# 4

# Students' Backgrounds and Attitudes Towards Mathematics and Science

## Overview

What leads to such large gender discrepancies in mathematics performance by the final year of secondary school, when relatively few gender differences appear at the fourth and eighth grades? In addition, why do gender differences in science performance appear in the primary grades and increase as students progress through school? Previous studies have examined career aspirations by gender and found that females tended to have much less interest in mathematics and science because of a perceived conflict of roles, interests, usefulness of mathematics, or parental influences.

As a complement to the achievement analyses presented in this report, Chapter 4 explores these issues using the TIMSS background and questionnaire data. More specifically, it presents the results by gender for several background questions, including the amount of time devoted to studying mathematics and science, the perceived value of mathematics and science education, motivating factors to do well in mathematics and science, and career aspirations in fields related to mathematics and science.

## Homework: Do Males and Females Devote the Same Amount of Time to Studying Mathematics and Science?

Since homework assignments can reinforce in-class learning and provide students with additional learning activities, the amount of time students devote to their homework is thought to have a major impact on what is learned. For example, research in learning mathematics has shown that students who spend more time on homework are more likely to develop mathematical ideas, and perform at higher levels on tests that measure mathematical concepts.[8] Thus, this report looks at the amount of time males and females reported spending doing homework or studying mathematics and science.

Exhibit 4.1-4.2

Exhibits 4.1 and 4.2 summarize for the fourth and eighth grades, respectively, the amount of out-of-school time males and females reported studying mathematics and science on a normal school day. On average, internationally, fourth-grade females reported significantly more hours per day spent studying both mathematics and science out of school than did males. They also reported more total hours of daily homework than did males.

At the eighth grade, females in 16 countries devoted significantly more time out of school to their mathematics schoolwork than did males while females in 14 countries spent significantly more time out of school studying science. These data indicate that although female students in the eighth grade reported dedicating just as much, and in several countries, slightly more, time to studying mathematics as did males, it was not evident in their performance. Some students do spend extra time on homework to keep up academically, which possibly could be a contributing factor here.

Exhibit 4.3

Exhibit 4.3 reveals that, internationally, females in the final year of secondary school reported spending more time out of school than males, in studying mathematics (0.9 to 0.7 hours), and science (0.8 to 0.6 hours). Yet, despite the additional time spent studying, females had lower average performance than males on the mathematics and science literacy assessments. Interestingly, even though the gender gap in achievement increased to favor males more at the upper grade levels than at the lower grades, the gender gap in the amount of time devoted to out-of-school study tended to favor of females across the grades. These findings are consistent with those reported in the literature that suggest that females often do better in their mathematics classes (i.e., grades, homework) than males despite performing less well on assessments of mathematics.[9]

[8] Fennema, E. (1990). Justice, equity, and mathematics education" in E. Fennema and G. Leder (Eds.), *Mathematics and Gender: Influences on Teachers and Students.* New York, NY: Teachers College Press.

[9] Willingham, W., and Cole, N. (1997). *Gender and Fair Assessment.* Mawhaw, NJ: Lawrence Erlbaum and Associates.

## Exhibit 4.1 Students' Reports by Gender on Time Spent Studying on a Normal School Day
### Fourth Grade*

| Country | Hours Studying Mathematics | | Hours Studying Science | | Total Hours Studying | |
|---|---|---|---|---|---|---|
| | Males | Females | Males | Females | Males | Females |
| Australia | 0.7 (0.02) | 0.8 (0.02) | 0.4 (0.02) | 0.4 (0.02) | 1.9 (0.05) | 2.0 (0.04) |
| Austria | 0.9 (0.03) | 1.0 (0.03) | 0.9 (0.03) | 0.9 (0.04) | 2.8 (0.07) | 3.0 (0.1) |
| Canada | 0.8 (0.03) | 0.8 (0.03) | 0.6 (0.03) | 0.6 (0.03) | 2.1 (0.07) | 2.3 (0.09) |
| Cyprus | 1.1 (0.04) | 1.1 (0.04) | 0.8 (0.03) | 0.9 (0.04) | 3.0 (0.08) | 3.2 (0.09) |
| Czech Republic | 0.7 (0.02) | 0.8 (0.02) | 0.6 (0.02) | 0.6 (0.02) | 2.1 (0.05) | 2.2 (0.06) |
| Hong Kong | 1.2 (0.04) | ▲ 1.4 (0.03) | 0.8 (0.02) | 0.9 (0.03) | 3.7 (0.07) | ▲ 4.1 (0.08) |
| Hungary | 1.0 (0.03) | 1.1 (0.04) | 1.0 (0.03) | 1.1 (0.04) | 3.1 (0.09) | 3.4 (0.11) |
| Iceland | 0.8 (0.03) | 0.9 (0.04) | 0.3 (0.03) | 0.4 (0.03) | 1.7 (0.07) | 2.0 (0.07) |
| Iran, Islamic Rep. | s 2.3 (0.05) | r 2.4 (0.12) | s 2.0 (0.06) | r 2.2 (0.1) | s 6.4 (0.13) | r 6.8 (0.25) |
| Ireland | 0.7 (0.03) | 0.9 (0.03) | 0.4 (0.02) | 0.4 (0.02) | 2.1 (0.07) | 2.2 (0.05) |
| Japan | 0.8 (0.02) | ▲ 0.9 (0.02) | 0.4 (0.02) | ▲ 0.5 (0.02) | 1.9 (0.06) | ▲ 2.3 (0.05) |
| Korea | 0.9 (0.03) | ▲ 1.1 (0.03) | 0.7 (0.02) | 0.8 (0.03) | 2.8 (0.06) | ▲ 3.1 (0.07) |
| Latvia (LSS) | 1.0 (0.04) | 1.0 (0.04) | 0.8 (0.03) | 0.8 (0.04) | 3.0 (0.1) | 2.8 (0.09) |
| Netherlands | 0.5 (0.04) | 0.5 (0.04) | 0.4 (0.04) | 0.4 (0.03) | 1.4 (0.09) | 1.5 (0.08) |
| New Zealand | 0.8 (0.05) | 0.8 (0.04) | 0.5 (0.04) | 0.4 (0.03) | 2.2 (0.1) | 2.1 (0.09) |
| Norway | 0.6 (0.03) | 0.7 (0.03) | 0.3 (0.02) | 0.4 (0.03) | 1.5 (0.06) | 1.7 (0.06) |
| Portugal | 1.2 (0.04) | 1.3 (0.05) | 1.2 (0.04) | 1.3 (0.05) | 3.7 (0.11) | 3.9 (0.13) |
| Scotland | 0.5 (0.02) | 0.6 (0.02) | 0.3 (0.02) | 0.3 (0.02) | 1.6 (0.05) | 1.6 (0.07) |
| Slovenia | 1.0 (0.03) | 1.1 (0.04) | 1.0 (0.03) | 1.1 (0.04) | 3.0 (0.08) | 3.3 (0.09) |
| United States | 0.9 (0.03) | 1.0 (0.03) | 0.8 (0.03) | 0.8 (0.03) | 2.8 (0.06) | 3.0 (0.07) |
| International Avg. | 0.9 (0.01) | ▲ 1.0 (0.01) | 0.7 (0.01) | ▲ 0.8 (0.01) | 2.6 (0.02) | ▲ 2.8 (0.02) |

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1994-95.

▲ = Gender difference statistically significant at .05 level, adjusted for multiple comparisons

* Fourth Grade in most countries; see Appendix A for information about the grades tested in each country.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

An "r" indicates a 70-84% student response rate. An "s" indicates a 50-69% response rate. Data are not available for England and Singapore because the student response rate was less than 50%.

For comparative purposes, only those countries with approved sampling procedures across all populations are included. As a result, data from Kuwait, Philippines, Denmark, Greece, Thailand, Israel, and South Africa are not analyzed in this section. Bulgaria has also been excluded because achievement data by gender is not available.

