Review of: "Targeting the fronto-parietal network using multifocal personalized transcranial alternating current stimulation to enhance motor sequence learning in healthy older adults"

Philip Tseng[1]

1 Taipei Medical University

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This study aimed to improve motor sequence learning (MSL) with theta frequency transcranial alternating current stimulation (tACS) over frontopareital network (FPN). The rationale is that MSL is essentially a motor working memory (WM) exercise, therefore targeting WM-related areas (FPN) will likely be helpful to MSL. I think the rationale makes sense, but based on the design I suspect the MSL task here is actually more of a verbal WM task transcoded into a motor response. This may be my misunderstanding from the wording of the Methods: As I understand it, participants learned the sequence from a piece of paper, then had to practice 3 times without button presses. Therefore, this looks more like a verbal WM to motor response code type of task, and the learning was not motor-related. This could potentially change the interpretation of the results.

Another question I have is that the introduction talks very little about the rationale of using elderly adults (>60 in this case). If this is the first ever study using theta tACS for MSL, one would expect a wide range of age group be recruited?

Finally, I appreciate the personalized EEG approach very much. But I do feel that it can be toned down in the abstract and general discussion section because we don't know if a non-personalized theta tACS would be equally effective in the current study. That would require a non-personalized control condition.

The parametric design of WM load is a very nice touch as previous studies indeed have demonstrated an interaction between tACS/tDCS and task difficulty (or sometimes individual ability).