

Distinct causal roles of DLPFC and M1 in long-term motor expertise: a combined TMS-fMRI study

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Summary

- ◆ Both DLPFC and M1 disruption impairs performance at all levels of motor skill expertise.
- ◆ Double dissociation during skill development: Causal importance of DLPFC diminishes, M1 grows
- ◆ TMS disrupts distinct sequence encoding

Research Questions

- ◆ Does decreasing activation reflect reduced importance or increased efficiency?
- ◆ Can 'releasing' frontal control improve performance?
- ◆ Does TMS disrupt sequence representation?

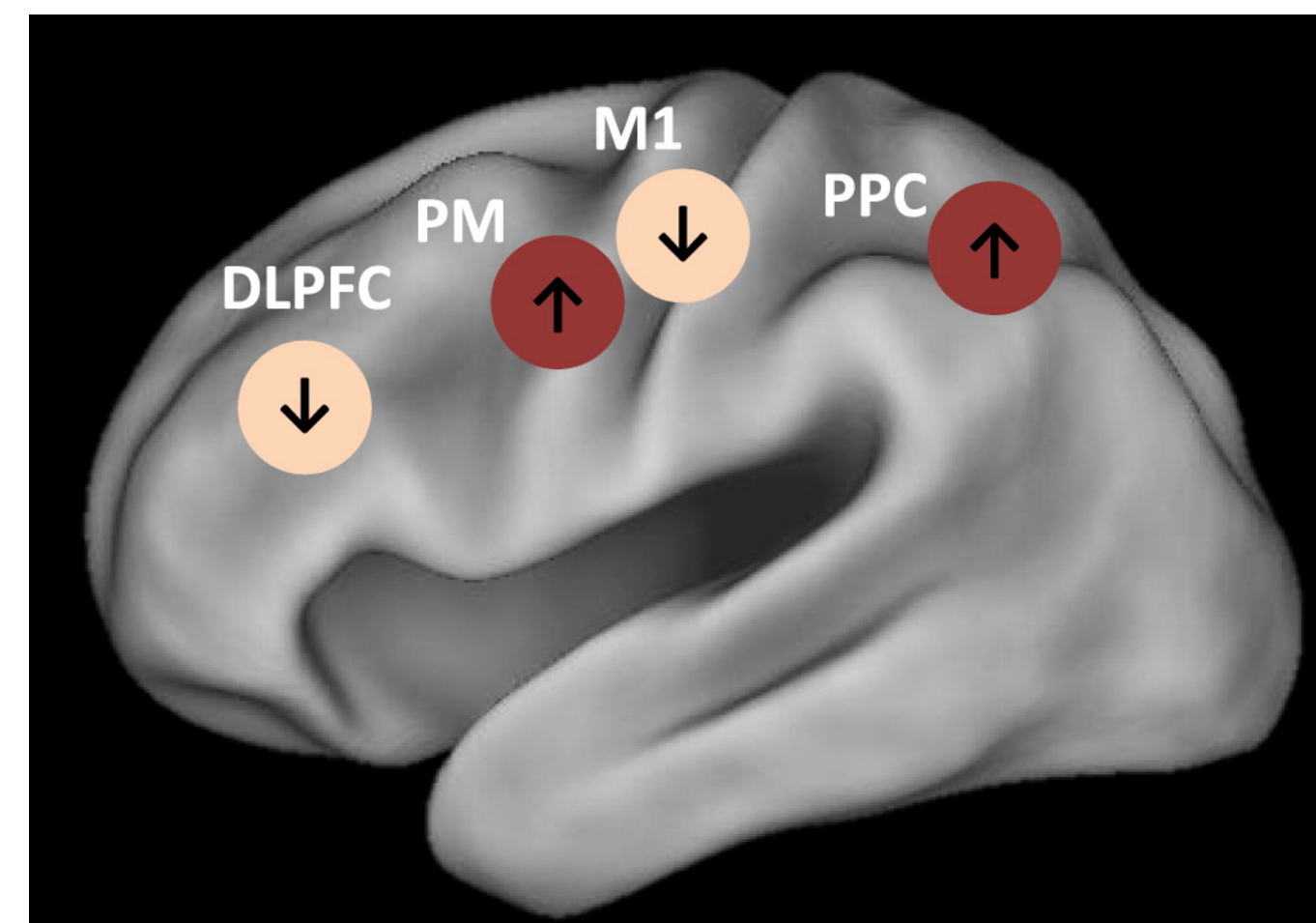
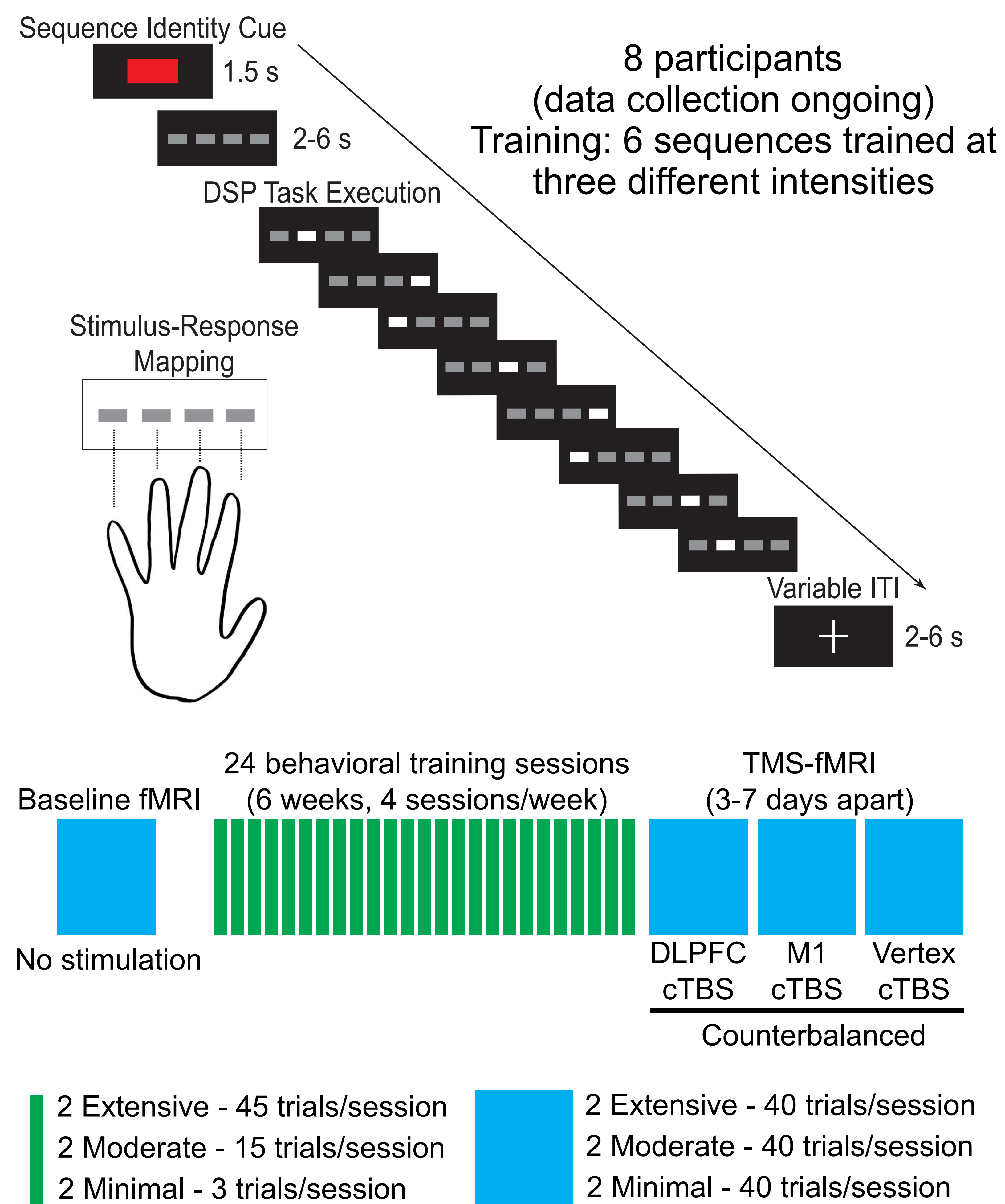
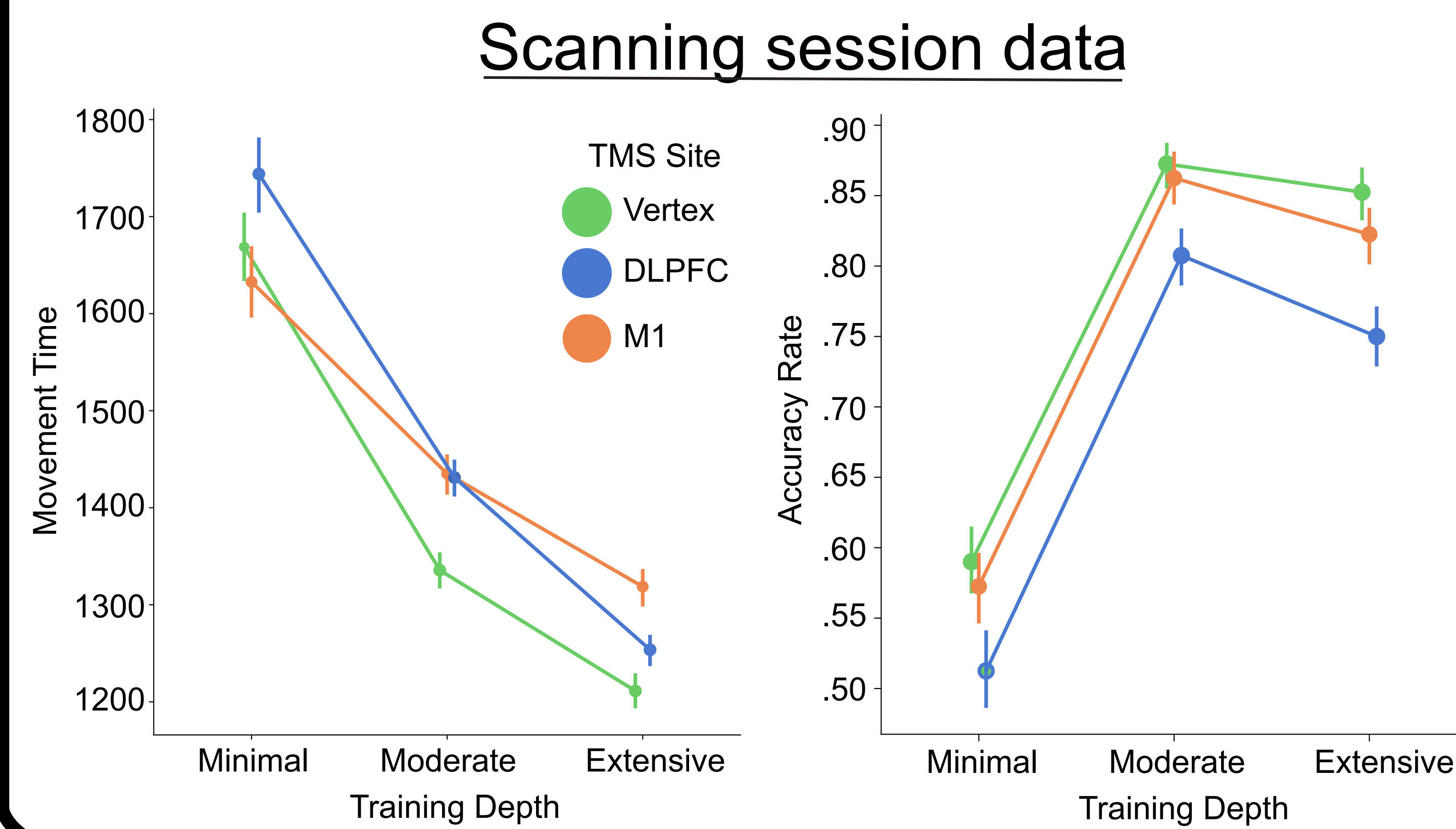
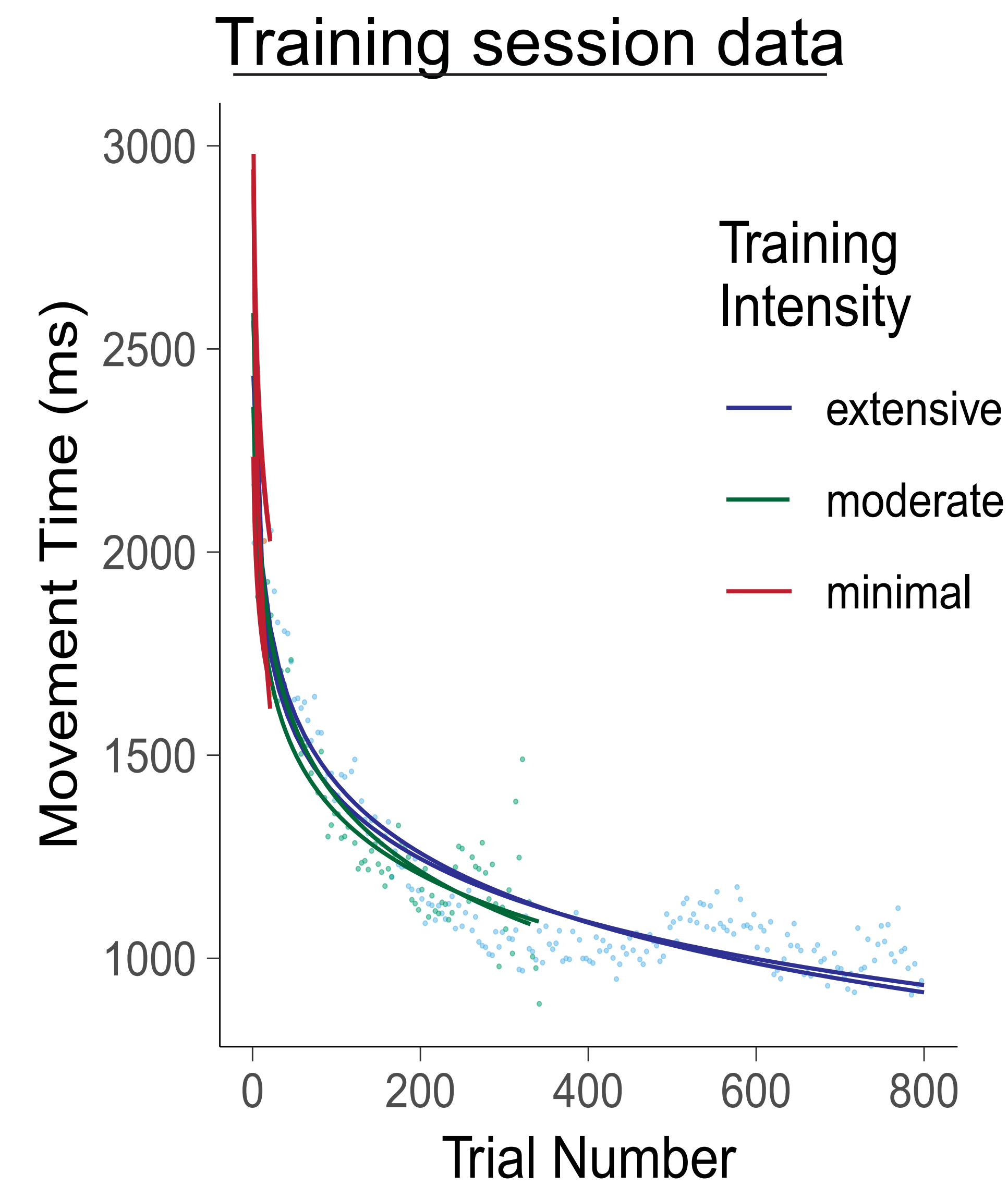