## Exhibit 4.2 Students' Reports by Gender on Time Spent Studying on a Normal School Day - Eighth Grade*

| Country | Hours Studying Mathematics | | Hours Studying Science | | Total Hours Studying | |
|---|---|---|---|---|---|---|
| | Males | Females | Males | Females | Males | Females |
| Australia | 0.6 (0.02) | ▲ 0.7 (0.02) | 0.5 (0.02) | ▲ 0.6 (0.02) | 1.8 (0.05) | ▲ 2.3 (0.05) |
| Austria | 0.7 (0.02) | ▲ 0.9 (0.03) | 0.6 (0.03) | ▲ 0.9 (0.05) | 2.0 (0.06) | ▲ 2.7 (0.11) |
| Belgium (Fl) | 1.0 (0.03) | 1.2 (0.04) | 0.7 (0.02) | ▲ 0.9 (0.03) | 3.1 (0.07) | ▲ 3.8 (0.1) |
| Belgium (Fr) | 0.9 (0.03) | 1.0 (0.03) | 0.8 (0.03) | 0.9 (0.04) | 2.8 (0.1) | 3.2 (0.09) |
| Canada | 0.7 (0.03) | 0.8 (0.02) | 0.5 (0.02) | 0.6 (0.02) | 2.0 (0.08) | ▲ 2.4 (0.07) |
| Colombia | 1.3 (0.09) | 1.4 (0.05) | 1.2 (0.1) | 1.2 (0.05) | 4.5 (0.23) | 4.7 (0.14) |
| Cyprus | 1.1 (0.03) | 1.3 (0.03) | 0.8 (0.03) | 0.9 (0.03) | 3.3 (0.08) | ▲ 3.9 (0.09) |
| Czech Republic | 0.5 (0.02) | ▲ 0.7 (0.02) | 0.5 (0.02) | ▲ 0.7 (0.03) | 1.6 (0.05) | ▲ 2.1 (0.05) |
| France | 0.8 (0.03) | 0.9 (0.02) | 0.6 (0.02) | 0.6 (0.02) | 2.5 (0.06) | ▲ 2.9 (0.07) |
| Germany | 0.6 (0.02) | ▲ 0.7 (0.02) | 0.6 (0.03) | 0.7 (0.02) | 1.8 (0.06) | ▲ 2.2 (0.06) |
| Hong Kong | 0.8 (0.03) | 0.9 (0.02) | 0.6 (0.02) | 0.5 (0.02) | 2.5 (0.08) | 2.7 (0.08) |
| Hungary | 0.8 (0.02) | ▲ 0.9 (0.02) | 0.9 (0.03) | ▲ 1.2 (0.04) | 2.6 (0.06) | ▲ 3.6 (0.08) |
| Iceland | 0.9 (0.03) | 0.9 (0.04) | 0.6 (0.04) | 0.6 (0.03) | 2.3 (0.09) | 2.5 (0.09) |
| Iran, Islamic Rep. | 1.9 (0.06) | ▲ 2.2 (0.06) | 1.7 (0.06) | ▲ 2.1 (0.06) | 5.9 (0.13) | ▲ 7.1 (0.12) |
| Ireland | 0.7 (0.02) | 0.8 (0.02) | 0.6 (0.02) | 0.6 (0.02) | 2.4 (0.06) | ▲ 2.9 (0.07) |
| Japan | 0.7 (0.02) | 0.8 (0.02) | 0.6 (0.02) | 0.6 (0.02) | 2.2 (0.05) | 2.4 (0.05) |
| Korea | 0.7 (0.03) | ▲ 0.9 (0.03) | 0.5 (0.02) | 0.6 (0.02) | 2.3 (0.06) | ▲ 2.7 (0.07) |
| Latvia (LSS) | 0.8 (0.02) | ▲ 1.0 (0.03) | 0.6 (0.02) | ▲ 0.7 (0.02) | 2.3 (0.06) | ▲ 3.1 (0.07) |
| Lithuania | 0.7 (0.03) | ▲ 0.9 (0.03) | 0.6 (0.03) | 0.8 (0.03) | 2.3 (0.08) | ▲ 3.0 (0.08) |
| Netherlands | 0.6 (0.02) | 0.6 (0.01) | 0.6 (0.02) | 0.6 (0.02) | 2.1 (0.05) | 2.2 (0.05) |
| New Zealand | 0.6 (0.02) | 0.7 (0.02) | 0.5 (0.02) | 0.6 (0.02) | 2.0 (0.06) | 2.2 (0.06) |
| Norway | 0.7 (0.02) | 0.7 (0.02) | 0.6 (0.02) | 0.6 (0.01) | 2.3 (0.05) | 2.4 (0.06) |
| Portugal | 0.8 (0.02) | ▲ 1.1 (0.03) | 0.8 (0.02) | ▲ 1.0 (0.03) | 2.7 (0.06) | ▲ 3.4 (0.07) |
| Romania | 1.7 (0.07) | 1.9 (0.08) | 1.5 (0.07) | 1.7 (0.08) | 4.7 (0.19) | 5.3 (0.22) |
| Russian Federation | 0.8 (0.03) | ▲ 1.0 (0.02) | 0.9 (0.02) | ▲ 1.1 (0.04) | 2.6 (0.06) | ▲ 3.2 (0.07) |
| Scotland | 0.5 (0.02) | 0.6 (0.02) | 0.5 (0.02) | 0.5 (0.02) | 1.6 (0.06) | ▲ 1.9 (0.05) |
| Singapore | 1.4 (0.02) | 1.5 (0.03) | 1.3 (0.02) | 1.4 (0.02) | 4.5 (0.06) | 4.7 (0.05) |
| Slovak Republic | 0.6 (0.02) | ▲ 0.8 (0.02) | 0.7 (0.02) | ▲ 0.8 (0.03) | 2.1 (0.05) | ▲ 2.7 (0.05) |
| Slovenia | 0.8 (0.03) | ▲ 1.0 (0.03) | 0.9 (0.03) | ▲ 1.1 (0.03) | 2.5 (0.07) | ▲ 3.2 (0.07) |
| Spain | 1.1 (0.03) | ▲ 1.2 (0.03) | 0.9 (0.03) | ▲ 1.1 (0.03) | 3.2 (0.07) | ▲ 4.0 (0.08) |
| Sweden | 0.6 (0.02) | 0.7 (0.02) | 0.6 (0.02) | 0.7 (0.02) | 2.1 (0.05) | ▲ 2.4 (0.05) |
| Switzerland | 0.9 (0.02) | ▲ 1.0 (0.02) | 0.7 (0.02) | ▲ 0.8 (0.02) | 2.4 (0.05) | ▲ 2.9 (0.06) |
| United States | 0.7 (0.02) | ▲ 0.8 (0.02) | 0.6 (0.02) | ▲ 0.7 (0.02) | 2.1 (0.05) | ▲ 2.5 (0.05) |
| International Avg. | 0.9 (0.01) | ▲ 1.0 (0.01) | 0.7 (0.01) | ▲ 0.9 (0.01) | 2.6 (0.01) | ▲ 3.1 (0.01) |

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1994-95.

▲ = Gender difference statistically significant at .05 level, adjusted for multiple comparisons

* Eighth Grade in most countries; see Appendix A for information about the grades tested in each country.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

An "r" indicates a 70-84% student response rate. An "s" indicates a 50-69% response rate. Data are not available for England because the student response rate was less than 50%.

For comparative purposes, only those countries with approved sampling procedures across all populations are included. As a result, data from Kuwait, Philippines, Denmark, Greece, Thailand, Israel, and South Africa are not analyzed in this section. Bulgaria has also been excluded because achievement data by gender is not available.

## Exhibit 4.3 Students' Reports by Gender on Time Spent Studying on a Normal School Day - Final Year of Secondary School*

| Country | Hours Studying Mathematics | | Hours Studying Science | | Total Hours Studying | |
|---|---|---|---|---|---|---|
| | Males | Females | Males | Females | Males | Females |
| Australia | 0.9 (0.06) | 1.0 (0.04) | 0.9 (0.06) | 1.1 (0.05) | 2.9 (0.18) | ▲ 3.6 (0.14) |
| Austria | 0.5 (0.04) | 0.7 (0.05) | 0.3 (0.03) | ▲ 0.5 (0.04) | 1.5 (0.1) | ▲ 2.3 (0.12) |
| Canada | 1.0 (0.05) | ▲ 1.2 (0.07) | 0.9 (0.04) | ▲ 1.3 (0.09) | 2.3 (0.1) | ▲ 3.1 (0.16) |
| Cyprus | 0.9 (0.07) | 1.1 (0.08) | 0.6 (0.06) | 0.5 (0.03) | 2.7 (0.17) | ▲ 3.5 (0.17) |
| Czech Republic | 0.3 (0.02) | 0.4 (0.05) | 0.3 (0.06) | ▲ 0.7 (0.07) | 1.0 (0.07) | ▲ 1.8 (0.09) |
| France | 1.0 (0.04) | 0.9 (0.05) | 0.9 (0.05) | 1.0 (0.06) | 3.1 (0.1) | ▲ 3.8 (0.16) |
| Hungary | 0.7 (0.02) | ▲ 0.8 (0.03) | 0.7 (0.03) | ▲ 1.1 (0.05) | 2.3 (0.07) | ▲ 3.6 (0.12) |
| Iceland | 0.6 (0.03) | 0.7 (0.03) | 0.4 (0.02) | ▲ 0.5 (0.02) | 1.8 (0.05) | ▲ 2.4 (0.07) |
| Lithuania | 0.7 (0.04) | ▲ 0.9 (0.04) | 0.6 (0.03) | ▲ 1.0 (0.05) | 2.3 (0.14) | ▲ 3.7 (0.13) |
| Netherlands | 0.6 (0.03) | ▲ 0.8 (0.05) | 0.6 (0.04) | 0.7 (0.05) | 1.5 (0.08) | 1.9 (0.09) |
| New Zealand | 0.7 (0.03) | 0.8 (0.04) | 0.6 (0.03) | 0.6 (0.03) | 2.0 (0.08) | ▲ 2.5 (0.07) |
| Norway | 0.4 (0.03) | 0.5 (0.05) | 0.6 (0.06) | ▲ 0.9 (0.06) | 1.5 (0.05) | ▲ 2.4 (0.07) |
| Russian Federation | 1.2 (0.07) | 1.3 (0.07) | 1.0 (0.06) | 1.1 (0.05) | 3.0 (0.12) | ▲ 3.8 (0.13) |
| Slovenia | 0.6 (0.04) | ▲ 1.0 (0.07) | 0.4 (0.03) | 0.5 (0.07) | 1.6 (0.1) | ▲ 2.7 (0.17) |
| Sweden | 0.4 (0.02) | 0.5 (0.02) | 0.6 (0.04) | 0.6 (0.04) | 1.5 (0.08) | ▲ 2.3 (0.06) |
| Switzerland | 0.8 (0.05) | ▲ 1.0 (0.06) | 0.6 (0.05) | 0.7 (0.06) | 1.6 (0.08) | ▲ 2.5 (0.11) |
| United States | 0.6 (0.03) | ▲ 0.8 (0.03) | 0.6 (0.04) | ▲ 0.7 (0.05) | 1.4 (0.08) | ▲ 2.1 (0.07) |
| International Avg. | 0.7 (0.01) | ▲ 0.9 (0.01) | 0.6 (0.01) | ▲ 0.8 (0.01) | 2.0 (0.03) | ▲ 2.9 (0.03) |

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1994-95.

