Children's Encoding and Solving of Mathematical Equations

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Abstract: Elementary school children often fail to correctly solve equivalence problems (e.g., 3+4+5=3+__). This study investigated whether children's difficulties are due, in part, to incorrectly encoding (internally representing) the equivalence problems and tested whether improvements in encoding would lead to improvements in problem solving. To address these issues, we developed a new measure of problem encoding that used a change detection paradigm, and we also utilized more traditional reconstruction and recognition measures. Children completed measures of encoding and problem solving before and after a brief lesson designed to improve their encoding. Change detection performance was significantly correlated with performance on the traditional encoding measures. Moreover, all three encoding measures were related to children's pretest problem-solving performance. Finally, pre- to posttest changes in children's encoding appeared to be related to changes in children's problem-solving performance. These findings suggest that improving problem encoding should be a target of instruction about equations.