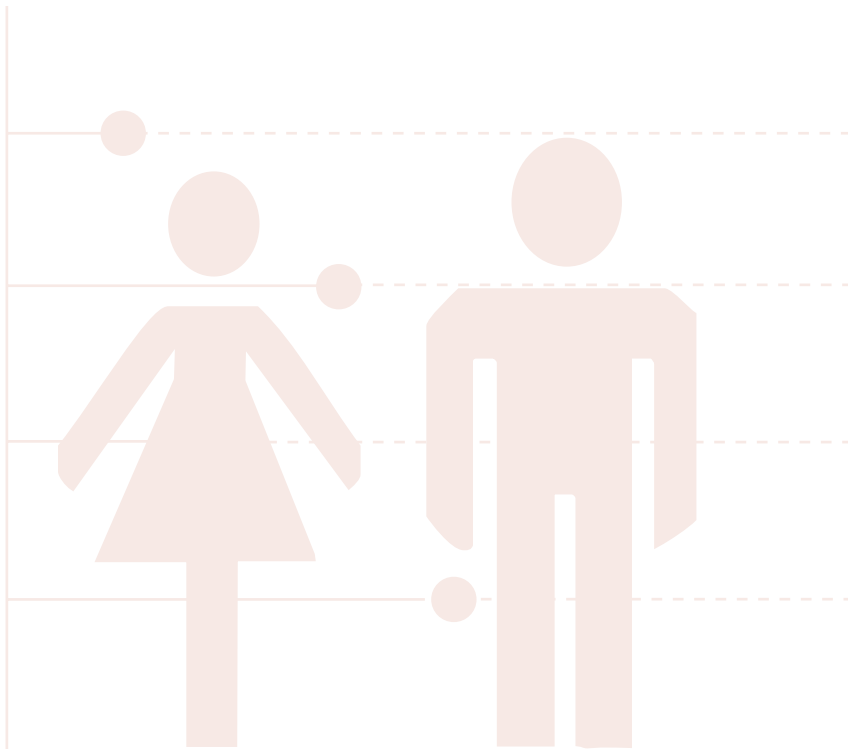


2

Gender Differences in Mathematics and Science Achievement for High-Performing Students

Overview

The two analyses presented in Chapter 2 investigate gender differences for high- and low-performing students to determine whether patterns for the differences in mean achievement hold across the performance distributions. Although both analytic approaches are related, the first approach examines the gender composition of the top quarter of students in each country. The second analysis asks, given the 75th percentile for a given country, what percentage of males and females reach that benchmark? These analyses were conducted for the set of countries meeting the TIMSS sampling guidelines at the eighth grade.



Exploring Gender Differences Among High-Performing Students

For each country, at each grade level, students were ranked according to mean mathematics achievement scores. The top quarter of the students were identified as “high-performing,” the middle 50% as “middle-performing,” and the bottom quarter as “low-performing.” All students were classified as belonging to one of the three performance categories. Once students were classified, the data first were analyzed to determine the percentages of males and females within the low-, middle-, and high-performing groups, and the differences between those percentages.⁵ The mean achievement by gender for each of these groups was then calculated and compared (see Appendix B).

Exhibits 2.1 – 2.4 show the percentages by gender of high-performing students in mathematics at the fourth and eighth grades and for students in the final year of secondary school for mathematics literacy and advanced mathematics. The data reveal a slight tendency for males to outnumber females proportionally among high-performers in several countries at the fourth grade and, somewhat more so, at the eighth grade, although the differences generally were not statistically significant. At the final year of secondary school, however, males were disproportionately represented among high performers in 10 out of 18 countries for mathematics literacy and for 7 out of 12 countries in advanced mathematics.

Exhibit 2.1-2.4

An examination of Exhibits 2.5 - 2.8 reveals an even more extreme picture for gender differences among high-performing students in science achievement. As early as fourth grade in science, males were already disproportionately represented among high-performing students in 11 of the 22 TIMSS countries included in this analysis. The pattern was similar at the eighth grade with significantly higher percentages of males being present among high-performers in 13 out of 34 countries. By the final year of secondary school, males were significantly over-represented among high-performers in nearly every country in science literacy, from 61% of the high-performing students in the United States up to 74% in Norway. Similarly, for final-year students taking the physics assessment, there were significantly higher percentages of males than females among the high-performing students in nearly all the TIMSS countries. At the low end of the range, 65% of high-performing physics students in France were male while at the high end of the range, fully 84% of high-performing students in the Czech Republic were male.

