

Introduction

- Metamemory (i.e., knowing what you know and what you don't know) involves monitoring, the ability to accurately assess the content of one's memory, and control, altering behaviors based on that assessment (Nelson & Narens, 1990).
- Few studies have examined the relationship between monitoring and control at retrieval (Hanczakowski, Pasek, Zawadzka, & Mazzone, 2013; Hanczakowski, Zawadzka, & Cockcroft-McKay, 2014).
- Previous research has shown that HD-tDCS to the left DLPFC improves monitoring accuracy using a semantic feeling-of-knowing (FOK) task (Chua & Ahmed, 2016; Chua, Ahmed, & Garcia, 2017).

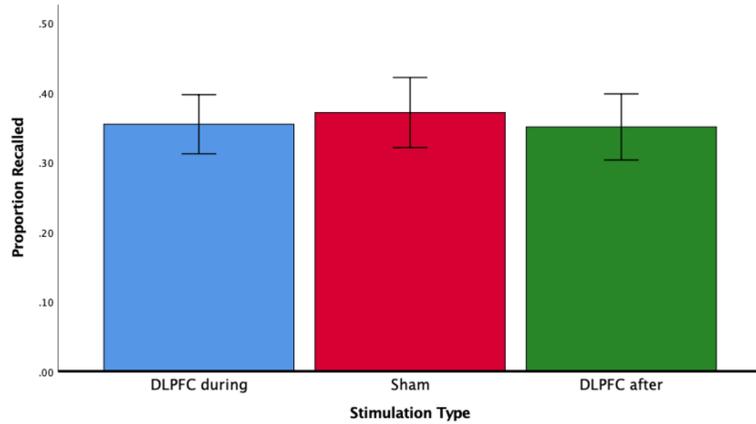
Current Study Aim:

- Determine the influence of metamemory monitoring on strategic control of memory & the role of the DLPFC in metamemory processes.

Hypothesis:

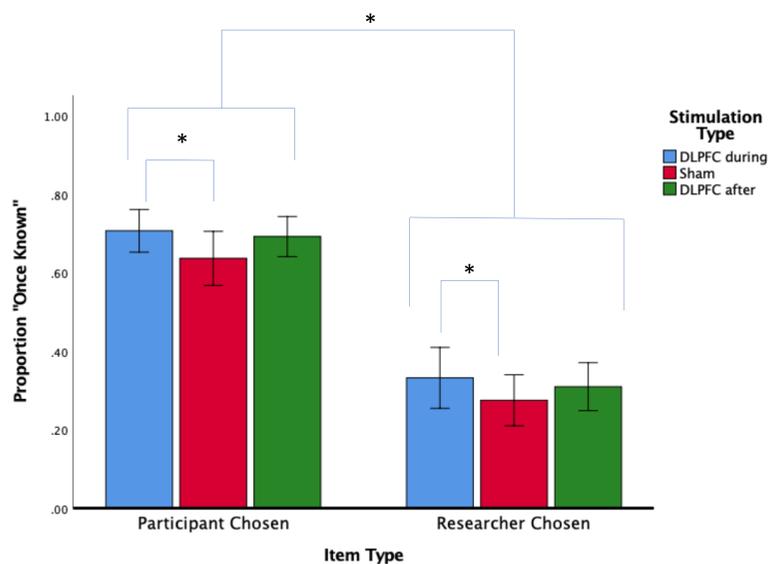
- Brain stimulation over the left DLPFC, compared to sham, will lead to improved metamemory monitoring, which in turn leads to better strategic control of memory.

Initial Memory Performance Matched Across Stimulation



Participants were matched on initial recall across stimulation type ($p = .109$).

"Once-Knowing" the Answer Impacts Choice

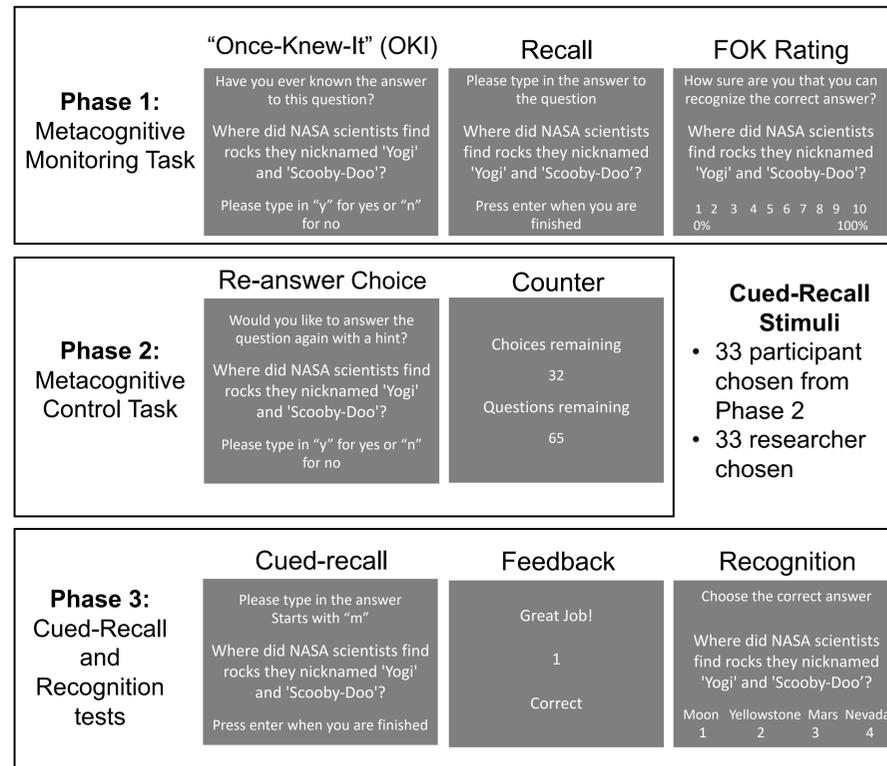


Participants were more likely to choose to re-answer an incorrect question again with a hint if they "Once-Knew-It" (OKI). Additionally, in the "DLPFC during" session, participants reported "once knowing" a higher proportion of items (non-recalled questions) compared to sham.

