### INTRODUCTION

tDCS is a promising tool to non-invasively manipulate neural function. As with any new tool, there are concerns with the reliability and consistency of tDCS-induced effects. One source of variability may reflect individual differences in the sensitivity to brain stimulation. Unlike TMS where the stimulation level is usually tailored on an individual basis, tDCS protocols use a fixed stimulation level. We ask here if the efficacy of tDCS in modulating physiology and behavior may be related to individual differences in sensitivity to brain stimulation. As with any new tool, there are concerns with the reliability and consistency of tDCS-induced effects. One source of variability may reflect individual differences in the sensitivity to brain stimulation. Assessment if individual variation in this measure predicts efficacy of tDCS-induced changes in cortico-spinal excitability.

### PHYSIOLOGY (Labruna et al., 2015)

**Logic:** Use TMS threshold for producing motor-evoked potentials as proxy for sensitivity to brain stimulation. Assess if individual variation in this measure predicts efficacy of tDCS-induced changes in cortico-spinal excitability.

### BEHAVIOR

Can we predict the effectiveness of tDCS on motor learning from TMS sensitivity?

#### Motor Learning Task

**Participants:** 27 receive anodal tDCS; 14 receive sham tDCS.

**Anodal tDCS:** 2 mA on M1 during Adapt phase (approximately 20 min).

**Sham tDCS:** No stimulation during Adapt phase.

**Retention:** Larger persistent error at end of washout phase (no feedback).

**Acquisition:** Reduced error at end of adaptation phase.

- Sensitivity effect most evident during adaptation.
- Positive correlation between TMS-measured sensitivity to brain stimulation and efficacy of tDCS in improving acquisition (High sensitive individuals show smallest error at end of adaptation phase).
- Weak correlation, and in wrong direction, between sensitivity and retention (greatest retention for those with low sensitivity).

**CONCLUSIONS**

- Anodal tDCS over M1 enhances both acquisition and retention.
- Sensitivity to brain stimulation can predict efficacy of tDCS for enhancing acquisition.

**FUTURE DIRECTIONS**

- Can TMS-defined sensitivity be used to adjust TDCS intensity on an individual basis?
- Does TMS-defined sensitivity (at M1) predict efficacy of tDCS at other brain regions?