Math anxiety effects on the processing of incorrect solutions in simple arithmetic

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Abstract

This study focuses on the capacity to solve numerical incongruities in high and lower mathematical anxiety individuals by investigating behavioral data and event-related brain potentials. Thirteen high mathematical anxious (HMA) and thirteen low mathematical anxious (LMA) individuals were presented with simple addition problems in a verification task (a + b = c). The proposed solution was manipulated by presenting correct or incorrect solutions. Incorrect solutions were constructed by adding or subtracting one to or from the correct solution (small-split solution) and by adding fourteen to the correct solution (large-split solution). Due to previous evidence suggesting HMA's difficulties in processing large-split solutions (Faust, Ashcraft & Fleck, 1996) we investigated this phenomenon by using the event-related potential technique. No differences were found neither on reaction times nor in error rates. However, large-split solutions elicited an enhanced late positive potential (LPP) for the HMA group. Given that LPP's amplitude have been related to the amount of attentional resources devoted on a task, the HMA group seems to be expending more attentional resources on processing such an implausible solution than the LMA group. Results are interpreted according to two theories explaining the negative effects of anxiety on performance, the Processing Efficiency Theory and the Attentional Control Theory.

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