▲ = Gender difference statistically significant at .05 level, adjusted for multiple comparisons

* See Appendix A for information about the grades tested in each country.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

An "r" indicates a 70-84% student response rate. An "s" indicates a 50-69% response rate. Data are not available for Germany because the student response rate was less than 50%.

For comparative purposes, only those countries with approved sampling procedures across all populations are included. As a result, data from Kuwait, Philippines, Denmark, Greece, Thailand, Israel, and South Africa are not analyzed in this section. Bulgaria has also been excluded because achievement data by gender is not available.

## Attitudes Towards Mathematics and Science: How Much Do Males and Females Value Education in Mathematics and Science?

Student's attitudes and beliefs have an enormous impact on student performance in a particular subject area. As part of examining students' attitudes towards mathematics and science, TIMSS asked questions about the degree of agreement with the importance of doing well in the three major academic subjects of mathematics, science, and language. For purposes of comparison, students also were asked about the importance of two non-academic activities – having time to have fun and being good at sports. The degree of agreement within each category was examined by gender to see if males and females had different levels of agreement on all three academic-related questions and the two non-academic questions.

There is a whole host of literature, including the findings of TIMSS and previous IEA studies in reading literacy, mathematics, and science, showing that females usually outperform males in reading and writing, and that males outperform females in science and mathematics and devote more time to playing sports.[10] The literature sometimes suggests that these have become "stereotypical roles" for males and females that are often reinforced by teachers, parents, and by the students themselves.

Exhibit 4.4

Perhaps somewhat surprisingly, Exhibit 4.4 shows that in many countries, at fourth grade, it was females who were significantly more likely than males to report that it is important to do well in mathematics and science. Consistent with anticipated results, however, in two-thirds of the countries, significantly greater percentages of fourth-grade males than females reported that it was important to do well in sports. Exhibit 4.5 indicates that in the eighth grade there were few differences in the percentages of males and females reporting that they think it is important to do well in mathematics or science. Consistent with the previous studies mentioned above, however, significantly more females than males felt that it was important to well in language. Again, in all but two countries, Colombia and Iran, eighth-grade males more often than females felt that they needed to be good in sports.

Exhibit 4.5

[10] See Beaton, A.E., Mullis, I.V.S., Martin, M.O., Gonzalez, E.J., Kelly, D.L., and Smith, T.A. (1996). *Mathematics Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study (TIMSS).* Chestnut Hill, MA: Boston College; Beaton, A.E., Martin, M.O., Mullis, I.V.S., Gonzalez, E.J., Smith, T.A., and Kelly, D.L. (1996). *Science Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study (TIMSS).* Chestnut Hill, MA: Boston College; Elley, W.B. (1992). *How in the world do students read?: IEA Study of reading literacy.* Hamburg, Germany: Grindeldruck GMBH (especially Chapter 6).

## Exhibit 4.4 Students' Reports by Gender on the Importance of Doing Well in Various Activities - Fourth Grade*

| Country | Do Well in Mathematics | | Do Well in Science | | Be Good at Sports | |
|---|---|---|---|---|---|---|
| | Males | Females | Males | Females | Males | Females |
| Australia | 93 (0.6) | ▲ 97 (0.4) | 90 (1.0) | 92 (1.0) | ▲ 91 (0.7) | 86 (0.9) |
| Austria | 96 (0.8) | 95 (0.7) | 94 (0.6) | 94 (0.9) | 89 (1.1) | 85 (1.7) |
| Canada | 97 (0.5) | 98 (0.4) | 93 (0.8) | 96 (0.7) | ▲ 86 (1.0) | 80 (0.9) |
| Cyprus | 97 (0.5) | 97 (0.5) | 93 (0.7) | 92 (0.8) | ▲ 93 (0.8) | 83 (1.5) |
| Czech Republic | 96 (0.5) | 97 (0.5) | 95 (0.5) | 97 (0.5) | 90 (0.9) | 86 (1.1) |
| England | 96 (0.5) | 97 (0.5) | 93 (0.8) | 94 (0.7) | ▲ 92 (0.6) | 89 (1.1) |
| Hong Kong | 95 (0.6) | ▲ 98 (0.4) | 88 (1.1) | 92 (0.9) | ▲ 69 (1.4) | 56 (1.7) |
| Hungary | 97 (0.4) | 98 (0.4) | 97 (0.5) | 97 (0.4) | ▲ 89 (0.9) | 82 (1.3) |
| Iceland | 94 (0.8) | ▲ 98 (0.4) | 84 (1.8) | 90 (1.7) | 92 (1.0) | 94 (0.8) |
| Iran, Islamic Rep. | r 95 (0.7) | 97 (0.7) | 97 (0.5) | 97 (0.9) | r 91 (1.1) | r 91 (1.8) |
| Ireland | 95 (0.7) | ▲ 99 (0.3) | 86 (1.2) | ▲ 93 (0.8) | 92 (0.9) | 88 (1.0) |
| Japan | 77 (0.9) | 74 (1.0) | 73 (1.0) | 70 (1.1) | ▲ 80 (0.9) | 70 (1.0) |
| Korea | 72 (1.4) | 71 (1.3) | 71 (1.3) | 68 (1.4) | ▲ 76 (1.2) | 69 (1.3) |
| Latvia (LSS) | 96 (0.6) | 97 (0.5) | 91 (0.9) | ▲ 95 (0.7) | ▲ 92 (1.2) | 83 (1.5) |
| Netherlands | 93 (1.2) | 93 (1.0) | 82 (1.8) | 85 (1.6) | 88 (1.2) | 84 (1.4) |
| New Zealand | 94 (0.9) | ▲ 97 (0.5) | 89 (1.0) | 92 (1.0) | 91 (0.9) | 91 (0.9) |
| Norway | 92 (0.9) | 96 (1.0) | 88 (1.3) | ▲ 94 (1.0) | ▲ 84 (1.2) | 75 (1.5) |
| Portugal | 94 (0.7) | 95 (0.7) | 94 (0.8) | 95 (0.8) | ▲ 94 (0.7) | 84 (1.7) |
| Scotland | 96 (0.5) | ▲ 99 (0.3) | 92 (0.7) | 94 (0.7) | ▲ 94 (0.6) | 90 (0.9) |
| Singapore | 97 (0.3) | ▲ 98 (0.3) | 93 (0.5) | ▲ 96 (0.5) | 82 (0.9) | 79 (1.2) |
| Slovenia | 92 (0.7) | 95 (0.7) | 91 (0.9) | ▲ 96 (0.7) | ▲ 94 (0.6) | 90 (0.8) |
| United States | 97 (0.4) | ▲ 99 (0.3) | 96 (0.5) | ▲ 98 (0.3) | ▲ 89 (0.9) | 76 (1.0) |
| International Avg. | 93 (0.2) | ▲ 95 (0.1) | 90 (0.2) | ▲ 92 (0.2) | ▲ 88 (0.2) | 82 (0.3) |

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1994-95.

▲ = Gender difference statistically significant at .05 level, adjusted for multiple comparisons

* Fourth Grade in most countries; see Appendix A for information about the grades tested in each country.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

An "r" indicates a 70-84% student response rate. An "s" indicates a 50-69% response rate. Data are not available for Germany because the student response rate was less than 50%.

For comparative purposes, only those countries with approved sampling procedures across all populations are included. As a result, data from Kuwait, Philippines, Denmark, Greece, Thailand, Israel, and South Africa are not analyzed in this section. Bulgaria has also been excluded because achievement data by gender is not available.

