

# 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?

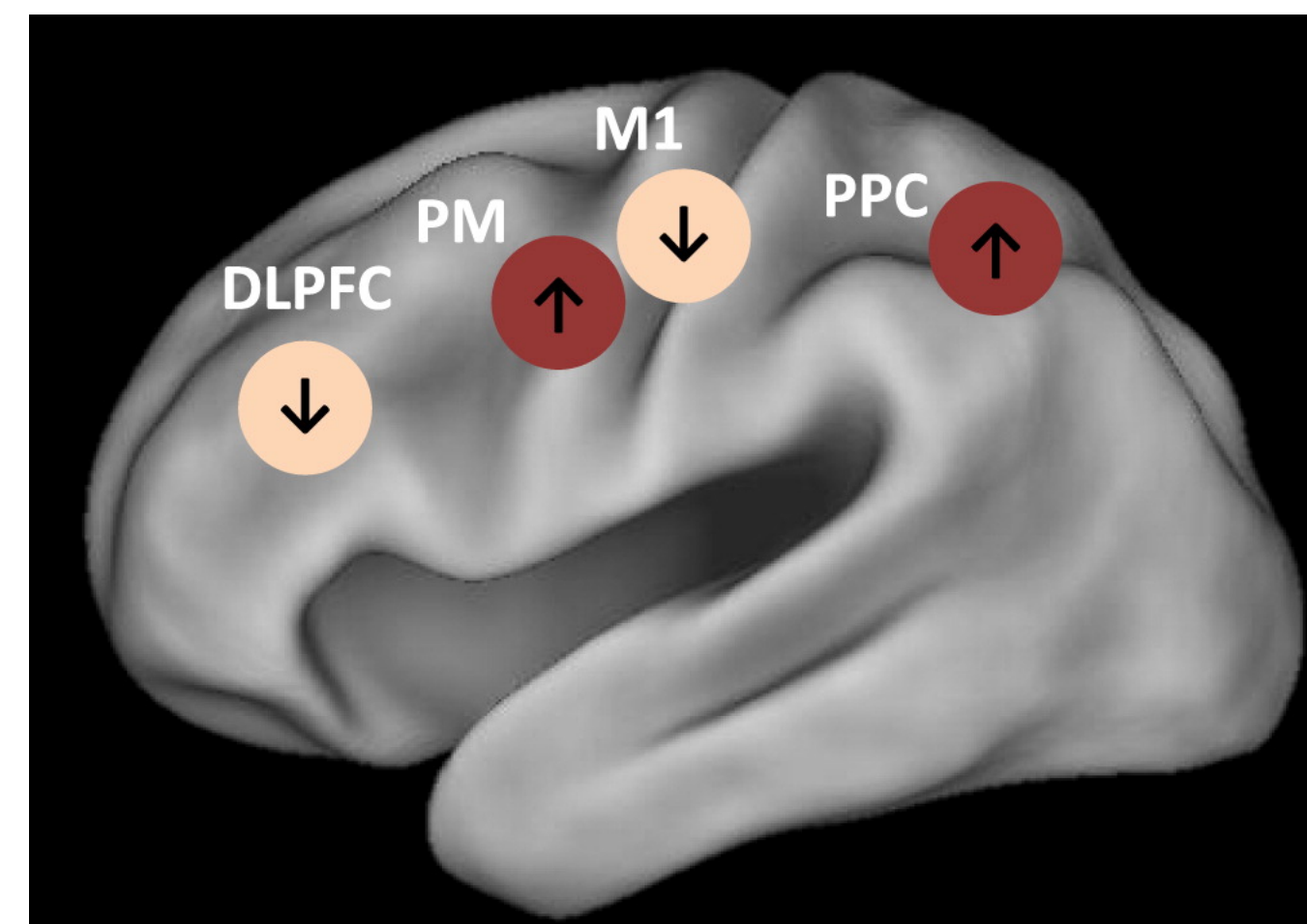