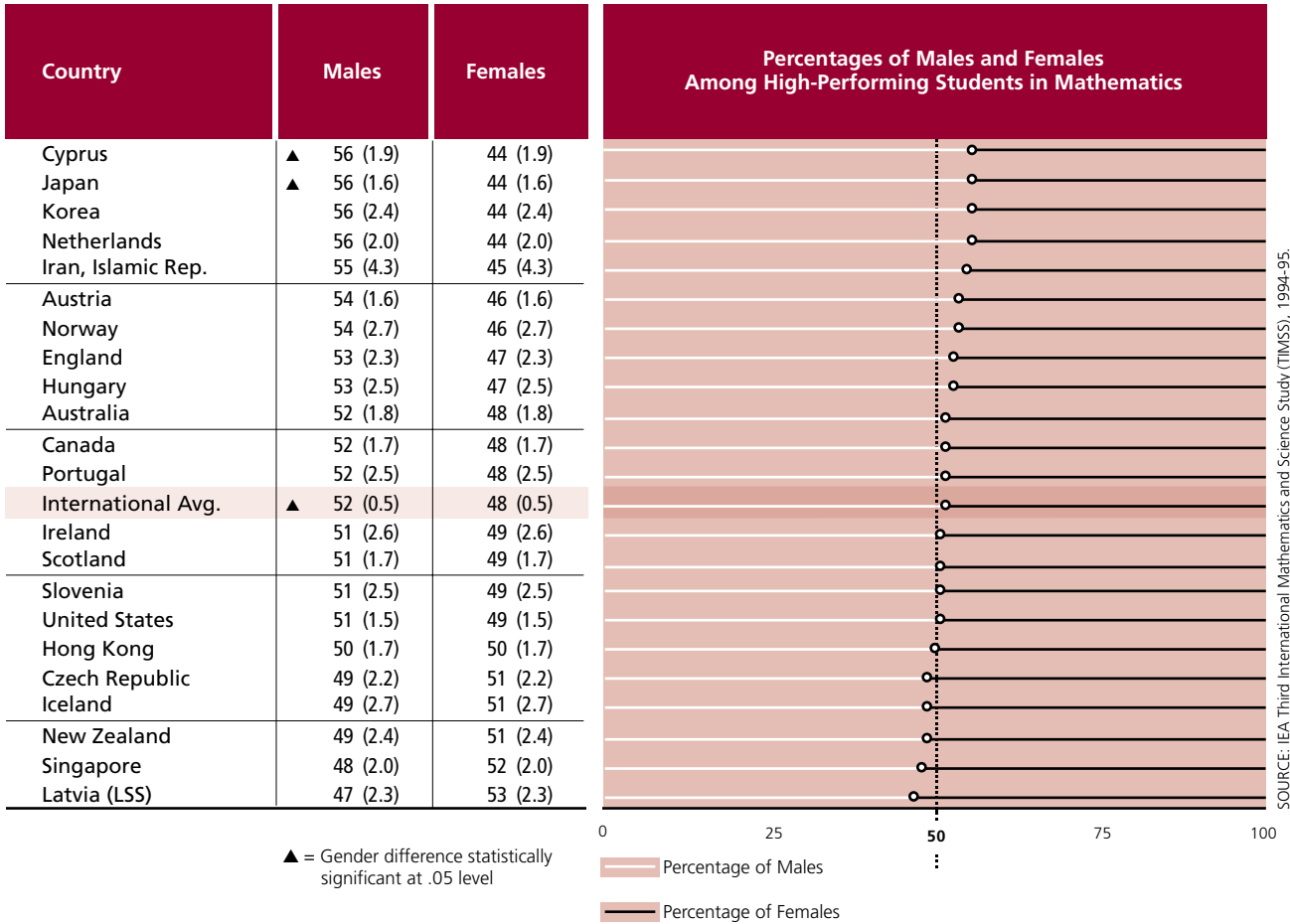
Exhibit 2.5-2.8

For more detail about performance by gender across the achievement distributions in mathematics and science, please see Appendix B. Appendix B presents both the percentages and the mean achievement by gender for low-, middle-, and high-performing students.

⁵ These analyses took into account any overall gender imbalances found in the participating sample for each country. That is, for each country, adjustments were made to the proportions of males and females within the “low,” “middle,” and “high” performing classifications based on the overall unequal gender representation of the sample for that country. See Appendix A for sample sizes within each country by gender.

Exhibit 2.1

Percentages by Gender of High-Performing Students¹ in Mathematics Fourth Grade*



¹ High-performing students are defined as those students scoring at or above the 75th percentile for their country. Percentages have been adjusted to account for male-female imbalances in the total sample.

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

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

Exhibit 2.2

Percentages by Gender of High-Performing Students¹ in Mathematics Eighth Grade*



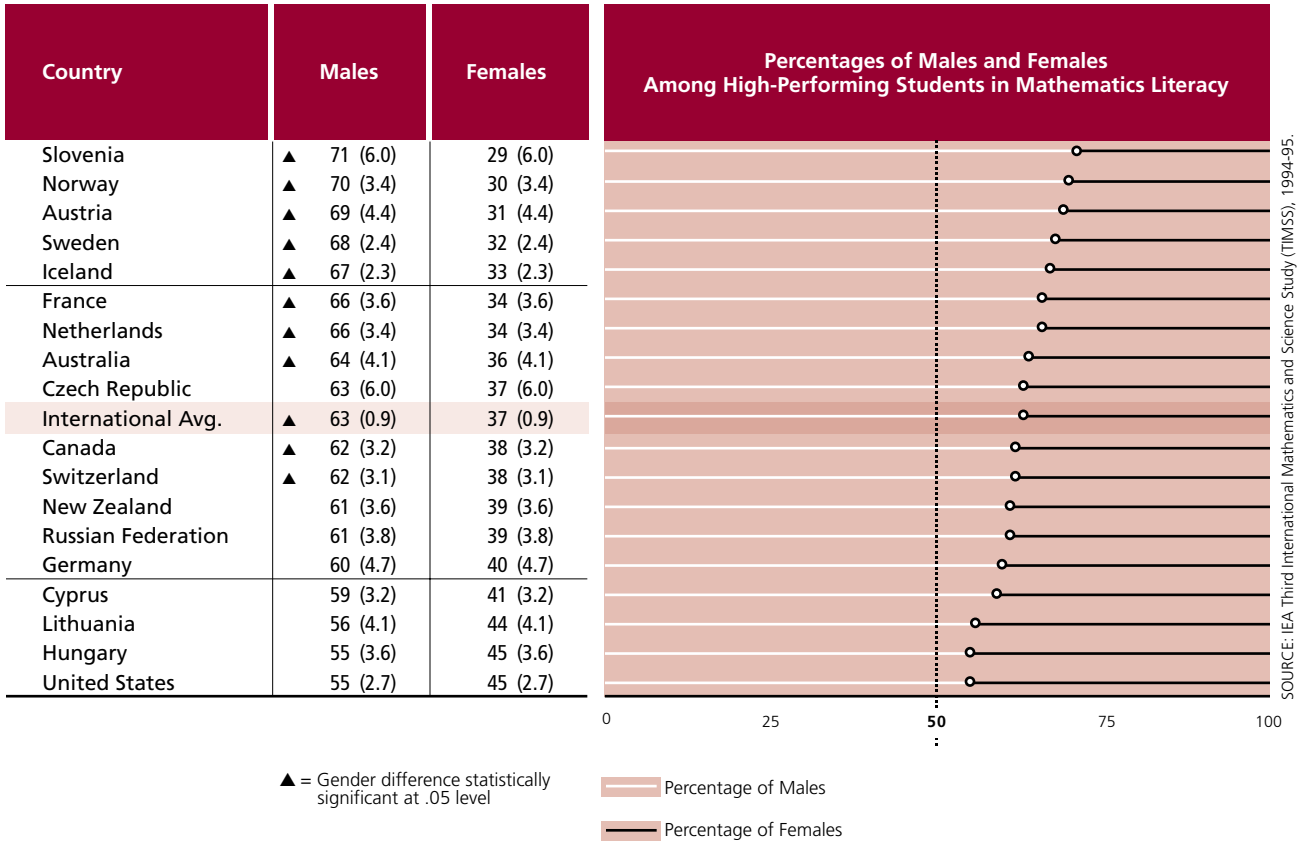
¹ High-performing students are defined as those students scoring at or above the 75th percentile for their country. Percentages have been adjusted to account for male-female imbalances in the total sample.

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

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

Exhibit 2.3

Percentages by Gender of High-Performing Students¹ in Mathematics Literacy Final Year of Secondary School*



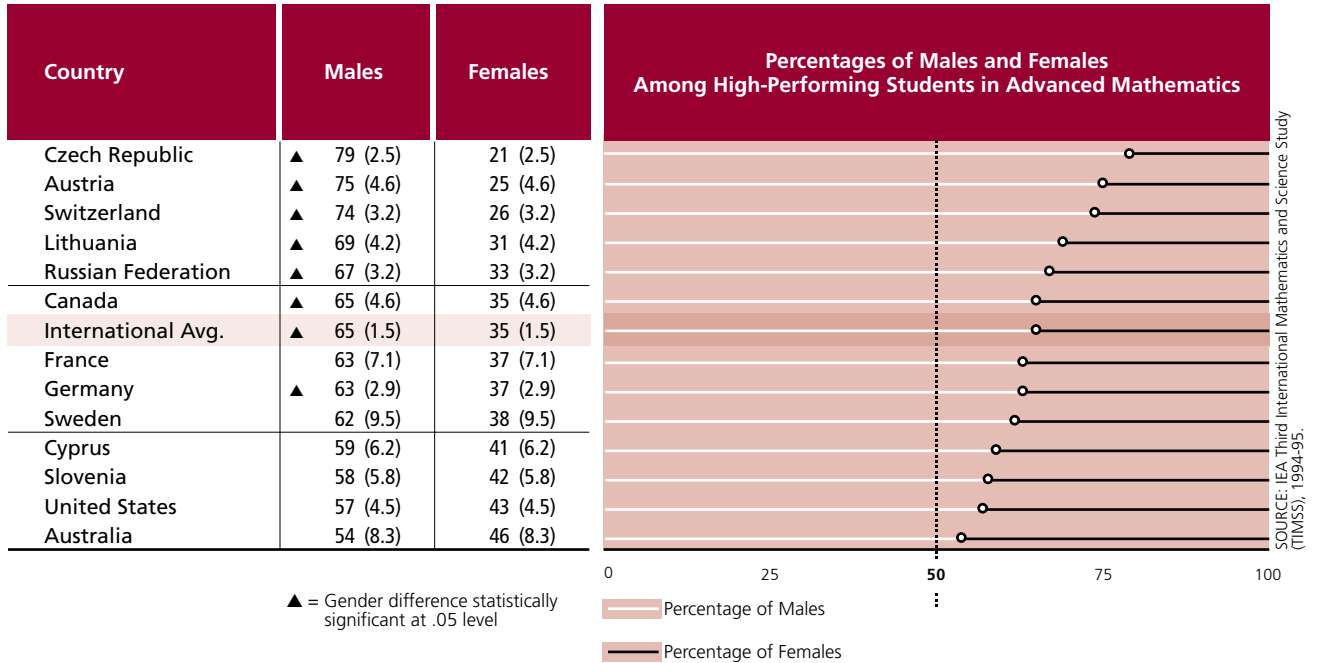
¹ High-performing students are defined as those students scoring at or above the 75th percentile for their country. Percentages have been adjusted to account for male-female imbalances in the total sample.

