

Chapter 4

STUDENTS' BACKGROUNDS AND ATTITUDES TOWARDS MATHEMATICS

To provide an educational context for interpreting the mathematics achievement results, TIMSS collected a full range of descriptive information from students about their backgrounds as well as their activities in and out of school. This chapter presents eighth-grade students' responses to a selected subset of these questions. In an effort to explore the degree to which the students' home and social environment fostered academic development, some of the questions presented herein address the availability of educational resources in the home. Another group of questions is provided to help examine whether or not students typically spend their out-of-school time in ways that support their in-school academic performance. Because students' attitudes and opinions about mathematics reflect what happens in school and their perceptions of the value of mathematics in broader social contexts, results also are described for several questions from the affective domain. More specifically, these questions asked students to express their opinions about the abilities necessary for success in mathematics, provide information about what motivates them to do well in mathematics, and indicate their attitudes towards mathematics.

Student and teacher questionnaire data for two countries are unavailable for this report and thus do not appear in this chapter – Bulgaria and South Africa. Bulgaria had complications with data entry, and South Africa joined the study later than the other countries.

WHAT EDUCATIONAL RESOURCES DO STUDENTS HAVE IN THEIR HOMES?

Students specifically were asked about the availability at home of three types of educational resources – a dictionary, a study desk or table for their own use, and a computer. Table 4.1 reveals that in most countries eighth-grade students with all three of these educational study aids had higher mathematics achievement than students who did not have ready access to these study aids. In almost all the countries, nearly all students reported having a dictionary in their homes. There was more variation among countries in the percentages of students reporting their own study desk or table. Of the three study aids, the most variation was in the number of eighth-grade students reporting having a home computer. In several countries, more than 70% of students reported having a computer in the home, including the more than 85% who so reported in England, the Netherlands, and Scotland. For these three countries, it is likely that these high percentages include computers used for entertainment purposes, such as computer games.

The number of books in the home can be an indicator of a home environment that values literacy, the acquisition of knowledge, and general academic support. Table 4.2 presents eighth-grade students' reports about the number of books in their homes in relation to their achievement on the TIMSS mathematics test. In most countries, the more books students reported in the home, the higher their mathematics

Table 4.1**Students' Reports on Educational Aids in the Home: Dictionary, Study Desk/Table and Computer - Mathematics - Upper Grade (Eighth Grade*)**

Country	Have All Three Educational Aids		Do Not Have All Three Educational Aids		Have Dictionary	Have Study Desk/Table for Own Use	Have Computer
	Percent of Students	Mean Achievement	Percent of Students	Mean Achievement	Percent of Students	Percent of Students	Percent of Students
<i>Australia</i>	66 (1.2)	542 (4.3)	34 (1.2)	509 (4.5)	88 (0.7)	97 (0.4)	73 (1.2)
<i>Austria</i>	56 (1.5)	548 (3.6)	44 (1.5)	530 (3.9)	98 (0.3)	93 (0.8)	59 (1.5)
Belgium (Fl)	64 (1.3)	577 (4.9)	36 (1.3)	547 (7.2)	99 (0.5)	96 (0.5)	67 (1.3)
<i>Belgium (Fr)</i>	58 (1.4)	541 (3.3)	42 (1.4)	510 (4.8)	97 (0.5)	96 (0.5)	60 (1.4)
Canada	57 (1.4)	539 (2.4)	43 (1.4)	513 (3.2)	97 (0.4)	89 (0.6)	61 (1.3)
<i>Colombia</i>	10 (1.2)	407 (9.3)	90 (1.2)	383 (3.4)	96 (0.5)	84 (1.0)	11 (1.2)
Cyprus	37 (0.9)	486 (2.8)	63 (0.9)	468 (2.4)	97 (0.3)	96 (0.5)	39 (0.9)
Czech Republic	33 (1.3)	583 (5.8)	67 (1.3)	555 (5.0)	94 (0.6)	90 (0.6)	36 (1.2)
<i>Denmark</i>	66 (1.5)	510 (3.0)	34 (1.5)	492 (4.6)	85 (1.1)	98 (0.3)	76 (1.2)
England	80 (1.0)	512 (3.1)	20 (1.0)	485 (5.6)	98 (0.4)	90 (0.8)	89 (0.8)
France	49 (1.3)	547 (3.6)	51 (1.3)	531 (3.6)	99 (0.2)	96 (0.4)	50 (1.3)
<i>Germany</i>	66 (1.1)	515 (4.3)	34 (1.1)	500 (5.5)	98 (0.4)	93 (0.6)	71 (1.0)
<i>Greece</i>	28 (1.0)	502 (5.4)	72 (1.0)	478 (2.8)	97 (0.3)	93 (0.5)	29 (1.0)
Hong Kong	33 (1.8)	606 (7.3)	67 (1.8)	582 (6.5)	99 (0.1)	80 (1.1)	39 (1.9)
Hungary	32 (1.2)	574 (3.7)	68 (1.2)	523 (3.4)	77 (1.2)	92 (0.7)	37 (1.2)
Iceland	72 (1.6)	490 (5.2)	28 (1.6)	479 (4.5)	95 (0.5)	96 (0.6)	77 (1.4)
Iran, Islamic Rep.	1 (0.3)	- -	99 (0.3)	430 (2.2)	54 (1.5)	40 (2.0)	4 (0.4)
Ireland	67 (1.2)	536 (5.2)	33 (1.2)	514 (6.3)	99 (0.3)	86 (0.9)	78 (1.1)
<i>Israel</i>	75 (2.1)	534 (5.8)	25 (2.1)	497 (8.8)	100 (0.2)	98 (0.4)	76 (2.1)
Japan	- -	- -	- -	- -	- -	- -	- -
Korea	38 (1.2)	635 (3.6)	62 (1.2)	591 (2.7)	98 (0.2)	95 (0.4)	39 (1.2)
<i>Kuwait</i>	38 (2.0)	398 (3.8)	62 (2.0)	389 (2.6)	84 (1.1)	73 (2.0)	53 (2.1)
Latvia (LSS)	13 (0.8)	492 (5.4)	87 (0.8)	495 (3.1)	94 (0.6)	98 (0.3)	13 (0.9)
Lithuania	35 (1.3)	485 (4.0)	65 (1.3)	474 (4.0)	88 (1.0)	95 (0.6)	42 (1.4)
<i>Netherlands</i>	83 (1.3)	545 (8.2)	17 (1.3)	524 (7.7)	100 (0.1)	99 (0.2)	85 (1.2)
New Zealand	56 (1.4)	522 (5.0)	44 (1.4)	491 (4.6)	99 (0.2)	91 (0.6)	60 (1.3)
Norway	63 (1.1)	512 (2.7)	37 (1.1)	489 (2.9)	97 (0.3)	98 (0.2)	64 (1.1)
Portugal	35 (1.8)	471 (3.6)	65 (1.8)	446 (2.2)	98 (0.4)	84 (0.9)	39 (1.8)
<i>Romania</i>	8 (1.0)	531 (8.5)	92 (1.0)	479 (3.8)	60 (1.6)	69 (1.3)	19 (1.2)
Russian Federation	30 (1.4)	541 (5.5)	70 (1.4)	534 (6.1)	88 (1.1)	95 (0.7)	35 (1.5)
<i>Scotland</i>	74 (1.2)	506 (5.8)	26 (1.2)	480 (6.6)	96 (0.5)	84 (1.2)	90 (0.6)
Singapore	47 (1.5)	657 (5.0)	53 (1.5)	631 (5.1)	99 (0.1)	92 (0.5)	49 (1.5)
Slovak Republic	27 (1.2)	570 (4.3)	73 (1.2)	539 (3.6)	96 (0.5)	86 (0.9)	31 (1.2)
<i>Slovenia</i>	43 (1.4)	563 (3.7)	57 (1.4)	525 (3.4)	94 (0.5)	93 (0.6)	47 (1.3)
Spain	40 (1.3)	501 (2.9)	60 (1.3)	479 (2.1)	99 (0.1)	93 (0.5)	42 (1.2)
Sweden	58 (1.3)	532 (2.9)	42 (1.3)	501 (3.5)	94 (0.4)	100 (0.1)	60 (1.3)
Switzerland	63 (1.2)	555 (3.2)	37 (1.2)	531 (3.6)	97 (0.4)	95 (0.4)	66 (1.2)
<i>Thailand</i>	4 (0.8)	577 (14.9)	96 (0.8)	521 (5.4)	68 (2.1)	66 (2.1)	4 (0.9)
United States	56 (1.7)	521 (4.7)	44 (1.7)	474 (4.2)	97 (0.4)	90 (0.7)	59 (1.7)

*Eighth grade in most countries; see Table 2 for more 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.

Countries shown in italics did not satisfy one or more guidelines for sample participation rates, age/grade specifications, or classroom sampling procedures (see Figure A.3). Background data for Bulgaria and South Africa are unavailable.

Because population coverage falls below 65%, Latvia is annotated LSS for Latvian Speaking Schools only.

A dash (-) indicates data are not available. A tilde (~) indicates insufficient data to report achievement.

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

Table 4.2

Students' Reports on the Number of Books in the Home Mathematics - Upper Grade (Eighth Grade*)

Country	None or Very Few (0-10 Books)		About One Shelf (11– 25 Books)		About One Bookcase (26-100 Books)		About Two Bookcases (101-200 Books)		Three or More Bookcases (More than 200 Books)	
	Percent of Students	Mean Achieve- ment	Percent of Students	Mean Achieve- ment	Percent of Students	Mean Achieve- ment	Percent of Students	Mean Achieve- ment	Percent of Students	Mean Achieve- ment
<i>Australia</i>	3 (0.3)	449 (7.2)	7 (0.6)	482 (5.4)	24 (0.8)	512 (3.7)	25 (0.6)	534 (4.1)	42 (1.4)	555 (4.7)
<i>Austria</i>	11 (1.0)	485 (5.8)	17 (1.1)	505 (4.8)	31 (1.2)	534 (3.9)	17 (0.9)	567 (5.7)	24 (1.4)	579 (4.5)
Belgium (Fl)	11 (1.2)	521 (11.6)	18 (0.8)	549 (8.0)	33 (1.0)	571 (4.9)	18 (1.0)	587 (4.9)	21 (0.9)	575 (7.1)
<i>Belgium (Fr)</i>	7 (0.7)	461 (11.5)	10 (0.7)	484 (6.0)	28 (1.1)	517 (4.7)	21 (0.9)	537 (4.0)	34 (1.5)	555 (4.1)
Canada	4 (0.3)	505 (8.4)	10 (0.7)	510 (5.7)	28 (1.0)	528 (3.4)	25 (0.8)	532 (3.2)	33 (1.4)	534 (3.4)
<i>Colombia</i>	26 (1.5)	376 (5.5)	31 (1.1)	375 (3.7)	27 (1.3)	395 (3.8)	9 (0.7)	404 (7.7)	7 (1.0)	402 (10.4)
Cyprus	6 (0.6)	428 (7.6)	18 (0.8)	448 (3.4)	34 (0.8)	479 (2.9)	23 (0.8)	494 (3.8)	20 (0.8)	490 (4.0)
Czech Republic	1 (0.2)	~ ~	4 (0.5)	506 (8.1)	30 (1.5)	539 (4.9)	32 (0.9)	569 (6.4)	34 (1.8)	588 (5.8)
<i>Denmark</i>	3 (0.6)	452 (13.5)	9 (0.8)	471 (6.8)	30 (1.2)	494 (3.3)	21 (0.9)	506 (4.4)	37 (1.5)	522 (3.8)
England	6 (0.6)	431 (7.7)	13 (1.0)	463 (5.2)	27 (1.3)	495 (4.0)	22 (0.8)	518 (5.1)	32 (1.5)	540 (4.3)
France	5 (0.5)	511 (9.1)	17 (1.0)	520 (3.8)	36 (1.1)	536 (3.7)	21 (1.0)	559 (4.8)	20 (1.2)	547 (4.7)
<i>Germany</i>	8 (0.8)	447 (6.4)	14 (1.1)	464 (4.5)	26 (1.0)	499 (4.4)	19 (0.9)	532 (5.8)	33 (1.7)	542 (5.4)
<i>Greece</i>	5 (0.4)	450 (5.7)	22 (0.9)	454 (3.3)	43 (0.9)	485 (3.4)	18 (0.7)	509 (5.8)	12 (0.7)	519 (5.8)
Hong Kong	21 (1.2)	559 (9.4)	29 (1.0)	594 (5.9)	29 (0.9)	599 (7.4)	10 (0.7)	602 (7.8)	10 (0.9)	606 (9.2)
Hungary	4 (0.6)	455 (10.7)	8 (0.7)	479 (6.1)	25 (1.0)	517 (4.2)	21 (1.0)	545 (4.1)	42 (1.4)	569 (3.8)
Iceland	1 (0.2)	~ ~	5 (0.8)	465 (9.6)	29 (1.4)	477 (4.9)	28 (1.2)	486 (5.7)	37 (1.7)	501 (6.6)
Iran, Islamic Rep.	37 (1.8)	415 (2.9)	32 (0.9)	432 (2.3)	17 (0.9)	438 (3.3)	6 (0.5)	437 (6.8)	7 (0.7)	452 (5.3)
Ireland	7 (0.6)	468 (7.6)	16 (0.8)	491 (5.9)	34 (1.0)	530 (5.0)	21 (0.7)	550 (5.1)	22 (1.2)	555 (6.3)
<i>Israel</i>	4 (0.6)	482 (14.7)	13 (1.6)	498 (7.7)	31 (1.9)	514 (7.1)	26 (1.4)	539 (8.0)	25 (2.0)	542 (7.6)
Japan	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Korea	10 (0.6)	535 (6.1)	12 (0.8)	560 (6.4)	33 (0.9)	599 (3.6)	23 (0.8)	634 (3.6)	21 (0.9)	652 (4.1)
<i>Kuwait</i>	22 (1.4)	382 (3.2)	27 (1.5)	389 (3.4)	28 (1.6)	400 (3.9)	10 (1.0)	404 (5.4)	13 (0.9)	402 (4.7)
Latvia (LSS)	1 (0.3)	~ ~	4 (0.6)	448 (7.9)	17 (1.0)	471 (4.3)	21 (1.1)	484 (5.0)	57 (1.4)	509 (3.5)
Lithuania	3 (0.4)	415 (7.1)	17 (0.9)	442 (4.5)	35 (1.2)	470 (4.1)	21 (0.9)	496 (4.6)	24 (1.1)	507 (5.2)
<i>Netherlands</i>	8 (1.0)	488 (10.7)	16 (1.3)	507 (10.1)	34 (1.3)	538 (7.3)	19 (0.9)	558 (7.7)	22 (1.7)	577 (7.4)
New Zealand	3 (0.4)	441 (8.2)	7 (0.6)	452 (6.5)	24 (0.8)	488 (4.7)	25 (0.7)	516 (4.8)	41 (1.4)	531 (5.2)
Norway	2 (0.3)	~ ~	6 (0.4)	467 (5.2)	25 (0.9)	483 (3.0)	22 (0.7)	504 (3.2)	45 (1.2)	524 (3.1)
Portugal	10 (0.8)	428 (2.9)	26 (1.3)	443 (2.7)	32 (1.0)	454 (2.6)	15 (0.8)	472 (3.4)	17 (1.4)	475 (4.3)
<i>Romania</i>	24 (1.3)	459 (7.0)	22 (1.3)	466 (5.2)	19 (1.0)	476 (4.8)	11 (0.7)	498 (5.5)	24 (1.7)	523 (5.4)
Russian Federation	2 (0.3)	~ ~	11 (0.8)	495 (10.6)	36 (1.3)	523 (5.2)	24 (0.8)	550 (4.4)	26 (1.3)	562 (4.8)
<i>Scotland</i>	11 (1.2)	441 (4.8)	17 (1.1)	468 (4.7)	28 (1.0)	490 (4.5)	19 (1.0)	525 (5.9)	25 (2.0)	540 (8.0)
Singapore	11 (0.8)	611 (4.8)	22 (0.9)	622 (5.5)	41 (0.8)	648 (4.8)	14 (0.7)	665 (6.8)	12 (1.0)	674 (6.1)
Slovak Republic	2 (0.3)	~ ~	11 (0.6)	497 (6.8)	45 (1.1)	541 (3.2)	23 (0.9)	562 (4.3)	18 (1.0)	581 (5.9)
<i>Slovenia</i>	2 (0.4)	~ ~	15 (0.9)	500 (4.8)	38 (1.2)	532 (3.5)	22 (0.9)	560 (4.7)	22 (1.1)	571 (4.4)
Spain	4 (0.4)	443 (6.1)	18 (1.1)	460 (3.1)	33 (1.0)	482 (2.6)	20 (0.8)	498 (3.2)	26 (1.2)	513 (3.0)
Sweden	3 (0.3)	468 (8.3)	8 (0.7)	464 (5.0)	24 (1.0)	503 (4.3)	24 (0.8)	524 (3.3)	41 (1.5)	541 (3.5)
Switzerland	8 (1.0)	480 (6.9)	16 (0.9)	511 (4.7)	30 (1.0)	542 (3.1)	20 (0.9)	568 (3.7)	26 (1.2)	579 (4.7)
<i>Thailand</i>	19 (1.2)	507 (4.8)	30 (1.0)	514 (5.1)	33 (1.2)	528 (6.5)	9 (0.6)	537 (8.1)	9 (1.0)	552 (9.2)
United States	8 (0.8)	435 (4.5)	13 (0.8)	462 (5.2)	28 (0.9)	491 (3.5)	21 (0.6)	517 (5.2)	31 (1.5)	531 (5.1)

*Eighth grade in most countries; see Table 2 for more 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.