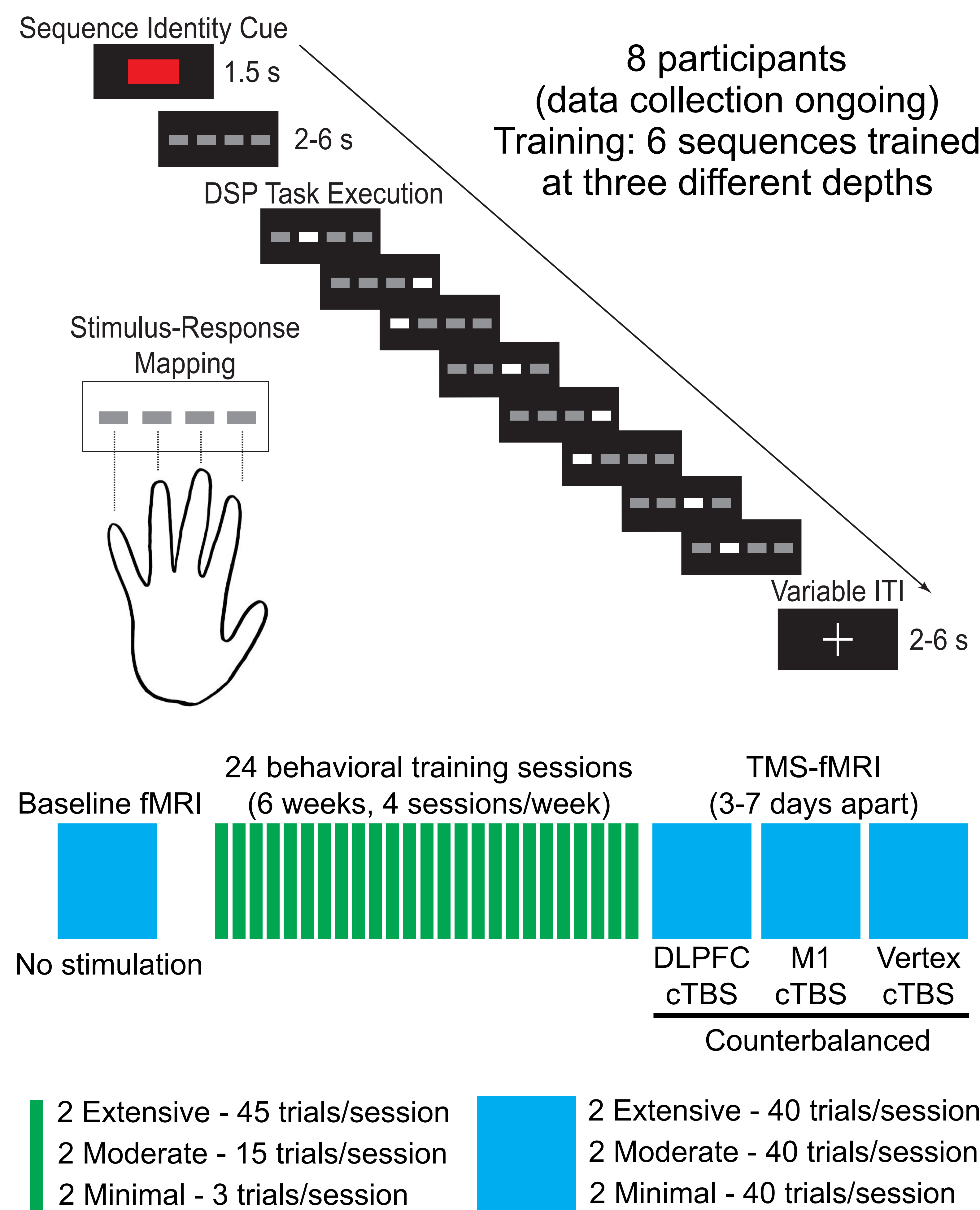
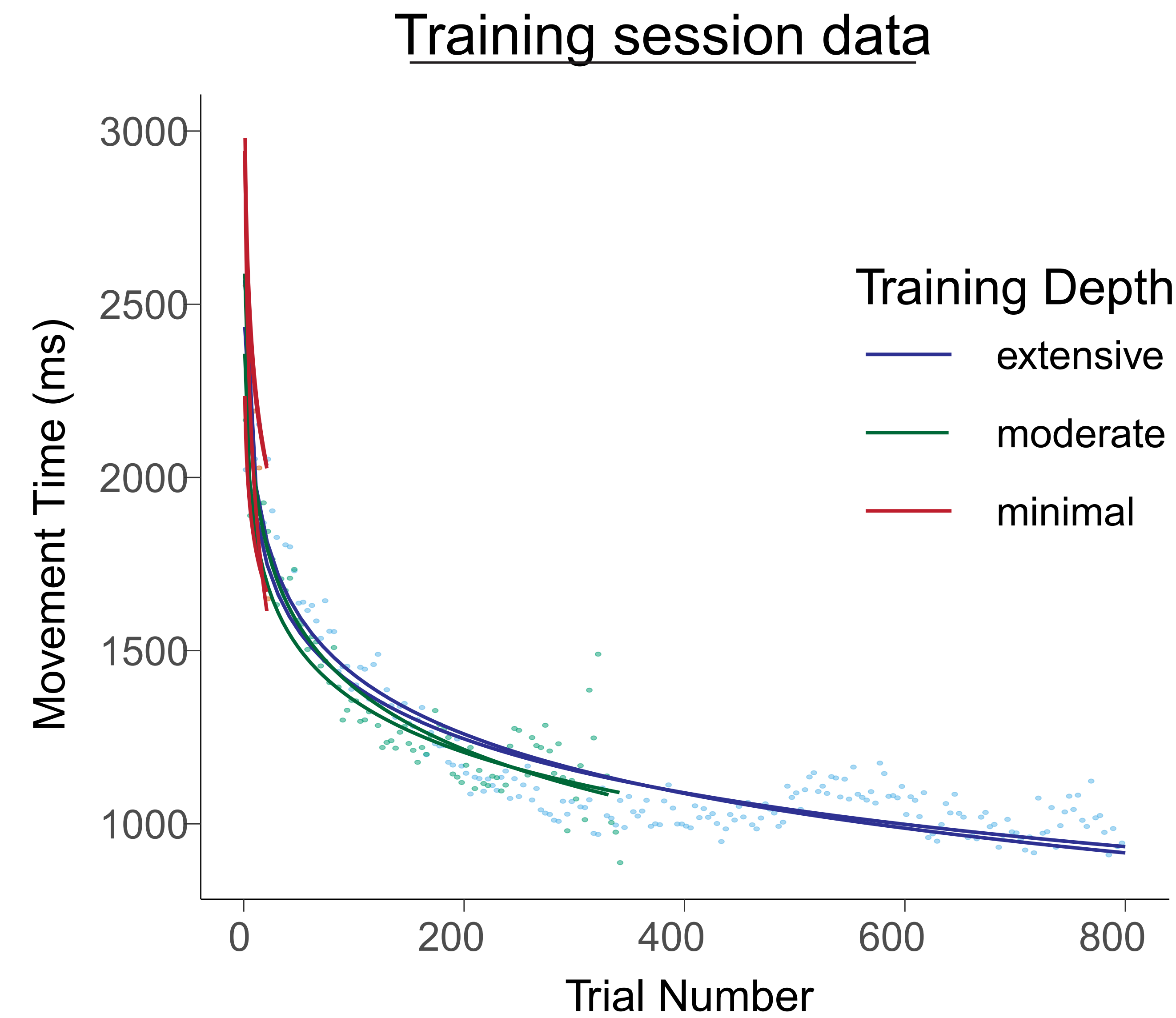


Figure from Dayan and Cohen, 2011

