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ABSTRACT

This study examined, for Korean and Singaporean eight-grade students, if there were significant sociocultural differences that influenced different gender performance levels in mathematics achievement in the Trends in International Mathematics and Science Study (TIMSS) in 2011. From TIMSS 1995 to TIMSS 2011, Korean girls have been consistently underperforming compared with boys, and Singaporean girls have been consistently outperforming the boys in mathematics achievement. Compared to Singapore, Korea maintains a relatively lower gender equity level. This developed a conceptual model to analyze the influence of sociocultural factors and student attitude towards mathematics-on-mathematics achievement for Korean and Singaporean students.

The TIMSS 2011 mathematics achievement scores and student questionnaire responses from 5,165 Korean and 5, 923 Singaporean eight-grade students were analyzed for the study. Inferential statistics such as correlation analysis, factor analysis, multiple regression analysis, and path analysis were conducted for the study. Interviews were conducted individually with 13 Korean students and 2 teachers to substantiate the quantitative analysis of the study.

The results of the study revealed that there were significant gender differences in parental involvement in education in Korea. The lower level of 'parental involvement in education' for Korean girls negatively contributed to girls' confidence levels and in turn, contributed negatively to their mathematics achievement. The interviews with Korean students further confirmed Korean girls' low confidence levels in mathematics. Additionally, the Korean girls' responses to 'like learning mathematics', 'value learning mathematics' and 'confident with mathematics' were significantly lower than those of the boys. There were no significant gender differences in 'parental involvement in education' among Singaporean students. There was no significant gender difference in 'like learning mathematics' and 'value learning mathematic' in Singapore. The Korean and Singaporean students indicated no significant gender difference in 'teacher influence.' The teacher of both countries provided fender equitable influence on students. The conceptual model revealed that although 'value learning mathematics' and 'confident with mathematics' had a significant effect on mathematics achievement, 'like learning mathematics' had no significant effect on mathematics achievement for Korean students. The Korean students appeared to work hard to achieve high results in mathematics without much regard to interest in mathematics. For Singaporean students, 'value learning mathematics' had no significant effect on mathematics achievement. The TIMSS 2011 results indicated that Singaporean students maintained a low level of appreciation for mathematics (Mullis, et al., 2012). Consistent with the findings of O'Connoer-Petruso and Miranda (2004), the most

significant predictor for mathematics achievement for Korean students and Singaporean students was 'confident with mathematics.'

This study proposes actions to increase parental involvement in girls' education and raise girls' confidence in mathematics to increase girls' mathematics achievement levels and reduce gender gap in mathematics achievement in Korea. The study recommends longer-term national initiatives to raise Korean students' interest in mathematics and raise Singaporean students' appreciation for mathematics. To further advance the studies of gender differences in mathematics achievement, a validation of the conceptual model for other countries with mathematics achievement gender gap can further raise the importance of parental influence on girls' mathematics achievement.

Keywords: Gender differences, Mathematics achievements, Mathematics education