Changes in negative and positive EEG shifts during slow cortical potential training in children with attention-deficit/hyperactivity disorder: a preliminary investigation.

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Abstract
We examined the effects of self-regulation of slow cortical potentials (SCP) in nine children with attention-deficit/hyperactivity disorder (ADHD) by focusing on the changes in electroencephalographic (EEG) shifts during SCP sessions. In SCP training, individuals learn to increase and decrease their cortical excitabilities (enhancement of negative and positive cortical shifts). To examine the efficiency of SCP training, we conducted an attention task and measured contingent negative variation, which relates to the attention maintenance ability. Moreover, to assess training effects at the behavioral level, the Japanese ADHD rating scale (SNAP-J) was completed by the parents. In SCP training, we analyzed changes in EEG shifts during 16 training sessions by calculating the peak amplitudes of positive and negative shifts. The results of EEG data showed that peak amplitudes increased in sessions 11 and 12 for negative shifts and in sessions 9 and 13 for positive shifts. Moreover, we found an enhancement of contingent negative variation amplitude in the attention task before and after training, suggesting that the ability of these children to maintain attention could be modified by SCP training. However, significant behavioral improvements were not observed on the Japanese ADHD rating scale. It has been proposed that the number of additional training sessions may affect both physiological and behavioral improvements. Our present results, however, suggest the possibility that even low numbers of training sessions, such as 16, can bring about physiological improvement, whereas greater numbers of training sessions may be needed to have an influence on behavioral changes.