Achievement Differences and Gender

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It has been asserted that achievement differences in certain fields – the sciences in particular – can be explained by innate differences in boys' and girls' ability, specifically their representation among those with the highest ability in mathematics. Although some research evidence supports this hypothesis, scholars have also argued against this claim. For example, a meta-analysis of US state assessments found that female and male 2nd through 11th grade students did not significantly differ in mathematics performance, but limitations in these data did not allow for analyses of the areas in which extant research finds that gender differences may be more likely to emerge – complex problem solving and advanced mathematics (Hyde et al. 2008). If not ability, what does explain variation in male and female secondary school students' selection into scientific disciplines, in postsecondary and beyond?

Importantly, extensive research suggests that gendered differences are most likely shaped more strongly by social, psychological, and cultural forces rather than biology. Recent research shows cross-national variation in sex segregation of career fields as well as in the level of gender differences in students' performance on mathematics assessments. Importantly, differences in science achievement and choice of career pursuits in these fields appear to develop over time.

Socialization begins early in life, including messages girls and boys receive about what careers are appropriate for them. Notably, US girls perform as well as US boys in mathematics and science in elementary and early secondary school on the National Assessment of Educational Progress (NAEP). Male students have been found to slightly outperform females on these tests at the end of high school, particularly on advanced curriculum. One hypothesis for the emergence of this gap could be that males are simply stronger in advanced mathematics and science than females.

But another pattern emerges in secondary school that suggests a different causal path. It is in secondary school that students can choose which courses to take, and females may be less inclined to pursue areas that are not associated with female success. Indeed, males have been found to enroll in more advanced secondary school physics courses than females. Notably, of those students who completed the most advanced mathematics and science courses and went on to major in the most male-dominated sciences – physical sciences, engineering, mathematics, and computer sciences (PEMC) – there is a negative association between female gender and tenth grade perceptions of their mathematics ability on their chances of selecting these majors instead of other college majors – controlling for mathematics ability and other potentially confounding factors (Perez-Felkner et al. 2012). This finding corresponds with research on career task values. When children internalize their society's expectations for their career-related achievement, they may in turn devalue and turn away from tasks related to areas in which their group is not expected to perform well (e.g., mathematics for girls) (Eccles 2011). It may be that gender differences in scientific career achievement can be explained by these social psychological differences in female and male students' orientations to mathematics and science.

Cross-References

▶ Attitude Differences and Gender
▶ Careers and Gender
▶ Gender
▶ Gender-Inclusive Practices
▶ Interventions, Gender-Related
▶ Participation, Gender-Related
▶ Socio-Cultural Perspectives and Characteristics

References

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Achievement Levels

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Keywords

Achievement levels; Advanced International Benchmark; High International Benchmark; Intermediate International Benchmark; Low International Benchmark; TIMSS

Achievement levels are performance standards describing what students who achieve a given level on a scale typically know and can do. They refer to academic achievement providing a context for interpreting students' scores on different assessments. Each achievement level description reveals a picture across a broad range of performance levels with corresponding details related to the framework. They are cumulative, students performing at one of the superior levels also displaying the competencies associated with the lower levels.

For example, Trends in International Mathematics and Science Study (TIMSS) utilizes scale anchoring procedure to summarize and describe achievement at four points on the mathematics and science scales – Advanced International Benchmark (625), High International Benchmark (550), Intermediate International Benchmark (475), and Low International Benchmark (400). The first step was to identify those students scoring at each cut point followed by determining which particular items anchored at each of these benchmarks. To determine which items students at each benchmark are most likely to answer successfully, the percent correct for those students was calculated for each item. The delineation of sets of items that students at each international benchmark are very likely to answer correctly and that discriminate between adjacent anchor points takes into consideration the percentage of students at a particular benchmark correctly answering an item and the percentage of students scoring at the next lower benchmark who correctly answer an item. The experts based on the items' descriptions within each benchmark elaborated the descriptors according to the frameworks. The result is a summary of the international learning outcomes in terms of acquiring skills and knowledge reflecting demonstrably different accomplishments by students reaching each successively higher benchmark.

Cross-References

▶ Assessment Framework
▶ Cut Scores
▶ Scale Scores
▶ Third International Mathematics and Science Study (TIMSS)

Action and Science Learning

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The Actional Turn in the Sciences of Culture

We argue that an actional turn is currently taking place across all the social and human sciences – the "sciences of culture." By "actional turn," we mean the fact that each studied phenomenon is seen through practice, as a practice.