Does meditation practice modulate the dynamics of attentional neural networks? An EEG study

Results:

The aim of the research project was to investigate whether a brief daily mindfulness meditation practice can contribute to an improvement of attentional functions and changes in the underlying brain networks.

Towards this end we conducted a longitudinal EEG study with randomized control group design that assessed the modification of attentional functions after 16 weeks of mindfulness meditation practice. At baseline participants were allocated to a meditation (MG) or a wait-list control group (CG). The MG received three hours mindfulness meditation training and were requested to meditate daily for ten minutes for the next 16 weeks. At baseline, after 8 weeks and after 16 weeks, participants performed computerized tasks that address attentional control mechanisms, while the 64-channel EEG was recorded.

The analysis of the event-related potentials (ERP) of the EEG confirmed that regular mindfulness practice influences brain mechanisms of attentional control evidenced by differences between the MG and CG in ERP components that indicate inhibitory, resource allocation and conflict monitoring processes. Importantly, also the levels of self reported mindfulness (assessed with the Five Facet Mindfulness Questionnaire) increased significantly in the MG compared to the CG. This increase was positively correlated with the self-reported amount of meditation practice.

Consistent with recent findings, the pattern of results suggests that mindfulness practice may be associated with a more even distribution of limited attentional resources and more efficient conflict monitoring.

Published works:

Malinowski, P. (2013). Neural mechanisms of attentional control in mindfulness meditation. Frontiers in Neuroscience, 7:8. doi: 10.3389/fnins.2013.00008

Moore, A. W., Gruber, T., Derose, J. & Malinowski, P. (2012). Regular, brief mindfulness meditation practice improves electrophysiological markers of attentional control. *Frontiers in Human Neuroscience, 6,* 18. doi: 10.3389/fnhum.2012.00018

Chiesa, A. & Malinowski, P. (2011). Mindfulness based interventions: are they all the same? *Journal of Clinical Psychology, 67(4),* 404-424.

Malinowski, P., Mead, B. and Pozuelos-López J. (2011). Individual levels of mindfulness predict brain activity related to inhibitory control and response monitoring. *Frontiers in Human Neuroscience. Conference Abstract: XI International Conference on Cognitive Neuroscience (ICON XI).* [doi: 10.3389/conf.fnhum.2011.207.00050]

Pozuelos-López, J., Mead, B., Rueda, M. and Malinowski, P. (2011). Mindfulness and cognitive control: are they really related? *Frontiers in Human Neuroscience. Conference Abstract: XI International Conference on Cognitive Neuroscience (ICON XI).* [doi: 10.3389/conf.fnhum.2011.207.00260]

Area(s) of interest:

Meditation research, mindfulness, attentional functions, attention training

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