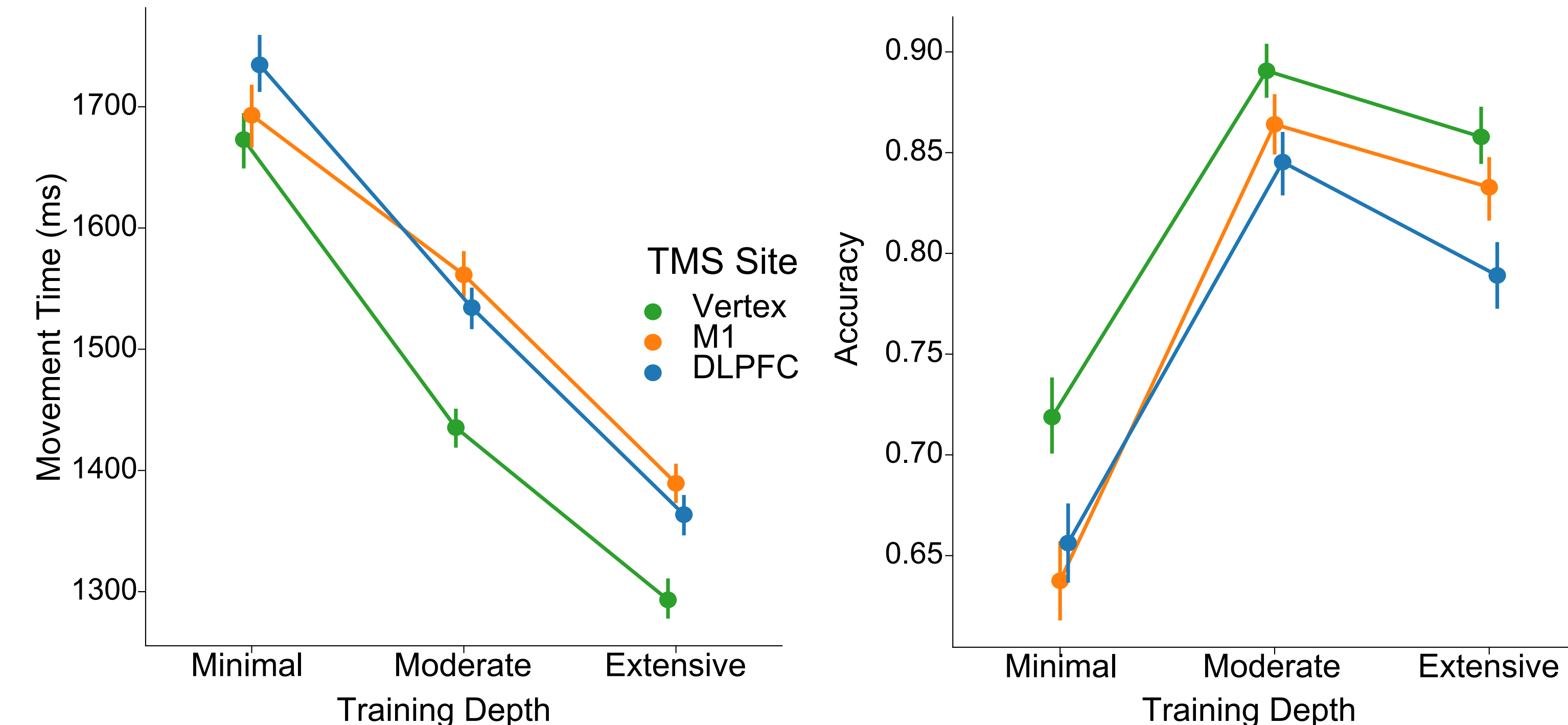
## Experimental Design



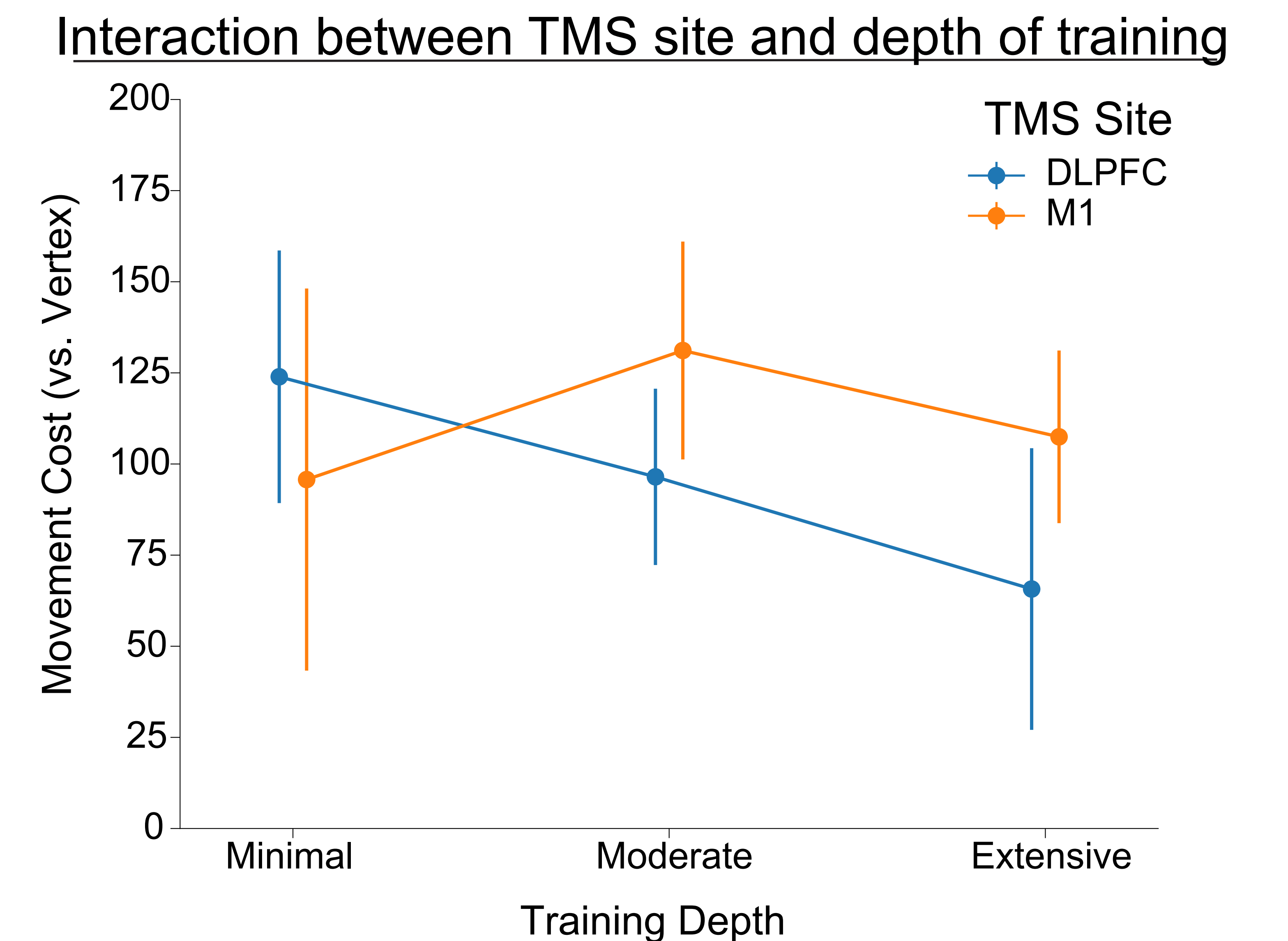