Countries shown in italics did not satisfy one or more guidelines for sample participation rates, age/grade specifications, or classroom sampling procedures (see Figure A.3). Background data for Bulgaria and South Africa are unavailable.

Because population coverage falls below 65%, Latvia is annotated LSS for Latvian Speaking Schools only.

A dash (-) indicates data are not available. A tilde (~) indicates insufficient data to report achievement.

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

achievement. Although the main purpose of the question was to gain some information about the relative importance of academic pursuits in the students' home environments rather than to determine the actual number of books in students' homes, there was a substantial amount of variation from country to country in eighth-grade students' reports about the number of books in their homes. In Colombia, Hong Kong, Iran, Kuwait, Romania, and Thailand, 40% or more of the students reported 25 or fewer books in the home. Conversely, 40% or more of the students in Australia, Hungary, Latvia (LSS), New Zealand, Norway, and Sweden reported more than 200 books in their homes.

Information about their parents' educational levels was gathered by asking students to indicate the highest level of education completed by their fathers and mothers. Table 4.3 presents the relationship between eighth-grade students' mathematics achievement and their reports of the highest level of education of either parent. Results are presented at three educational levels: finished university, finished upper secondary school but not university, and finished primary school but not upper secondary school. These three educational levels are based on internationally-defined categories, which may not be strictly comparable across countries due to differences in national education systems. Although the majority of countries translated and defined the educational categories used in their questionnaires to be comparable to the internationally-defined levels, some countries used modified response options to conform to their national education systems. Also, for a few countries, the percentages of students responding to this question fell below 85%. When this happened, the percentages shown in the table are annotated with an "r" for a response rate of 70% to 84% or an "s" if the response rate was from 50% to 69%.

Despite the different educational approaches, structures, and organizations across the TIMSS countries, it is clear from the data in Table 4.3 that parents' education is positively related to students' mathematics achievement. In every country, the pattern was for those eighth-grade students whose parents had more education to also be those who had higher achievement in mathematics. Once again, the purpose of this question was not to ascertain precisely the educational levels of students' parents, but to gain further understanding about the relative importance of schooling in their home environments. As indicated by the results, there was variation among countries in the percentages of students reporting that they did not know their parents' educational levels, as well as in the percentages of students reporting that their parents had completed successively higher educational levels. For example, in Canada, Israel, Lithuania, the Russian Federation, and the United States, more than 30% of the students reported that at least one of their parents had finished university, and only relatively small percentages (fewer than 12%) reported that they did not know the educational levels of their parents. In contrast, almost all students (90% or more) in Hong Kong, Iran, Kuwait, Portugal, and Thailand also reported knowing their parents' educational levels, but for these countries, fewer than 10% of students reported that either parent had finished university.

Table 4.3

Students' Reports on the Highest Level of Education of Either Parent¹ Mathematics - Upper Grade (Eighth Grade*)

Country	Finished University ²		Finished Upper Secondary School But Not University ³		Finished Primary School But Not Upper Secondary School ⁴		Do Not Know	
	Percent of Students	Mean Achievement	Percent of Students	Mean Achievement	Percent of Students	Mean Achievement	Percent of Students	Mean Achievement
<i>Australia</i>	28 (1.4)	572 (4.4)	37 (0.9)	528 (4.4)	24 (0.9)	510 (3.6)	11 (0.6)	494 (4.9)
<i>Austria</i>	10 (0.7)	574 (7.2)	70 (1.1)	547 (3.7)	8 (0.9)	496 (7.4)	12 (0.9)	513 (6.1)
Belgium (FI)	20 (1.6)	599 (6.0)	34 (1.3)	572 (5.3)	21 (2.4)	538 (10.3)	25 (1.4)	548 (5.9)
<i>Belgium (Fr)</i>	27 (1.6)	557 (3.9)	34 (1.3)	537 (3.9)	11 (1.3)	491 (6.2)	27 (1.6)	501 (7.4)
Canada	37 (1.3)	544 (3.4)	39 (1.2)	526 (2.9)	13 (0.9)	510 (5.1)	10 (0.5)	504 (4.2)
<i>Colombia</i>	15 (1.6)	410 (8.2)	28 (1.6)	396 (4.3)	47 (2.3)	378 (4.1)	10 (0.9)	371 (6.8)
Cyprus	r 15 (0.9)	521 (4.8)	29 (1.1)	502 (4.0)	52 (1.4)	455 (2.9)	4 (0.5)	454 (8.8)
Czech Republic	21 (1.7)	604 (7.5)	47 (1.5)	571 (4.9)	25 (1.5)	532 (4.1)	7 (0.8)	516 (7.8)
<i>Denmark</i>	13 (1.0)	528 (5.5)	46 (1.5)	512 (3.5)	8 (0.7)	488 (8.0)	33 (1.7)	498 (4.0)
England	- -	- -	- -	- -	- -	- -	- -	- -
France	r 13 (1.2)	576 (5.8)	36 (1.3)	549 (3.6)	19 (1.2)	530 (4.1)	31 (1.3)	529 (3.8)
<i>Germany</i>	11 (1.0)	553 (8.5)	32 (1.3)	526 (5.0)	38 (1.6)	504 (4.2)	19 (1.3)	488 (6.7)
<i>Greece</i>	18 (1.1)	537 (6.3)	39 (1.3)	492 (4.5)	40 (1.8)	462 (2.9)	3 (0.3)	457 (8.1)
Hong Kong	7 (1.0)	638 (8.6)	30 (1.2)	607 (6.6)	55 (1.8)	584 (5.9)	7 (0.7)	554 (12.6)
Hungary	r 24 (1.8)	594 (4.9)	66 (1.7)	539 (3.2)	11 (0.9)	492 (6.0)	- -	- -
Iceland	25 (2.8)	505 (7.0)	44 (2.0)	495 (4.7)	15 (1.4)	467 (6.8)	15 (1.0)	472 (6.5)
Iran, Islamic Rep.	r 3 (0.6)	468 (7.1)	21 (1.8)	447 (2.5)	68 (2.2)	426 (2.5)	7 (1.0)	424 (5.6)
Ireland	17 (1.3)	564 (7.6)	46 (1.0)	535 (4.7)	26 (1.2)	510 (5.7)	10 (0.7)	499 (6.6)
<i>Israel</i>	37 (2.5)	552 (7.8)	45 (2.2)	518 (5.8)	10 (1.3)	486 (5.9)	8 (0.9)	506 (8.5)
Japan	- -	- -	- -	- -	- -	- -	- -	- -
Korea	22 (1.3)	654 (5.1)	47 (1.3)	607 (2.8)	26 (1.1)	575 (4.2)	5 (0.5)	573 (9.3)
<i>Kuwait</i>	s 3 (1.2)	429 (11.6)	3 (0.9)	387 (13.2)	92 (2.1)	390 (2.9)	1 (0.7)	~ ~
Latvia (LSS)	r 27 (1.5)	528 (5.5)	49 (1.4)	493 (3.7)	13 (1.0)	470 (6.2)	11 (1.0)	473 (6.4)
Lithuania	s 37 (1.6)	508 (4.4)	44 (1.6)	474 (4.1)	7 (1.0)	449 (6.3)	12 (1.2)	472 (6.4)
<i>Netherlands</i>	12 (1.4)	570 (10.6)	55 (1.8)	549 (7.7)	10 (0.7)	524 (9.2)	23 (1.4)	522 (7.8)
New Zealand	25 (1.3)	543 (6.0)	38 (1.1)	504 (4.4)	15 (0.8)	491 (5.7)	21 (1.1)	494 (5.4)
Norway	25 (1.2)	524 (4.5)	38 (1.1)	505 (3.1)	9 (0.6)	487 (4.6)	27 (1.2)	495 (3.2)
Portugal	9 (1.2)	494 (4.6)	13 (1.0)	473 (4.0)	73 (2.0)	447 (2.1)	5 (0.4)	452 (5.8)
<i>Romania</i>	10 (1.3)	517 (8.7)	47 (1.5)	497 (4.9)	33 (1.9)	467 (7.2)	10 (0.9)	460 (6.5)
Russian Federation	34 (1.8)	565 (4.9)	54 (1.6)	526 (6.4)	5 (0.5)	484 (8.0)	6 (0.8)	519 (10.8)
<i>Scotland</i>	14 (1.4)	559 (8.4)	33 (1.4)	499 (5.3)	14 (0.8)	485 (5.5)	39 (1.3)	487 (5.6)
Singapore	8 (1.0)	692 (7.5)	69 (1.0)	645 (5.0)	23 (1.2)	623 (4.9)	- -	- -
Slovak Republic	20 (1.4)	588 (5.4)	50 (1.1)	551 (3.2)	23 (1.2)	517 (4.5)	6 (0.5)	521 (7.5)
<i>Slovenia</i>	19 (1.1)	583 (4.4)	59 (1.4)	542 (3.4)	18 (1.3)	503 (4.6)	4 (0.4)	522 (9.0)
Spain	15 (1.2)	517 (3.6)	21 (0.9)	502 (3.3)	54 (1.8)	479 (2.3)	10 (0.8)	478 (3.5)
Sweden	22 (1.2)	544 (3.9)	34 (1.1)	524 (3.4)	9 (0.6)	494 (4.6)	35 (1.1)	511 (3.4)
Switzerland	11 (0.8)	588 (5.4)	61 (1.3)	552 (2.6)	13 (0.9)	520 (5.1)	15 (1.0)	534 (4.7)
<i>Thailand</i>	9 (1.4)	571 (9.5)	14 (1.4)	543 (8.9)	73 (2.6)	513 (4.4)	3 (0.5)	524 (12.3)
United States	33 (1.4)	527 (5.9)	54 (1.3)	494 (4.0)	7 (0.8)	455 (4.8)	5 (0.4)	489 (8.5)

*Eighth grade in most countries; see Table 2 for more information about the grades tested in each country.

¹The response categories were defined by each country to conform to their own educational system and may not be strictly comparable across countries.

See Figure 4.1 for country modifications to the definitions of educational levels. Also, no response category was provided for students whose parents had no formal education or did not finish primary school, except in France where a small percentage of students in this category are included in the missing responses.

²In most countries, defined as completion of at least a 4-year degree program at a university or an equivalent institute of higher education.

³Finished upper secondary school with or without some tertiary education not equivalent to a university degree. In most countries, finished secondary corresponds to completion of an upper-secondary track terminating after 11 to 13 years of schooling.

⁴Finished primary school or some secondary school not equivalent to completion of upper secondary.

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

Countries shown in italics did not satisfy one or more guidelines for sample participation rates, age/grade specifications, or classroom sampling procedures (see Figure A.3). Background data for Bulgaria and South Africa are unavailable.

Because population coverage falls below 65%, Latvia is annotated LSS for Latvian Speaking Schools only.

A dash (-) indicates data are not available. A tilde (~) indicates insufficient data to report achievement.

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

Data for Singapore not obtained from students; entered at ministry level.

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

Figure 4.1 Country Modifications to the Definitions of Educational Levels for Parents' Highest Level of Education¹

Finished Primary School But Not Upper Secondary School	
Internationally-Defined Levels:	<i>Finished Primary School or Finished Some Secondary School</i>
Countries with Modified Nationally-Defined Levels:	
Austria:	<i>Compulsory (Pflichtschulabschluss; 9 grades)</i>
Denmark:	<i>Basic school (Folkeskolen, Realeksamen; 9 or 10 grades)</i>
France:	<i>Lower Secondary (Collège, CAP)</i>
Germany:	<i>Lower secondary (Hauptschulabschluss; 9 or 10 grades) or Medium secondary (Fachoberschulreife, Realschulabschluss or Polytechnische Oberschule; 10 grades)</i>
Hungary:	<i>Some or all of general school (8 grades)</i>
Norway:	<i>Compulsory (9 grades) or some upper secondary</i>
Scotland:	<i>Some secondary school</i>
Singapore:	<i>Primary school</i>
Sweden:	<i>Compulsory (9 grades) or started upper secondary</i>
Switzerland:	<i>Compulsory (9 grades)</i>

Finished Upper Secondary School ² But Not University	
Internationally-Defined Levels:	<i>Finished Secondary School or Some Vocational/Technical Education After Secondary School or Some University</i>
Countries with Modified Nationally-Defined Levels:	
Austria:	<i>Upper-secondary tracks: apprenticeship (Berufsschul-/Lehrabschluss), medium vocational (Handelsschule, Fachschule), higher vocational (HAK, HTL, etc.), or higher academic (Gymnasium, Realgymnasium)</i>
Cyprus:	<i>Upper-secondary tracks: academic or vocational/technical or Post-Secondary: Finished college</i>
Denmark:	<i>Upper-secondary tracks: academic or general/vocational (gymnasium, hf, htx, hhx) vocational training (erhvervsfaglig uddannelse) Post-Secondary: Medium-cycle higher education (mellemlang uddannelse)</i>
France:	<i>Upper-secondary tracks: BEP (11 grades) or baccalauréat (général, technologique or professionnel; 12 or 13 grades) Post-Secondary: 2 or 3 years study after baccalauréat (BTS, DUT, Licence)</i>
Germany:	<i>Upper-secondary tracks: general/academic or apprenticeship/vocational training (Lehrabschluss, Berufsfachschule) Post-Secondary: Higher vocational schools (Fachhochschulabschluss)</i>
Hungary:	<i>Upper-secondary tracks: apprenticeship (general + 3 years) or final exam in secondary (general + 4 years)</i>
Sweden:	<i>Upper-secondary tracks: academic or vocational (gymnasieutbildning or yrkesinriktad utbildning) Post-Secondary: Less than 3 years of university studies</i>
Switzerland:	<i>Upper-secondary tracks: occupational (apprentissage, école professionnelle), academic (gymnase, baccalauréat, maturité cantonale), or teacher training (école normale, formation d'enseignant) Post-Secondary: Applied science university (haute école professionnelle ou commerciale)</i>

Finished University	
Internationally-Defined Level:	<i>Finished University</i>
Countries with Modified Nationally-Defined Levels:	
Austria:	<i>University (master's degree)</i>
Canada:	<i>University or college</i>
Cyprus:	<i>University degree or post-graduate studies</i>
France:	<i>4 years of study after baccalauréat</i>
Germany:	<i>University, Technical University or Pedagogical Institute</i>
Hungary:	<i>University or college diploma</i>
New Zealand:	<i>University or Teachers' College</i>
Norway:	<i>University or college</i>
Portugal:	<i>University or polytechnic</i>
Sweden:	<i>3 years university studies or more</i>
Switzerland:	<i>University or insitute of technology</i>
United States:	<i>Bachelor's degree at college or university</i>

¹Educational levels were translated and defined in most countries to be comparable to the internationally-defined levels. Countries that used modified response options to conform to their national education systems are indicated to aid in the interpretation of the reporting categories presented in Table 4.3.

²Upper-secondary corresponds to ISCED level 3 tracks terminating after 11 to 13 years in most countries. (Education at a Glance, OECD, 1995)

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

Figure 4.1 shows the definitions of the educational categories used by TIMSS and the modifications made to them by some countries. In several countries, the finished primary school but not upper secondary school category included only a single level corresponding to finishing compulsory education (8 to 10 grades) and did not include finishing only primary school. In addition, in Germany, the completion of medium secondary education was considered part of this category, while in Austria, which has an educational system similar to Germany's, the medium-level vocational education was included in the second category reporting upper-secondary education.

