

Short-Term Effects of an Open Monitoring Meditation on Cognitive Control and Information Processing

Authors : Sarah Ullrich, Juliane Rolle, Christian Beste, Nicole Wolff

Abstract : Inhibition and cognitive flexibility are essential parts of executive functions in our daily lives, as they enable the avoidance of unwanted responses or selectively switch between mental processes to generate appropriate behavior. There is growing interest in improving inhibition and response selection through brief mindfulness-based meditations. Arguably, open-monitoring meditation (OMM) improves inhibitory and flexibility performance by optimizing cognitive control and information processing. Yet, the underlying neurophysiological processes have been poorly studied. Using the Simon-Go/Nogo paradigm, the present work examined the effect of a single 15-minute smartphone app-based OMM on inhibitory performance and response selection in meditation novices. We used both behavioral and neurophysiological measures (event-related potentials, ERPs) to investigate which subprocesses of response selection and inhibition are altered after OMM. The study was conducted in a randomized crossover design with N = 32 healthy adults. We thereby investigated Go and Nogo trials in the paradigm. The results show that as little as 15 minutes of OMM can improve response selection and inhibition at behavioral and neurophysiological levels. More specifically, OMM reduces the rate of false alarms, especially during Nogo trials regardless of congruency. It appears that OMM optimizes conflict processing and response inhibition compared to no meditation, also reflected in the ERP N2 and P3 time windows. The results may be explained by the meta control model, which argues in terms of a specific processing mode with increased flexibility and inclusive decision-making under OMM. Importantly, however, the effects of OMM were only evident when there was the prior experience with the task. It is likely that OMM provides more cognitive resources, as the amplitudes of these EKPs decreased. OMM novices seem to induce finer adjustments during conflict processing after familiarization with the task.

Keywords : EEG, inhibition, meditation, Simon Nogo

Conference Title : ICMTRP 2022 : International Conference on Mindfulness Theory, Research and Practice

Conference Location : Sydney, Australia

Conference Dates : May 16-17, 2022