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Math Anxiety Effects on Complex Addition: An ERP Study

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Abstract : In the present study, we used event-related potentials (ERP) to address the question of whether high (HMA) and low math-anxious (LMA) individuals differ on a complex addition verification task, which involved both carrying and non-carrying additions. ERPs were recorded while seventeen HMA and seventeen LMA individuals performed the verification task. Groups did not differ in trait anxiety or gender distribution. Participants were presented with two-digit additions and were asked to decide whether the proposed solution was correct or incorrect. Behavioral data showed a significant Carrying x Proposed solution x Group interaction for accuracy, showing that carrying additions were more error prone than non-carrying ones for both groups, although the difference non-carrying minus carrying was larger for the HMA group. As for ERPs, a P2 component larger in HMA individuals than in their LMA peers was found both for carrying and non-carrying additions. The P2 was followed by a sustained negative slow wave at parietal positions. Because the negative slow waves are thought to reflect the updating of working memory, these results give support to the relationship among working memory, math performance and math anxiety.

Keywords : math anxiety, carrying, working memory, P2
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