The second reporting category (finished upper secondary school but not university) was complicated because, in many countries, particularly in Europe, there are several upper-secondary tracks leading to university or other tertiary institutions as well as vocational/apprenticeship programs. In most countries, finishing upper secondary means completion of 11 to 13 years of education. In some systems, however, the general secondary education may be completed after 9 or 10 years, followed by 2 to 4 years of full- or part-time vocational/apprenticeship training that may be either included as part of the secondary educational system or considered as post-secondary. All of the upper-secondary tracks and any upper-secondary or post-secondary vocational education programs included as response options are combined in the second reporting category.

Several countries also differed in their interpretation of what is included in the category of finished university. For example, degrees obtained from technical institutes and other non-university institutions of higher education are considered equivalent to a university degree in some countries but not in others. Completion of a degree at one of these institutions, therefore, may have been included in either the finished university or the finished upper secondary school but not university categories. In countries such as Canada, New Zealand, Portugal, and the United States, the finished university category includes the completion of the equivalent of a bachelor's degree at either a university, college, or polytechnic, while in Austria and France, this category corresponds to the equivalent of a master's degree received at a university.

WHAT ARE THE ACADEMIC EXPECTATIONS OF STUDENTS, THEIR FAMILIES, AND THEIR FRIENDS?

Tables 4.4, 4.5, and 4.6 present eighth-grade students' reports about how they themselves, their mothers, and their friends feel about the importance of doing well in various academic and non-academic activities. The first three questions asked about the degree of agreement with the importance of doing well in the academic subjects of mathematics, science, and language, respectively. In almost every country, nearly all eighth-graders agreed or strongly agreed that it was important to do well in mathematics. The percentages were in the high 90s for many countries and exceeded 90% in all countries except one, and that was Romania, with 88% agreement. Similarly, approximately the same high percentages of students were in agreement with the importance of doing well in language. In many countries, somewhat fewer eighth-grade students agreed with the importance of doing well in science. Still, the percentages were relatively high, ranging from more than 90% agreement in a number of countries to a low of 68% in Switzerland and 72% in Germany.

For the most part, eighth-grade students indicated that their mothers' opinions about the importance of these academic activities corresponded very closely to their own feelings. In contrast, however, students reported that their friends were not in as much agreement about the importance of academic success. Although students' friends purportedly were in general agreement with the importance of doing well in mathematics, the percentages were generally in the 80s rather than the 90s. According to students, their friends were in the lowest degree of agreement about doing well in mathematics in Germany and Sweden (70% for both countries).

As with the students' reports about their own feelings and those of their mothers, students indicated a close alignment in their friends' degree of agreement about the importance of academic success in mathematics and that in language. Apparently, even though the relative importance varies from group to group, students, their mothers, and their friends find it very nearly equally important to do well in mathematics and language. According to students in some countries, however, their friends do not have nearly the same positive feeling about the importance of doing well in science. Countries where fewer than two-thirds of eighth-graders reported that their friends agreed or strongly agreed it was important to do well in science included Australia (64%), Austria (45%), the Czech Republic (61%), France (53%), Germany (35%), Hungary (66%), Iceland (65%), Ireland (59%), Israel (56%), Latvia (LSS) (53%), Lithuania (55%), New Zealand (66%), the Slovak Republic (60%), Slovenia (56%), Sweden (61%), and Switzerland (40%).

For purposes of comparison, eighth-grade students also were asked about the importance of two non-academic activities – having time to have fun and being good at sports. In most countries, very high percentages of the students (more than 95%) felt it was important to have time to have fun. The percentages in agreement were similar to those agreeing that it was important to do well in mathematics and language. Generally, there was less agreement about the importance of being good at sports which was rather similar to the level of agreement about the importance of doing well in science.

It needs to be emphasized, however, that the relative rankings given to the five activities by students varied from country to country.

In nearly all countries, 80% or more of the eighth-grade students reported that their mothers agreed that it was important to have time to have fun. The exceptions were Hong Kong (74%), Iran (79%), Korea (58%), Kuwait (63%), and Singapore (79%), where students reported from 8% to 29% lower agreement for their mothers than for themselves. According to students, their mothers give a moderate to high degree of support to the importance of being good at sports. In nearly all countries, the percentages of students' reporting such agreement were in the 70s, 80s, and 90s, except in Austria (56%), Germany (48%), Kuwait (69%), the Netherlands (63%), and Switzerland (59%).

As might be anticipated, students reported that most of their friends agreed that it was important to have fun – more than 90% in all countries except Iran (87%), Korea (88%), Kuwait (77%), and Romania (86%). Internationally, eighth-graders reported that their friends generally were in moderate agreement that it was important to do well in sports. The percentages of their friends' agreement as reported by students ranged from a low of 64% in Germany to a high of 96% in Colombia.

Table 4.4**Students' Reports on Whether They Agree or Strongly Agree That It Is Important to Do Various Activities - Mathematics - Upper Grade (Eighth Grade*)**

Country	Percent of Students				
	Do Well in Mathematics	Do Well in Science	Do Well in Language	Have Time to Have Fun	Be Good at Sports
<i>Australia</i>	96 (0.4)	89 (0.6)	95 (0.4)	98 (0.2)	85 (0.6)
<i>Austria</i>	94 (0.5)	82 (1.2)	93 (0.6)	98 (0.3)	82 (0.9)
Belgium (Fl)	98 (0.3)	93 (0.6)	98 (0.4)	98 (0.3)	80 (1.0)
<i>Belgium (Fr)</i>	98 (0.3)	94 (0.7)	98 (0.3)	98 (0.4)	87 (0.8)
Canada	98 (0.2)	94 (0.7)	97 (0.3)	99 (0.2)	86 (0.6)
<i>Colombia</i>	99 (0.2)	99 (0.2)	99 (0.2)	98 (0.3)	97 (0.3)
Cyprus	94 (0.5)	86 (1.0)	94 (0.6)	94 (0.5)	85 (1.0)
Czech Republic	98 (0.5)	88 (1.0)	98 (0.3)	98 (0.3)	84 (0.9)
<i>Denmark</i>	97 (0.4)	87 (1.0)	97 (0.4)	99 (0.3)	83 (0.8)
England	99 (0.2)	96 (0.5)	99 (0.3)	99 (0.3)	80 (1.1)
France	97 (0.4)	83 (1.2)	97 (0.5)	97 (0.4)	80 (0.8)
<i>Germany</i>	93 (0.6)	72 (1.0)	91 (0.6)	97 (0.4)	72 (1.1)
<i>Greece</i>	96 (0.4)	93 (0.5)	96 (0.4)	96 (0.4)	91 (0.6)
Hong Kong	96 (0.5)	90 (0.9)	96 (0.5)	94 (0.5)	83 (0.9)
Hungary	95 (0.5)	86 (0.8)	95 (0.5)	96 (0.5)	78 (0.9)
Iceland	97 (1.0)	90 (1.2)	97 (1.0)	98 (0.4)	90 (1.6)
Iran, Islamic Rep.	97 (0.4)	98 (0.4)	96 (0.6)	87 (1.1)	95 (0.7)
Ireland	97 (0.3)	86 (1.1)	96 (0.4)	99 (0.2)	85 (0.8)
<i>Israel</i>	98 (0.5)	85 (1.0)	89 (1.5)	98 (0.5)	84 (1.3)
Japan	92 (0.4)	87 (0.6)	91 (0.5)	99 (0.1)	83 (0.7)
Korea	94 (0.5)	91 (0.6)	93 (0.6)	87 (0.8)	86 (0.8)
<i>Kuwait</i>	96 (0.6)	96 (0.6)	96 (0.5)	85 (2.0)	81 (1.2)
Latvia (LSS)	97 (0.4)	84 (1.0)	97 (0.3)	97 (0.4)	87 (0.8)
Lithuania	93 (0.6)	78 (1.1)	96 (0.4)	94 (0.6)	93 (0.5)
<i>Netherlands</i>	97 (0.6)	95 (0.7)	99 (0.3)	98 (0.6)	78 (1.2)
New Zealand	97 (0.3)	92 (0.6)	96 (0.5)	99 (0.3)	86 (0.7)
Norway	96 (0.5)	92 (0.6)	96 (0.5)	99 (0.1)	79 (0.9)
Portugal	97 (0.3)	97 (0.3)	99 (0.2)	93 (0.5)	94 (0.5)
<i>Romania</i>	88 (0.8)	86 (0.8)	88 (0.8)	86 (1.0)	80 (1.1)
Russian Federation	97 (0.4)	95 (0.6)	97 (0.5)	98 (0.4)	88 (0.9)
<i>Scotland</i>	98 (0.4)	92 (0.7)	98 (0.3)	98 (0.3)	82 (0.9)
Singapore	99 (0.2)	99 (0.2)	100 (0.1)	96 (0.3)	89 (0.6)
Slovak Republic	96 (0.4)	86 (0.8)	96 (0.4)	98 (0.2)	91 (0.5)
<i>Slovenia</i>	96 (0.5)	86 (0.9)	96 (0.4)	95 (0.5)	87 (0.7)
Spain	99 (0.2)	99 (0.2)	99 (0.2)	99 (0.1)	95 (0.3)
Sweden	92 (0.6)	84 (0.8)	90 (0.6)	99 (0.2)	84 (0.7)
Switzerland	96 (0.4)	68 (1.1)	94 (0.4)	95 (0.6)	78 (0.9)
<i>Thailand</i>	93 (0.5)	94 (0.5)	96 (0.4)	95 (0.3)	91 (0.5)
United States	97 (0.3)	96 (0.5)	96 (0.3)	99 (0.2)	88 (0.6)

*Eighth grade in most countries; see Table 2 for more 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.

Countries shown in italics did not satisfy one or more guidelines for sample participation rates, age/grade specifications, or classroom sampling procedures (see Figure A.3). Background data for Bulgaria and South Africa are unavailable.

Because population coverage falls below 65%, Latvia is annotated LSS for Latvian Speaking Schools only.

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

Table 4.5**Students' Reports on Whether Their Mothers Agree or Strongly Agree That It Is Important to Do Various Activities - Mathematics - Upper Grade (Eighth Grade*)**

Country	Percent of Students				
	Do Well in Mathematics	Do Well in Science	Do Well in Language	Have Time to Have Fun	Be Good at Sports
<i>Australia</i>	98 (0.2)	94 (0.4)	98 (0.2)	94 (0.4)	83 (0.7)
<i>Austria</i>	96 (0.4)	81 (1.0)	95 (0.5)	90 (0.7)	56 (1.1)
Belgium (Fl)	97 (0.4)	93 (0.8)	98 (0.4)	94 (0.5)	73 (1.2)
<i>Belgium (Fr)</i>	99 (0.3)	98 (0.3)	99 (0.3)	95 (0.6)	85 (0.7)
Canada	99 (0.1)	98 (0.3)	99 (0.1)	96 (0.4)	83 (0.7)
<i>Colombia</i>	99 (0.4)	99 (0.3)	99 (0.2)	93 (0.6)	94 (1.0)
Cyprus	95 (0.4)	89 (0.8)	95 (0.5)	91 (0.6)	80 (0.8)
Czech Republic	99 (0.2)	93 (0.8)	98 (0.3)	90 (0.7)	74 (1.1)
<i>Denmark</i>	99 (0.3)	95 (0.6)	99 (0.3)	98 (0.3)	81 (1.0)
England	99 (0.3)	96 (0.5)	99 (0.3)	94 (0.6)	74 (1.2)
France	98 (0.3)	88 (0.9)	99 (0.3)	91 (0.7)	74 (1.0)
<i>Germany</i>	94 (0.8)	71 (1.4)	93 (0.7)	88 (0.7)	48 (1.2)
<i>Greece</i>	96 (0.3)	94 (0.5)	96 (0.4)	89 (0.6)	83 (0.7)
Hong Kong	93 (0.6)	86 (0.7)	93 (0.6)	74 (0.9)	71 (1.3)
Hungary	96 (0.4)	85 (0.8)	96 (0.4)	96 (0.4)	73 (1.1)
Iceland	97 (0.8)	95 (1.3)	98 (0.5)	95 (0.7)	87 (1.6)
Iran, Islamic Rep.	96 (0.5)	96 (0.5)	95 (0.5)	79 (1.8)	90 (1.5)
Ireland	98 (0.3)	89 (1.0)	98 (0.2)	94 (0.5)	83 (0.8)
<i>Israel</i>	99 (0.4)	89 (0.9)	93 (0.6)	95 (0.7)	79 (1.4)
Japan	- -	- -	- -	- -	- -
Korea	96 (0.4)	92 (0.5)	94 (0.5)	58 (1.1)	72 (0.9)
<i>Kuwait</i>	91 (1.0)	r 91 (0.9)	r 91 (0.8)	r 63 (2.2)	r 69 (2.0)
Latvia (LSS)	97 (0.4)	85 (1.1)	97 (0.5)	90 (0.8)	82 (0.9)
Lithuania	91 (0.6)	77 (1.1)	95 (0.5)	86 (0.8)	87 (0.9)
<i>Netherlands</i>	96 (0.5)	94 (0.7)	97 (0.4)	96 (0.4)	63 (1.4)
New Zealand	98 (0.3)	95 (0.4)	97 (0.3)	95 (0.5)	86 (0.8)
Norway	97 (0.4)	95 (0.5)	97 (0.4)	97 (0.3)	71 (1.1)
Portugal	96 (0.4)	98 (0.3)	98 (0.3)	87 (0.7)	91 (0.6)
<i>Romania</i>	93 (0.5)	94 (0.6)	90 (0.7)	83 (1.0)	76 (1.0)
Russian Federation	96 (0.3)	95 (0.4)	97 (0.4)	92 (0.6)	84 (0.7)
<i>Scotland</i>	98 (0.3)	93 (0.6)	99 (0.2)	94 (0.5)	77 (1.0)
Singapore	99 (0.2)	99 (0.2)	99 (0.1)	79 (0.8)	84 (0.8)
Slovak Republic	99 (0.2)	94 (0.5)	99 (0.2)	95 (0.4)	88 (0.6)
<i>Slovenia</i>	91 (0.7)	85 (0.7)	92 (0.6)	88 (0.7)	81 (0.9)
Spain	99 (0.2)	99 (0.2)	99 (0.2)	96 (0.4)	93 (0.5)
Sweden	96 (0.4)	92 (0.5)	95 (0.4)	97 (0.3)	83 (0.7)
Switzerland	96 (0.3)	69 (1.0)	95 (0.4)	83 (0.9)	59 (1.1)
<i>Thailand</i>	94 (0.5)	95 (0.4)	96 (0.4)	84 (0.9)	90 (0.5)
United States	98 (0.2)	97 (0.2)	98 (0.2)	93 (0.4)	81 (0.8)

*Eighth grade in most countries; see Table 2 for more information about the grades tested in each country.

Data are reported as percent of students.

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

Countries shown in italics did not satisfy one or more guidelines for sample participation rates, age/grade specifications, or classroom sampling procedures (see Figure A.3). Background data for Bulgaria and South Africa are unavailable.

Because population coverage falls below 65%, Latvia is annotated LSS for Latvian Speaking Schools only.

A dash (-) indicates data are not available.

