REGULAR, BRIEF MINDFULNESS MEDITATION PRACTICE IMPROVES ELECTROPHYSIOLOGICAL MARKERS OF ATTENTIONAL CONTROL

Peter Malinowski¹, Adam Moore¹, & Thomas Gruber²

1) School of Natural Science and Psychology, Liverpool John Moores University, UK
   2) Institute of Experimental Psychology I, University of Osnabrück, Germany

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Objectives: Mindfulness based meditation practices involve various attentional skills, including the ability to sustain and focus one’s attention. During a simple mindful breathing practice, sustained attention is required to maintain focus on the breath while cognitive control is required to detect mind wandering. As the refinement of attentional functions is considered to significantly contribute to the positive effects of meditation practice, the aim of this project was to investigate whether brief regular mindfulness meditation practice would result in improvements in the self regulation of attention and foster changes in neuronal activity related to attentional control.

Methods: A longitudinal randomised control group EEG study was conducted. At baseline (T1), 40 meditation naïve participants were randomised into a wait list group and a meditation group, who received three hours mindfulness meditation training. 28 participants remained in the final analysis. At T1, after 8 weeks (T2) and after 16 weeks (T3), all participants performed a computerized Stroop task (a measure of attentional control) while the 64-channel EEG was recorded. Between T1 and T3 the meditators were requested to meditate daily for ten minutes.

Results: Event-related potential (ERP) analysis highlighted two between group effects that developed over the course of the 16-week mindfulness training. An early effect at left and right posterior sites 160 – 240 ms post stimulus indicates that meditation practice improved the focusing of attentional resources. A second effect at central posterior sites 310 – 380 ms post stimulus reflects that meditation practice reduced the recruitment of resources during object recognition processes, especially for incongruent stimuli. Scalp topographies and source analyses (VARETA) indicate relevant changes in neural sources, pertaining to left medial and lateral occipitotemporal areas for the early effect and right lateral occipitotemporal and inferior temporal areas for the later effect.

Discussion and Conclusions: The results suggest that mindfulness meditation may alter the efficiency of allocating cognitive resources, leading to improved self regulation of attention. That meditating for only 10 minutes per day leads to significant changes in neural activity highlights the potential mindfulness practice may have for the everyday user.

Publications:
Malinowski, P., Mead, B. and Pozuelos-López J. (2011). Individual levels of
mindfulness predict brain activity related to inhibitory control and response

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