

Exploring the Neurophysiological Impact of Alternating Bilateral Stimulation on Emotional Reactivity in University Students

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Introduction: University students often face high emotional and cognitive demands, highlighting the need for effective strategies to regulate anxiety and emotional reactivity. Alternating Bilateral Stimulation (BLS), a non-invasive technique derived from EMDR therapy, alternately activates brain hemispheres through rhythmic sensory stimuli. It is hypothesized to reduce emotional reactivity by weakening fear memory traces (1) and promoting cognitive integration of emotional experiences (2). The Late Positive Potential (LPP), an event-related potential (ERP) larger for negative than neutral stimuli (3), represents a reliable marker of emotional reactivity.

Aim: This study examined whether alternating BLS alone could modulate emotional reactivity and state anxiety among university students, as reflected by changes in LPP amplitude in response to negative stimuli.

Methods: Thirty students were randomly assigned to two groups. The experimental group received bimodal alternating BLS, while the control group received bimodal simultaneous BLS, activating both hemispheres together. EEG (64 channels) was recorded during a visuomotor Emotional Simple Response Task (E-SRT) before (T0) and after (T1) 15 minutes of stimulation. State anxiety (STAI-Y1) and emotional impact ratings (0–100 VAS) were also assessed.

Results and Conclusions: No significant changes were found in state anxiety or VAS scores. However, a reduction in centro-parietal LPP amplitude (~600 ms) was observed in the experimental group only, suggesting a decrease in emotional reactivity at the neurophysiological level even without changes in subjective measures. Although based on a single session, these findings suggest that alternating BLS may enhance students' well-being. Future research should investigate long-term effects of repeated stimulation.

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