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

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

Table 4.6**Students' Reports on Whether Their Friends Agree or Strongly Agree That It Is Important to Do Various Activities - Mathematics - Upper Grade (Eighth Grade*)**

Country	Percent of Students				
	Do Well in Mathematics	Do Well in Science	Do Well in Language	Have Time to Have Fun	Be Good at Sports
<i>Australia</i>	78 (0.8)	64 (1.0)	76 (0.8)	98 (0.2)	83 (0.8)
<i>Austria</i>	77 (1.2)	45 (1.8)	74 (1.1)	97 (0.4)	79 (1.2)
Belgium (Fl)	84 (1.7)	70 (1.6)	83 (1.8)	98 (0.4)	76 (1.5)
<i>Belgium (Fr)</i>	86 (1.1)	78 (1.3)	87 (0.9)	97 (0.4)	84 (1.2)
Canada	80 (0.8)	68 (1.3)	78 (0.8)	99 (0.2)	87 (0.6)
<i>Colombia</i>	95 (0.5)	93 (0.6)	95 (0.5)	97 (0.4)	96 (0.4)
Cyprus	85 (0.8)	71 (1.1)	85 (0.9)	91 (0.6)	82 (1.0)
Czech Republic	84 (1.3)	61 (1.5)	84 (1.2)	98 (0.3)	82 (1.1)
<i>Denmark</i>	94 (0.6)	82 (1.0)	95 (0.6)	99 (0.2)	92 (0.7)
England	88 (0.9)	80 (1.1)	88 (0.9)	99 (0.3)	79 (1.2)
France	85 (1.3)	53 (1.5)	88 (1.1)	97 (0.4)	80 (1.0)
<i>Germany</i>	70 (1.3)	35 (1.4)	68 (1.3)	94 (0.5)	64 (1.3)
<i>Greece</i>	87 (0.7)	82 (0.8)	89 (0.6)	96 (0.3)	85 (0.8)
Hong Kong	86 (0.9)	74 (1.3)	87 (0.9)	93 (0.5)	76 (1.0)
Hungary	81 (0.9)	66 (1.2)	83 (0.8)	94 (0.5)	74 (1.1)
Iceland	85 (1.4)	65 (2.0)	85 (1.1)	98 (0.4)	89 (1.2)
Iran, Islamic Rep.	95 (0.5)	95 (0.9)	93 (0.6)	87 (1.3)	93 (0.9)
Ireland	80 (0.9)	59 (1.4)	78 (0.8)	99 (0.2)	85 (0.7)
<i>Israel</i>	93 (1.1)	56 (2.5)	75 (2.0)	98 (0.5)	79 (1.9)
Japan	90 (0.5)	83 (0.7)	88 (0.6)	99 (0.2)	81 (0.7)
Korea	86 (0.8)	79 (0.9)	81 (0.8)	88 (0.7)	78 (1.0)
<i>Kuwait</i>	90 (0.8)	90 (0.6)	86 (0.9)	77 (2.4)	78 (1.5)
Latvia (LSS)	86 (0.9)	53 (1.3)	87 (1.0)	97 (0.4)	87 (0.8)
Lithuania	83 (0.9)	55 (1.3)	88 (0.9)	95 (0.5)	90 (0.7)
<i>Netherlands</i>	87 (0.9)	82 (1.2)	90 (0.7)	97 (0.6)	66 (1.2)
New Zealand	77 (1.0)	66 (1.2)	76 (1.0)	98 (0.3)	87 (0.8)
Norway	84 (0.8)	72 (1.2)	83 (0.9)	99 (0.2)	83 (1.0)
Portugal	89 (0.7)	88 (0.8)	93 (0.4)	92 (0.6)	94 (0.5)
<i>Romania</i>	87 (0.8)	80 (1.0)	88 (0.8)	86 (1.0)	81 (1.0)
Russian Federation	88 (0.8)	81 (0.8)	88 (0.8)	97 (0.4)	84 (0.8)
<i>Scotland</i>	81 (1.2)	70 (1.3)	82 (1.0)	98 (0.3)	84 (0.8)
Singapore	97 (0.4)	96 (0.5)	98 (0.2)	96 (0.3)	86 (0.8)
Slovak Republic	83 (0.7)	60 (1.3)	84 (0.7)	98 (0.2)	92 (0.5)
<i>Slovenia</i>	77 (1.2)	56 (1.6)	78 (1.1)	95 (0.5)	81 (0.9)
Spain	91 (0.6)	89 (0.7)	91 (0.5)	99 (0.2)	94 (0.4)
Sweden	70 (1.2)	61 (1.4)	68 (1.2)	97 (0.3)	75 (0.8)
Switzerland	85 (0.8)	40 (1.4)	82 (1.0)	93 (0.8)	75 (1.1)
<i>Thailand</i>	93 (0.6)	94 (0.5)	95 (0.4)	95 (0.4)	91 (0.4)
United States	75 (1.0)	69 (1.2)	73 (0.9)	98 (0.2)	90 (0.7)

*Eighth grade in most countries; see Table 2 for more information about the grades tested in each country.

Data are reported as percent of students.

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

Countries shown in italics did not satisfy one or more guidelines for sample participation rates, age/grade specifications, or classroom sampling procedures (see Figure A.3). Background data for Bulgaria and South Africa are unavailable.

Because population coverage falls below 65%, Latvia is annotated LSS for Latvian Speaking Schools only.

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

HOW DO STUDENTS SPEND THEIR OUT-OF-SCHOOL TIME DURING THE SCHOOL WEEK?

Even though education may be thought to be the dominant activity of school-aged children, young people actually spend much more of their time outside of school. Some of this out-of-school time is spent at furthering academic development – for example, in studying or doing homework in school subjects. Table 4.7 presents eighth-grade students' reports about the average number of hours per day they spend studying or doing homework in mathematics, science, and other subjects. Students in many countries reported spending roughly an hour per day studying mathematics. Eighth-graders in the Czech Republic, Denmark, Germany, the Netherlands, and Scotland were at the lower end of the range, reporting an average of about one-half hour per day (.5 to .6 of an hour). Those in Iran and Romania were at the top end, reporting about two hours mathematics homework per day (2.0 and 1.8 hours, respectively). On average, students in nearly all countries reported spending somewhat less time per day studying science.

Participating countries showed some variation in the amount of time students spent doing homework each day across all school subjects. The most common response about the amount of homework done, reported by eighth-graders in about half the countries, was an average of two to three hours per day, but there was a range. Students in Iran, Kuwait, and Romania reported spending the most time on homework, more than five hours per day. Students in the Czech Republic, Denmark, and Scotland reported spending the least amount of time per day on homework, less than two hours.

The students also were asked about a variety of other ways they could spend their time out of school. Eighth-graders were asked about watching television, playing computer games, playing or talking with friends, doing jobs at home, playing sports, and reading books for enjoyment. Their reports about the amount of time spent daily in each of these activities are shown in Table 4.8. Granted, some television programming and some computer games are targeted at developing children's academic abilities, and leisure reading also can be related to higher academic achievement. Still, much fare on television is not educationally related, and eighth-grade students in many countries reported spending nearly as much time each day watching television – an average of two to three hours per day – as they did doing homework. Eighth-graders in many countries also appear to spend several hours per day playing or talking with friends, and nearly two hours playing sports. The time spent on leisure activities is not additive, because students often do these activities simultaneously (e.g., talk with friends and watch television). Nevertheless, it does appear that in most countries at least as much time is spent in these largely non-academic activities as in studying and doing homework, and probably more time.

Table 4.9 shows the relationship between time spent doing homework in all subjects and students' average mathematics achievement. The relationship was curvilinear in many countries, with the highest achievement being associated with a moderate amount of homework per day (one to three hours). This pattern suggests that, compared to their higher-achieving counterparts, the lower-performing students may do less homework, either because they do not do it or because their teachers do not assign it, or more

Table 4.7

Students' Reports on How They Spend Their Daily Out-of School Study Time¹ Mathematics - Upper Grade (Eighth Grade*)

Country	Average Hours Each Day Studying Mathematics or Doing Homework After School	Average Hours Each Day Studying Science or Doing Science Homework After School	Average Hours Each Day Studying or Doing Homework in Other School Subjects	Total Hours Each Day on Average
<i>Australia</i>	0.7 (0.02)	0.5 (0.01)	0.9 (0.02)	2.0 (0.04)
<i>Austria</i>	0.8 (0.02)	0.7 (0.03)	0.8 (0.02)	2.4 (0.07)
Belgium (Fl)	1.1 (0.03)	0.8 (0.02)	1.5 (0.03)	3.4 (0.07)
<i>Belgium (Fr)</i>	1.0 (0.02)	0.8 (0.02)	1.2 (0.03)	3.0 (0.07)
Canada	0.7 (0.02)	0.6 (0.02)	0.9 (0.03)	2.2 (0.07)
<i>Colombia</i>	1.3 (0.06)	1.2 (0.06)	2.0 (0.07)	4.6 (0.15)
Cyprus	1.2 (0.02)	0.9 (0.02)	1.5 (0.03)	3.6 (0.06)
Czech Republic	0.6 (0.02)	0.6 (0.02)	0.6 (0.02)	1.8 (0.05)
<i>Denmark</i>	0.5 (0.02)	0.3 (0.02)	0.5 (0.02)	1.4 (0.05)
England	- -	- -	- -	- -
France	0.9 (0.02)	0.6 (0.01)	1.2 (0.03)	2.7 (0.05)
<i>Germany</i>	0.6 (0.02)	0.6 (0.02)	0.8 (0.02)	2.0 (0.05)
<i>Greece</i>	1.2 (0.03)	1.2 (0.03)	2.0 (0.05)	4.4 (0.08)
Hong Kong	0.9 (0.02)	0.6 (0.02)	1.1 (0.03)	2.5 (0.06)
Hungary	0.8 (0.02)	1.1 (0.02)	1.2 (0.03)	3.1 (0.06)
Iceland	0.9 (0.03)	0.6 (0.03)	0.9 (0.03)	2.4 (0.07)
Iran, Islamic Rep.	2.0 (0.05)	1.9 (0.05)	2.5 (0.05)	6.4 (0.13)
Ireland	0.7 (0.02)	0.6 (0.01)	1.4 (0.03)	2.7 (0.05)
<i>Israel</i>	1.0 (0.04)	0.6 (0.03)	1.2 (0.05)	2.8 (0.10)
Japan	0.8 (0.01)	0.6 (0.01)	1.0 (0.02)	2.3 (0.04)
Korea	0.8 (0.02)	0.6 (0.02)	1.1 (0.02)	2.5 (0.05)
<i>Kuwait</i>	1.6 (0.04)	1.5 (0.05)	2.3 (0.07)	5.3 (0.12)
Latvia (LSS)	0.9 (0.02)	0.6 (0.02)	1.2 (0.03)	2.7 (0.05)
Lithuania	0.8 (0.02)	0.7 (0.02)	1.2 (0.04)	2.7 (0.06)
<i>Netherlands</i>	0.6 (0.01)	0.6 (0.01)	1.0 (0.03)	2.2 (0.04)
New Zealand	0.7 (0.02)	0.6 (0.01)	0.9 (0.02)	2.1 (0.05)
Norway	0.7 (0.02)	0.6 (0.01)	1.0 (0.02)	2.3 (0.04)
Portugal	1.0 (0.02)	0.9 (0.02)	1.1 (0.02)	3.0 (0.05)
<i>Romania</i>	1.8 (0.07)	1.6 (0.06)	1.6 (0.06)	5.0 (0.18)
Russian Federation	0.9 (0.02)	1.0 (0.02)	1.0 (0.02)	2.9 (0.05)
<i>Scotland</i>	0.6 (0.02)	0.5 (0.01)	0.7 (0.02)	1.8 (0.04)
Singapore	1.4 (0.02)	1.3 (0.02)	1.9 (0.03)	4.6 (0.04)
Slovak Republic	0.7 (0.01)	0.8 (0.02)	0.9 (0.02)	2.4 (0.04)
<i>Slovenia</i>	0.9 (0.02)	1.0 (0.02)	0.9 (0.02)	2.9 (0.05)
Spain	1.2 (0.02)	1.0 (0.02)	1.4 (0.03)	3.6 (0.06)
Sweden	0.7 (0.01)	0.7 (0.01)	0.9 (0.02)	2.3 (0.04)
Switzerland	0.9 (0.02)	0.7 (0.01)	1.0 (0.02)	2.7 (0.04)
<i>Thailand</i>	1.2 (0.03)	1.0 (0.02)	1.3 (0.02)	3.5 (0.06)
United States	0.8 (0.02)	0.6 (0.01)	0.9 (0.02)	2.3 (0.04)

¹Average hours based on: No Time = 0; Less Than 1 Hour = .5; 1-2 Hours = 1.5; 3-5 Hours = 4; More Than 5 Hours = 7.

*Eighth grade in most countries; see Table 2 for more 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.

Countries shown in italics did not satisfy one or more guidelines for sample participation rates, age/grade specifications, or classroom sampling procedures (see Figure A.3). Background data for Bulgaria and South Africa are unavailable.

Because population coverage falls below 65%, Latvia is annotated LSS for Latvian Speaking Schools only.

A dash (-) indicates data are not available.

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

Table 4.8**Students' Reports on How They Spend Their Daily Leisure Time¹
Mathematics - Upper Grade (Eighth Grade*)**

Country	Average Hours Each Day Watching Television or Videos	Average Hours Each Day Playing Computer Games	Average Hours Each Day Playing or Talking with Friends	Average Hours Each Day Doing Jobs at Home	Average Hours Each Day Playing Sports	Average Hours Each Day Reading a Book for Enjoyment
<i>Australia</i>	2.4 (0.05)	0.6 (0.02)	1.4 (0.03)	0.9 (0.02)	1.6 (0.03)	0.6 (0.02)
<i>Austria</i>	1.9 (0.06)	0.6 (0.03)	2.9 (0.08)	0.8 (0.03)	1.9 (0.07)	0.8 (0.03)
Belgium (Fl)	2.0 (0.05)	0.5 (0.06)	1.6 (0.05)	1.1 (0.03)	1.8 (0.07)	0.7 (0.03)
<i>Belgium (Fr)</i>	1.9 (0.08)	0.7 (0.03)	1.7 (0.10)	0.8 (0.03)	1.8 (0.04)	0.8 (0.03)
Canada	2.3 (0.04)	0.5 (0.02)	2.2 (0.05)	1.0 (0.02)	1.9 (0.03)	0.8 (0.02)
<i>Colombia</i>	2.2 (0.07)	r 0.4 (0.06)	1.9 (0.06)	2.3 (0.07)	1.9 (0.06)	0.9 (0.05)
Cyprus	2.3 (0.04)	0.8 (0.03)	1.7 (0.04)	1.0 (0.03)	1.4 (0.04)	0.8 (0.02)
Czech Republic	2.6 (0.05)	0.6 (0.03)	2.9 (0.09)	1.3 (0.04)	1.9 (0.06)	1.0 (0.03)
<i>Denmark</i>	2.2 (0.06)	0.7 (0.03)	2.8 (0.07)	1.1 (0.04)	1.7 (0.06)	0.7 (0.03)
England	2.7 (0.07)	0.9 (0.05)	2.5 (0.06)	0.8 (0.03)	1.5 (0.05)	0.7 (0.03)
France	1.5 (0.04)	0.5 (0.02)	1.5 (0.05)	0.9 (0.03)	1.7 (0.04)	0.8 (0.03)
<i>Germany</i>	1.9 (0.04)	0.8 (0.04)	3.5 (0.07)	0.9 (0.02)	1.7 (0.04)	0.7 (0.02)
<i>Greece</i>	2.1 (0.04)	0.7 (0.03)	1.5 (0.04)	0.9 (0.03)	1.8 (0.04)	1.0 (0.03)
Hong Kong	2.6 (0.05)	0.8 (0.03)	1.2 (0.04)	0.7 (0.02)	0.9 (0.03)	0.9 (0.02)
Hungary	3.0 (0.06)	0.7 (0.03)	2.3 (0.05)	2.0 (0.04)	1.7 (0.04)	1.2 (0.04)
Iceland	2.2 (0.05)	0.7 (0.06)	3.1 (0.06)	0.8 (0.03)	1.8 (0.06)	0.9 (0.06)
Iran, Islamic Rep.	1.8 (0.06)	r 0.2 (0.02)	1.2 (0.04)	1.8 (0.06)	1.2 (0.09)	1.1 (0.04)
Ireland	2.1 (0.03)	0.5 (0.03)	1.5 (0.06)	0.9 (0.03)	1.4 (0.05)	0.6 (0.02)
<i>Israel</i>	3.3 (0.10)	0.9 (0.04)	2.4 (0.08)	1.2 (0.05)	1.9 (0.09)	1.0 (0.04)
Japan	2.6 (0.04)	0.6 (0.02)	1.9 (0.04)	0.6 (0.01)	1.3 (0.03)	0.9 (0.02)
Korea	2.0 (0.04)	0.3 (0.02)	0.9 (0.03)	0.5 (0.02)	0.5 (0.02)	0.8 (0.03)
<i>Kuwait</i>	1.9 (0.07)	0.7 (0.05)	1.5 (0.11)	1.2 (0.08)	1.5 (0.10)	1.0 (0.04)
Latvia (LSS)	2.6 (0.05)	0.7 (0.04)	2.1 (0.06)	1.5 (0.04)	1.2 (0.04)	1.1 (0.03)
Lithuania	2.8 (0.05)	0.9 (0.04)	2.7 (0.06)	1.2 (0.03)	1.2 (0.04)	1.0 (0.03)
<i>Netherlands</i>	2.5 (0.09)	0.7 (0.04)	2.8 (0.08)	0.9 (0.04)	1.8 (0.06)	0.6 (0.03)
New Zealand	2.5 (0.05)	0.7 (0.03)	1.5 (0.04)	0.9 (0.02)	1.5 (0.04)	0.8 (0.02)
Norway	2.5 (0.04)	0.8 (0.03)	3.2 (0.06)	1.1 (0.03)	1.9 (0.05)	0.7 (0.02)
Portugal	2.0 (0.04)	0.7 (0.03)	1.7 (0.05)	1.0 (0.04)	1.7 (0.04)	0.7 (0.02)
<i>Romania</i>	1.9 (0.06)	0.6 (0.05)	1.5 (0.06)	1.9 (0.08)	1.3 (0.05)	1.3 (0.07)
Russian Federation	2.9 (0.05)	1.0 (0.04)	2.9 (0.05)	1.5 (0.03)	1.0 (0.03)	1.3 (0.04)
<i>Scotland</i>	2.7 (0.05)	1.0 (0.04)	2.8 (0.08)	0.7 (0.02)	1.9 (0.05)	0.7 (0.02)
Singapore	2.7 (0.05)	0.6 (0.03)	1.5 (0.04)	1.0 (0.03)	0.7 (0.03)	1.1 (0.02)
Slovak Republic	2.7 (0.05)	0.6 (0.03)	2.9 (0.07)	1.5 (0.05)	1.8 (0.04)	1.0 (0.03)
<i>Slovenia</i>	2.0 (0.04)	0.6 (0.02)	1.7 (0.05)	1.6 (0.05)	1.6 (0.03)	0.9 (0.02)
Spain	1.8 (0.05)	0.3 (0.02)	1.8 (0.06)	1.1 (0.03)	1.7 (0.04)	0.6 (0.02)
Sweden	2.3 (0.04)	0.6 (0.02)	2.3 (0.05)	0.9 (0.02)	1.6 (0.04)	0.7 (0.02)
Switzerland	1.3 (0.03)	0.4 (0.02)	2.4 (0.05)	1.0 (0.03)	1.8 (0.03)	0.8 (0.02)
<i>Thailand</i>	2.1 (0.07)	0.3 (0.02)	1.2 (0.03)	1.6 (0.03)	1.1 (0.02)	1.0 (0.02)
United States	2.6 (0.07)	0.7 (0.03)	2.5 (0.06)	1.2 (0.04)	2.2 (0.05)	0.7 (0.02)