## Exposure determines skill level



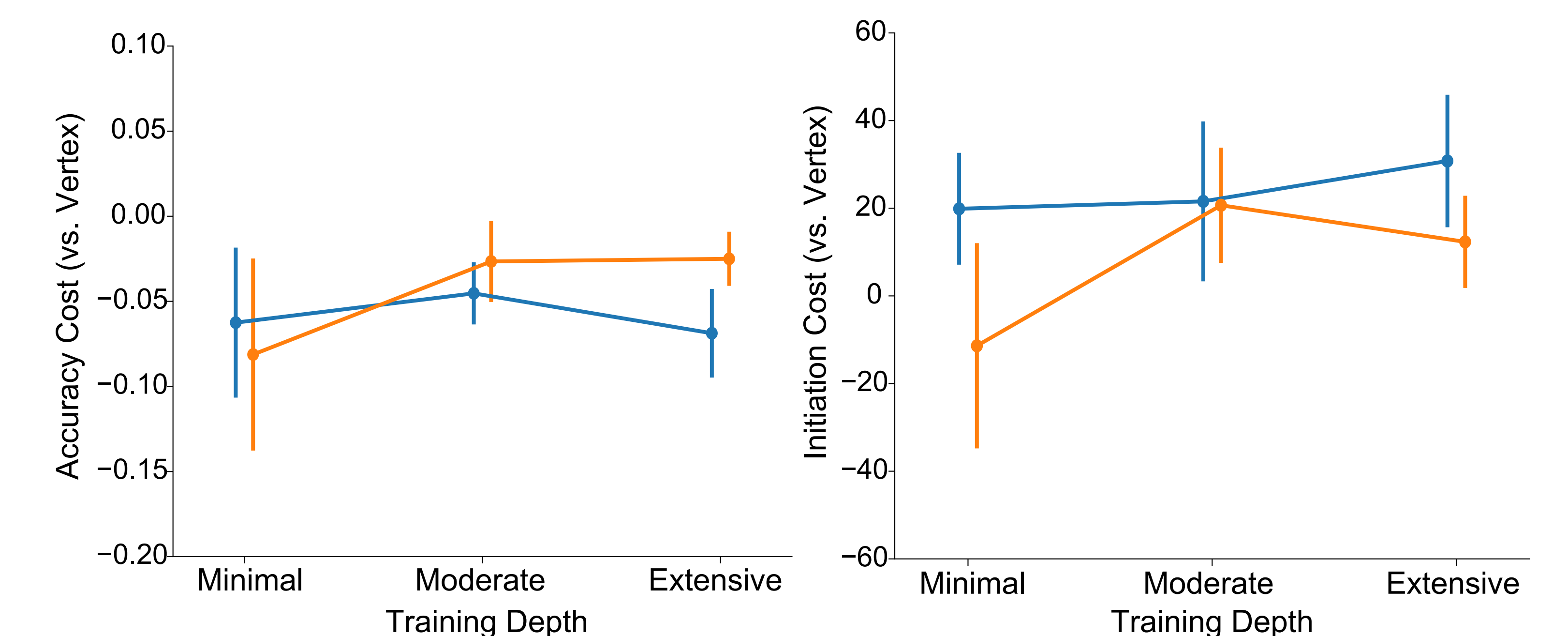
## Scanning session data