## Exhibit 4.5 Students' Reports by Gender on the Importance of Doing Well in Various Activities - Eighth Grade*

| Country | Do Well in Mathematics | | Do Well in Science | | Do Well in Language | |
|---|---|---|---|---|---|---|
| | Males | Females | Males | Females | Males | Females |
| Australia | 96 (0.5) | 96 (0.4) | 89 (0.9) | 89 (0.7) | 94 (0.7) | ▲ 96 (0.4) |
| Austria | 95 (0.6) | 93 (0.8) | 83 (1.2) | 81 (1.7) | 91 (1.0) | ▲ 95 (0.9) |
| Belgium (Fl) | 98 (0.5) | 99 (0.4) | 93 (0.7) | 93 (0.9) | 97 (0.6) | 99 (0.3) |
| Belgium (Fr) | 98 (0.4) | 99 (0.3) | 94 (0.9) | 94 (0.9) | 98 (0.5) | 99 (0.4) |
| Canada | 97 (0.4) | 98 (0.4) | 94 (0.8) | 94 (0.9) | 96 (0.5) | ▲ 98 (0.3) |
| Colombia | 99 (0.4) | 100 (0.1) | 99 (0.3) | 100 (0.1) | 99 (0.4) | 99 (0.2) |
| Cyprus | 93 (0.9) | 96 (0.5) | 87 (1.2) | 86 (1.2) | 92 (0.8) | ▲ 97 (0.5) |
| Czech Republic | 98 (0.6) | 97 (0.9) | 90 (1.2) | 87 (1.2) | 97 (0.6) | 98 (0.5) |
| England | 99 (0.3) | 99 (0.4) | 97 (0.5) | 95 (0.8) | 99 (0.3) | 99 (0.4) |
| France | 97 (0.5) | 97 (0.6) | ▲ 86 (1.3) | 79 (1.5) | 95 (0.8) | ▲ 99 (0.3) |
| Germany | 94 (0.8) | 91 (0.9) | ▲ 77 (1.3) | 68 (1.4) | 90 (0.9) | 93 (0.7) |
| Hong Kong | 96 (0.6) | 97 (0.6) | 91 (0.9) | 90 (1.3) | 95 (0.7) | 97 (0.6) |
| Hungary | 94 (0.8) | 96 (0.6) | 84 (1.2) | 87 (0.9) | 93 (0.9) | ▲ 96 (0.5) |
| Iceland | 96 (1.7) | 98 (0.7) | 89 (1.5) | 91 (1.5) | 95 (1.8) | 98 (0.6) |
| Iran, Islamic Rep. | 97 (0.7) | 98 (0.5) | 98 (0.7) | 98 (0.5) | 96 (0.7) | 95 (0.8) |
| Ireland | 97 (0.6) | 98 (0.4) | 87 (1.4) | 86 (1.6) | 95 (0.6) | ▲ 98 (0.4) |
| Japan | 92 (0.5) | 93 (0.5) | 88 (0.7) | 86 (0.8) | 90 (0.6) | ▲ 93 (0.5) |
| Korea | 93 (0.7) | 94 (0.7) | 90 (0.8) | 93 (0.8) | 91 (0.8) | ▲ 95 (0.7) |
| Latvia (LSS) | 96 (0.6) | 98 (0.4) | 83 (1.4) | 85 (1.2) | 96 (0.6) | ▲ 99 (0.3) |
| Lithuania | 91 (1.0) | ▲ 95 (0.7) | 77 (1.5) | 79 (1.4) | 94 (0.9) | ▲ 98 (0.4) |
| Netherlands | 98 (0.5) | 97 (1.1) | 96 (0.7) | 94 (1.2) | 98 (0.5) | 99 (0.2) |
| New Zealand | 97 (0.4) | 97 (0.5) | 93 (0.7) | 91 (0.8) | 94 (0.7) | 97 (0.4) |
| Norway | 96 (0.7) | 96 (0.6) | 94 (0.8) | 91 (0.7) | 95 (0.7) | 97 (0.6) |
| Portugal | 97 (0.5) | 98 (0.4) | 97 (0.4) | 98 (0.3) | 98 (0.3) | 100 (0.2) |
| Romania | 88 (1.0) | 87 (1.1) | 86 (0.9) | 86 (1.2) | 88 (1.2) | 89 (1.1) |
| Russian Federation | 97 (0.5) | 97 (0.5) | 94 (0.8) | 95 (0.7) | 95 (0.7) | ▲ 99 (0.4) |
| Scotland | 98 (0.4) | 98 (0.5) | 93 (1.0) | 91 (0.9) | 98 (0.5) | 98 (0.3) |
| Singapore | 99 (0.3) | 99 (0.2) | 99 (0.3) | 99 (0.2) | 100 (0.1) | 100 (0.1) |
| Slovak Republic | 97 (0.5) | 95 (0.5) | 86 (1.0) | 85 (1.1) | 95 (0.6) | ▲ 98 (0.4) |
| Slovenia | 96 (0.5) | 96 (0.7) | 87 (1.0) | 85 (1.3) | 95 (0.6) | 96 (0.6) |
| Spain | 98 (0.4) | ▲ 100 (0.1) | 98 (0.4) | 99 (0.2) | 98 (0.4) | ▲ 100 (0.2) |
| Sweden | 92 (0.7) | 91 (0.8) | 87 (1.0) | 82 (1.2) | 89 (0.9) | 91 (0.8) |
| Switzerland | 97 (0.5) | 94 (0.6) | ▲ 72 (1.6) | 64 (1.4) | 92 (0.8) | ▲ 96 (0.4) |
| United States | 96 (0.4) | 98 (0.4) | 95 (0.6) | 96 (0.5) | 95 (0.4) | ▲ 98 (0.4) |
| International Avg. | 96 (0.1) | 96 (0.1) | ▲ 90 (0.2) | 89 (0.2) | 95 (0.1) | ▲ 97 (0.1) |

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1994-95.

▲ = Gender difference statistically significant at .05 level, adjusted for multiple comparisons

* Eighth Grade in most countries; see Appendix A for information about the grades tested in each country

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

An "r" indicates a 70-84% student response rate. An "s" indicates a 50-69% response rate.

For comparative purposes, only those countries with approved sampling procedures across all populations are included. As a result, data from Kuwait, Philippines, Denmark, Greece, Thailand, Israel, and South Africa are not analyzed in this section. Bulgaria has also been excluded because achievement data by gender is not available.

## Exhibit 4.5 (Continued)

**Students' Reports by Gender on the Importance of Doing Well in Various Activities - Eighth Grade***

| Country | Have Time to Have Fun | | Be Good at Sports | |
|---|---|---|---|---|
| | Males | Females | Males | Females |
| Australia | 98 (0.3) | 99 (0.3) | ▲ 91 (0.6) | 78 (0.8) |
| Austria | 98 (0.5) | 99 (0.4) | ▲ 86 (1.2) | 79 (1.1) |
| Belgium (Fl) | 97 (0.5) | 99 (0.3) | ▲ 86 (1.1) | 74 (1.4) |
| Belgium (Fr) | 98 (0.6) | 99 (0.4) | ▲ 93 (0.9) | 81 (1.1) |
| Canada | 99 (0.2) | 99 (0.2) | ▲ 91 (0.7) | 81 (1.0) |
| Colombia | 98 (0.6) | 98 (0.3) | 98 (0.5) | 97 (0.5) |
| Cyprus | 94 (0.8) | 95 (0.6) | ▲ 92 (1.0) | 78 (1.4) |
| Czech Republic | 98 (0.4) | 98 (0.4) | ▲ 89 (1.2) | 78 (1.5) |
| England | 99 (0.3) | 98 (0.5) | ▲ 88 (1.2) | 70 (1.7) |
| France | 97 (0.5) | 98 (0.5) | ▲ 87 (1.0) | 72 (1.2) |
| Germany | 96 (0.5) | 97 (0.5) | ▲ 79 (1.4) | 65 (1.7) |
| Hong Kong | 95 (0.7) | 94 (0.7) | ▲ 89 (0.7) | 75 (1.5) |
| Hungary | 96 (0.6) | 97 (0.6) | ▲ 86 (1.2) | 70 (1.4) |
| Iceland | 97 (0.7) | 98 (0.5) | 93 (2.5) | 87 (1.5) |
| Iran, Islamic Rep. | ▲ 92 (0.8) | 81 (2.0) | ▲ 91 (0.2) | 92 (1.5) |
| Ireland | 98 (0.4) | 100 (0.2) | ▲ 97 (0.5) | 79 (1.3) |
| Japan | 99 (0.2) | 99 (0.2) | ▲ 90 (1.0) | 77 (1.2) |
| Korea | 89 (0.9) | 85 (1.3) | ▲ 88 (0.7) | 80 (1.2) |
| Latvia (LSS) | 97 (0.5) | 97 (0.6) | ▲ 91 (0.7) | 81 (1.3) |
| Lithuania | 94 (0.9) | 94 (0.7) | ▲ 95 (0.7) | 89 (0.8) |
| Netherlands | 98 (0.6) | 98 (0.7) | ▲ 97 (0.7) | 70 (1.7) |
| New Zealand | 98 (0.4) | 99 (0.3) | ▲ 87 (1.3) | 81 (0.9) |
| Norway | 99 (0.3) | 99 (0.2) | ▲ 92 (0.7) | 76 (1.2) |
| Portugal | ▲ 97 (0.4) | 89 (0.8) | ▲ 83 (1.2) | 91 (0.9) |
| Romania | 88 (1.1) | 84 (1.4) | ▲ 98 (0.4) | 74 (1.5) |
| Russian Federation | 98 (0.4) | 98 (0.5) | ▲ 86 (1.2) | 82 (1.2) |
| Scotland | 98 (0.4) | 98 (0.4) | ▲ 95 (0.7) | 74 (1.4) |
| Singapore | 95 (0.4) | 96 (0.4) | ▲ 90 (0.9) | 85 (1.0) |
| Slovak Republic | 98 (0.4) | 98 (0.4) | ▲ 93 (0.6) | 87 (0.9) |
| Slovenia | 95 (0.7) | 95 (0.7) | ▲ 95 (0.5) | 81 (1.2) |
| Spain | 99 (0.2) | 99 (0.2) | ▲ 92 (0.8) | 93 (0.5) |
| Sweden | 98 (0.3) | 99 (0.2) | ▲ 97 (0.4) | 79 (1.0) |
| Switzerland | 94 (0.7) | 95 (0.6) | ▲ 89 (0.8) | 71 (1.5) |
| United States | 98 (0.3) | 99 (0.2) | ▲ 85 (0.9) | 83 (0.9) |
| International Avg. | 97 (0.1) | 96 (0.1) | ▲ 93 (0.5) | 80 (0.2) |

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1994-95.