Figure from Dayan and Cohen, 2011

Experimental Design

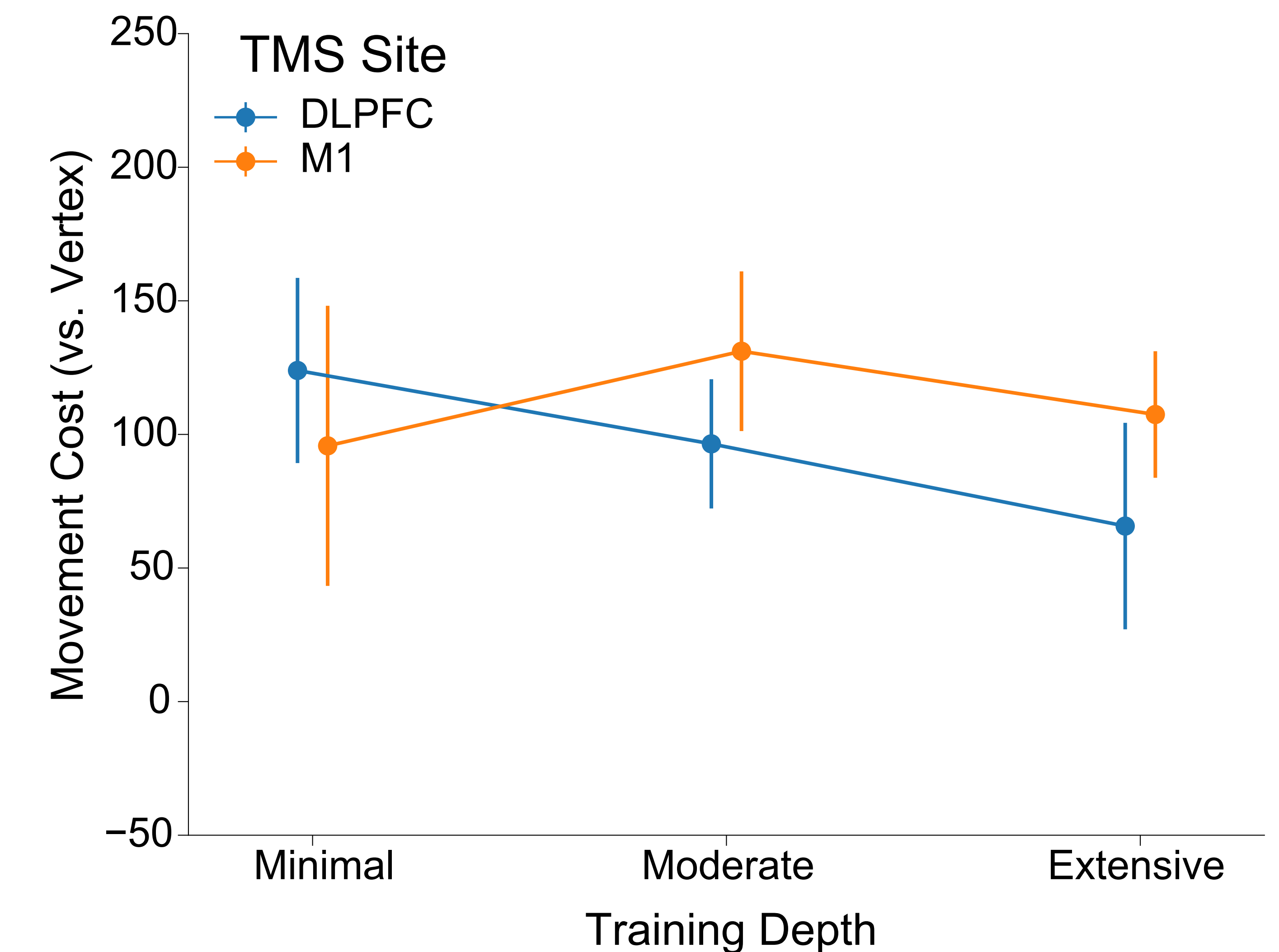


Exposure determines skill level

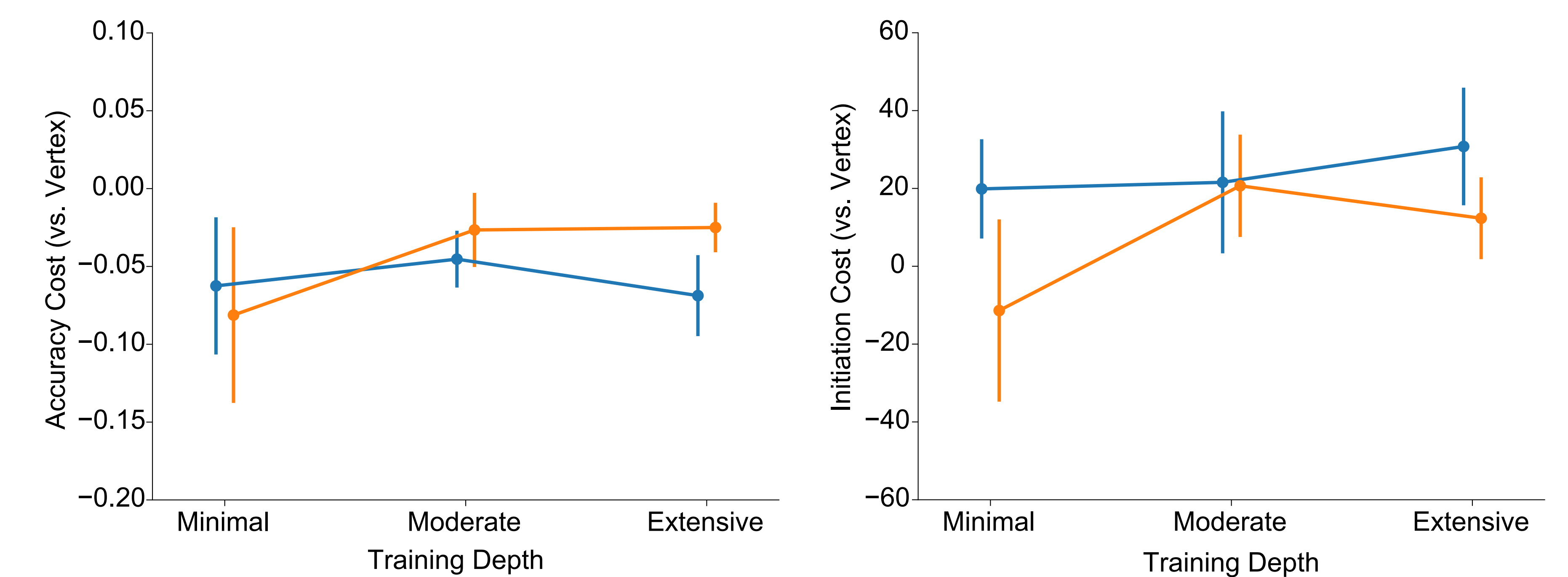


