

Mathematics and Science Achievements Predicted by Self-Concept and Subject Value Among 8th Grade Saudi Students: Invariance Across Gender

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The aims of this study were to evaluate the relationships among student's self-perceptions, subject value, and achievement in mathematics and science in a single-sex educational milieu, and test whether the relationships were invariant across gender. The data for this study were obtained from the Third International Math and Science Study (TIMSS) 2007 database in which 4,099 eighth-grade Saudi students participated. The variables used in this study were mathematics and science self-concepts, subject value, and achievement in mathematics and science. The relationships among constructs were examined using structural equation modeling. The results revealed that the measurement and structural models were invariant across gender. Also, although the boys held more positive self-concepts (self-enhancing) about math and science, girls outperformed boys in both math and science (self-improving). The implication of the study is that intervention strategies should consider the conceptualization that self-concept and subject value are two distinct domain-specific constructs. Also, interventions may be differentially designed for boys and girls, especially in single-sex settings. However, more research should be conducted in which high-stake tests vs. low-stake tests like the TIMSS, are used as measures of achievement. Future research may study gender differences in self-concept, subject value, and achievement by using measurement models that provide more detailed information about measurement bias across gender groups.

Keywords: TIMSS, math and science achievement, self-concept, attitudes, gender invariance

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Achievement behavior, self-perception (Heine, 2001), and self-evaluation (Becker et al., 2014) are best understood within a cultural context. Empirical research has indicated that

“individuals evaluate themselves in culturally appropriate ways, deriving feelings of self-esteem particularly from those identity aspects that fulfill values prioritized by others in their

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