

## 284. From brain waves to memory boost: Personalized frequency-modulated transcranial electric stimulation over posterior parietal cortex for associative memory enhancement

Dr Jovana Bjekić<sup>1</sup>, Dr Marko Živanović<sup>2</sup>, Dunja Paunović<sup>1</sup>, Katarina Vulić<sup>1</sup>, Uroš Konstantinović<sup>1</sup>, Marija Stanković<sup>1</sup>, Dr Saša R. Filipović<sup>1</sup>

<sup>1</sup>University of Belgrade, Institute for Medical Research, <sup>2</sup>University of Belgrade, Faculty of Philosophy

284. Non-invasive brain stimulation (NIBS) has gained increased interest in research of associative memory (AM) and its impairments. However, the one-size-fits-all approach yields inconsistent effects, thus putting forward the need for the development of personalized frequency-modulated NIBS protocols to increase the focality and the effectiveness of the interventions. Specifically, transcranial alternating current stimulation (tACS) and transcranial oscillatory current stimulation (otDCS) with theta-band frequencies (4-8Hz) are promising opportunities for memory neuromodulation. The aim of the current study was (1) to develop a method for extracting the individual theta-band frequency (ITF) to be used as an input parameter for personalized theta-modulated tACS and otDCS; (2) to assess the effects of tACS and otDCS in comparison to constant anodal tDCS and sham on different AM measures including short-term AM, delayed recognition, and cued recall. In a sample of 42 healthy volunteers, we extracted the ITF from the EEG signal recorded during successful encoding in an AM task, for each participant. In cross-over counterbalanced design, different stimulation protocols (tACS/otDCS/tDCS/sham) were delivered in separate sessions (7 days apart) for 20 minutes over posterior parietal cortex. The tACS and otDCS were applied using the ITF. Participants completed a series of AM tasks both during and following the stimulation. The study showed mixed results - depending on the outcome measure we observed either better AM performance in relation to tACS, otDCS, and tDCS or no effects of stimulation. We will discuss ITF-extraction challenges and possible methodological and conceptual explanations for the inconsistent effects.