Summary: Math anxiety impedes performance in simple arithmetic tasks. Anxiety constrains working memory capacity and particularly the attentional functions of the central executive. The experiment reported here explored how interactivity mitigated the impact of math anxiety on the performance of elementary school students with simple additions. It manipulated two independent variables. The first was the length of the additions – involving either 7 or 11 number tokens (the value of the tokens ranged from 1 to 20). The other was the level of interactivity: in the low interactivity condition participants could not touch or point to the number tokens that configured the sums, and in a high interactivity condition participants could manipulate the tokens as they saw fit in deriving their answer. The length of the addition had an impact on accuracy, with longer sums leading to poorer performance. However, overall, performance in the high interactivity condition was superior, in terms of accuracy, absolute calculation error and efficiency, than performance in the low interactivity condition. Mathematics anxiety significantly predicted performance in the low interactivity condition, but not in the high interactivity condition. These results suggest that working memory resources are augmented through interactivity with the physical problem presentation, defusing the impact of anxiety on performance.

Classification: C20

Keywords: distributed cognition; interactivity; math anxiety; mental arithmetic

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