

Enhanced dopamine availability and response readiness. The influence of 3 doses of methylphenidate on contingent negative variation in the EEG of healthy volunteers

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not in the other groups. The BWV group also had increased vitality and reduced tension and sleep disturbance, although these benefits also followed Mindfulness training. The Mindfulness group was the only group who had an increase in calmness and in a sense of being grounded, and they had a comparatively greater increase in absorption than the other groups. All three groups had improved stress, vitality and mindfulness post-intervention, although none of the groups showed any change in salivary cortisol, attention, memory or health. In conclusion, significant improvements in well-being followed training in all three practices, although BWV was unique in its benefits to depression, tiredness and sleep latency. Further research is needed to investigate its effects, and to isolate which exercises produce them.

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A randomised controlled single-blind trial of the efficacy of Reiki in benefiting mood and well-being

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This is a constructive replication of a previous trial conducted by [2], where students who had received Reiki demonstrated greater health and mood benefits than those who received no Reiki. The current study examined impact on anxiety/depression. 40 university students – half with high depression and/or anxiety and half with low depression and/or anxiety – were randomly assigned to receive Reiki or to a non-Reiki control group. Participants experienced six 30-minute sessions over a period of two to eight weeks, where they were blind to whether non-contact Reiki was administered as their attention was absorbed in a guided relaxation. The efficacy of the intervention was assessed pre-post intervention and at five-week follow-up by self-report measures of mood, illness symptoms and sleep. The participants with high anxiety and/or depression who received Reiki showed a progressive improvement in overall mood, which was significantly better at five-week follow-up, while no change was seen in the controls. While the Reiki group did not demonstrate the comparatively greater reduction in symptoms of illness seen in our earlier study, the findings of both studies suggest that Reiki may benefit mood.

Reference

[1] D. Bowden, L. Goddard, J.H. Gruzelier, A randomised controlled single-blind trial of the efficacy of Reiki at benefiting mood and well-being, *Evidence-Based Complementary and Alternative Medicine* (2011).

[2] D. Bowden, L. Goddard, J.H. Gruzelier, A randomised controlled single-blind trial of the effects of Reiki and positive imagery on well-being and salivary cortisol, *Brain Research Bulletin* 81 (2010) 66–72.

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Assessing effects of neurofeedback on emotional interference

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Approach: 40 students received seven NFB sessions of 30 min each. Four conditions were trained, based on SMR neurofeedback at Cz: visual and auditory feedback (VFAP); visual feedback and auditory placebo (VFAP); visual placebo and auditory feedback (VPAF); visual and auditory placebo (VPAP). An operant response task was administered both before and after NFB sessions. In between presentations of pictures from the International Affective Picture System (IAPS) subjects were to press a keyboard with their left

hand when a circle was presented and with their right hand when a square was presented.

Results: SMR and theta increased over time in a repeated measures design, no interaction effects with condition were found. SMR (5.0 and 5.7 μV) and theta (11.1 and 11.9 μV) were not significantly different before and after NFB. In the operant response task, a main effect of time was found for errors in the negative-valence pictures: after NFB the number of correct responses was decreased. A condition-by-time interaction effect was found for reaction time: whereas in the VPAP condition a decrease of reaction time was found with negative-valence pictures, in the VFAP condition the decrease was smaller or the reaction time even increased. No interaction effects were found for errors.

Discussion: In spite of lack of objective support for changes in EEG, neurofeedback appears to have affected emotional interference. The increased response time may be due to a decrease in impulsivity. Another possible explanation may be increased activity of the pulvinar due to NFB, thus enhancing the affective strength of the negative-valence pictures shown. Subjects were not asked for their beliefs about the condition they were in. This leaves room for methodological factors influencing the results.

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Enhanced dopamine availability and response readiness. The influence of 3 doses of methylphenidate on contingent negative variation in the EEG of healthy volunteers

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The basal ganglia play an important role in motor control, which is dependent on dopaminergic input. Preparation of a motor response has been associated with dopamine release in the basal ganglia and response readiness may therefore serve as a pharmacodynamic marker of dopamine activity. We measured response readiness using the amplitude of the contingent negative variation (CNV), a slow negative shift in the electroencephalogram. The CNV is evoked in a paradigm in which a warning stimulus (S1) signals the occurrence of the imperative stimulus (S2) 4 seconds later, to which the participant has to respond. CNV was assessed in healthy volunteers after administration of placebo or 10, 20 or 40 mg of methylphenidate, a catecholamine re-uptake blocker which primarily enhances the synaptic concentration of dopamine and to a lesser extent also noradrenaline. Episodic memory was measured using a word learning test. In addition, participants filled out two visual analog scales measuring subjective ratings of mood and alertness: Profile of Mood States (POMS) and Bond & Lader (B&L). Results indicated that methylphenidate dose-dependently increased CNV amplitude and decreased reaction times. Episodic memory performance improved. Furthermore participants reported improved mood, feeling more alert, vigorous and content and less angry and tired after methylphenidate. These results indicate that dopamine availability increases response readiness as measured by the CNV paradigm. The CNV appears to be a good candidate biomarker for assessing changes in dopaminergic function by treatments that either directly or indirectly target the dopaminergic system.

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