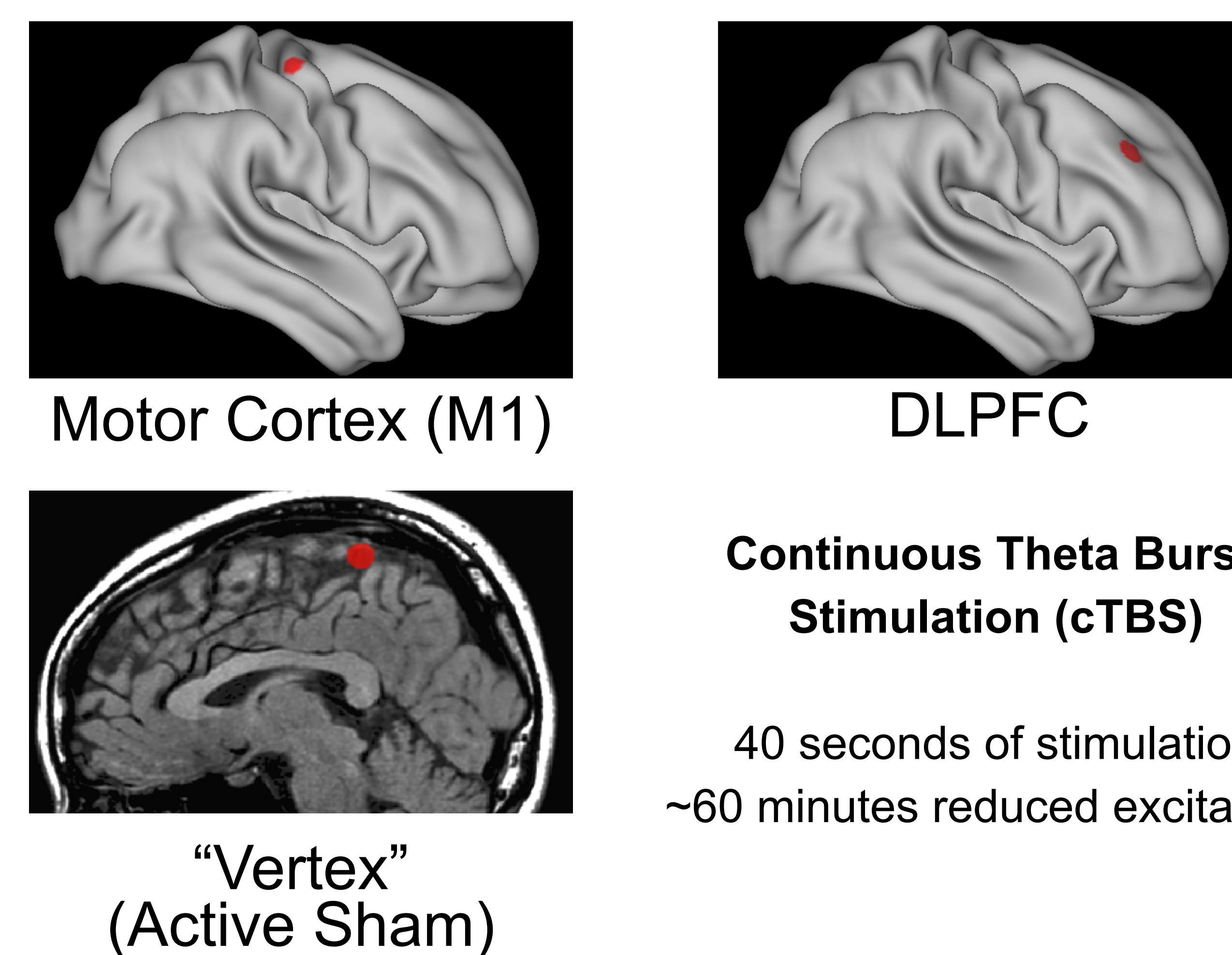
## Double dissociation of M1 and DLPFC



## DLPFC disruption affects performance at all depths



## TMS Targets/Details



## TMS disrupts expert skill distinctiveness