▲ = Gender difference statistically significant at .05 level, adjusted for multiple comparisons

* Eighth Grade in most countries; see Appendix A for information about the grades tested in each country

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

An "r" indicates a 70-84% student response rate. An "s" indicates a 50-69% response rate.

For comparative purposes, only those countries with approved sampling procedures across all populations are included. As a result, data from Kuwait, Philippines, Denmark, Greece, Thailand, Israel, and South Africa are not analyzed in this section. Bulgaria has also been excluded because achievement data by gender is not available.

Exhibit 4.6

Exhibit 4.6 shows the responses given by students in the final year of secondary school to the questions about the importance of doing well in mathematics and science. As the data reveal, the response patterns by gender shift dramatically between the fourth grade and the final-year of secondary school. The TIMSS data show a progression from the fourth grade, where more females than males felt it was important to do well in mathematics and science, to the eighth grade where there were few differences by gender. By the final year of secondary school, significantly more males than females in most countries reported that it was important to do well in mathematics and science. Consistent with the earlier grades, final-year females reported that they thought it was important to do well in language, and males reported that it was important to do well in sports. Internationally, the differences were statistically significant with more males than females reporting it was important to do well in mathematics (83% to 75%); in science (73% to 66%); and sports (78% to 61%). Females reported in significantly greater numbers than males (91% to 84%) that it was important to do well in language.

There are a number of theories as to why more males than females seem to believe that it is important to do well in mathematics and science, including the role of parents in the development of their children's belief structure. The TIMSS results show that as early as the eighth-grade students in nearly every country reported a gender difference in parental views about the importance of learning mathematics and science. As shown in Exhibit 4.7, more eighth-grade males than females strongly agreed that it was important to do well in mathematics to please their parents (27% compared to 17%, on average internationally) and significantly more females than males disagreed or strongly disagreed with the same question (42% compared to 30%). In addition, Exhibit 4.8 presenting results for countries teaching science as an integrated subject at the eighth grade reveals a similar trend for science, with significantly more males than females internationally strongly agreeing that it was important to do well in science to please their parents (25% compared to 18%).

Exhibit 4.7

Exhibit 4.8

## Exhibit 4.6 Students' Reports by Gender on the Importance of Doing Well in Various Activities - Final Year of Secondary School*

| Country | Do Well in Mathematics | | Do Well in Science | |
|---|---|---|---|---|
| | Males | Females | Males | Females |
| Australia | ▲ 90 (1.3) | 84 (1.5) | 75 (2.2) | 66 (3.1) |
| Austria | ▲ 80 (2.2) | 69 (2.7) | 69 (2.8) | 72 (2.2) |
| Cyprus | r 84 (2.5) | 79 (3.2) | r 69 (2.4) | 57 (3.5) |
| Czech Republic | 83 (2.0) | 78 (2.2) | r 64 (1.4) | 64 (7.0) |
| France | ▲ 88 (1.4) | 80 (1.7) | ▲ 77 (2.0) | 55 (2.0) |
| Iceland | ▲ 85 (1.2) | 78 (1.4) | 70 (1.6) | 71 (1.9) |
| Lithuania | r ▲ 85 (1.5) | r 76 (1.6) | r 72 (2.3) | r 69 (1.7) |
| Netherlands | ▲ 88 (1.6) | 73 (2.5) | ▲ 82 (1.8) | 64 (3.4) |
| New Zealand | ▲ 86 (1.8) | 74 (2.4) | ▲ 73 (2.4) | 57 (2.9) |
| Norway | ▲ 79 (1.9) | 71 (1.6) | 68 (2.2) | 68 (2.1) |
| Russian Federation | r 87 (2.6) | r 83 (1.5) | 90 (1.5) | 91 (1.3) |
| Slovenia | ▲ 63 (3.0) | 48 (3.7) | ▲ 70 (3.3) | 52 (2.4) |
| Sweden | ▲ 81 (1.4) | 69 (1.5) | ▲ 65 (1.7) | 55 (1.8) |
| Switzerland | ▲ 85 (2.1) | 69 (2.4) | 59 (3.3) | 57 (2.5) |
| United States | 90 (1.2) | 91 (1.1) | 86 (1.3) | 85 (1.5) |
| International Avg. | ▲ 83 (0.5) | 75 (0.5) | ▲ 73 (0.6) | 66 (0.7) |

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1994-95.

▲ = Gender difference statistically significant at .05 level, adjusted for multiple comparisons

* See Appendix A for information about the grades tested in each country.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number,some totals may appear inconsistent.

An "r" indicates a 70-84% student response rate. An "s" indicates a 50-69% response rate. Data are not available for Canada, Germany, and Hungary because the student response rate was less than 50%.

For comparative purposes, only those countries with approved sampling procedures across all populations are included. As a result, data from Kuwait, Philippines, Denmark, Greece, Thailand, Israel, and South Africa are not analyzed in this section. Bulgaria has also been excluded because achievement data by gender is not available.

## Exhibit 4.6 (Continued)

## Students' Reports by Gender on the Importance of Doing Well in Various Activities - Final Year of Secondary School*

| Country | Do Well in Language | | Be Good at Sports | |
|---|---|---|---|---|
| | Males | Females | Males | Females |
| Australia | 89 (1.1) | ▲ 95 (0.8) | ▲ 78 (2.4) | 49 (1.8) |
| Austria | 83 (1.6) | ▲ 94 (0.7) | 72 (2.2) | 66 (2.1) |
| Cyprus | r 93 (1.8) | 96 (1.3) | ▲ 89 (1.9) | 63 (2.4) |
| Czech Republic | 80 (1.9) | ▲ 93 (1.2) | 83 (1.5) | 77 (2.4) |
| France | 78 (2.7) | ▲ 94 (1.0) | ▲ 72 (2.3) | 54 (2.0) |
| Iceland | 83 (1.0) | ▲ 93 (1.1) | ▲ 74 (1.3) | 53 (2.4) |
| Lithuania | r 85 (1.4) | r ▲ 92 (0.9) | ▲ 96 (0.7) | r 87 (1.1) |
| Netherlands | 88 (1.7) | ▲ 96 (1.2) | ▲ 70 (2.0) | 55 (2.1) |
| New Zealand | 86 (1.0) | 91 (1.9) | ▲ 76 (2.0) | 49 (2.7) |
| Norway | 80 (1.5) | ▲ 94 (0.9) | 69 (2.0) | 63 (1.6) |
| Russian Federation | r 82 (2.1) | r ▲ 94 (1.2) | r ▲ 92 (1.4) | r 70 (1.8) |
| Slovenia | 70 (3.1) | 59 (3.6) | ▲ 75 (2.7) | 54 (2.0) |
| Sweden | 80 (1.4) | ▲ 90 (1.0) | ▲ 74 (1.3) | 61 (1.7) |
| Switzerland | 80 (1.6) | ▲ 91 (1.3) | ▲ 68 (1.9) | 54 (2.0) |
| United States | 90 (1.2) | ▲ 96 (0.7) | ▲ 77 (1.2) | 47 (1.6) |
| International Avg. | 84 (0.4) | ▲ 91 (0.4) | ▲ 78 (0.5) | 61 (0.5) |

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1994-95.

▲ = Gender difference statistically significant at .05 level, adjusted for multiple comparisons

* See Appendix A for information about the grades tested in each country.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number,some totals may appear inconsistent.

An "r" indicates a 70-84% student response rate. An "s" indicates a 50-69% response rate. Data are not available for Canada, Germany, and Hungary because the student response rate was less than 50%.

For comparative purposes, only those countries with approved sampling procedures across all populations are included. As a result, data from Kuwait, Philippines, Denmark, Greece, Thailand, Israel, and South Africa are not analyzed in this section. Bulgaria has also been excluded because achievement data by gender is not available.