* See Appendix A for characteristics of students sampled.

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

Exhibit 2.4

Percentages by Gender of High-Performing Students¹ in Advanced Mathematics Final Year of Secondary School*



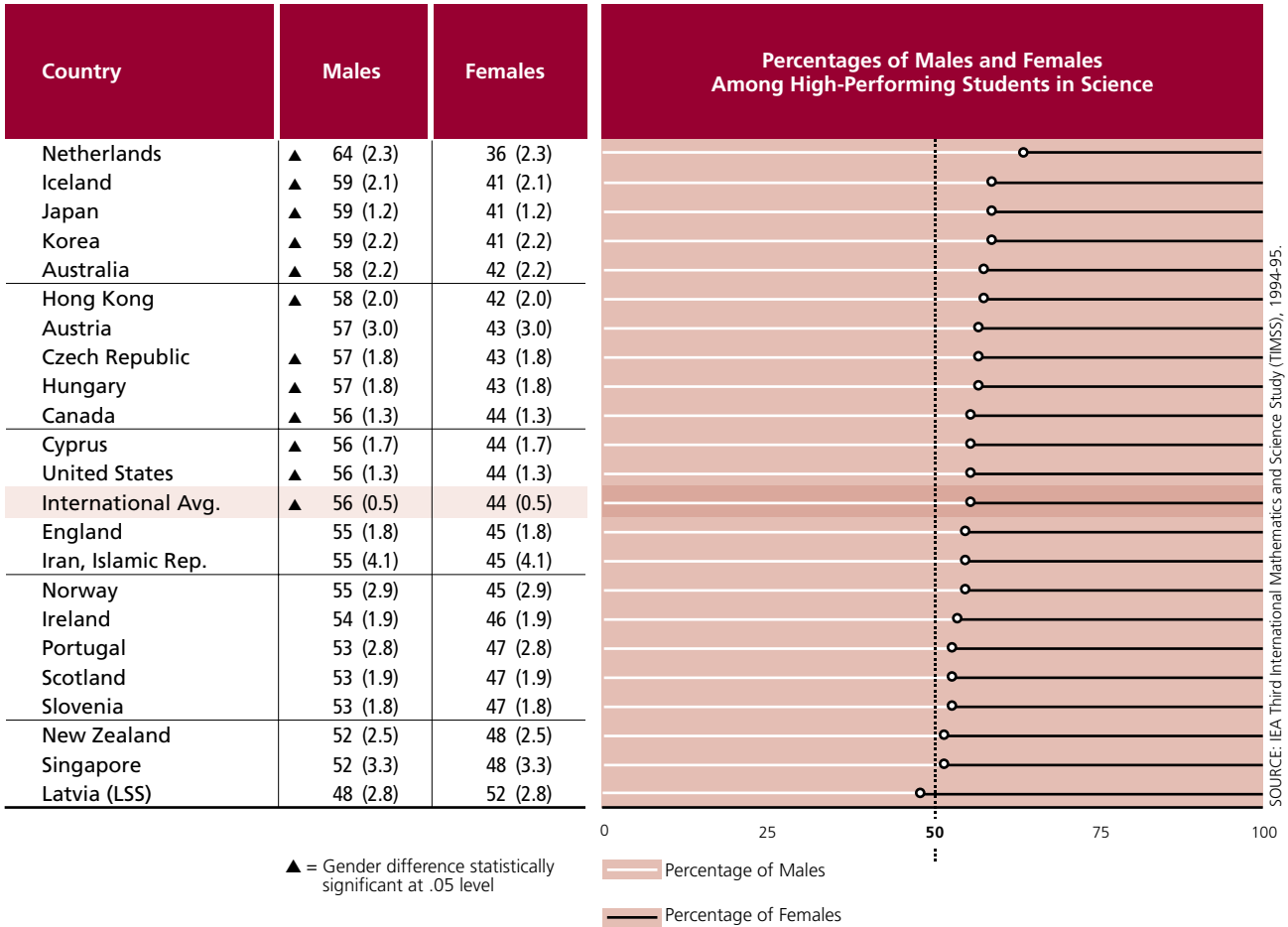
¹ High-performing students are defined as those students scoring at or above the 75th percentile for their country. Percentages have been adjusted to account for male-female imbalances in the total sample.

* See Appendix A for characteristics of students sampled.

