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**Janet E. Mertz\*** ([mertz@oncology.wisc.edu](mailto:mertz@oncology.wisc.edu)), McArdle Laboratory for Cancer Research, 1400 University Avenue, University of Wisconsin, Madison, WI 53706-1599, and **Jonathan M. Kane** ([kanej@uw.edu](mailto:kanej@uw.edu)), Depart. of Mathematical & Computer Sciences, University of Wisconsin, 800 West Main Street, Whitewater, WI 53190-1790. *Gender Differences in Mathematics: Facts from Recent Data.*

Boys frequently outperform girls in mathematics, resulting in a positive gender gap. Boys' mathematics scores usually exhibit greater variance than girls', resulting in a variance ratio greater than one. However, some nations consistently exhibit no gender gap and variance ratios of one. To identify reasons for these phenomena, we analyzed data from recent Trends in International Mathematics and Science Studies and Programme in International Student Assessments. We found that variance ratio and gender gap are unrelated to a country's wealth, major religion, and co-educational schooling. Instead, they are largely due to a variety of country-specific sociocultural factors. In particular, mathematics performance at the low, medium, and high levels for boys as well as girls exhibited a strong positive correlation with some measures of gender equity, especially participation rate and salary of women in the paid labor force relative to men. Other measures such as the percentage of girls participating on a country's IMO teams also correlate with measures of gender equity. Thus, sociocultural and socioeconomic factors appear to be the primary determinants of mathematics performance at all levels for both girls and boys, not intrinsic biological differences between the sexes or religion. (Received September 18, 2011)