## Exhibit 4.7 Students' Reports by Gender on Doing Well in Mathematics to Please Parents
### Eighth Grade*

| Country | I need to do well in mathematics to please my parents | | | | | |
|---|---|---|---|---|---|---|
| | Strongly Agree | | Agree | | Disagree/ Strongly Disagree | |
| | Males | Females | Males | Females | Males | Females |
| Australia | ▲ 26 (1.0) | 18 (0.9) | 51 (0.9) | 50 (0.9) | 23 (0.9) | ▲ 32 (0.9) |
| Austria | ▲ 21 (1.5) | 12 (1.1) | 40 (1.5) | 34 (1.6) | 39 (1.7) | ▲ 53 (1.7) |
| Belgium (Fl) | ▲ 20 (1.2) | 11 (1.0) | 55 (1.9) | 50 (1.4) | 25 (1.4) | ▲ 39 (1.8) |
| Belgium (Fr) | ▲ 33 (1.7) | 23 (2.1) | 48 (1.8) | 51 (1.7) | 19 (1.7) | ▲ 26 (1.3) |
| Canada | ▲ 28 (1.1) | 19 (0.8) | 45 (1.1) | 43 (1.4) | 27 (1.3) | ▲ 38 (1.3) |
| Colombia | ▲ 48 (3.0) | 35 (2.1) | 35 (1.9) | 38 (1.4) | 18 (1.8) | ▲ 28 (1.8) |
| Cyprus | ▲ 43 (1.2) | 24 (1.2) | 36 (1.5) | 38 (1.4) | 22 (1.4) | ▲ 38 (1.3) |
| Czech Republic | ▲ 28 (1.5) | 17 (1.3) | 59 (1.6) | 64 (1.4) | 13 (1.3) | 18 (1.3) |
| England | ▲ 27 (1.7) | 13 (1.3) | 45 (2.0) | 41 (1.7) | 28 (1.9) | ▲ 45 (2.1) |
| France | ▲ 21 (1.4) | 13 (1.0) | 41 (1.9) | 42 (1.5) | 38 (1.8) | 45 (1.7) |
| Germany | ▲ 31 (1.6) | 19 (1.3) | 33 (1.2) | 30 (1.4) | 36 (1.7) | ▲ 51 (1.6) |
| Hong Kong | 17 (0.8) | 15 (1.1) | 44 (1.1) | 43 (1.3) | 40 (1.2) | 42 (1.7) |
| Hungary | ▲ 13 (1.1) | 7 (0.9) | ▲ 58 (1.5) | 49 (1.7) | 29 (1.2) | ▲ 44 (1.8) |
| Iceland | ▲ 17 (2.0) | 8 (1.2) | ▲ 38 (2.1) | 22 (1.6) | 45 (2.2) | ▲ 70 (2.3) |
| Iran, Islamic Rep. | 70 (1.7) | 69 (2.0) | 25 (1.7) | 26 (2.0) | 5 (0.6) | 6 (1.2) |
| Ireland | ▲ 24 (1.3) | 13 (0.9) | ▲ 47 (1.0) | 40 (1.3) | 29 (1.1) | ▲ 46 (1.4) |
| Japan | 6 (0.5) | 5 (0.5) | 29 (0.8) | 28 (1.0) | 65 (1.1) | 67 (1.2) |
| Korea | 13 (1.1) | 9 (0.7) | 46 (1.7) | 42 (1.4) | 41 (2.0) | ▲ 49 (1.4) |
| Latvia (LSS) | ▲ 35 (1.8) | 24 (1.6) | 48 (1.9) | 53 (1.5) | 17 (1.4) | 23 (1.5) |
| Lithuania | ▲ 22 (1.5) | 12 (1.0) | ▲ 42 (1.8) | 32 (1.6) | 36 (1.8) | ▲ 56 (1.7) |
| Netherlands | ▲ 12 (1.4) | 5 (0.9) | ▲ 41 (2.0) | 29 (1.8) | 48 (2.2) | ▲ 66 (2.1) |
| New Zealand | ▲ 27 (1.2) | 17 (1.2) | 45 (1.4) | 43 (1.4) | 28 (1.3) | ▲ 40 (1.7) |
| Norway | ▲ 19 (1.2) | 8 (0.7) | ▲ 43 (1.4) | 34 (1.2) | 38 (1.4) | ▲ 58 (1.4) |
| Portugal | ▲ 30 (1.3) | 14 (1.2) | 45 (1.3) | 44 (1.5) | 25 (1.2) | ▲ 42 (1.4) |
| Romania | ▲ 37 (1.3) | 30 (1.3) | 43 (1.4) | 43 (1.4) | 20 (1.2) | ▲ 28 (1.5) |
| Russian Federation | ▲ 34 (1.3) | 19 (1.1) | 46 (1.2) | 45 (1.5) | 20 (1.3) | ▲ 36 (1.4) |
| Scotland | ▲ 29 (1.2) | 15 (1.2) | 44 (1.3) | 42 (1.6) | 27 (1.2) | ▲ 43 (1.7) |
| Singapore | 22 (0.9) | 18 (0.9) | 46 (1.0) | 46 (1.0) | 32 (1.3) | 36 (1.1) |
| Slovak Republic | ▲ 18 (1.1) | 11 (0.9) | 59 (1.3) | 54 (1.4) | 23 (1.4) | ▲ 35 (1.4) |
| Slovenia | ▲ 12 (0.9) | 5 (0.8) | ▲ 41 (1.6) | 30 (1.6) | 47 (1.8) | ▲ 65 (1.7) |
| Spain | ▲ 45 (1.3) | 28 (1.2) | 43 (1.1) | 48 (1.5) | 13 (0.8) | ▲ 24 (1.5) |
| Sweden | ▲ 16 (1.3) | 5 (0.6) | ▲ 42 (1.2) | 28 (1.2) | 42 (1.3) | ▲ 67 (1.4) |
| Switzerland | ▲ 21 (1.4) | 14 (1.0) | ▲ 43 (1.4) | 34 (1.2) | 36 (1.3) | ▲ 52 (1.4) |
| United States | ▲ 41 (1.0) | 30 (1.2) | 44 (1.0) | 45 (0.8) | 14 (0.9) | ▲ 25 (1.2) |
| International Avg. | ▲ 27 (0.2) | 17 (0.2) | ▲ 44 (0.3) | 41 (0.2) | 30 (0.3) | ▲ 42 (0.3) |

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1994-95.

▲ = Gender difference statistically significant at .05 level, adjusted for multiple comparisons

* Eighth Grade in most countries; see Appendix A for information about the grades tested in each country

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

An "r" indicates a 70-84% student response rate. An "s" indicates a 50-69% response rate.

For comparative purposes, only those countries with approved sampling procedures across all populations are included. As a result, data from Kuwait, Philippines, Denmark, Greece, Thailand, Israel, and South Africa are not analyzed in this section. Bulgaria has also been excluded because achievement data by gender is not available.

## Exhibit 4.8 Students' Reports by Gender on Doing Well in Science to Please Parents
### Eighth Grade*

| Country | I need to do well in science to please my parents | | | | | |
|---|---|---|---|---|---|---|
| | Strongly Agree | | Agree | | Disagree/ Strongly Disagree | |
| | Males | Females | Males | Females | Males | Females |
| Australia | ▲ 20 (0.9) | 13 (0.7) | 50 (1.1) | 48 (1.0) | 30 (1.0) | ▲ 38 (1.1) |
| Austria | 14 (1.1) | 11 (1.0) | 38 (1.6) | 33 (1.7) | 49 (1.7) | 56 (1.7) |
| Belgium (Fr) | ▲ 32 (2.8) | s 20 (2.0) | 47 (3.0) | 47 (2.5) | 21 (2.9) | 33 (2.7) |
| Canada | ▲ 21 (1.1) | 16 (0.8) | 44 (1.2) | 43 (1.4) | 34 (1.6) | ▲ 41 (1.5) |
| Colombia | ▲ 43 (2.6) | 32 (1.9) | 38 (1.8) | 38 (1.4) | 19 (1.7) | ▲ 30 (1.7) |
| Cyprus | ▲ 30 (1.4) | 18 (1.4) | 42 (1.4) | 38 (1.7) | 28 (1.5) | ▲ 44 (1.4) |
| England | ▲ 24 (1.6) | 11 (1.2) | 48 (1.7) | 42 (1.9) | 29 (1.8) | ▲ 46 (2.0) |
| Hong Kong | 16 (0.9) | 13 (0.9) | 40 (1.1) | 43 (1.3) | 43 (1.4) | 44 (1.5) |
| Iran, Islamic Rep. | 62 (1.2) | 62 (1.7) | 34 (1.1) | 33 (1.5) | 4 (0.9) | 5 (0.9) |
| Ireland | ▲ 18 (1.1) | 10 (1.0) | ▲ 46 (1.4) | 37 (1.3) | 36 (1.3) | ▲ 53 (1.4) |
| Japan | 6 (0.5) | 5 (0.4) | 28 (0.8) | 27 (0.9) | 65 (1.1) | 68 (1.0) |
| Korea | ▲ 14 (1.1) | 10 (0.7) | 42 (1.3) | 39 (1.3) | 43 (1.7) | ▲ 52 (1.2) |
| New Zealand | ▲ 21 (1.1) | 14 (1.0) | ▲ 47 (1.3) | 41 (1.1) | 33 (1.1) | ▲ 45 (1.5) |
| Norway | ▲ 15 (1.1) | 6 (0.6) | ▲ 43 (1.3) | 32 (1.3) | 42 (1.6) | ▲ 62 (1.3) |
| Scotland | ▲ 25 (1.4) | 13 (1.1) | 44 (1.4) | 39 (1.5) | 32 (1.4) | ▲ 48 (1.7) |
| Singapore | ▲ 24 (1.1) | 20 (0.8) | 47 (1.2) | 46 (1.2) | 29 (1.3) | ▲ 34 (1.1) |
| Spain | ▲ 44 (1.4) | 28 (1.4) | 43 (1.2) | ▲ 50 (1.6) | 12 (0.8) | ▲ 22 (1.6) |
| Switzerland | 11 (1.1) | 8 (0.7) | ▲ 37 (1.5) | 29 (1.1) | 52 (1.7) | ▲ 63 (1.3) |
| United States | ▲ 37 (1.2) | 26 (1.0) | 45 (1.3) | 48 (0.9) | 18 (0.9) | ▲ 25 (1.0) |
| International Avg. | ▲ 25 (0.3) | 18 (0.3) | ▲ 42 (0.3) | 40 (0.3) | 33 (0.3) | 43 (0.3) |

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1994-95.

