Overcoming Intuitive Interference in Mathematics and Science Education: From Neurocognitive Psychological Research to an Educational Intervention

Dr. Reuven Babai
School of Education and School of Neuroscience, Tel Aviv University, Israel

Abstract:

Students' difficulties in mathematics and science often arise from intuitive interference, where automatically processed, irrelevant variables disrupt task performance. Previous research has suggested that this interference contributes to errors in various tasks (Stavy et al., 2006).

Here, we focus on a comparison of perimeters task, in which area is the interfering variable. In congruent trials, where no interference occurs, participants exhibit higher accuracy and faster response times compared to incongruent trials, in which area interferes. Brain imaging research indicates that correct responses in incongruent trials are linked to activation in prefrontal regions known for their executive inhibitory control, suggesting that intervention aimed at activating inhibitory control could aid students (Babai, et al., 2006; Stavy & Babai. 2010).

A reaction time study applied an explicit warning intervention about the possible interference of the area variable. Eighty-four sixth graders performed the task with or without the warning. The warning group showed higher accuracy in incongruent trials and longer reaction times across all trials. These results suggest that the warning helps students overcome interference by activating inhibitory control mechanisms. Overall, the study indicates that simple interventions, such as explicit warnings, could improve student performance by addressing task-related interference.