* $p < .05$

Methods

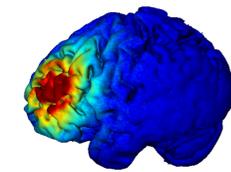
Behavioral Task



3 HD-tDCS Sessions

- Stim A (DLPFC during):** 15 min during Phase 1
- Stim B (Sham):** 15 min during Phase 1
- Stim C (DLPFC after):** 15 min after Phase 1, but before phase 2

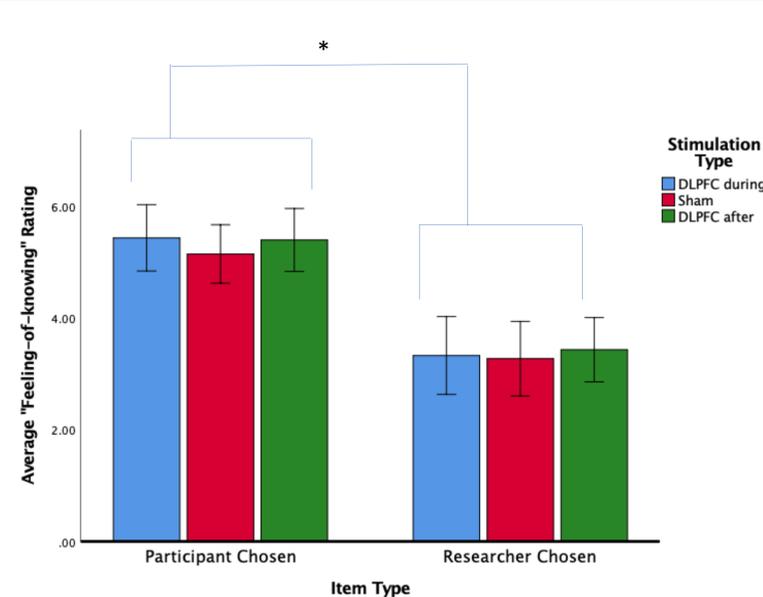
Left DLPFC



Participants

- 36 participants (25 females) ages 18 – 34 ($M = 24$, $SD = 4.95$) with no contraindications to HD-tDCS.

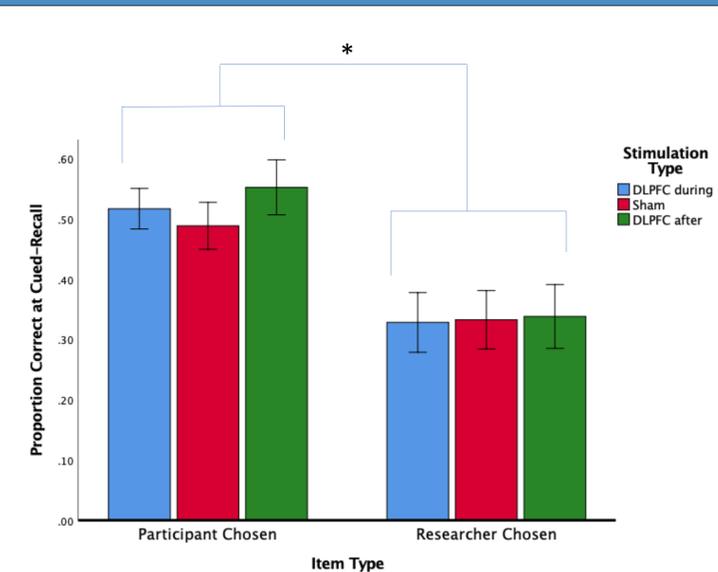
Feeling of Knowing for the Answer Impacts Choice



Participants were more likely to choose to re-answer an incorrect question again with a hint if they gave it a higher feeling-of-knowing rating. This did not differ by stimulation type.

* $p < .05$

Ability to Choose Led to Greater Memory Performance



Participants had greater cued-recall performance for items they chose compared to researcher chosen items, showing that the ability to choose significantly improved memory performance. This did not differ by stimulation type.

* $p < .05$

Conclusions

- Participants used metamemory monitoring outputs to make decisions about what to answer again with a hint.
 - OKI (familiarity with question)
 - FOK (familiarity with answer)
- Participants indicated that they "once knew" the answer to more items for DLPFC during stimulation compared to sham, however this finding did not extend to FOK ratings. This may indicate that stimulation led participants to have an increased sense of familiarity for the question, as opposed to increased access to the answer.
- Cued-recall performance was greater for items they chose to answer again with a hint, compared to those that the researcher chose. This finding, coupled with the participants tendency to choose items that they felt were within memory, shows that participants use the outputs of monitoring to make strategic control decisions, and that these decisions lead to increased memory performance.