▲ = Gender difference statistically significant at .05 level, adjusted for multiple comparisons

* Eighth grade in most countries; see Appendix A for characteristics of students sampled.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

An "r" indicates a 70-84% student response rate. An "s" indicates a 50-69% response rate. Data are not available for Belgium (Fl), Czech Republic, France, Germany, Hungary, Iceland, Latvia (LSS), Lithuania, Netherlands, Portugal, Romania, Russian Federation, Slovak Republic, Slovenia, and Sweden because the student response rate was less than 50%.

For comparative purposes, only those countries with approved sampling procedures across all populations are included. As a result, data from Kuwait, Philippines, Denmark, Greece, Thailand, Israel, and South Africa are not analyzed in this section. Bulgaria has also been excluded becauseachievement data by gender is not available.

## Careers in Mathematics: How Do Males and Females Differ in Their Views Towards Having a Job in Mathematics?

Exhibit 4.9

Exhibit 4.10

Exhibit 4.11

Exhibit 4.9 shows that in many of the TIMSS countries, significantly more eighth-grade males than females (39% to 30%, on average internationally) reported that doing well in mathematics was important for getting a desired job. In a large majority of countries and internationally, females disagreed or strongly disagreed about the importance of future employment as a reason to do well in mathematics (29% to 20%). Exhibit 4.10 shows that the pattern was similar for science, with significantly more males than females internationally reporting that doing well in science was important to getting a desired job (27% to 23%). Similarly, significantly greater percentages of females than males disagreed or strongly disagreed about the importance of future employment as a reason to do well in science (46% to 41%).

TIMSS asked the final-year students participating in the literacy testing if they would like a job in the area of mathematics. The results are presented by gender in Exhibit 4.11. In many countries, significantly more males than females strongly agreed or agreed they would like a mathematics-related job. On average internationally, about three-fourths of the females (73%) disagreed or strongly disagreed that they wanted a job that involved the use of mathematics. In considering these results, it is important to remember that the students participating in the literacy testing represent the total population of students graduating from secondary school and going on to future endeavors.

## Exhibit 4.9 Students' Reports by Gender on Doing Well in Mathematics to Get Desired Job - Eighth Grade*

| Country | I need to do well in mathematics to get the job I want | | | | | |
|---|---|---|---|---|---|---|
| | Strongly Agree | | Agree | | Disagree/ Strongly Disagree | |
| | Males | Females | Males | Females | Males | Females |
| Australia | ▲ 42 (1.2) | 29 (1.0) | 41 (1.1) | 46 (1.0) | 17 (0.7) | ▲ 25 (1.0) |
| Austria | ▲ 43 (1.9) | 23 (1.4) | 31 (1.3) | 31 (1.4) | 26 (1.6) | ▲ 46 (1.8) |
| Belgium (Fl) | ▲ 22 (1.4) | 12 (1.3) | 43 (1.5) | 37 (1.6) | 35 (1.5) | ▲ 51 (2.5) |
| Belgium (Fr) | ▲ 44 (1.6) | 26 (1.6) | 37 (1.7) | 35 (1.9) | 19 (1.2) | ▲ 38 (1.7) |
| Canada | ▲ 47 (1.4) | 40 (1.2) | 38 (1.3) | 44 (1.2) | 15 (1.0) | 16 (0.8) |
| Colombia | 53 (2.2) | 47 (2.0) | 34 (2.0) | 36 (1.4) | 13 (1.2) | 17 (1.3) |
| Cyprus | ▲ 58 (1.6) | 48 (1.3) | 30 (1.2) | ▲ 37 (1.2) | 12 (1.1) | 15 (0.9) |
| Czech Republic | ▲ 37 (1.6) | 27 (1.8) | 51 (1.4) | 49 (1.5) | 12 (1.0) | ▲ 23 (1.8) |
| England | ▲ 45 (1.7) | 28 (1.5) | 40 (1.7) | 46 (1.6) | 15 (1.2) | ▲ 26 (1.4) |
| France | ▲ 42 (1.3) | 28 (1.4) | 35 (1.3) | 38 (1.4) | 23 (1.2) | ▲ 34 (1.5) |
| Germany | ▲ 49 (1.6) | 29 (1.8) | 29 (1.4) | 32 (1.5) | 22 (1.1) | ▲ 38 (1.7) |
| Hong Kong | 26 (1.3) | 21 (1.4) | 51 (1.4) | 53 (1.2) | 22 (1.0) | 26 (1.2) |
| Hungary | 24 (1.3) | 21 (1.2) | 57 (1.4) | 53 (1.3) | 19 (1.3) | ▲ 26 (1.5) |
| Iceland | 36 (2.8) | 28 (1.7) | 45 (2.4) | 49 (2.5) | 18 (1.2) | 24 (2.2) |
| Iran, Islamic Rep. | 63 (1.6) | 61 (1.5) | 29 (1.2) | 26 (1.2) | 8 (0.9) | 12 (1.4) |
| Ireland | ▲ 47 (1.7) | 33 (1.3) | 37 (1.5) | 43 (1.5) | 16 (1.3) | ▲ 24 (1.2) |
| Japan | ▲ 13 (0.7) | 10 (0.6) | 43 (1.0) | 44 (1.1) | 44 (1.1) | 45 (1.1) |
| Korea | 14 (1.4) | 11 (0.8) | 34 (1.1) | 33 (1.4) | 51 (1.7) | 56 (1.4) |
| Latvia (LSS) | 42 (1.6) | 36 (1.5) | 44 (1.5) | 47 (1.4) | 14 (1.1) | 17 (1.3) |
| Lithuania | 45 (1.8) | 40 (1.5) | 42 (1.8) | 46 (1.6) | 12 (1.0) | 14 (1.1) |
| Netherlands | ▲ 22 (1.9) | 10 (0.7) | ▲ 44 (1.9) | 30 (1.8) | 35 (1.7) | ▲ 60 (1.8) |
| New Zealand | ▲ 48 (1.1) | 34 (1.3) | 41 (1.2) | 43 (1.2) | 12 (0.7) | ▲ 23 (1.2) |
| Norway | ▲ 30 (1.3) | 18 (1.0) | 48 (1.3) | 49 (1.3) | 22 (1.1) | ▲ 33 (1.2) |
| Portugal | ▲ 44 (1.3) | 30 (1.1) | 36 (1.4) | ▲ 42 (1.2) | 19 (1.0) | ▲ 27 (1.2) |
| Romania | 43 (1.4) | 37 (1.5) | 38 (1.3) | 39 (1.4) | 19 (1.1) | 24 (1.6) |
| Russian Federation | 44 (1.4) | 41 (1.0) | 40 (1.5) | 40 (1.2) | 17 (1.0) | 19 (1.3) |
| Scotland | ▲ 57 (1.7) | 45 (1.5) | 33 (1.5) | ▲ 40 (1.4) | 11 (0.9) | 14 (0.9) |
| Singapore | 39 (1.0) | 35 (1.3) | 47 (0.8) | 49 (1.2) | 14 (0.9) | 17 (1.2) |
| Slovak Republic | ▲ 35 (1.3) | 28 (1.4) | 50 (1.3) | 47 (1.6) | 15 (1.1) | ▲ 25 (1.3) |
| Slovenia | ▲ 31 (1.5) | 24 (1.2) | 50 (1.7) | 52 (1.3) | 20 (1.1) | 25 (1.4) |
| Spain | ▲ 37 (1.4) | 26 (1.3) | 39 (1.3) | 40 (1.2) | 24 (1.0) | ▲ 34 (1.3) |
| Sweden | ▲ 30 (1.2) | 18 (0.9) | 47 (1.4) | 46 (1.0) | 23 (1.2) | ▲ 36 (1.1) |
| Switzerland | ▲ 39 (1.4) | 20 (1.0) | 38 (1.3) | 35 (1.2) | 23 (1.1) | ▲ 45 (1.3) |
| United States | 49 (1.3) | 44 (1.2) | 37 (1.2) | 40 (0.9) | 14 (0.8) | 16 (1.1) |
| International Avg. | ▲ 39 (0.3) | 30 (0.2) | 41 (0.2) | ▲ 42 (0.2) | 20 (0.2) | ▲ 29 (0.2) |

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1994-95.

▲ = Gender difference statistically significant at .05 level, adjusted for multiple comparisons

* Eighth Grade in most countries; see Appendix A for information about the grades tested in each country.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

An "r" indicates a 70-84% student response rate. An "s" indicates a 50-69% response rate.

For comparative purposes, only those countries with approved sampling procedures across all populations are included. As a result, data from Kuwait, Philippines, Denmark, Greece, Thailand, Israel, and South Africa are not analyzed in this section. Bulgaria has also been excluded because achievement data by gender is not available.

