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# Exploring the Role of Neuromodulation in Enhancing Creative Thinking: A Narrative Review

JYOTI JAMES[1]*, SIDHARTH BANSAL[1]

## ABSTRACT

Cognition comprises mental operations including reasoning, problem-solving, and decision-making. In this context, creative thinking would be an important function to be considered. Neuromodulation, through electrical or magnetic stimulation of specific areas in the brain, can be employed to modulate such processes by boosting cognitive performance as well as boosting creativity. This review aimed to cover all the existing evidence on the impacts of neuromodulation methods on creative thinking. This review focussed on experimental studies on neuromodulation for enhancing creativity among healthy adults, including students and professionals. The literature was narrowed down to studies published in the last 10 years, focussing on divergent and convergent thinking, verbal creativity, and intelligence tests, in order to make the literature relevant and rigorous. A literature search was conducted using PubMed, PEDro, and Google Scholar using the combined terms related to "neuromodulation" and "creative thinking." Thematic and qualitative analysis of the studies was conducted to analyse the impact on creative thinking, verbal creativity, and task-specifi c outcomes infl uenced by modulating parameters. The findings of the study indicate that neuromodulation techniques, specifi cally tDCS, improve creative thinking. Other techniques also exhibited positive effects but dearth of literature available on longitudinal and comparative studies involving other forms of neuromodulation such results are very encouraging. Neuromodulation enhances creativity through task-specific and modality-dependent effects. Long-term effects should be observed in future studies, and the standardisation of protocols with the optimisation of stimulation parameters would be essential.

**Keywords:** Cognition, Intelligence tests, Verbal creativity

**PARTICULARS OF CONTRIBUTORS:**
1. School of Allied Medical Sciences, Lovely Professional University, Jalandhar-Delhi G.T. Road, Phagwara, Punjab (India)- 144411.

**NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:**
*Jyoti James
School of Allied Medical Sciences, Lovely Professional University, Jalandhar-Delhi G.T. Road, Phagwara, Punjab (India)- 144411.
E-mail: jamesjyoti3@gmail.com