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

Exhibit 2.5

Percentages by Gender of High-Performing Students¹ in Science Fourth Grade*



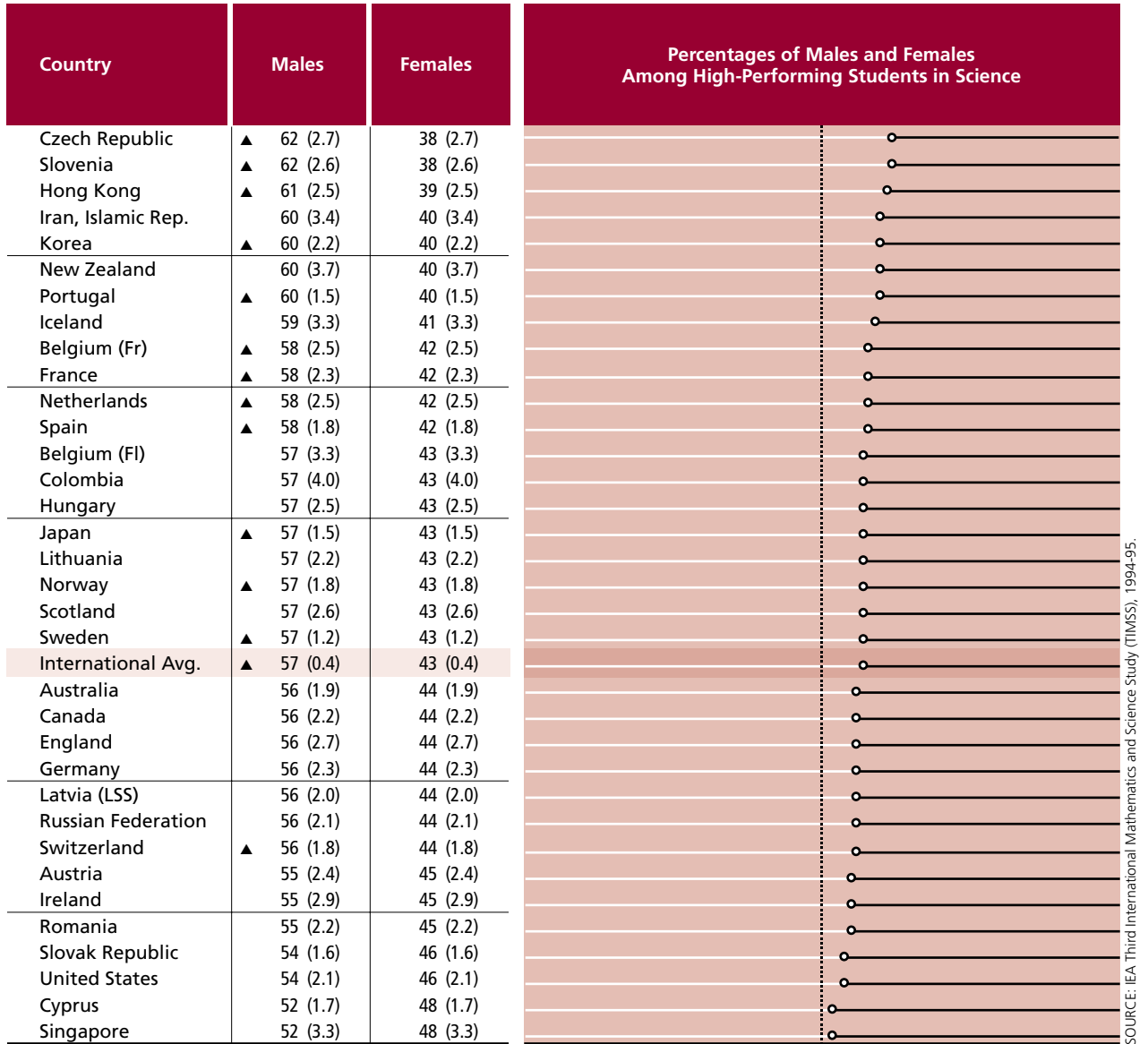
¹ High-performing students are defined as those students scoring at or above the 75th percentile for their country. Percentages have been adjusted to account for male-female imbalances in the total sample.

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

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

Exhibit 2.6

**Percentages by Gender of High-Performing Students¹ in Science
Eighth Grade***



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

▲ = Gender difference statistically significant at .05 level

0 25 50 75 100
 ■ Percentage of Males
 ● Percentage of Females

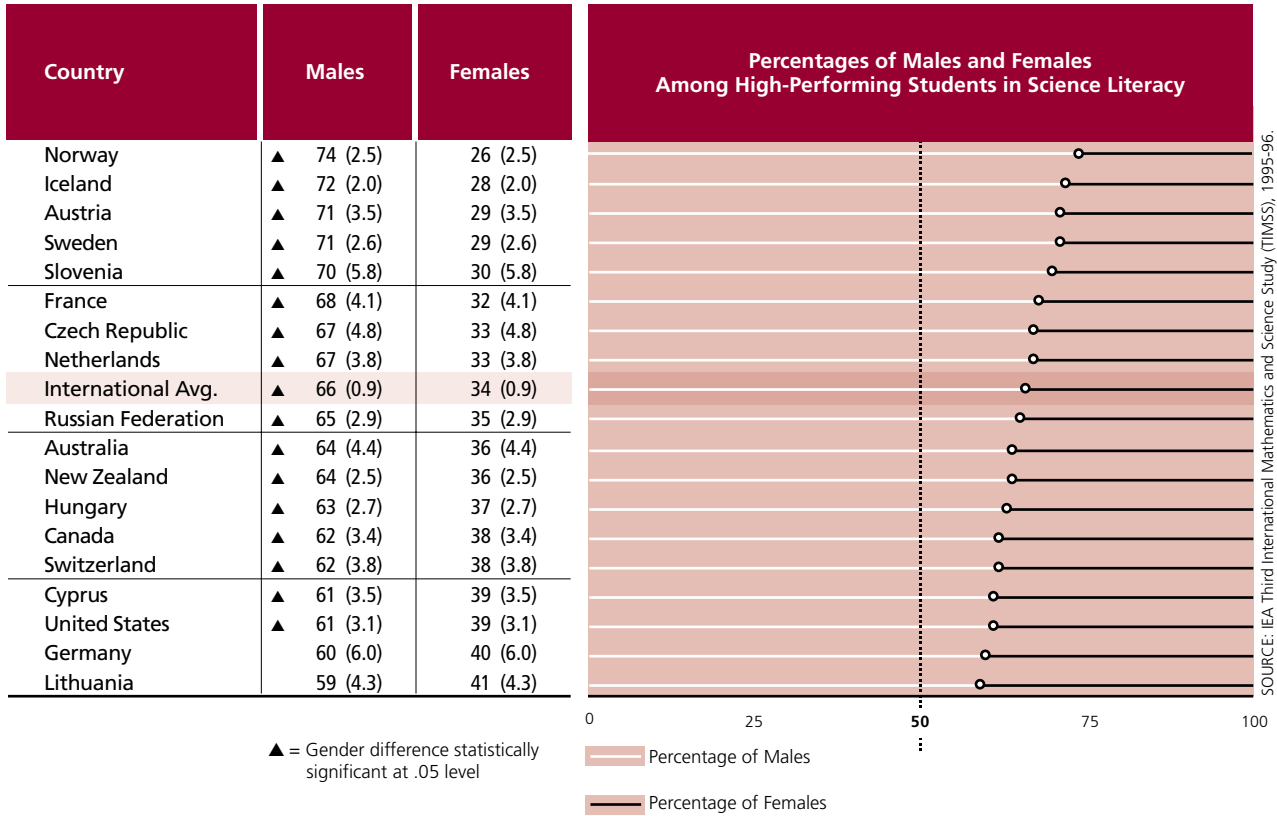
1 High-performing students are defined as those students scoring at or above the 75th percentile for their country. Percentages have been adjusted to account for male-female imbalances in the total sample.

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

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

Exhibit 2.7

Percentages by Gender of High-Performing Students¹ in Science Literacy Final Year of Secondary School*



¹ High-performing students are defined as those students scoring at or above the 75th percentile for their country. Percentages have been adjusted to account for male-female imbalances in the total sample.

* See Appendix A for characteristics of students sampled.