## Exhibit 4.10 Students' Reports by Gender on Doing Well in Science to Get Desired Job
### Eighth Grade*

| Country | I need to do well in science to get the job I want | | | | | |
|---|---|---|---|---|---|---|
| | Strongly Agree | | Agree | | Disagree/ Strongly Disagree | |
| | Males | Females | Males | Females | Males | Females |
| Australia | 24 (0.9) | 20 (0.8) | 31 (0.9) | 29 (1.0) | 45 (1.2) | ▲ 51 (1.1) |
| Austria | 17 (1.2) | 16 (1.4) | 20 (1.4) | 23 (1.0) | 63 (2.0) | 61 (1.7) |
| Belgium (Fr) | s 29 (2.7) | s 24 (2.9) | 25 (2.5) | 29 (1.8) | 46 (3.8) | 47 (2.4) |
| Canada | 28 (1.5) | 26 (1.0) | 36 (1.3) | 36 (1.4) | 37 (1.5) | 38 (1.4) |
| Colombia | 41 (2.6) | 36 (1.9) | 36 (1.8) | 36 (1.5) | 24 (1.8) | 28 (1.6) |
| Cyprus | ▲ 31 (1.5) | 21 (1.3) | 30 (1.4) | 33 (1.6) | 39 (1.5) | ▲ 47 (1.5) |
| England | 31 (1.7) | 25 (1.4) | 37 (1.6) | 30 (1.7) | 32 (1.7) | ▲ 45 (2.2) |
| Hong Kong | ▲ 19 (1.2) | 13 (1.0) | 39 (1.2) | 38 (1.3) | 42 (1.3) | ▲ 49 (1.5) |
| Iran, Islamic Rep. | 58 (1.9) | 56 (2.3) | 33 (1.4) | 33 (1.7) | 9 (1.3) | 11 (1.5) |
| Ireland | 22 (1.3) | 20 (1.3) | 29 (1.3) | 30 (1.1) | 50 (1.5) | 50 (1.8) |
| Japan | ▲ 11 (0.6) | 7 (0.5) | 31 (0.9) | 30 (0.9) | 58 (1.0) | ▲ 63 (1.0) |
| Korea | ▲ 16 (0.9) | 10 (0.8) | ▲ 35 (1.2) | 26 (1.2) | 49 (1.3) | ▲ 63 (1.3) |
| New Zealand | ▲ 25 (1.1) | 20 (1.0) | 34 (1.4) | 30 (1.1) | 41 (1.5) | ▲ 51 (1.3) |
| Norway | ▲ 16 (1.1) | 12 (0.7) | 35 (1.2) | 30 (1.2) | 49 (1.4) | ▲ 58 (1.3) |
| Scotland | 39 (1.7) | 32 (1.5) | 30 (1.4) | 29 (1.2) | 31 (1.4) | ▲ 39 (1.7) |
| Singapore | ▲ 33 (1.8) | 24 (1.2) | 42 (1.2) | 43 (1.3) | 26 (1.6) | ▲ 33 (1.6) |
| Spain | 32 (1.2) | 27 (1.5) | 34 (1.1) | 37 (1.3) | 34 (1.2) | 36 (1.2) |
| Switzerland | 12 (0.8) | 11 (0.9) | 19 (1.0) | ▲ 24 (1.1) | 70 (1.1) | 65 (1.2) |
| United States | 33 (1.4) | 31 (0.9) | 35 (1.2) | 32 (1.0) | 33 (0.9) | 36 (1.3) |
| International Avg. | ▲ 27 (0.4) | 23 (0.3) | 32 (0.3) | 31 (0.3) | 41 (0.4) | ▲ 46 (0.4) |

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1994-95.

▲ = Gender difference statistically significant at .05 level, adjusted for multiple comparisons

* Eighth grade in most countries; see Appendix A for characteristics of the students sampled.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

An "r" indicates a 70-84% student response rate. An "s" indicates a 50-69% response rate. Data are not available for Belgium(Fl), Czech Republic, France, Germany, Hungary, Iceland, Latvia (LSS), Lithuania, Netherlands, Portugal, Romania, Russian Federation, Slovak Republic, Slovenia, and Sweden because the student response rate was less than 50%.

For comparative purposes, only those countries with approved sampling procedures across all populations are included. As a result, data from Kuwait, Philippines, Denmark, Greece, Thailand, Israel, and South Africa are not analyzed in this section. Bulgaria has also been excluded because achievement data by gender is not available.

## Exhibit 4.11 Students' Reports by Gender on Doing Well in Mathematics to Get Desired Job - Final Year of Secondary School*

| Country | I would like a job that involves using mathematics | | | | | |
|---|---|---|---|---|---|---|
| | Strongly Agree | | Agree | | Disagree/Strongly Disagree | |
| | Males | Females | Males | Females | Males | Females |
| Australia | 6 (1.1) | 3 (0.9) | ▲ 37 (2.1) | 18 (2.0) | 57 (2.2) | ▲ 80 (2.2) |
| Austria | ▲ 11 (1.9) | 4 (0.7) | ▲ 21 (2.3) | 12 (1.2) | 69 (2.9) | ▲ 84 (1.3) |
| Canada | 11 (1.1) | 7 (1.1) | ▲ 39 (2.6) | 23 (1.8) | 51 (2.4) | ▲ 71 (2.0) |
| Cyprus | 14 (2.3) | 9 (1.7) | 35 (3.6) | 24 (1.8) | 52 (3.2) | ▲ 68 (2.2) |
| Czech Rep. | 4 (0.7) | 3 (0.7) | 23 (2.1) | 18 (2.0) | 73 (2.4) | 79 (1.9) |
| France | 10 (1.6) | 6 (1.1) | ▲ 40 (2.1) | 22 (1.8) | 50 (3.1) | ▲ 73 (2.1) |
| Hungary | 5 (0.5) | 5 (0.5) | 15 (1.0) | 12 (0.9) | 80 (1.1) | 84 (1.0) |
| Iceland | 8 (1.3) | 4 (0.6) | ▲ 40 (1.9) | 24 (1.5) | 52 (1.9) | ▲ 72 (1.4) |
| Lithuania | 11 (1.4) | 10 (1.0) | 31 (2.0) | 28 (1.0) | 59 (2.2) | 62 (1.4) |
| Netherlands | 5 (1.0) | 4 (1.1) | ▲ 30 (1.8) | 14 (1.5) | 65 (2.1) | ▲ 82 (2.0) |
| New Zealand | 5 (1.0) | 3 (0.8) | ▲ 38 (2.8) | 26 (1.6) | 57 (2.7) | ▲ 71 (1.8) |
| Norway | ▲ 7 (0.8) | 4 (0.6) | ▲ 29 (1.7) | 19 (1.4) | 64 (2.0) | ▲ 77 (1.7) |
| Russian Fed. | 11 (0.9) | 12 (0.9) | 36 (2.6) | 33 (1.5) | 53 (2.8) | 55 (1.7) |
| Slovenia | 5 (1.0) | 4 (0.9) | 32 (2.6) | 25 (1.9) | 63 (2.8) | 71 (2.2) |
| Sweden | ▲ 7 (0.8) | 4 (0.5) | ▲ 37 (1.7) | 22 (1.1) | 56 (2.0) | ▲ 74 (1.3) |
| Switzerland | ▲ 13 (1.3) | 4 (0.6) | ▲ 32 (1.8) | 15 (1.6) | 55 (2.3) | ▲ 81 (1.8) |
| United States | 12 (1.0) | 9 (0.8) | ▲ 35 (1.2) | 26 (1.4) | 53 (1.5) | ▲ 65 (1.6) |
| International Avg. | ▲ 8 (0.3) | 5 (0.2) | ▲ 32 (0.5) | 21 (0.4) | 60 (0.6) | ▲ 73 (0.4) |

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1994-95.

▲ = Gender difference statistically significant at .05 level, adjusted for multiple comparisons

* See Appendix A for information about the grades tested in each country

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

An "r" indicates a 70-84% student response rate. An "s" indicates a 50-69% response rate. Data are not available for Germany because the student response rate was less than 50%.

For comparative purposes, only those countries with approved sampling procedures across all populations are included. As a result, data from Kuwait, Philippines, Denmark, Greece, Thailand, Israel, and South Africa are not analyzed in this section. Bulgaria has also been excluded because achievement data by gender is not available.

## Summary

The findings from this chapter show that even though males outperformed females in mathematics and science, females in most countries reported spending more time out-of-school studying mathematics and science than their male counterparts. Also, interestingly, at the fourth grade, more females than males reported that it was important to do well in mathematics and science. These attitudes shifted dramatically, however, as students became older. At the eighth grade, there were few differences between the genders regarding the importance of doing well in mathematics and science and by the final year of secondary school – significantly more males than females in most countries agreed that it was important to do well in mathematics and science.

According to student's perceptions, parental influence encourages mathematics achievement differently for males than females. As early as the eighth grade, significantly greater percentages of males than females agreed that it was important to do well in mathematics to please their parents. Also, more eighth-grade males than females agreed that it was important to do well in mathematics and science to get their desired job. At the final year of secondary school, internationally, greater percentages of males than females reported that they would like a job in mathematics or a mathematics-related field. Nearly three-fourths of the females, on average internationally, reported that they did not need to do well in mathematics to get their desired job.