Double dissociation of M1 and DLPFC in expertise

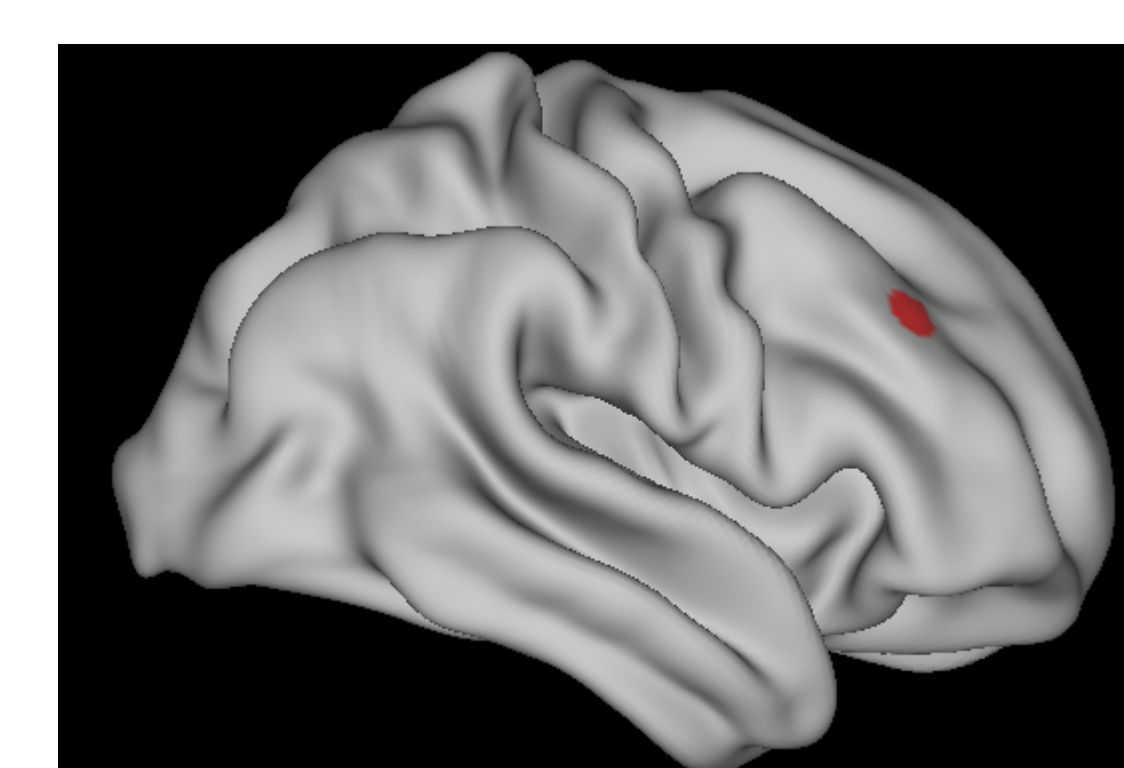
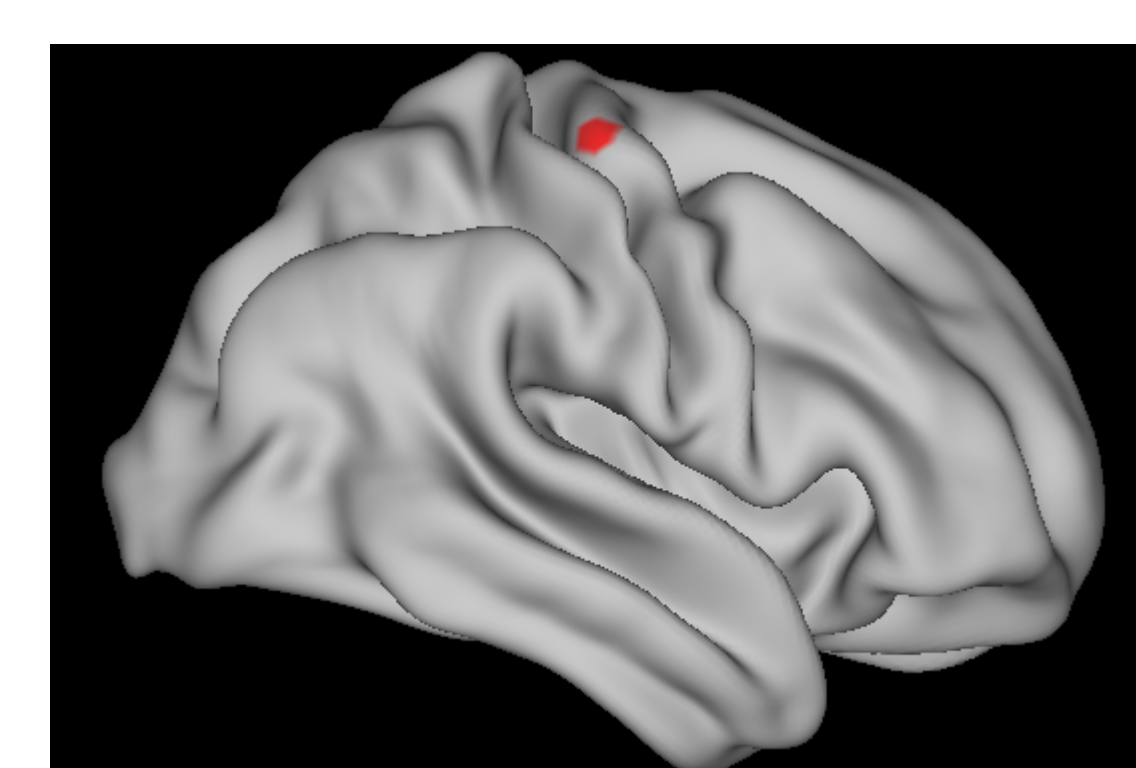
Interaction between TMS site and depth of training



DLPFC disruption affects performance at all levels of expertise



TMS Targets/Details



Continuous Theta Burst Stimulation (cTBS)
40 seconds of stimulation
~60 minutes reduced excitability

TMS disrupts expert skill distinctiveness