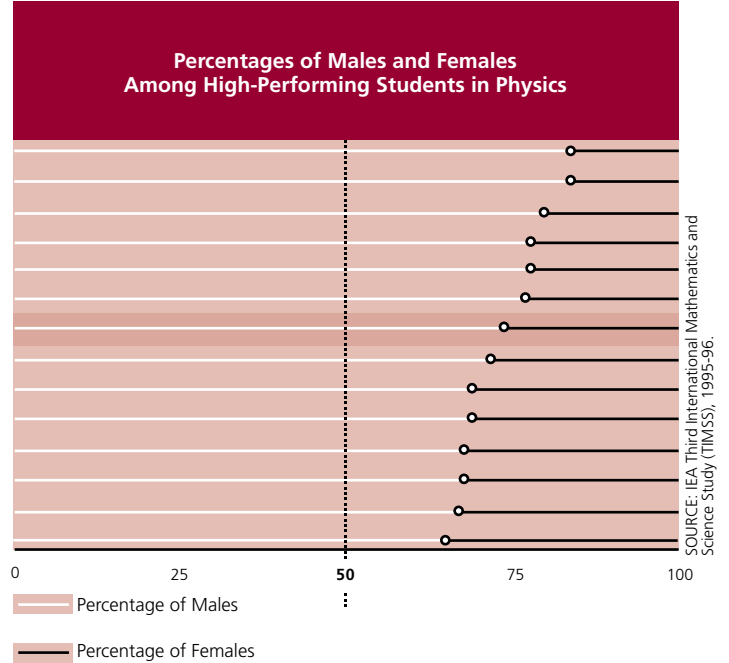
() Standard errors appear in parenthesis. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

Exhibit 2.8

Percentages by Gender of High Performing Students¹ in Physics Final Year of Secondary School*

Country	Males	Females
Czech Republic	▲ 84 (2.3)	16 (2.3)
Switzerland	▲ 84 (2.4)	16 (2.4)
Sweden	▲ 80 (5.6)	20 (5.6)
Austria	▲ 78 (5.6)	22 (5.6)
Slovenia	▲ 78 (9.3)	22 (9.3)
Germany	▲ 77 (7.1)	23 (7.1)
International Avg.	▲ 74 (1.7)	26 (1.7)
Canada	▲ 72 (4.5)	28 (4.5)
Norway	▲ 69 (5.1)	31 (5.1)
Russian Federation	▲ 69 (6.4)	31 (6.4)
Cyprus	68 (8.4)	32 (8.4)
United States	▲ 68 (3.7)	32 (3.7)
Australia	67 (8.0)	33 (8.0)
France	▲ 65 (4.6)	35 (4.6)

▲ = Gender difference statistically significant at .05 level

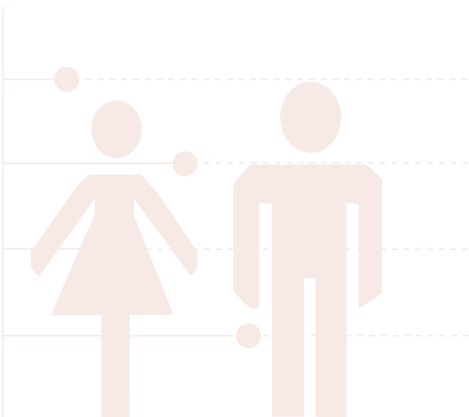


SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1995-96.

¹ High-performing students are defined as those students scoring at or above the 75th percentile for their country. Percentages have been adjusted to account for male-female imbalances in the total sample.

* See Appendix A for characteristics of students sampled.

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



Exploring Gender Differences in the Proportion of High-Performing Students Among Test Takers

For the companion analysis presented in this chapter, the first stage entailed determining for each country, at each grade, the test scores corresponding to the 75th percentile of achievement (e.g., 563 for the United States at the eighth grade) and to the 25th percentile of achievement (e.g., 435 for the United States at the eighth grade). Once these upper and lower-quarter benchmarks were identified, the data within each country were analyzed to determine the percentages of males and females performing above or below each of the upper- and lower-quarter benchmarks.

The results of this analysis are presented in Exhibits 2.9 – 2.12. For mathematics, at fourth and eighth grades, only Korea had significant differences in the percentages of males and females scoring above and below their own country-specific benchmarks. At the final year of secondary school, however, a disproportionate percentage of males scored above the upper benchmark in mathematics literacy in 12 out of 18 countries while a disproportionate percentage of females scored below the lower benchmark in 8 out of 18 countries. The results for the advanced mathematics assessment showed a similar pattern with significantly greater percentages of males reaching the upper benchmark in 7 out of 13 countries and significantly greater percentages of females failing to reach the lower benchmark in 8 out of 13 countries.

Exhibit 2.9-2.12

In science, the results presented in Exhibits 2.13 – 2.16 corroborate the patterns observed in previous analyses. At both the fourth and eighth grades, significantly more males than females reached the upper benchmark in about 40% of the participating countries. Conversely, significantly more females than males performed below the lower benchmark in about 18% of the participating countries. By the final year of secondary school, significantly greater percentages of males than females scored above the country's upper benchmark in nearly every participating country for both science literacy and physics.

Exhibit 2.13-2.16

Exhibit 2.9
Percentages of Males and Females at Upper and Lower Mathematics Benchmarks² - Fourth Grade*

Country	Upper Quarter		Lower Quarter	
	Percentage of Females At or Above Country's Upper Benchmark	Percentage of Males At or Above Country's Upper Benchmark	Percentage of Females At or Below Country's Lower Benchmark	Percentage of Males At or Below Country's Lower Benchmark
Australia	24 (1.5)	26 (1.3)	25 (1.7)	25 (1.7)
Austria	23 (1.6)	27 (1.9)	27 (1.9)	23 (1.9)
Canada	24 (2.0)	26 (1.9)	26 (2.1)	24 (1.7)
Cyprus	23 (1.7)	28 (1.9)	25 (1.8)	25 (1.6)
Czech Rep.	25 (1.8)	25 (1.7)	26 (1.5)	24 (1.5)
England	23 (1.9)	27 (1.6)	26 (1.6)	24 (1.6)
Hong Kong	24 (2.2)	26 (2.3)	25 (2.0)	25 (1.9)
Hungary	24 (1.8)	27 (2.0)	25 (1.9)	24 (1.6)
Iceland	25 (1.8)	25 (2.3)	25 (1.8)	25 (1.7)
Iran, Islamic Rep.	22 (2.7)	28 (3.2)	27 (2.5)	23 (2.7)
Ireland	25 (2.0)	25 (1.7)	24 (2.1)	26 (1.9)
Japan	22 (1.3)	28 (1.5)	26 (1.2)	24 (1.2)
Korea	22 (1.6)	28 (1.5)	28 (1.5)	22 (1.4)
Latvia (LSS)	27 (2.6)	23 (2.3)	23 (2.2)	27 (1.9)
Netherlands	22 (1.8)	28 (2.1)	28 (1.9)	22 (2.1)
New Zealand	25 (2.0)	25 (2.0)	22 (1.9)	28 (2.7)
Norway	23 (1.9)	27 (1.9)	25 (1.9)	25 (1.9)
Portugal	24 (1.6)	26 (1.7)	25 (1.8)	25 (2.0)
Scotland	25 (1.8)	25 (1.8)	24 (1.7)	26 (1.9)
Singapore	26 (2.7)	24 (2.0)	23 (1.7)	26 (1.7)
Slovenia	25 (1.8)	25 (1.7)	25 (2.2)	25 (1.7)
United States	24 (1.6)	26 (1.3)	25 (1.3)	25 (1.3)
International Avg.	24 (0.4)	▲ 26 (0.4)	25 (0.4)	25 (0.4)

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1994-1995.

▲ = Gender difference statistically significant at .05 level

² The upper benchmark is defined as the country's 75th percentile. The lower benchmark is defined as the country's 25th percentile.

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

() Standard errors appear in parentheses. Results are rounded to the nearest whole number.