¹Average hours based on: No Time = 0; Less Than 1 Hour = .5; 1-2 Hours = 1.5; 3-5 Hours = 4; More Than 5 Hours = 7.

*Eighth grade in most countries; see Table 2 for more 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.

Countries shown in italics did not satisfy one or more guidelines for sample participation rates, age/grade specifications, or classroom

sampling procedures (see Figure A.3). Background data for Bulgaria and South Africa are unavailable.

Because population coverage falls below 65%, Latvia is annotated LSS for Latvian Speaking Schools only.

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

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

Table 4.9**Students' Reports on Total Amount of Daily Out-of-School Study Time¹
Mathematics - Upper Grade (Eighth Grade*)**

Country	Less than 1 Hour		1 to < 2 Hours		2 to 3 Hours		More than 3 Hours	
	Percent of Students	Mean Achievement						
<i>Australia</i>	15 (0.9)	486 (5.7)	46 (1.0)	541 (4.4)	22 (0.6)	543 (5.2)	17 (0.7)	532 (4.8)
<i>Austria</i>	9 (0.8)	524 (6.7)	46 (1.3)	551 (4.1)	21 (0.9)	544 (4.5)	24 (1.2)	528 (5.3)
Belgium (Fl)	2 (0.4)	~ ~	25 (1.3)	552 (8.9)	28 (1.1)	592 (5.9)	45 (1.6)	560 (4.6)
<i>Belgium (Fr)</i>	7 (0.8)	466 (7.4)	32 (1.0)	543 (4.6)	21 (1.3)	544 (5.5)	40 (1.5)	519 (4.5)
Canada	14 (1.2)	514 (5.6)	47 (1.1)	538 (2.8)	18 (0.7)	534 (3.7)	21 (1.1)	511 (3.6)
<i>Colombia</i>	2 (0.4)	~ ~	17 (1.1)	394 (5.2)	20 (1.2)	389 (3.6)	61 (1.9)	390 (3.5)
Cyprus	9 (0.5)	442 (5.8)	19 (0.7)	475 (3.9)	26 (0.8)	491 (4.0)	46 (0.9)	475 (2.9)
Czech Republic	13 (1.1)	551 (7.1)	57 (1.1)	571 (5.1)	17 (0.9)	568 (8.2)	13 (0.8)	542 (7.6)
<i>Denmark</i>	39 (1.6)	517 (4.4)	39 (1.4)	508 (3.8)	13 (0.8)	479 (4.1)	9 (0.7)	468 (6.9)
England	- -	- -	- -	- -	- -	- -	- -	- -
France	8 (0.7)	505 (8.0)	33 (1.2)	545 (3.6)	28 (1.0)	547 (4.5)	31 (1.2)	537 (3.7)
<i>Germany</i>	14 (1.1)	476 (6.7)	51 (1.2)	521 (4.3)	18 (1.0)	524 (7.0)	17 (0.9)	498 (5.0)
<i>Greece</i>	6 (0.6)	450 (7.4)	14 (0.7)	483 (5.2)	21 (0.7)	485 (3.9)	59 (1.2)	491 (3.3)
Hong Kong	13 (1.0)	539 (9.3)	32 (0.9)	586 (6.6)	25 (0.9)	607 (6.1)	30 (1.1)	604 (7.2)
Hungary	4 (0.4)	483 (11.3)	33 (1.1)	536 (5.0)	22 (0.9)	541 (5.2)	41 (1.3)	545 (3.7)
Iceland	5 (1.0)	450 (12.0)	46 (1.7)	501 (5.1)	25 (1.3)	489 (5.4)	23 (1.4)	477 (7.3)
Iran, Islamic Rep.	1 (0.2)	~ ~	5 (0.5)	428 (5.6)	12 (1.0)	436 (4.8)	82 (1.3)	431 (2.4)
Ireland	5 (0.6)	465 (8.8)	29 (1.0)	517 (5.3)	40 (1.1)	547 (5.5)	26 (1.2)	533 (5.7)
<i>Israel</i>	5 (0.6)	539 (10.9)	36 (2.2)	546 (6.3)	26 (1.5)	521 (6.8)	33 (2.1)	502 (6.3)
Japan	13 (0.8)	578 (5.3)	39 (0.8)	607 (2.6)	20 (0.6)	609 (4.0)	28 (1.0)	612 (2.7)
Korea	15 (0.9)	582 (4.9)	32 (1.1)	604 (3.5)	25 (0.8)	607 (4.0)	29 (1.2)	628 (4.3)
<i>Kuwait</i>	3 (0.6)	358 (10.3)	13 (1.5)	401 (5.5)	19 (1.3)	397 (5.1)	65 (1.8)	392 (2.0)
Latvia (LSS)	4 (0.5)	467 (9.4)	35 (1.1)	507 (4.4)	32 (1.2)	497 (4.9)	29 (1.2)	487 (3.4)
Lithuania	5 (0.6)	453 (9.4)	39 (1.4)	487 (3.9)	28 (1.0)	481 (4.6)	28 (1.4)	474 (5.4)
<i>Netherlands</i>	3 (0.9)	492 (16.2)	54 (1.7)	539 (9.0)	27 (1.7)	562 (7.0)	16 (0.8)	524 (6.0)
New Zealand	12 (0.9)	472 (5.6)	51 (1.2)	519 (4.7)	21 (1.0)	518 (6.1)	17 (0.9)	495 (5.6)
Norway	6 (0.5)	481 (6.8)	50 (1.2)	514 (2.9)	24 (0.9)	510 (3.6)	21 (0.9)	483 (3.6)
Portugal	3 (0.3)	458 (8.1)	41 (1.1)	463 (3.1)	18 (0.7)	455 (3.3)	38 (1.2)	448 (3.0)
<i>Romania</i>	9 (0.7)	459 (10.4)	16 (1.0)	464 (7.0)	15 (0.7)	481 (5.4)	60 (1.6)	494 (4.2)
Russian Federation	4 (0.5)	493 (10.3)	33 (1.1)	538 (5.3)	25 (1.0)	538 (5.2)	38 (1.4)	544 (6.9)
<i>Scotland</i>	17 (1.4)	461 (4.8)	54 (1.2)	506 (5.7)	17 (1.0)	517 (8.6)	12 (0.8)	503 (7.4)
Singapore	2 (0.3)	~ ~	7 (0.4)	642 (8.0)	13 (0.6)	652 (6.6)	78 (0.9)	643 (4.9)
Slovak Republic	6 (0.5)	549 (8.3)	46 (0.9)	556 (3.9)	25 (0.7)	548 (4.4)	23 (1.0)	532 (4.1)
<i>Slovenia</i>	5 (0.5)	551 (9.8)	36 (1.0)	561 (4.1)	21 (0.8)	537 (4.8)	37 (1.1)	523 (3.4)
Spain	3 (0.4)	443 (5.5)	26 (1.0)	490 (3.1)	18 (0.9)	495 (3.3)	53 (1.3)	487 (2.4)
Sweden	7 (0.6)	496 (6.9)	55 (1.2)	528 (3.1)	17 (0.8)	525 (4.3)	21 (0.9)	503 (4.2)
Switzerland	4 (0.3)	523 (7.9)	44 (1.2)	556 (3.4)	19 (0.8)	548 (5.1)	33 (1.1)	536 (4.0)
<i>Thailand</i>	3 (0.3)	495 (11.9)	26 (1.0)	514 (5.4)	18 (0.7)	515 (5.7)	54 (1.5)	531 (6.6)
United States	17 (1.1)	471 (7.2)	42 (0.9)	514 (4.2)	17 (0.7)	507 (5.5)	24 (0.8)	498 (5.9)

¹Sum of time reported spent studying or doing homework in mathematics, science, and other subjects.

*Eighth grade in most countries; see Table 2 for more 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.

Countries shown in italics did not satisfy one or more guidelines for sample participation rates, age/grade specifications, or classroom sampling procedures (see Figure A.3). Background data for Bulgaria and South Africa are unavailable.

Because population coverage falls below 65%, Latvia is annotated LSS for Latvian Speaking Schools only.

A dash (-) indicates data are not available. A tilde (~) indicates insufficient data to report achievement.

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

homework, perhaps because they need to spend the extra time to keep up academically. In some countries, students doing one hour a day of homework or more had higher average mathematics achievement than students doing less than one hour a day (e.g., Greece, Japan, the Russian Federation, and Spain), although in these countries there was little difference in achievement as the time spent increased from at least one hour to more than three hours. A direct positive relationship between time spent doing homework and mathematics achievement was found in other countries, such as Korea and Romania. The only inverse relationship was noted for Denmark. Clearly, different countries have different policies and practices about assigning homework.

The relationship between mathematics achievement and amount of time spent watching television each day was more consistent across countries than that with doing homework (see Table 4.10). In about half the TIMSS countries, the highest mathematics achievement was associated with watching from one to two hours of television per day. This was the most common response, reflecting from 33% to 54% of the students for all countries. That watching less than one hour of television per day generally was associated with lower average mathematics achievement than watching one to two hours in many countries most likely has little to do with the influence of television viewing on mathematics achievement. For these students, low television viewing may be a surrogate socio-economic indicator, suggesting something about children's access to television sets across countries. Because students with fewer socio-economic advantages generally perform less well than their counterparts academically, it may be that students who reported less than one hour watching television each day simply do not have television sets in their homes, or come from homes with only one television set where they have less opportunity to spend a lot of time watching their choice of programming.

In general, beyond one to two hours of television viewing per day, the more television eighth-graders reported watching, the lower their mathematics achievement, although there were several countries where students watching three to five hours of television did not have lower achievement than those watching one to two hours. In all countries, however, students watching more than five hours of television per day had the lowest average mathematics achievement. Countries where 10% or more of the students reported watching more than five hours of television each day included Colombia, England, Hong Kong, Hungary, Israel, Latvia (LSS), Lithuania, New Zealand, the Russian Federation, Scotland, the Slovak Republic, and the United States.

Table 4.10**Students' Reports on the Hours Spent Each Day Watching Television and Videos
Mathematics - Upper Grade (Eighth Grade*)**

Country	Less than 1 Hour		1 to 2 Hours		3 to 5 Hours		More than 5 Hours	
	Percent of Students	Mean Achievement						
<i>Australia</i>	24 (0.9)	539 (6.0)	41 (0.8)	539 (4.1)	27 (0.8)	528 (3.8)	9 (0.6)	487 (5.5)
<i>Austria</i>	25 (1.4)	540 (5.4)	53 (1.1)	546 (4.2)	17 (1.0)	539 (5.2)	5 (0.6)	497 (8.6)
Belgium (Fl)	24 (1.2)	580 (6.7)	52 (1.2)	575 (6.2)	19 (1.0)	535 (7.1)	5 (0.5)	514 (12.1)
<i>Belgium (Fr)</i>	33 (1.3)	536 (4.2)	44 (1.8)	536 (4.9)	17 (1.3)	522 (4.0)	6 (1.0)	445 (9.0)
Canada	22 (0.7)	522 (2.9)	46 (0.8)	534 (3.5)	25 (0.7)	532 (3.0)	7 (0.6)	504 (5.2)
<i>Colombia</i>	31 (1.5)	384 (4.9)	39 (1.2)	397 (3.3)	20 (1.2)	391 (5.2)	11 (1.0)	374 (5.3)
Cyprus	25 (1.1)	466 (4.4)	45 (1.1)	486 (2.7)	21 (0.8)	479 (3.7)	9 (0.7)	441 (5.7)
Czech Republic	15 (0.8)	556 (7.5)	45 (1.2)	575 (6.2)	31 (1.2)	562 (4.3)	9 (0.8)	531 (8.9)
<i>Denmark</i>	28 (1.1)	499 (3.9)	42 (1.2)	507 (4.0)	22 (1.0)	510 (4.5)	8 (0.7)	488 (6.0)
England	20 (1.3)	500 (8.1)	37 (1.2)	515 (3.9)	31 (1.2)	516 (3.7)	11 (0.9)	481 (6.1)
France	42 (1.3)	546 (3.9)	45 (1.1)	539 (2.9)	9 (0.7)	532 (5.5)	4 (0.5)	494 (10.8)
<i>Germany</i>	31 (1.0)	510 (6.2)	47 (1.1)	517 (4.5)	16 (0.8)	511 (5.9)	6 (0.6)	467 (7.4)
<i>Greece</i>	32 (0.9)	486 (3.5)	42 (0.7)	489 (3.7)	17 (0.7)	486 (4.9)	9 (0.5)	470 (5.7)
Hong Kong	22 (0.9)	582 (7.7)	39 (0.9)	599 (6.8)	28 (1.0)	599 (6.5)	11 (0.8)	556 (9.1)
Hungary	11 (0.7)	550 (6.2)	41 (1.1)	552 (4.0)	33 (0.9)	537 (3.9)	15 (1.0)	496 (5.2)
Iceland	24 (1.3)	475 (7.4)	47 (1.3)	494 (4.5)	22 (1.2)	498 (5.7)	7 (0.8)	473 (11.8)
Iran, Islamic Rep.	32 (1.3)	421 (3.1)	46 (0.9)	434 (2.9)	17 (0.9)	438 (4.1)	5 (0.6)	425 (7.9)
Ireland	20 (0.8)	517 (6.4)	51 (1.1)	539 (5.2)	23 (0.8)	531 (5.3)	5 (0.5)	486 (8.5)
<i>Israel</i>	9 (1.4)	506 (17.0)	33 (2.1)	536 (7.0)	44 (1.7)	525 (5.4)	14 (1.2)	505 (7.8)
Japan	9 (0.5)	606 (5.7)	53 (0.9)	615 (2.1)	30 (0.8)	596 (3.4)	9 (0.5)	569 (5.1)
Korea	32 (1.0)	612 (4.6)	40 (1.0)	618 (3.4)	20 (0.8)	595 (5.3)	7 (0.6)	570 (6.9)
<i>Kuwait</i>	39 (1.7)	386 (2.9)	38 (1.3)	398 (3.3)	14 (1.2)	400 (3.8)	9 (0.8)	384 (4.1)
Latvia (LSS)	16 (1.0)	474 (4.4)	44 (1.1)	500 (3.7)	29 (1.2)	509 (4.2)	10 (0.7)	475 (5.1)
Lithuania	12 (0.7)	469 (6.2)	44 (1.3)	480 (4.6)	32 (1.2)	483 (4.0)	12 (0.9)	472 (5.8)
<i>Netherlands</i>	17 (1.8)	544 (14.0)	47 (1.7)	556 (7.0)	27 (1.5)	529 (6.3)	9 (0.9)	496 (7.3)
New Zealand	24 (1.0)	506 (6.4)	38 (0.9)	521 (4.8)	26 (0.9)	510 (4.7)	12 (0.8)	474 (5.7)
Norway	15 (0.7)	508 (4.2)	48 (1.0)	509 (2.5)	30 (1.0)	503 (3.7)	7 (0.4)	470 (6.0)
Portugal	27 (1.0)	450 (3.3)	48 (0.9)	458 (2.9)	20 (0.8)	460 (3.3)	5 (0.5)	440 (5.3)
<i>Romania</i>	38 (1.4)	475 (5.6)	39 (1.2)	489 (5.5)	16 (0.9)	495 (5.6)	8 (0.7)	470 (7.7)
Russian Federation	12 (1.0)	515 (6.9)	42 (1.4)	538 (5.9)	32 (1.0)	547 (4.8)	14 (0.9)	535 (7.5)
<i>Scotland</i>	15 (0.7)	488 (7.2)	43 (1.0)	504 (6.9)	31 (1.0)	508 (5.9)	11 (0.7)	472 (4.8)
Singapore	7 (0.6)	657 (7.2)	50 (1.1)	650 (5.2)	37 (1.2)	636 (5.2)	6 (0.5)	619 (8.6)
Slovak Republic	14 (0.7)	561 (7.4)	47 (1.0)	550 (3.5)	28 (0.9)	547 (4.1)	11 (0.8)	523 (5.6)
<i>Slovenia</i>	23 (1.1)	546 (4.1)	54 (1.1)	541 (3.4)	19 (0.9)	540 (4.7)	4 (0.4)	518 (9.9)
Spain	33 (1.2)	481 (3.0)	46 (1.0)	494 (2.4)	17 (0.8)	489 (3.9)	4 (0.5)	464 (5.1)
Sweden	16 (0.7)	518 (4.9)	51 (0.9)	528 (3.3)	27 (0.8)	514 (3.7)	6 (0.5)	478 (5.5)
Switzerland	45 (1.5)	556 (4.1)	44 (1.3)	543 (3.2)	9 (0.7)	528 (6.6)	2 (0.2)	~ ~
<i>Thailand</i>	28 (1.4)	510 (4.7)	46 (1.0)	524 (6.4)	19 (1.1)	540 (7.3)	8 (0.7)	521 (6.9)
United States	22 (0.8)	504 (5.7)	40 (0.9)	513 (5.1)	25 (0.6)	501 (4.2)	13 (1.0)	461 (4.6)

