

## EXPLORING THE RELATIONSHIP BETWEEN ACADEMIC SELF-EFFICACY AND MIDDLE SCHOOL STUDENTS' PERFORMANCE ON A HIGH-STAKES MATHEMATICS TEST

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*This study investigates the relationship between middle school students' academic self-efficacy and performance on the TAKS high-stakes mathematics test. The baseline sample was (n=2,508) middle school students. Self-efficacy scores did not have a significant interaction with gender, but were found to decrease significantly (as do TAKS passing rates) as the grade level increased – a sobering trend. This study has major implications for pedagogy and curricular approaches and interventions.*

This study aimed to explore the possible relationship between middle school students' academic self-efficacy and performance on a high stakes mathematics test. Researchers are beginning to recognize that both the cognitive and affective aspects of learning are present when students construct mathematical understandings. Affective influences are hard to measure, but clearly influence students' participation in mathematics study and careers. Research indicates that self-efficacy influences academic motivation (Pajares 1996; Schunk 1995). Self-efficacy is one's self-judgments of personal capabilities to initiate and successfully perform specified tasks at designated levels, expend greater effort and persevere in the face of adversity (Bandura 1988, 1986). Self-efficacy is grounded in a larger theoretical framework known as Social Cognitive Theory which supports human achievement as dependent on interactions between one's behaviors, personal factors and environmental conditions (Bandura 1986, 1997). The work of Bandura concerning self-efficacy indicates that students' perceptions of their abilities to perform tasks, greatly influences their success. Self-efficacy beliefs influence task choice, effort, persistence, resilience, and achievement (Bandura 1997; Schunk 1995). Compared with other students who doubt their learning capabilities, Pajares and Schunk find that those who feel efficacious for learning or performing a task participate more readily, work harder, persist longer when they encounter difficulties, and achieve at a higher level. The stronger the perceived self-efficacy, the higher the goal challenges people set for themselves and the firmer is their commitment to them (Bandura 1991). Ability is not a fixed attribute residing in one's behavioral repertoire. Rather it is a generative capability in which cognitive, social, motivational, and behavioral skills must be organized and effectively orchestrated to serve numerous purposes (Bandura 1993).

The measures used were the Middle School Self-Efficacy Scale (validated in Fouad, Smith, Enochs 1997) and the Texas Assessment of Knowledge and Skills (TAKS). Regression and two-way ANOVA were used for analysis.

Baseline data was collected from 1,148 students at Jackson Middle School and from 1,360 students at Waldo Middle School (names are pseudonyms for schools in El Paso County). Based on TAKS passing rates in each subject for all students (and for each ethnic student subgroup meeting minimum size), schools are monitored and classified as "academically unacceptable", "academically acceptable. One school is considered a "high performance" school and the other is a "low performance" school. Scores were matched on ethnicity and grade levels. A subset of

students from Jackson Middle School was selected to match individual scores on both instruments using a regression to determine the relationship between academic self-efficacy and math scores.

High self-efficacy scores were consistent with mean TAKS scores across both schools and among grade levels. TAKS scores and self-efficacy scores decreased across the middle school experience with both schools. However, there is a decrease in mathematics test scores as students progress through the middle school grades. This pattern is evident in both the lower socioeconomic and the higher socioeconomic middle school samples. There is a decrease in students' self-efficacy scores as they progress through the middle school experience across socioeconomic status variables. These patterns are consistent with both sample populations.

A two-way ANOVA indicated that self-efficacy scores were significantly influenced by the school attended:  $F(1,790) = 5.181, p = .023$ . There was not a significant influence from gender ( $F(1, 790) = .049, p = .825$ ), nor was there significant interaction between school and gender ( $F(1,790)=1.879, p = .171$ ). The positive correlation ( $r = .215$ ) between individual students' TAKS and self-efficacy scores is highly statistically significant ( $n = 406, p < .001$ ).

This study supports the PME goals by seeking to further a deeper understanding of major psychological aspects of learning and teaching mathematics. Additional related detail appears in Blake, Lesser, Perez, Fonseca, Jablonski, and Gallo (2006).

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