Exhibit 2.10
Percentages of Males and Females at Upper and Lower Mathematics Benchmarks² - Eighth Grade*

Country	Upper Quarter		Lower Quarter	
	Percentage of Females At or Above Country's Upper Benchmark	Percentage of Males At or Above Country's Upper Benchmark	Percentage of Females At or Below Country's Lower Benchmark	Percentage of Males At or Below Country's Lower Benchmark
Australia	25 (1.7)	25 (2.0)	23 (1.7)	27 (1.7)
Austria	23 (1.7)	27 (1.6)	25 (2.0)	25 (1.6)
Belgium (FL)	25 (2.3)	25 (2.5)	24 (4.3)	26 (3.6)
Belgium (FR)	24 (1.8)	26 (2.2)	25 (1.8)	25 (2.3)
Canada	25 (1.5)	26 (1.5)	24 (1.2)	26 (1.6)
Columbia	23 (2.4)	27 (3.6)	26 (2.1)	25 (4.0)
Cyprus	25 (1.3)	25 (1.3)	23 (1.5)	26 (1.4)
Czech Rep.	22 (2.6)	28 (2.2)	27 (2.3)	23 (1.6)
England	22 (1.5)	27 (2.4)	24 (2.0)	26 (2.0)
France	25 (2.1)	26 (1.6)	27 (1.8)	23 (1.6)
Germany	25 (2.2)	26 (2.3)	24 (2.2)	25 (2.2)
Hong Kong	21 (2.4)	29 (2.6)	29 (3.3)	22 (2.8)
Hungary	25 (1.7)	25 (1.4)	25 (1.6)	25 (1.8)
Iceland	23 (2.9)	27 (3.0)	23 (2.3)	27 (3.3)
Iran, Islamic Rep.	21 (1.9)	28 (1.9)	29 (2.6)	22 (1.8)
Ireland	22 (2.4)	29 (2.6)	27 (2.4)	23 (2.8)
Japan	22 (1.0)	▲ 28 (1.0)	26 (1.0)	25 (1.0)
Korea	22 (1.3)	28 (1.5)	28 (1.4)	22 (1.3)
Latvia (LSS)	23 (1.7)	27 (1.9)	26 (1.7)	24 (2.0)
Lithuania	25 (2.0)	25 (1.7)	25 (2.0)	25 (2.1)
Netherlands	23 (2.8)	27 (2.9)	27 (3.2)	24 (3.1)
New Zealand	23 (2.2)	27 (2.6)	26 (2.0)	24 (2.0)
Norway	24 (1.3)	26 (1.5)	24 (1.4)	26 (1.3)
Portugal	23 (1.8)	27 (1.8)	27 (1.6)	23 (1.7)
Romania	24 (1.7)	26 (2.1)	25 (1.7)	26 (2.0)
Russian Federation	25 (2.2)	26 (2.2)	23 (2.0)	27 (2.6)
Scotland	22 (2.3)	28 (3.2)	28 (2.3)	23 (2.0)
Singapore	25 (2.4)	25 (2.5)	25 (2.3)	25 (2.7)
Slovak Rep.	24 (1.6)	27 (1.7)	25 (1.5)	25 (1.6)
Slovenia	24 (1.4)	26 (1.8)	27 (1.6)	23 (1.5)
Spain	23 (1.5)	27 (1.6)	27 (1.5)	23 (1.3)
Sweden	26 (1.7)	25 (1.5)	26 (1.4)	24 (1.6)
Switzerland	23 (1.3)	27 (1.5)	26 (1.5)	25 (1.7)
United States	23 (2.0)	27 (2.0)	25 (1.7)	25 (1.9)
International Avg.	24 (0.3)	▲ 26 (0.4)	26 (0.3)	25 (0.4)

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1994-1995.

▲ = Gender difference statistically significant at .05 level

² The upper benchmark is defined as the country's 75th percentile. The lower benchmark is defined as the country's 25th percentile.

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

() Standard errors appear in parentheses. Results are rounded to the nearest whole number.

Exhibit 2.11
Percentages of Males and Females at Upper and Lower Mathematics Literacy Benchmarks² - Final Year of Secondary School*

Country	Upper Quarter		Lower Quarter	
	Percentage of Females At or Above Country's Upper Benchmark	Percentage of Males At or Above Country's Upper Benchmark	Percentage of Females At or Below Country's Lower Benchmark	Percentage of Males At or Below Country's Lower Benchmark
Australia	19 (2.7)	▲ 34 (4.8)	28 (3.8)	21 (4.1)
Austria	18 (2.1)	▲ 38 (3.7)	▲ 30 (3.1)	16 (2.5)
Canada	19 (2.1)	▲ 32 (1.7)	▲ 30 (2.0)	19 (2.0)
Cyprus	21 (1.7)	30 (3.2)	27 (2.9)	23 (3.2)
Czech Rep.	18 (4.6)	32 (5.0)	33 (7.4)	18 (2.9)
France	18 (2.5)	▲ 34 (3.5)	▲ 31 (3.2)	18 (2.2)
Germany	20 (2.6)	30 (3.4)	30 (4.1)	21 (3.3)
Hungary	23 (1.7)	27 (2.1)	23 (2.3)	27 (1.7)
Iceland	17 (1.4)	▲ 34 (1.5)	▲ 31 (1.5)	17 (1.7)
Lithuania	23 (2.9)	29 (3.6)	29 (3.4)	17 (2.7)
Netherlands	17 (2.1)	▲ 33 (2.8)	▲ 37 (3.1)	14 (2.2)
New Zealand	20 (2.4)	▲ 30 (2.3)	28 (2.7)	22 (2.3)
Norway	15 (1.8)	▲ 35 (2.0)	▲ 33 (2.3)	17 (1.8)
Russian Federation	21 (2.7)	▲ 32 (3.5)	▲ 28 (2.6)	20 (2.0)
Slovenia	15 (3.4)	▲ 35 (5.4)	32 (4.0)	17 (5.6)
Sweden	16 (1.2)	▲ 34 (2.4)	▲ 30 (1.9)	20 (1.9)
Switzerland	18 (2.0)	▲ 30 (2.4)	31 (3.7)	20 (3.6)
United States	23 (1.6)	28 (1.9)	25 (1.6)	25 (1.7)
International Avg.	22 (0.5)	▲ 35 (0.7)	▲ 29 (0.7)	19 (0.6)

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1994-1995.

▲ = Gender difference statistically significant at .05 level

² The upper benchmark is defined as the country's 75th percentile. The lower benchmark is defined as the country's 25th percentile.

* See Appendix A for characteristics of students sampled.

() Standard errors appear in parentheses. Results are rounded to the nearest whole number.