*Eighth grade in most countries; see Table 2 for more 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.

Countries shown in italics did not satisfy one or more guidelines for sample participation rates, age/grade specifications, or classroom

sampling procedures (see Figure A.3). Background data for Bulgaria and South Africa are unavailable.

Because population coverage falls below 65%, Latvia is annotated LSS for Latvian Speaking Schools only.

A tilde (~) indicates insufficient data to report achievement.

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

HOW DO STUDENTS PERCEIVE SUCCESS IN MATHEMATICS?

Table 4.11 presents eighth-grade students' perceptions about doing well in mathematics. In all except four countries, the majority of students agreed or strongly agreed that they did well in mathematics. The four exceptions, where more than 50% of the students disagreed or strongly disagreed about doing well, were Hong Kong (62%), Japan (55%), Korea (62%), and Lithuania (51%). Notably, three of those countries were among the very highest performing countries. Countries where 80% or more of the eighth-graders felt they were usually good at mathematics represented a range in mathematics performance – Australia, Canada, Colombia, Denmark, England, Greece, Iceland, Iran, Israel, Kuwait, New Zealand, Scotland, Sweden, and the United States.

Figure 4.2 indicates that, internationally, eighth-grade girls had lower self-perceptions than boys about how well they usually do in mathematics. This figure and the distributions shown in Table 4.11 also show that, on average, both boys and girls in the participating countries tended to agree (or sometimes disagree) about usually doing well in mathematics rather than report the extremes of strongly agreeing or disagreeing. For most countries both boys and girls tended to indicate that they did well in mathematics – a perception that did not always coincide with their achievement on the TIMSS mathematics test.

Table 4.11

**Students' Self-Perceptions About Usually Doing Well in Mathematics
Upper Grade (Eighth Grade*)**

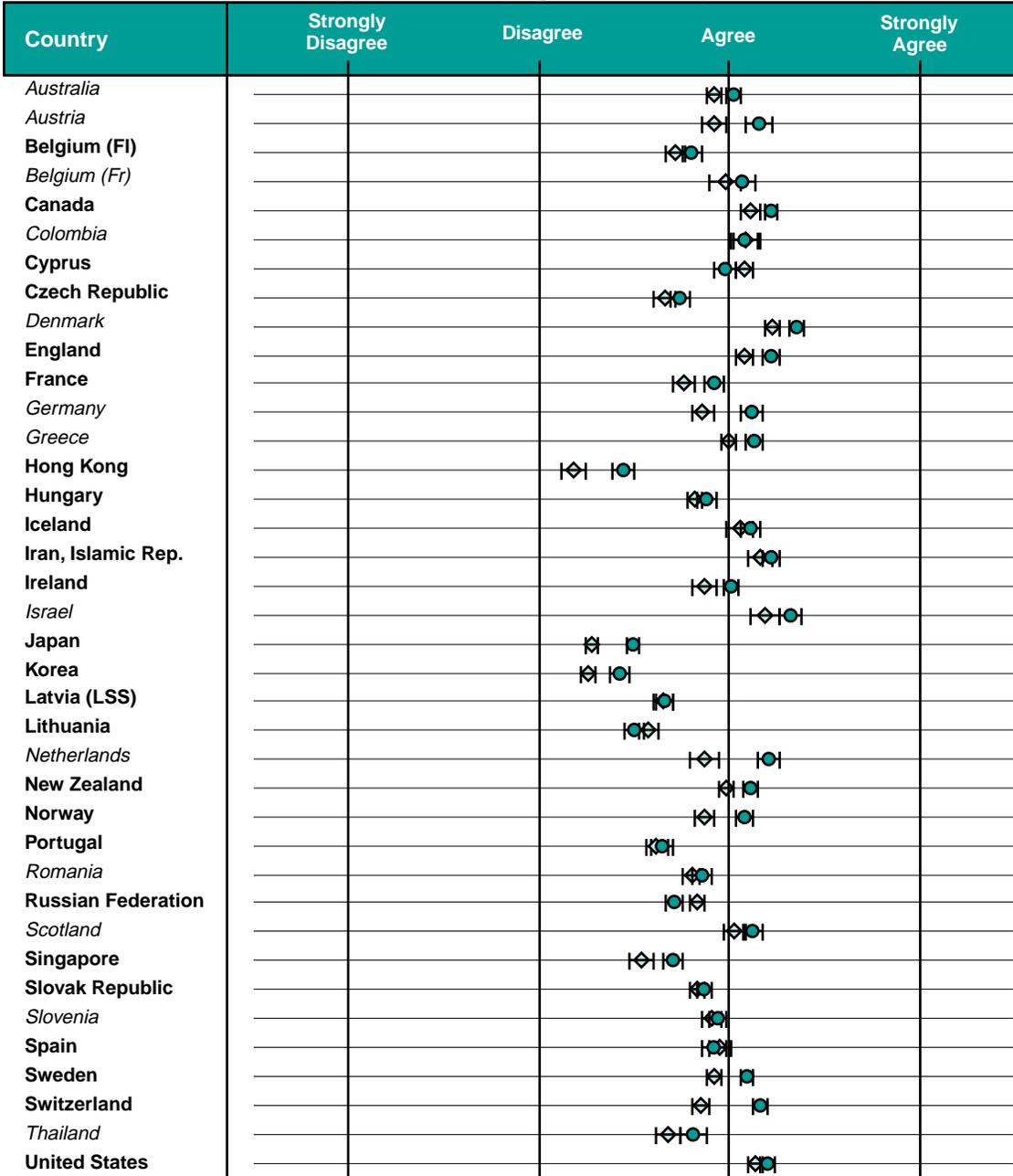
Country	Strongly Disagree		Disagree		Agree		Strongly Agree	
	Percent of Students	Mean Achievement						
<i>Australia</i>	3 (0.3)	457 (7.9)	17 (0.7)	487 (5.6)	60 (0.8)	530 (3.9)	20 (0.9)	586 (4.7)
<i>Austria</i>	3 (0.4)	512 (10.1)	21 (1.1)	508 (5.4)	45 (1.2)	535 (4.0)	31 (1.4)	572 (4.3)
Belgium (Fl)	5 (0.4)	512 (6.7)	29 (1.0)	548 (5.9)	48 (1.1)	567 (6.4)	17 (0.9)	609 (7.2)
<i>Belgium (Fr)</i>	3 (0.4)	467 (7.8)	19 (1.3)	505 (5.4)	48 (1.3)	528 (3.8)	29 (1.5)	550 (5.0)
Canada	3 (0.3)	480 (9.0)	13 (0.6)	480 (4.9)	49 (1.1)	514 (2.3)	35 (1.1)	570 (3.4)
<i>Colombia</i>	2 (0.4)	~ ~	17 (1.3)	373 (3.7)	51 (1.9)	385 (4.6)	30 (1.4)	398 (5.3)
Cyprus	5 (0.4)	411 (7.6)	18 (0.8)	432 (3.7)	46 (1.0)	469 (2.6)	31 (1.0)	521 (4.4)
Czech Republic	2 (0.3)	~ ~	37 (1.4)	516 (4.2)	48 (1.4)	584 (5.2)	13 (1.0)	640 (8.0)
<i>Denmark</i>	1 (0.2)	~ ~	8 (0.6)	431 (7.0)	53 (1.4)	492 (3.0)	38 (1.3)	537 (4.0)
England	1 (0.2)	~ ~	6 (0.6)	475 (8.3)	69 (1.0)	500 (3.0)	24 (1.0)	538 (5.8)
France	6 (0.7)	495 (6.1)	26 (1.1)	513 (4.0)	46 (1.0)	548 (3.4)	22 (0.8)	564 (5.1)
<i>Germany</i>	7 (0.5)	474 (7.1)	24 (1.0)	491 (5.2)	33 (1.1)	511 (5.1)	36 (1.1)	529 (5.3)
<i>Greece</i>	2 (0.3)	~ ~	16 (0.7)	454 (3.6)	55 (0.8)	481 (3.2)	27 (0.8)	515 (4.2)
Hong Kong	11 (0.9)	536 (9.5)	51 (1.2)	577 (6.7)	33 (1.2)	620 (6.7)	5 (0.5)	643 (8.2)
Hungary	3 (0.3)	469 (11.7)	25 (0.9)	490 (4.2)	57 (1.0)	545 (3.4)	15 (0.8)	608 (4.8)
Iceland	3 (0.6)	421 (10.1)	14 (1.4)	447 (4.9)	55 (1.6)	486 (4.5)	28 (1.8)	519 (9.5)
Iran, Islamic Rep.	1 (0.4)	~ ~	8 (0.7)	403 (4.3)	62 (1.4)	423 (2.6)	29 (1.4)	450 (3.7)
Ireland	3 (0.3)	475 (7.7)	18 (1.0)	492 (5.5)	61 (0.9)	530 (5.2)	18 (1.0)	572 (7.6)
<i>Israel</i>	2 (0.4)	~ ~	12 (1.3)	494 (10.1)	45 (1.9)	513 (6.2)	41 (1.9)	549 (8.3)
Japan	10 (0.5)	523 (3.7)	45 (0.7)	577 (2.3)	40 (0.7)	650 (2.5)	4 (0.3)	669 (7.8)
Korea	9 (0.5)	535 (5.7)	53 (1.0)	572 (3.0)	32 (0.9)	669 (3.0)	6 (0.6)	702 (5.7)
<i>Kuwait</i>	3 (0.7)	364 (11.3)	9 (0.9)	382 (3.6)	49 (1.7)	386 (2.4)	39 (2.1)	405 (3.9)
Latvia (LSS)	2 (0.3)	~ ~	43 (1.2)	471 (3.5)	43 (1.2)	505 (3.7)	12 (0.8)	542 (5.5)
Lithuania	5 (0.5)	446 (7.5)	46 (1.2)	454 (3.4)	38 (1.2)	492 (4.3)	11 (0.8)	544 (6.0)
<i>Netherlands</i>	4 (0.5)	487 (12.4)	21 (1.4)	504 (7.1)	43 (1.3)	537 (8.4)	32 (1.6)	580 (7.3)
New Zealand	2 (0.3)	~ ~	13 (0.8)	466 (6.1)	62 (0.9)	501 (4.5)	22 (0.8)	559 (5.5)
Norway	3 (0.3)	434 (7.4)	18 (0.9)	455 (3.2)	58 (1.0)	504 (2.2)	21 (0.8)	555 (4.4)
Portugal	7 (0.5)	419 (3.6)	37 (1.1)	435 (2.3)	42 (1.1)	463 (2.5)	14 (0.8)	502 (5.2)
<i>Romania</i>	6 (0.6)	455 (12.0)	25 (1.0)	459 (4.6)	49 (0.9)	488 (4.3)	20 (1.0)	505 (6.3)
Russian Federation	2 (0.3)	~ ~	37 (1.4)	501 (7.1)	43 (1.1)	547 (5.1)	18 (0.8)	590 (4.9)
<i>Scotland</i>	2 (0.3)	~ ~	10 (0.8)	455 (5.5)	66 (1.3)	491 (4.8)	22 (1.3)	553 (9.3)
Singapore	6 (0.4)	587 (9.0)	38 (1.2)	624 (5.2)	46 (1.1)	659 (4.9)	11 (0.6)	677 (6.2)
Slovak Republic	1 (0.2)	~ ~	28 (1.1)	496 (3.8)	55 (1.1)	555 (3.8)	15 (0.7)	619 (5.2)
<i>Slovenia</i>	2 (0.3)	~ ~	24 (1.1)	497 (4.0)	53 (1.0)	538 (3.6)	21 (0.9)	602 (4.2)
Spain	5 (0.5)	441 (4.6)	23 (1.0)	456 (2.6)	45 (1.1)	488 (2.6)	27 (1.0)	522 (3.4)
Sweden	2 (0.3)	~ ~	16 (0.7)	475 (3.4)	61 (0.9)	517 (3.0)	21 (0.8)	565 (3.8)
Switzerland	3 (0.4)	497 (10.1)	21 (0.9)	528 (4.0)	47 (0.9)	541 (3.0)	28 (1.1)	575 (3.3)
<i>Thailand</i>	2 (0.3)	~ ~	38 (1.5)	510 (5.1)	45 (1.1)	529 (6.6)	15 (0.9)	537 (7.4)
United States	3 (0.3)	430 (5.1)	11 (0.6)	462 (4.8)	52 (0.9)	491 (4.3)	34 (1.0)	534 (5.9)

*Eighth grade in most countries; see Table 2 for more 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.
 Countries shown in italics did not satisfy one or more guidelines for sample participation rates, age/grade specifications, or classroom sampling procedures (see Figure A.3). Background data for Bulgaria and South Africa are unavailable.
 Because population coverage falls below 65%, Latvia is annotated LSS for Latvian Speaking Schools only.
 A tilde (~) indicates insufficient data to report achievement.

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

Figure 4.2

Gender Differences in Students' Self-Perceptions About Usually Doing Well in Mathematics - Upper Grade (Eighth Grade*)



= Average for Girls (±2SE)
 = Average for Boys (±2SE)

*Eighth grade in most countries; see Table 2 for more information about the grades tested in each country. Countries shown in italics did not satisfy one or more guidelines for sample participation rates, age/grade specifications, or classroom sampling procedures (see Figure A.3). Background Data for Bulgaria and South Africa are unavailable. Because population coverage falls below 65%, Latvia is annotated LSS for Latvian Speaking Schools only.

