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Changes in EEG and Emotion Regulation in the Course of Inward-Attention Meditation Training

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Abstract : This study attempted to investigate the changes in electroencephalography (EEG) and emotion regulation following eight-week inward-attention meditation training program. The subjects were 24 adults without meditation experiences divided into meditation and control groups. The quantitatively analyzed changes in psychophysiological parameters during inward-attention meditation, and evaluated the emotion scores assessed by the State-Trait Anxiety Inventory (STAI), the Positive and Negative Affect Schedule (PANAS), and the Emotion Regulation Scale (ERS). The results were found: (1) During meditation, significant EEG increased for theta-band activity in the frontal and the bilateral temporal areas, for alpha-band activity in the left and central frontal areas, and for gamma-band activity in the left frontal and the left temporal areas. (2) The meditation group had significantly higher positive affect in posttest than in pretest. (3) There was no significant difference in the changes of EEG spectral characteristics and emotion scores in posttest and pretest for the control group. In the present study, a unique meditative concentration task with a constant level of moderate mental effort focusing on the center of brain was used, so as to enhance frontal midline theta, alpha, and gamma-band activity. These results suggest that this mental training allows individual reach a specific mental state of relaxed but focused awareness. The gamma-band activity, in particular, enhanced over left frontoparietal area may suggest that inward-attention meditation training involves temporal integrative mechanisms and may induce short-term and long-term emotion regulation abilities.

Keywords : meditation, EEG, emotion regulation, gamma activity
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