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Self-regulated learning of basic arithmetic skills: a longitudinal study.

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Summary: Background: Several studies have examined young primary school children's use of strategies when solving simple addition and subtraction problems. Most of these studies have investigated students' strategy use as if they were isolated processes. To date, we have little knowledge about how math strategies in young students are related to other important aspects in self-regulated learning. Aim: The main purpose of this study was to examine relations between young primary school children's basic mathematical skills and their use of math strategies, their metacognitive competence and motivational beliefs, and to investigate how students with basic mathematics skills at various levels differ in respect to the different self-regulation components. Sample: The participants were comprised of 27 year 2 students, all from the same class. Method: The data were collected in three stages (autumn year 2, spring year 2, and autumn year 3). The children's arithmetic skills were measured by age relevant tests, while strategy use, metacognitive competence, and motivational beliefs were assessed through individual interviews. The participants were divided into three performance groups; very good students, good students, and not-so-good students. Results: Analyses revealed that young primary school children at different levels of basic mathematics skill may differ in several important aspects of self-regulated learning. Analyses revealed that a good performance in addition and subtraction was related not only to the children's use of advanced mathematics strategies, but also to domain-specific metacognitive competence, ability attribution for success, effort attribution for failure, and high perceived self-efficacy when using specific strategies. Conclusions: The results indicate that instructional efforts to facilitate self-regulated learning of basic arithmetic skills should address cognitive, metacognitive, and motivational aspects of self-regulation. This is particularly important for low-performing students.

Classification: C32 C72 D52 F32
Keywords: self efficacy; achievement; program effectiveness; skills; subtraction; primary education; addition; problem solving; investigations; learning strategies; data collection; arithmetic; tests; metacognition; interviews; longitudinal studies; self management; student motivation; educational psychology
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