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Specialization of Brain Hemispheres in Verbal Creative Activity

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ABSTRACT

One of the objectives of neurophysiological research on creativity is to identify the role of the cerebral hemispheres in the implementation of creative activity. The aim of this study was to investigate interhemispheric relationships by analyzing changes in the parameters of visual evoked potentials (amplitudes of N200 and P300) in symmetric areas of the left and right cerebral hemispheres, including frontal and temporal-parieto-occipital regions, during the performance of a verbal creative task by students with different levels of creativity. To determine creativity levels, S. Mednick's Remote Associates Test (RAT) was used. Participants with high creativity levels demonstrated a significant ($p < 0.01$) dominance of the left frontal area for the N200 component. However, the amplitude of the P300 component showed a reliable dominance in the temporal-parieto-occipital region of the right hemisphere. In participants with low creativity, the amplitude of the N200 component was also significantly greater ($p < 0.05$) in the left frontal area. Similar to the high-creativity group, no interhemispheric difference was observed for the P300 component. Nevertheless, statistical analysis of the amplitude values of the visual evoked potential components in the temporal-parieto-occipital area revealed right-hemispheric dominance. These findings suggest that interhemispheric interaction varies depending on participants' level of creativity. The results of the study indicate that verbal creative processes are accompanied by pronounced interhemispheric asymmetry. Specifically, solving a verbal creative task is associated with left-hemispheric activation of the frontal cortex, which is more pronounced in individuals with lower levels of creativity.

Keywords: hemispheric specialization, verbal creativity, evoked potentials

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