SOLAB

At What Level Do Genders Experience Cognitive Divergence in Perceiving Symbolic Representation: A Neurocognitive Investigation of the Occipital and Temporal Regions of the Brain

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Abstract

In social discourse, symbols communicate culturally constructed meanings that shape perception. Research suggests these symbolic interpretations are not arbitrary but are built upon an individual's internal representations, which are subject to experiences and identity. Within this framework, studies on gender differences offer valuable insights suggesting divergence in cognitive processing between genders in the interpretation of stimuli. These findings raise a critical question: do such differences emerge at the level of visual perception, or are they the result of language comprehension? Hence, this study attempts to bridge the gap by investigating cognitive differences in the occipital and temporal regions of the brain between males and females. The study evaluated social reform symbols on *'Beti Bachao Beti Padhao'* (girl) and *'Make in India'* (lion) by executing a flanker task experiment. The study comprised 20 participants within the age group of 18-30 years. The result showed that the ERP components P300 in the occipital region and N400 in the temporal regions of the brain were activated. In the P300 amplitude, the occipital region showed a significant gender difference in response to attending symbols, with male participants showing heightened amplitude for the *Make in India* emblem; in contrast, female participants showed heightened amplitude for the *Beti Bachao Beti Padhao* emblem. Additionally, the N400 amplitude in the occipital region showed a more heightened amplitude for the female participants compared to the male participants. However, in the temporal region, heightened amplitude was observed among the male participants compared to the female participants. The findings indicate that symbolic processing initially diverges at the stage of visual perception, suggesting variations in the encoding of structural features. Subsequently, divergence occurs at the level of semantic interpretation, reflecting differing understandings and opinions regarding the symbol's meaning. This study has significant implications, as it contributes to the understanding of gender differences in information processing.

Keywords: Symbol, Visual perception, Language comprehension, Gender, P300, N400, Occipital, Temporal

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