Exhibit 2.12
Percentages of Males and Females at Upper and Lower Advanced Mathematics Benchmarks² - Final Year of Secondary School*

Country	Upper Quarter		Lower Quarter	
	Percentage of Females At or Above Country's Upper Benchmark	Percentage of Males At or Above Country's Upper Benchmark	Percentage of Females At or Below Country's Lower Benchmark	Percentage of Males At or Below Country's Lower Benchmark
Australia	23 (6.2)	27 (3.8)	28 (5.7)	23 (4.3)
Austria	14 (3.1)	▲ 43 (4.3)	▲ 36 (4.3)	7 (2.5)
Canada	17 (2.6)	▲ 32 (3.1)	▲ 30 (2.1)	20 (2.0)
Cyprus	20 (3.2)	28 (2.9)	29 (3.5)	23 (2.2)
Czech Rep.	12 (2.4)	▲ 44 (4.5)	▲ 36 (3.9)	9 (2.5)
France	18 (3.2)	30 (3.2)	31 (3.6)	20 (2.4)
Germany	20 (3.2)	▲ 33 (3.2)	▲ 29 (2.7)	18 (2.6)
Lithuania	15 (2.6)	▲ 35 (2.0)	▲ 36 (2.8)	14 (2.1)
Russian Federation	16 (2.7)	▲ 33 (3.8)	▲ 32 (3.9)	19 (2.8)
Slovenia	21 (3.7)	29 (5.6)	27 (4.9)	23 (3.6)
Sweden	18 (3.2)	28 (2.7)	29 (3.1)	23 (2.7)
Switzerland	13 (2.0)	▲ 36 (2.1)	▲ 33 (2.9)	18 (1.8)
United States	22 (2.7)	28 (3.1)	▲ 33 (2.7)	18 (2.6)
International Avg.	18 (0.8)	▲ 32 (0.9)	▲ 31 (0.9)	19 (0.7)

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1994-1995.

▲ = Gender difference statistically significant at .05 level

² The upper benchmark is defined as the country's 75th percentile. The lower benchmark is defined as the country's 25th percentile.

* See Appendix A for characteristics of students sampled.

() Standard errors appear in parentheses. Results are rounded to the nearest whole number.

Exhibit 2.13
**Percentages of Males and Females at Upper and Lower Science Benchmarks²
Fourth Grade***

Country	Upper Quarter		Lower Quarter	
	Percentage of Females At or Above Country's Upper Benchmark	Percentage of Males At or Above Country's Upper Benchmark	Percentage of Females At or Below Country's Lower Benchmark	Percentage of Males At or Below Country's Lower Benchmark
Australia	21 (1.2)	▲ 29 (1.4)	26 (1.7)	24 (1.4)
Austria	21 (1.8)	29 (2.0)	28 (2.0)	23 (1.9)
Canada	23 (1.7)	27 (1.8)	26 (1.7)	24 (1.7)
Cyprus	22 (1.6)	▲ 28 (1.8)	27 (1.6)	23 (2.0)
Czech Rep.	21 (1.7)	▲ 29 (1.9)	▲ 29 (1.8)	21 (1.5)
England	23 (1.5)	28 (1.8)	24 (1.5)	26 (1.7)
Hong Kong	21 (1.8)	▲ 29 (1.9)	28 (2.3)	22 (1.9)
Hungary	21 (1.5)	▲ 29 (1.9)	27 (1.9)	22 (1.7)
Iceland	21 (1.5)	29 (2.0)	27 (2.0)	23 (2.2)
Iran, Islamic Rep.	23 (2.6)	27 (3.0)	26 (2.3)	24 (2.4)
Ireland	24 (1.9)	27 (1.6)	26 (2.0)	24 (1.7)
Japan	21 (1.1)	▲ 29 (1.3)	▲ 28 (1.2)	22 (1.1)
Korea	20 (1.8)	▲ 30 (1.7)	▲ 28 (1.5)	22 (1.3)
Latvia (LSS)	25 (2.9)	25 (2.2)	24 (2.1)	26 (2.0)
Netherlands	18 (2.1)	▲ 33 (2.0)	▲ 31 (2.3)	19 (2.3)
New Zealand	24 (1.8)	26 (2.1)	22 (2.1)	28 (2.4)
Norway	21 (2.1)	28 (1.9)	26 (1.9)	24 (1.9)
Portugal	23 (1.8)	27 (1.8)	25 (1.9)	25 (2.0)
Scotland	23 (1.9)	27 (1.7)	25 (1.8)	25 (1.9)
Singapore	23 (2.8)	27 (2.3)	25 (2.0)	25 (1.6)
Slovenia	23 (1.7)	27 (1.8)	25 (2.2)	25 (1.9)
United States	22 (1.4)	▲ 28 (1.4)	27 (1.5)	23 (1.3)
International Avg.	23 (0.4)	▲ 28 (0.4)	▲ 26 (0.4)	24 (0.4)

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1994-1995.

▲ = Gender difference statistically significant at .05 level

² The upper benchmark is defined as the country's 75th percentile. The lower benchmark is defined as the country's 25th percentile.

* Fourth Grade in most countries; see Appendix A for characteristics of students sampled.

() Standard errors appear in parentheses. Results are rounded to the nearest whole number.

Exhibit 2.14
**Percentages of Males and Females at Upper and Lower Science Benchmarks²
Eighth Grade***

Country	Upper Quarter		Lower Quarter	
	Percentage of Females At or Above Country's Upper Benchmark	Percentage of Males At or Above Country's Upper Benchmark	Percentage of Females At or Below Country's Lower Benchmark	Percentage of Males At or Below Country's Lower Benchmark
Australia	22 (1.4)	28 (1.9)	26 (1.5)	25 (1.7)
Austria	22 (1.6)	28 (1.6)	28 (2.1)	22 (1.7)
Belgium (FL)	21 (2.4)	29 (2.0)	27 (2.4)	23 (3.1)
Belgium (FR)	22 (1.8)	29 (2.4)	26 (2.1)	23 (2.2)
Canada	23 (1.3)	28 (1.4)	26 (1.7)	24 (1.4)
Columbia	22 (2.9)	29 (2.7)	28 (2.1)	22 (3.8)
Cyprus	24 (1.2)	26 (1.3)	23 (1.2)	27 (1.3)
Czech Rep.	20 (2.4)	▲ 30 (2.1)	29 (2.6)	21 (1.9)
England	21 (1.8)	28 (2.2)	27 (1.9)	23 (1.9)
France	22 (1.8)	▲ 29 (1.5)	28 (1.7)	22 (1.6)
Germany	23 (1.7)	28 (2.2)	26 (2.2)	23 (2.1)
Hong Kong	19 (1.7)	▲ 30 (2.1)	▲ 30 (2.3)	20 (2.2)
Hungary	21 (1.5)	29 (1.7)	28 (1.8)	22 (1.4)
Iceland	20 (2.5)	29 (2.9)	26 (3.0)	24 (2.6)
Iran, Islamic Rep.	20 (1.8)	29 (2.4)	29 (1.9)	22 (1.8)
Ireland	22 (2.1)	28 (2.2)	27 (2.1)	23 (2.7)
Japan	21 (1.1)	▲ 28 (1.4)	▲ 27 (1.1)	23 (0.9)
Korea	20 (1.0)	▲ 29 (1.3)	▲ 30 (1.4)	21 (1.2)
Latvia (LSS)	21 (1.5)	▲ 29 (1.7)	28 (1.8)	22 (1.6)
Lithuania	22 (1.9)	29 (1.9)	28 (2.1)	22 (2.1)
Netherlands	20 (2.6)	30 (2.5)	29 (2.5)	21 (3.0)
New Zealand	20 (1.9)	▲ 30 (2.1)	28 (2.1)	22 (1.9)
Norway	21 (1.2)	▲ 29 (1.5)	26 (1.1)	24 (1.3)
Portugal	20 (1.4)	▲ 30 (1.6)	▲ 30 (1.3)	20 (1.4)
Romania	23 (2.1)	27 (2.4)	27 (2.0)	23 (1.8)
Russian Federation	23 (1.4)	28 (2.1)	26 (2.1)	24 (2.0)
Scotland	20 (1.9)	▲ 30 (2.9)	28 (1.9)	22 (1.8)
Singapore	23 (2.7)	27 (3.0)	27 (2.5)	23 (2.1)
Slovak Rep.	22 (2.1)	29 (2.0)	28 (1.7)	22 (1.7)
Slovenia	20 (1.6)	▲ 30 (1.9)	▲ 29 (1.6)	21 (1.3)
Spain	21 (1.3)	▲ 29 (1.2)	▲ 29 (1.3)	21 (1.3)
Sweden	22 (1.2)	▲ 28 (1.6)	27 (1.8)	23 (1.7)
Switzerland	21 (1.3)	▲ 29 (1.6)	27 (1.6)	23 (1.5)
United States	22 (1.8)	28 (1.7)	26 (1.9)	24 (1.8)
International Avg.	22 (0.3)	▲ 28 (0.3)	▲ 27 (0.3)	23 (0.3)

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1994-1995.

