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Improving students' proportional thinking using schema-based instruction.

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Summary: This study investigated the effectiveness of an instructional program (schema-based instruction, SBI) designed to teach 7th graders how to comprehend and solve proportion problems involving ratios/rates, scale drawings, and percents. The SBI program emphasized the underlying mathematical structure of problems via schematic diagrams, focused on a 4-step procedure to support and monitor problem solving, and addressed the flexible use of alternative solution strategies based on the problem situation. Blocking by teacher at three middle schools, the authors randomly assigned the 21 classrooms to one of two conditions: SBI and control. Classroom teachers provided the instruction. Results of multilevel modeling used to test for treatment effects after accounting for pretests and other characteristics (gender, ethnicity) revealed the direct effects of SBI on mathematical problem solving at posttest. However, the improved problem solving skills were not maintained a month later when SBI was no longer in effect nor did the skills transfer to solving problems in new domain-level content.

Classification: F83 F93 D53

Keywords: middle school students; problem solving; grade 7; thinking skills; instructional effectiveness; skills; mathematical concepts; visual aids; control groups; experimental groups; pretests; posttests; transfer of training; word problems

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