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

Students were asked about the necessity of various attributes or activities to do well in mathematics (see Table 4.12). There was enormous variation from country to country in the percentage of eighth-grade students agreeing that natural talent or ability were important to do well in mathematics. Fewer than 50% of the students agreed in England, France, Iceland, the Netherlands, and Sweden compared to 90% or more in Colombia, Denmark, Hungary, and Iran. Internationally, relatively few students agreed that good luck was important to do well. The countries where more than 50% of the eighth-graders agreed that good luck was needed to do well in mathematics included Colombia, the Czech Republic, Hungary, Iran, Japan, Korea, Kuwait, Latvia (LSS), Lithuania, Romania, the Russian Federation, and the Slovak Republic.

Internationally, there was a high degree of agreement among students that lots of hard work studying at home was necessary in order to do well in mathematics. Percentages of agreement were in the 80s and 90s for most countries, and in the 70s for Austria, Germany, Hungary, Switzerland, and Thailand. The variation was substantial from country to country regarding students' agreement with the necessity of memorizing the textbook or notes. In Belgium (French), France, Iceland, Japan, Kuwait, and Thailand, 90% or more of the eighth-grade students agreed or strongly agreed that memorization was important to doing well in mathematics. In contrast, fewer than 40% so agreed in Austria, Latvia (LSS), Lithuania, Singapore, the Slovak Republic, Slovenia, Sweden, and Switzerland.

Table 4.12

Students' Reports on Things Necessary to Do Well in Mathematics Upper Grade (Eighth Grade*)

Country	Percent of Students Responding Agree or Strongly Agree			
	Natural Talent/Ability	Good Luck	Lots of Hard Work Studying at Home	Memorize the Textbook or Notes
<i>Australia</i>	66 (0.8)	30 (0.8)	92 (0.5)	67 (0.8)
<i>Austria</i>	70 (1.4)	27 (1.2)	78 (1.2)	39 (1.2)
Belgium (Fl)	58 (1.7)	22 (2.0)	85 (1.1)	51 (1.8)
<i>Belgium (Fr)</i>	69 (1.3)	23 (1.3)	93 (0.8)	93 (0.5)
Canada	61 (1.0)	26 (0.9)	87 (0.7)	42 (0.9)
<i>Colombia</i>	91 (1.0)	62 (1.4)	97 (0.3)	74 (1.4)
Cyprus	51 (1.0)	34 (1.1)	92 (0.6)	71 (1.2)
Czech Republic	61 (1.0)	57 (1.2)	81 (1.0)	41 (1.8)
<i>Denmark</i>	90 (0.7)	28 (1.3)	87 (1.0)	61 (1.5)
England	45 (1.3)	23 (1.0)	93 (0.7)	49 (1.2)
France	40 (1.4)	21 (1.1)	90 (0.7)	95 (0.7)
<i>Germany</i>	59 (1.5)	25 (1.1)	76 (1.1)	47 (1.5)
<i>Greece</i>	54 (0.9)	26 (0.9)	95 (0.5)	84 (0.7)
Hong Kong	77 (1.0)	38 (1.0)	95 (0.6)	69 (1.5)
Hungary	95 (0.5)	56 (1.0)	79 (1.1)	47 (1.5)
Iceland	37 (1.8)	24 (1.5)	92 (0.8)	94 (1.0)
Iran, Islamic Rep.	95 (0.5)	51 (2.5)	96 (0.4)	89 (0.9)
Ireland	72 (1.0)	31 (1.2)	95 (0.5)	69 (1.1)
<i>Israel</i>	55 (2.1)	17 (1.6)	96 (0.6)	40 (2.1)
Japan	82 (0.6)	59 (1.0)	96 (0.3)	92 (0.6)
Korea	86 (0.7)	63 (1.0)	98 (0.2)	73 (0.7)
<i>Kuwait</i>	87 (1.3)	76 (1.7)	83 (1.4)	91 (0.8)
Latvia (LSS)	61 (1.1)	63 (1.4)	91 (0.7)	38 (1.3)
Lithuania	85 (1.0)	69 (1.1)	83 (0.9)	28 (1.5)
<i>Netherlands</i>	44 (1.5)	23 (1.5)	89 (0.9)	53 (1.7)
New Zealand	62 (1.1)	27 (1.2)	92 (0.5)	72 (1.2)
Norway	86 (0.6)	19 (0.8)	92 (0.6)	74 (1.1)
Portugal	72 (1.0)	39 (1.3)	97 (0.3)	56 (1.5)
<i>Romania</i>	66 (1.1)	59 (1.3)	88 (0.7)	73 (1.3)
Russian Federation	79 (1.0)	51 (1.4)	89 (0.8)	61 (1.9)
<i>Scotland</i>	- -	- -	- -	- -
Singapore	84 (0.7)	41 (1.0)	92 (0.7)	32 (1.6)
Slovak Republic	69 (1.1)	52 (1.1)	90 (0.6)	35 (1.1)
<i>Slovenia</i>	81 (1.0)	38 (1.3)	82 (1.0)	16 (1.0)
Spain	66 (1.2)	35 (1.0)	89 (0.8)	60 (1.4)
Sweden	48 (1.0)	24 (1.0)	83 (0.7)	33 (0.9)
Switzerland	60 (1.2)	22 (0.9)	71 (1.0)	36 (1.4)
<i>Thailand</i>	69 (1.2)	34 (1.1)	77 (0.9)	96 (0.4)
United States	50 (1.0)	32 (1.2)	90 (0.6)	59 (1.1)

*Eighth grade in most countries; see Table 2 for more 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.

Countries shown in italics did not satisfy one or more guidelines for sample participation rates, age/grade specifications, or classroom sampling procedures (see Figure A.3). Background data for Bulgaria and South Africa are unavailable.

Because population coverage falls below 65%, Latvia is annotated LSS for Latvian Speaking Schools only.

A dash (-) indicates data are not available.

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

Students also were asked about why they need to do well in mathematics. Students could agree with any or all of the three areas of possible motivation presented in Table 4.13, including getting their desired job, to please their parents, and to get into their desired secondary school or university. There were substantial differences from country to country in students' responses. In Colombia, Cyprus, Iran, Kuwait, and Scotland, 50% or more of the eighth-graders strongly agreed that they needed to do well in mathematics to get their desired job. The majority of students in nearly all countries either agreed or strongly agreed that getting their desired job was a motivating factor, except Korea, where 53% of the students disagreed or strongly disagreed.

In Iran, Kuwait, and Thailand, 50% or more of the students strongly agreed that they needed to do well in mathematics to please their parents. Even though in most countries the majority of the eighth-grade students agreed at some level that pleasing their parents was important, 50% or more disagreed or strongly disagreed in Denmark, Iceland, Japan, the Netherlands, Slovenia, and Sweden. Internationally, the reason most frequently cited by students for needing to do well in mathematics was to get into students' desired secondary school or university. With the exception of Austria, Belgium (Flemish), Germany, the Netherlands, and Switzerland, three-fourths or more of the students strongly agreed or agreed that this was a motivating factor for doing well in mathematics.

Table 4.13

Students' Reports on Why They Need to Do Well in Mathematics Upper Grade (Eighth Grade*)

Country	Percent of Students								
	Get Desired Job			Please Parents			Get into Desired Secondary School or University		
	Strongly Agree	Agree	Disagree/Strongly Disagree	Strongly Agree	Agree	Disagree/Strongly Disagree	Strongly Agree	Agree	Disagree/Strongly Disagree
<i>Australia</i>	36 (0.9)	43 (0.8)	21 (0.7)	22 (0.7)	50 (0.7)	28 (0.6)	36 (0.9)	42 (0.8)	22 (1.0)
<i>Austria</i>	33 (1.3)	31 (0.8)	36 (1.5)	17 (1.0)	37 (1.2)	46 (1.3)	36 (1.4)	27 (1.3)	37 (1.6)
Belgium (FI)	17 (0.9)	40 (1.1)	43 (1.5)	16 (0.8)	53 (1.2)	32 (1.2)	27 (1.1)	47 (0.9)	26 (1.0)
<i>Belgium (Fr)</i>	35 (1.3)	36 (1.4)	29 (1.2)	28 (1.6)	49 (1.2)	23 (1.2)	36 (1.2)	41 (1.3)	23 (1.1)
Canada	44 (0.9)	41 (1.0)	15 (0.6)	23 (0.7)	44 (0.9)	32 (1.1)	55 (1.4)	37 (1.2)	8 (0.5)
<i>Colombia</i>	50 (1.7)	35 (1.3)	15 (0.9)	41 (2.2)	36 (1.2)	23 (1.5)	63 (1.2)	31 (1.1)	6 (0.5)
Cyprus	53 (1.1)	34 (1.0)	13 (0.8)	34 (0.9)	37 (1.1)	30 (1.0)	50 (1.0)	32 (0.9)	18 (0.9)
Czech Republic	32 (1.3)	50 (1.1)	17 (1.2)	23 (1.1)	61 (1.0)	16 (0.8)	45 (1.0)	40 (1.2)	15 (0.9)
<i>Denmark</i>	32 (1.2)	39 (1.3)	29 (1.1)	13 (1.3)	28 (1.2)	59 (1.7)	40 (1.5)	45 (1.4)	14 (1.0)
England	37 (1.1)	43 (1.1)	20 (0.9)	20 (1.1)	43 (1.3)	36 (1.5)	41 (1.2)	45 (1.1)	14 (1.0)
France	35 (1.1)	36 (1.0)	29 (1.2)	17 (1.0)	42 (1.4)	41 (1.4)	42 (1.1)	42 (1.0)	17 (0.9)
<i>Germany</i>	39 (1.3)	31 (1.1)	30 (1.0)	25 (1.2)	32 (0.9)	43 (1.2)	32 (1.1)	33 (1.1)	35 (1.2)
<i>Greece</i>	45 (0.9)	37 (1.0)	17 (0.6)	37 (1.2)	39 (0.9)	25 (0.8)	51 (0.9)	34 (0.9)	15 (0.6)
Hong Kong	24 (1.0)	52 (0.9)	24 (0.8)	16 (0.7)	43 (0.9)	41 (1.1)	32 (0.9)	51 (0.9)	17 (0.8)
Hungary	22 (1.0)	55 (1.0)	23 (1.1)	10 (0.7)	53 (1.0)	36 (1.2)	32 (1.0)	43 (1.0)	25 (1.2)
<i>Iceland</i>	32 (1.8)	47 (2.0)	21 (1.2)	13 (1.4)	30 (1.3)	57 (2.1)	49 (1.5)	44 (1.9)	7 (0.8)
Iran, Islamic Rep.	62 (1.2)	28 (1.0)	10 (0.9)	69 (1.3)	25 (1.3)	5 (0.6)	73 (1.3)	22 (1.0)	5 (0.7)
Ireland	40 (1.1)	40 (1.1)	20 (0.9)	19 (0.9)	43 (0.8)	38 (1.0)	42 (1.1)	40 (1.1)	18 (1.2)
<i>Israel</i>	45 (1.8)	34 (1.5)	21 (1.1)	21 (1.4)	36 (2.0)	44 (2.0)	68 (1.8)	28 (1.6)	4 (0.6)
Japan	12 (0.5)	43 (0.7)	45 (0.8)	6 (0.4)	28 (0.7)	66 (0.9)	35 (0.7)	56 (0.8)	9 (0.9)
Korea	13 (0.8)	34 (0.8)	53 (1.1)	11 (0.7)	44 (1.2)	44 (1.3)	35 (1.2)	51 (1.0)	14 (0.8)
<i>Kuwait</i>	50 (2.4)	34 (1.7)	15 (1.2)	64 (2.2)	29 (1.7)	8 (0.8)	63 (1.5)	25 (1.1)	12 (1.1)
Latvia (LSS)	39 (1.2)	46 (1.0)	15 (1.0)	29 (1.4)	50 (1.3)	20 (1.0)	45 (1.3)	44 (1.1)	11 (0.7)
Lithuania	43 (1.4)	44 (1.3)	13 (0.9)	16 (0.9)	37 (1.3)	47 (1.3)	41 (1.2)	42 (1.3)	17 (1.0)
<i>Netherlands</i>	16 (1.1)	37 (1.4)	47 (1.3)	8 (1.0)	35 (1.4)	57 (1.7)	19 (1.1)	47 (1.2)	33 (1.3)
New Zealand	41 (1.0)	42 (0.9)	17 (0.7)	22 (0.8)	44 (1.0)	34 (1.0)	37 (1.0)	44 (0.9)	20 (0.7)
Norway	24 (0.9)	49 (0.9)	28 (0.9)	14 (0.8)	38 (0.9)	48 (1.0)	37 (1.0)	52 (1.0)	11 (0.7)
Portugal	37 (0.8)	39 (0.9)	23 (0.8)	22 (1.0)	44 (1.0)	34 (1.1)	43 (1.1)	40 (1.0)	17 (0.8)
<i>Romania</i>	40 (1.2)	38 (1.0)	22 (1.1)	33 (1.0)	43 (1.1)	24 (1.0)	46 (1.2)	36 (1.0)	18 (1.0)
Russian Federation	42 (0.9)	40 (0.9)	18 (0.9)	26 (1.0)	45 (1.2)	29 (1.2)	44 (1.1)	39 (1.1)	17 (0.7)
<i>Scotland</i>	51 (1.2)	36 (1.1)	12 (0.6)	22 (0.9)	43 (1.0)	34 (1.0)	51 (1.2)	33 (1.1)	16 (1.0)
Singapore	37 (0.8)	48 (0.6)	15 (0.7)	20 (0.6)	46 (0.8)	34 (1.0)	51 (1.0)	44 (1.0)	5 (0.3)
Slovak Republic	31 (0.9)	48 (1.0)	20 (0.9)	15 (0.7)	56 (1.0)	29 (1.1)	42 (0.9)	51 (0.9)	7 (0.5)
<i>Slovenia</i>	27 (1.1)	51 (1.1)	22 (1.0)	8 (0.6)	35 (1.3)	56 (1.5)	39 (1.1)	49 (1.1)	12 (0.7)
Spain	31 (1.0)	39 (0.9)	29 (0.8)	36 (1.0)	45 (0.9)	18 (0.9)	47 (1.0)	41 (0.9)	12 (0.5)
Sweden	24 (0.9)	47 (0.9)	29 (0.8)	11 (0.7)	35 (0.9)	54 (1.1)	29 (0.9)	53 (0.9)	18 (0.6)
Switzerland	30 (1.0)	36 (0.9)	34 (1.0)	18 (1.0)	39 (0.9)	43 (0.9)	32 (0.9)	39 (1.1)	28 (0.9)
<i>Thailand</i>	47 (1.1)	48 (1.0)	4 (0.4)	54 (1.1)	44 (1.1)	2 (0.3)	61 (1.1)	37 (1.0)	2 (0.3)
United States	47 (1.2)	39 (0.8)	15 (0.7)	35 (0.9)	45 (0.7)	20 (0.8)	64 (1.2)	32 (1.0)	4 (0.3)

*Eighth grade in most countries; see Table 2 for more 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.

Countries shown in italics did not satisfy one or more guidelines for sample participation rates, age/grade specifications, or classroom sampling procedures (see Figure A.3). Background data for Bulgaria and South Africa are unavailable.

Because population coverage falls below 65%, Latvia is annotated LSS for Latvian Speaking Schools only.

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

WHAT ARE STUDENTS' ATTITUDES TOWARDS MATHEMATICS?

To collect information on eighth-grade students' perceptions of mathematics, TIMSS asked them a series of questions about its utility, importance, and enjoyability. Students' perceptions about the value of learning mathematics may be considered as both an input and outcome variable, because their attitudes towards the subject can be related to educational achievement in ways that reinforce higher or lower performance. That is, students who do well in mathematics generally have more positive attitudes towards the subject, and those who have more positive attitudes tend to perform better.

Table 4.14 provides students' responses to the question about how much they like or dislike mathematics in relation to their average mathematics achievement. As anticipated, within nearly every country, a clear positive relationship can be observed between a stronger liking of mathematics and higher achievement. Even though the majority of eighth-graders in nearly every country indicated they liked mathematics to some degree, clearly not all students feel positive about this subject area. In Austria, the Czech Republic, Germany, Hungary, Japan, Korea, Lithuania, and the Netherlands, more than 40% of the eighth-grade students reported disliking mathematics.

The data in Figure 4.3 reveal that, on average, eighth-graders of both genders were relatively neutral about liking mathematics. In no country did girls report a significantly stronger liking of the subject area than did boys. However, boys reported liking mathematics better than girls did in several countries, including Austria, France, Germany, Hong Kong, Japan, Norway, and Switzerland.