▲ = Gender difference statistically significant at .05 level

² The upper benchmark is defined as the country's 75th percentile. The lower benchmark is defined as the country's 25th percentile.

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

() Standard errors appear in parentheses. Results are rounded to the nearest whole number.

Exhibit 2.15
**Percentages of Males and Females at Upper and Lower Science Literacy Benchmarks²
Final Year of Secondary School***

Country	Upper Quarter		Lower Quarter	
	Percentage of Females At or Above Country's Upper Benchmark	Percentage of Males At or Above Country's Upper Benchmark	Percentage of Females At or Below Country's Lower Benchmark	Percentage of Males At or Below Country's Lower Benchmark
Australia	19 (3.2)	▲ 34 (4.0)	28 (4.1)	21 (5.2)
Austria	16 (2.0)	▲ 40 (3.4)	30 (3.3)	16 (3.1)
Canada	19 (1.7)	▲ 32 (2.0)	▲ 30 (2.5)	19 (1.8)
Cyprus	20 (1.9)	▲ 31 (2.5)	27 (2.6)	22 (2.9)
Czech Rep.	16 (2.8)	▲ 33 (4.5)	▲ 35 (5.7)	16 (2.1)
France	16 (2.6)	▲ 35 (4.0)	▲ 32 (3.1)	18 (2.6)
Germany	20 (3.0)	30 (3.7)	31 (4.5)	19 (3.7)
Hungary	18 (1.6)	▲ 31 (1.8)	29 (2.2)	21 (1.6)
Iceland	15 (1.2)	▲ 37 (2.0)	▲ 31 (1.5)	17 (1.5)
Lithuania	22 (2.9)	31 (3.5)	▲ 30 (3.4)	16 (2.8)
Netherlands	17 (2.9)	▲ 33 (2.7)	▲ 37 (3.4)	14 (2.0)
New Zealand	18 (1.7)	▲ 32 (2.2)	28 (2.6)	22 (3.6)
Norway	13 (1.7)	▲ 37 (1.9)	▲ 35 (2.3)	15 (2.0)
Russian Federation	19 (2.6)	▲ 35 (3.6)	▲ 32 (2.6)	14 (1.7)
Slovenia	15 (3.3)	▲ 35 (5.4)	32 (3.7)	17 (4.9)
Sweden	15 (1.2)	▲ 36 (2.6)	▲ 32 (1.8)	18 (2.0)
Switzerland	18 (2.5)	▲ 30 (2.6)	▲ 33 (3.3)	19 (2.6)
United States	20 (1.9)	▲ 30 (2.1)	28 (1.8)	22 (1.5)
International Avg.	21 (0.5)	▲ 36 (0.7)	▲ 30 (0.7)	17 (0.6)

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1994-1995.

▲ = Gender difference statistically significant at .05 level

² The upper benchmark is defined as the country's 75th percentile. The lower benchmark is defined as the country's 25th percentile.

* See Appendix A for characteristics of students sampled.

() Standard errors appear in parentheses. Results are rounded to the nearest whole number.

Exhibit 2.16
**Percentages of Males and Females at Upper and Lower Physics Benchmarks²
Final Year of Secondary School***

Country	Upper Quarter		Lower Quarter	
	Percentage of Females At or Above Country's Upper Benchmark	Percentage of Males At or Above Country's Upper Benchmark	Percentage of Females At or Below Country's Lower Benchmark	Percentage of Males At or Below Country's Lower Benchmark
Australia	15 (3.4)	30 (4.3)	36 (5.6)	20 (2.9)
Austria	13 (3.6)	▲ 46 (4.4)	▲ 34 (4.1)	9 (2.5)
Canada	13 (2.3)	▲ 34 (2.3)	33 (4.7)	19 (3.6)
Cyprus	15 (3.3)	32 (3.9)	31 (4.2)	21 (3.1)
Czech Rep.	10 (1.6)	▲ 50 (4.4)	▲ 36 (2.7)	7 (1.6)
France	17 (3.2)	▲ 31 (2.3)	33 (4.2)	19 (3.0)
Germany	10 (2.6)	▲ 32 (4.6)	▲ 39 (5.7)	19 (5.9)
Norway	13 (2.4)	▲ 29 (2.7)	▲ 39 (5.2)	20 (2.3)
Russian Federation	15 (4.0)	▲ 33 (4.2)	▲ 38 (5.4)	17 (2.6)
Slovenia	9 (5.0)	▲ 31 (7.8)	▲ 50 (8.4)	16 (3.6)
Sweden	9 (2.6)	▲ 33 (2.7)	34 (3.4)	21 (2.5)
Switzerland	8 (1.1)	▲ 42 (2.8)	▲ 40 (2.9)	11 (2.1)
United States	16 (2.1)	▲ 34 (3.0)	▲ 33 (2.4)	17 (2.3)
International Avg.	13 (0.9)	▲ 34 (1.0)	▲ 36 (1.3)	18 (0.8)

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1994-1995.

▲ = Gender difference statistically significant at .05 level

² The upper benchmark is defined as the country's 75th percentile. The lower benchmark is defined as the country's 25th percentile.

* See Appendix A for characteristics of students sampled.

() Standard errors appear in parentheses. Results are rounded to the nearest whole number.

Summary

The analysis of the gender composition of top-quarter students in each country showed that for mathematics, the over-representation of males among high-performing students increased most notably between the eighth grade and the final year of secondary school. In contrast for science, a number of countries had significantly more males than females among high-performing students in the earlier grades. By the final year of secondary school, most countries had a significantly greater percentage of males than females among high-performing students in both mathematics and science.

As would be anticipated, similar results were found based on an analysis comparing the percentages of males and females reaching the 75th and 25th percentile benchmarks (upper and lower quarters) in each country. For mathematics at the fourth and eighth grades, roughly equal proportions of females and males performed at the top and bottom quarters within each of the TIMSS countries. This pattern indicates that any given student scoring at or above the top quartile for the country was just as likely to be a female as male. By the final year of secondary school, however, a different pattern emerged and there were significantly greater percentages of males than females performing at or above the upper benchmarks in both mathematics and science. For most of the TIMSS countries in both mathematics and science, a disproportionate number of males had achievement at or above the top quartile while a disproportionate number of females had achievement at or below the bottom quartile.

