)

Averaged Precision by TMS Condition

sampMT TMS Precision change vs Delay Period High Alpha

samp SS TMS Precision change vs Delay Period High Alpha

Conclusions

- Task-concurrent rTMS effects are subtle, and are better thought of as akin to biasing endogenous activity rather than imposing an exogenous rhythm

- Preliminary trends suggest opposing effects of rTMS to MT+ vs. S1 on individual differences in behavior

References
- Johnson, J.S., Hamidi, M., and Postle, B.R. (2010) *Using EEG to explore how rTMS produces its effects on behavior.* Brain Topography, 22, 281-293

EEG Results: ERPs and Spectral Data

Channels used in Spectral Analysis

Stimulation Site (MT+)

ERP   **ITC**   **ERSP**   **Alpha (8-15Hz) Power Topography**

Sample Period   Delay Period

No TMS

ERP for MT No TMS trials at MT Stimulation Site Electrode (P8)

Sample TMS

ERP for MT Sample TMS trials at MT stimulation site Electrode (P8)

Delay TMS

ERP for MT Delay TMS trials at MT Stimulation Site Electrode (P8)