



Speaker Dr. Nicole Else-Quest

Dr. Nicole Else-Quest, Assistant Professor of Psychology at Villanova University, gave a presentation entitled “Cross-National Patterns of Gender Differences in Math Attitudes, Affect, and Achievement” on March 17th at Villanova University. She began by posing the question: “Why are there not more women in STEM (science, technology, engineering and math)?” Part of the answer relates to how adolescents develop their interests and negotiate their identity. The heart of the presentation dealt with the supposed gender gaps in STEM in adolescents. There is mounting evidence that, contrary to stereotypes, the genders are more similar than different. However, there is an over-reliance on North American samples.

In Nicole’s study, she did a meta-analysis on the data from two international math assessment instruments: TIMSS (Trends in International Mathematics and Science Study) and PISA (Program for International Student Assessment). TIMSS 2003 tested 219,612 eighth grade students from 46 countries. This test focuses on achievement level in a math curriculum. PISA 2003 tested 273,883 15-year-olds from 41 countries and was used to assess math literacy. The effect sizes were measured by Cohen’s d value, where $d = (\text{Mean of males} - \text{Mean of females})/\text{pooled SD}$. If $d \sim 0.2$, the effect is small, a d of 0.5 is a medium effect and d of 0.8 is a large effect. For TIMSS-Math, the d value was -0.01, indicating that boys and girls performed similarly overall. For PISA the d value was 0.11, indicating that boys performed slightly better than girls overall. There was a fairly wide range of values for the individual nations, however.

There are several hypotheses as to what would account for the cross-national variation seen in both studies. One is the expectancy-value theory, which proposes that students choose a math task because they can do it or they like it. There are no role models. A second theory is the cognitive social learning theory, in which students perform a task because they were trained to do it and they imitate role models. The third hypothesis is the social structural theory, in which gender roles are based on cultural differences. This

would result in gender differences closely related to cultural variations in opportunity structures for girls and women. The assessment of gender equality is not simple. Individual domains can be health, education, economic (such as pay equity, research jobs), and political. Several composite indicators were chosen, but the best correlations were to the individual domains.

The gender differences in math achievement and attitudes in the TIMSS study (which assessed curriculum) were consistently associated with gender ratios in school enrollment. Gender equity in research jobs was also a strong predictor of the gender gap in math achievement, attitudes and affect. Practical applications of these findings are to use role models/mentors for STEM. Political implications are that structural changes are needed. As for cultural differences, Nicole made the interesting observation that Americans believe in innate ability, so they don't try as hard, whereas Asians believe that achievement results from hard work. The presentation ended with a number of questions from the audience, which continued after the formal session ended. Copies of her journal article were available to those who attended. The article is: "Cross-National Patterns of Gender Differences in Mathematics: A Meta-Analysis," Nicole M. Else- Quest, PhD, Villanova University; Janet Shibley Hyde, PhD, University of Wisconsin-Madison; Marcia C. Linn, PhD, University of California, Berkeley. *Psychological Bulletin*, Vol. 136, No.1.



Dinner prior to the presentation



Dr. Silvia Donnelly and Dr. Marian Birkeland asking questions after the talk

Article and photos by Dr. Sheryl Meyer

<http://www.awisphl.org/March2010meetingreport.pdf>