To gain some understanding about eighth-graders' view about the utility of mathematics and their enjoyment of it as a school subject, TIMSS asked students to state their level of agreement with the following four statements: 1) I would like a job that involved using mathematics, 2) Mathematics is important to everyone's life, 3) Mathematics is boring, and 4) I enjoy learning mathematics. The results for these four questions were averaged with students' responses to the question about liking mathematics to form an index of their overall attitudes towards mathematics based on all five questions.

The data for the index in Table 4.15 reveal that eighth-grade students generally had positive attitudes towards mathematics, and that those students with more positive attitudes had higher average mathematics achievement. On average, across the five questions comprising the mathematics attitude index, the majority of students in each TIMSS country expressed positive or strongly positive attitudes about mathematics. Very few students (usually only 2% to 3%) consistently had strongly negative opinions about all aspects of the subject. Since these results seem slightly more supportive than students' liking of the subject alone, it may be that students understand the utility of mathematics to a greater extent than they actually like doing it.

Gender differences for the index of overall attitudes are portrayed in Figure 4.4. In many countries, girls and boys reported similar overall attitudes about mathematics. The countries where boys' attitudes were significantly more positive than those of girls included Austria, France, Germany, Greece, Hong Kong, Japan, the Netherlands, Norway, Sweden, and Switzerland. Interestingly, the index of overall attitudes towards mathematics showed gender differences in a somewhat different set of countries than the single question about liking mathematics. For the countries showing a gender difference on the attitudes index but not on the liking question, it is possible that boys more than girls perceive the relevance of mathematics.

Table 4.14

Students' Reports on How Much They Like Mathematics Upper Grade (Eighth Grade*)

Country	Dislike a Lot		Dislike		Like		Like a Lot	
	Percent of Students	Mean Achievement						
<i>Australia</i>	12 (0.6)	480 (5.2)	24 (0.7)	523 (4.8)	51 (0.7)	541 (4.1)	13 (0.7)	563 (5.0)
<i>Austria</i>	16 (1.0)	517 (6.2)	26 (1.1)	529 (4.7)	41 (1.1)	548 (3.6)	17 (1.2)	558 (6.3)
Belgium (Fl)	11 (0.8)	520 (7.3)	21 (1.0)	558 (4.9)	49 (1.1)	566 (6.7)	18 (1.1)	602 (6.2)
<i>Belgium (Fr)</i>	11 (1.2)	489 (8.2)	19 (1.0)	514 (5.7)	48 (1.1)	529 (3.9)	22 (1.2)	557 (7.1)
Canada	10 (0.5)	498 (4.7)	16 (0.7)	521 (3.6)	54 (1.1)	527 (2.9)	20 (0.9)	553 (3.4)
<i>Colombia</i>	8 (0.6)	367 (6.9)	14 (1.1)	378 (3.9)	55 (1.3)	388 (3.1)	23 (1.4)	392 (6.6)
Cyprus	14 (0.9)	423 (3.5)	13 (0.5)	449 (4.3)	46 (1.0)	473 (2.7)	28 (1.0)	515 (3.4)
Czech Republic	14 (0.8)	533 (6.0)	36 (1.2)	550 (5.4)	41 (1.4)	578 (6.0)	8 (0.6)	606 (8.0)
<i>Denmark</i>	5 (0.6)	480 (7.9)	17 (1.1)	477 (4.3)	46 (1.2)	503 (4.0)	32 (1.5)	522 (3.9)
England	5 (0.5)	473 (8.5)	15 (1.0)	499 (6.5)	56 (1.2)	507 (3.2)	24 (1.1)	518 (4.6)
France	12 (1.0)	506 (5.7)	20 (1.1)	524 (4.6)	51 (1.3)	544 (3.3)	17 (1.0)	566 (5.5)
<i>Germany</i>	23 (1.2)	481 (4.8)	22 (1.1)	508 (6.8)	31 (1.1)	525 (5.0)	24 (1.1)	522 (5.7)
<i>Greece</i>	11 (0.6)	453 (5.0)	15 (0.6)	468 (4.3)	49 (1.0)	480 (3.4)	25 (1.0)	517 (3.6)
Hong Kong	12 (0.8)	545 (10.1)	23 (0.9)	569 (7.0)	48 (1.0)	598 (6.1)	17 (0.9)	629 (6.5)
Hungary	12 (0.8)	496 (7.4)	30 (1.2)	522 (4.3)	47 (1.1)	549 (3.8)	11 (0.7)	589 (6.1)
Iceland	6 (0.9)	447 (15.0)	15 (1.1)	480 (5.9)	56 (1.7)	488 (4.7)	23 (1.5)	503 (5.5)
Iran, Islamic Rep.	7 (0.6)	407 (5.2)	8 (0.7)	412 (5.2)	47 (1.5)	421 (2.8)	38 (1.5)	446 (2.8)
Ireland	9 (0.7)	492 (7.1)	18 (1.0)	520 (5.4)	53 (1.2)	531 (5.1)	21 (1.1)	549 (8.0)
<i>Israel</i>	10 (1.3)	513 (9.8)	24 (1.4)	523 (8.2)	45 (1.7)	522 (5.5)	21 (1.3)	536 (8.5)
Japan	11 (0.7)	550 (4.1)	36 (1.0)	585 (2.6)	43 (1.0)	625 (2.3)	10 (0.5)	649 (4.1)
Korea	6 (0.3)	536 (8.0)	36 (1.2)	569 (3.6)	44 (1.2)	628 (3.3)	14 (0.8)	676 (5.0)
<i>Kuwait</i>	8 (1.5)	371 (6.2)	8 (0.9)	391 (5.1)	40 (1.9)	391 (3.0)	44 (2.5)	398 (3.5)
Latvia (LSS)	7 (0.7)	469 (6.2)	26 (1.2)	475 (4.2)	56 (1.3)	499 (3.6)	11 (0.8)	536 (5.8)
Lithuania	12 (0.8)	457 (6.1)	35 (1.3)	463 (4.1)	44 (1.4)	488 (4.1)	9 (0.7)	519 (8.7)
<i>Netherlands</i>	13 (1.8)	494 (17.1)	30 (1.3)	535 (7.5)	50 (1.8)	554 (6.2)	8 (0.8)	567 (9.2)
New Zealand	9 (0.6)	475 (6.0)	19 (0.8)	500 (4.9)	51 (0.9)	508 (5.0)	21 (0.9)	533 (6.1)
Norway	11 (0.7)	454 (3.9)	26 (0.9)	485 (3.3)	47 (1.0)	514 (2.9)	16 (0.7)	540 (4.2)
Portugal	10 (0.7)	421 (3.8)	19 (1.0)	439 (3.4)	53 (1.0)	456 (2.5)	18 (1.1)	485 (4.0)
<i>Romania</i>	11 (0.7)	458 (7.3)	18 (0.7)	460 (5.4)	52 (1.0)	483 (4.1)	19 (1.0)	516 (5.6)
Russian Federation	5 (0.5)	499 (8.9)	22 (1.0)	510 (7.2)	58 (1.2)	540 (5.4)	15 (0.8)	574 (5.1)
<i>Scotland</i>	7 (0.6)	458 (6.4)	19 (0.9)	493 (5.3)	57 (1.0)	498 (6.0)	17 (1.0)	529 (9.8)
Singapore	4 (0.4)	583 (8.8)	14 (0.7)	613 (6.4)	54 (0.9)	642 (4.8)	28 (1.1)	671 (5.5)
Slovak Republic	15 (0.6)	496 (4.4)	25 (1.0)	526 (4.2)	49 (1.1)	559 (3.7)	11 (0.7)	613 (4.5)
<i>Slovenia</i>	11 (1.0)	511 (6.7)	23 (1.1)	519 (4.5)	52 (1.5)	540 (3.5)	14 (0.8)	606 (4.7)
Spain	13 (0.8)	459 (3.6)	24 (0.8)	473 (3.0)	45 (0.9)	491 (2.5)	18 (0.8)	516 (3.6)
Sweden	11 (0.7)	479 (4.9)	29 (1.0)	510 (3.2)	48 (1.1)	526 (3.3)	13 (0.7)	547 (5.1)
Switzerland	10 (0.7)	508 (7.0)	22 (1.1)	543 (4.1)	48 (0.9)	549 (3.2)	20 (0.8)	563 (4.6)
<i>Thailand</i>	3 (0.4)	502 (11.6)	15 (1.1)	504 (5.8)	59 (1.3)	519 (5.5)	23 (1.5)	548 (7.9)
United States	12 (0.7)	463 (5.2)	17 (0.7)	492 (5.2)	47 (0.8)	504 (4.8)	23 (1.0)	519 (6.1)

*Eighth grade in most countries; see Table 2 for more 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.

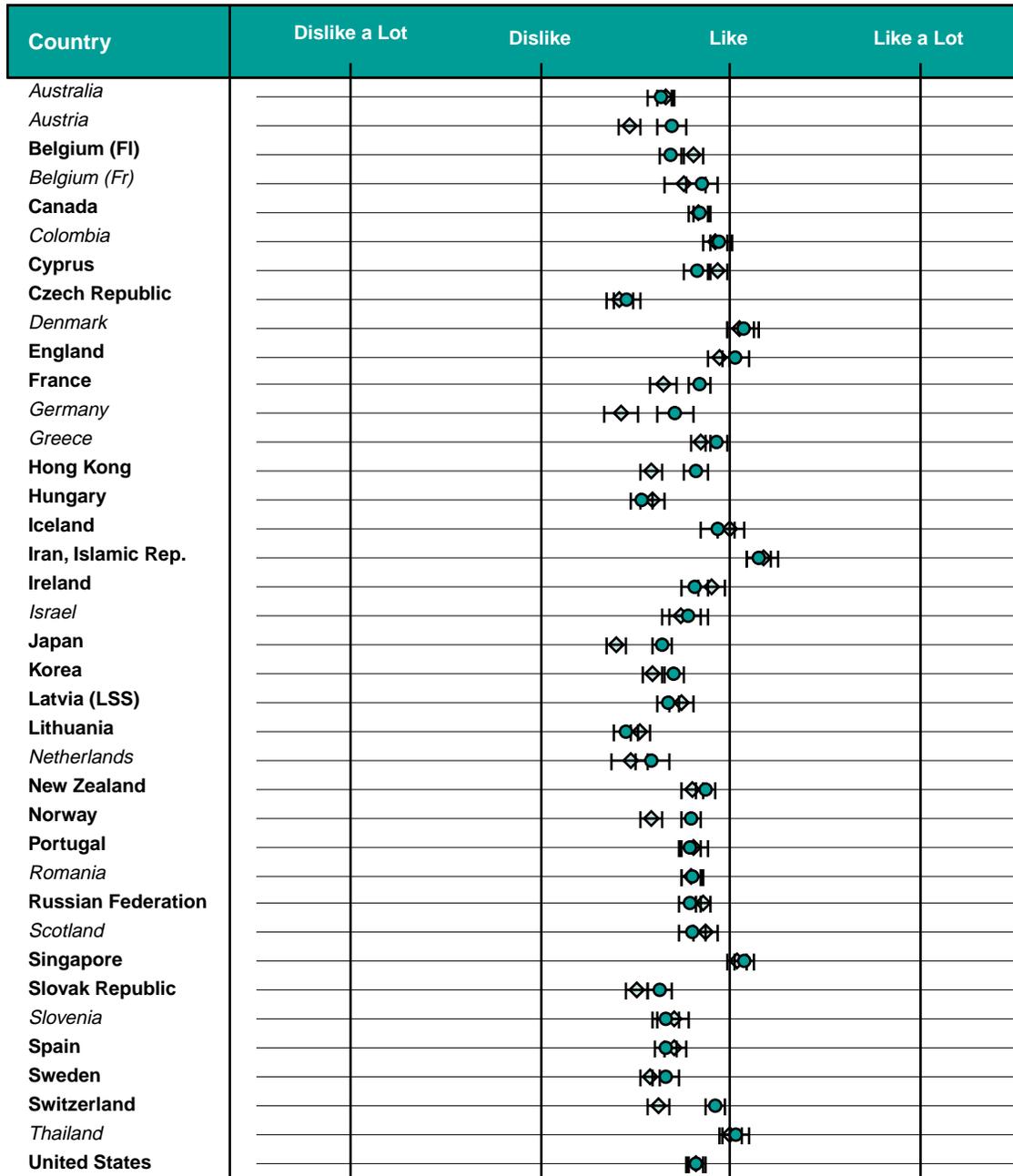
Countries shown in italics did not satisfy one or more guidelines for sample participation rates, age/grade specifications, or classroom sampling procedures (see Figure A.3). Background data for Bulgaria and South Africa are unavailable.

Because population coverage falls below 65%, Latvia is annotated LSS for Latvian Speaking Schools only.

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

Figure 4.3

**Gender Differences in Liking Mathematics
Upper Grade (Eighth Grade*)**



= Average for Girls (±2SE)
 = Average for Boys (±2SE)

*Eighth grade in most countries; see Table 2 for more information about the grades tested in each country. Countries shown in italics did not satisfy one or more guidelines for sample participation rates, age/grade specifications, or classroom sampling procedures (see Figure A.3). Background data for Bulgaria and South Africa are unavailable. Because population coverage falls below 65%, Latvia is annotated LSS for Latvian Speaking Schools

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

Table 4.15**Students' Overall Attitudes¹ Towards Mathematics
Upper Grade (Eighth Grade*)**

Country	Strongly Negative		Negative		Positive		Strongly Positive	
	Percent of Students	Mean Achievement						
<i>Australia</i>	4 (0.3)	492 (8.3)	32 (0.9)	514 (4.5)	55 (0.8)	540 (4.3)	9 (0.6)	561 (5.9)
<i>Austria</i>	4 (0.5)	527 (11.1)	38 (1.1)	532 (4.1)	47 (0.9)	542 (3.5)	12 (0.9)	560 (7.4)
Belgium (Fl)	4 (0.5)	535 (10.7)	33 (1.1)	547 (5.2)	52 (1.2)	572 (6.4)	11 (0.9)	604 (8.8)
<i>Belgium (Fr)</i>	3 (0.5)	507 (10.0)	28 (1.3)	514 (5.4)	53 (1.4)	526 (4.0)	15 (0.9)	558 (5.4)
Canada	3 (0.3)	510 (9.1)	23 (0.8)	512 (3.5)	58 (0.7)	528 (2.7)	16 (0.7)	554 (3.3)
<i>Colombia</i>	1 (0.5)	~ ~	11 (1.2)	387 (8.2)	61 (1.5)	385 (3.7)	26 (1.2)	387 (5.9)
Cyprus	2 (0.4)	~ ~	19 (1.1)	435 (3.3)	53 (0.9)	471 (2.6)	26 (1.0)	513 (3.8)
Czech Republic	3 (0.3)	543 (10.4)	39 (1.4)	544 (6.1)	52 (1.4)	574 (5.6)	6 (0.6)	613 (10.1)
<i>Denmark</i>	1 (0.2)	~ ~	16 (1.1)	479 (4.8)	57 (1.3)	502 (3.5)	26 (1.4)	523 (4.7)
England	1 (0.3)	~ ~	17 (1.0)	497 (5.9)	64 (1.1)	509 (3.0)	18 (1.0)	514 (6.0)
France	3 (0.5)	520 (7.7)	27 (1.5)	518 (4.5)	54 (1.1)	543 (3.2)	16 (1.0)	564 (5.7)
<i>Germany</i>	5 (0.5)	498 (8.0)	38 (1.4)	498 (5.2)	43 (1.1)	518 (5.3)	13 (0.8)	521 (6.3)
<i>Greece</i>	2 (0.3)	~ ~	21 (0.8)	467 (3.9)	57 (0.9)	482 (3.7)	20 (0.8)	512 (3.7)
Hong Kong	3 (0.4)	530 (16.4)	31 (1.0)	561 (7.8)	57 (1.1)	601 (6.1)	9 (0.6)	640 (6.6)
Hungary	2 (0.3)	~ ~	38 (1.2)	518 (4.1)	53 (1.3)	547 (3.7)	7 (0.6)	592 (7.2)
Iceland	2 (0.5)	~ ~	24 (1.6)	478 (5.5)	59 (1.5)	489 (4.9)	14 (1.2)	499 (6.5)
Iran, Islamic Rep.	2 (0.3)	~ ~	15 (1.2)	409 (3.1)	54 (1.6)	426 (2.7)	30 (1.3)	446 (2.9)
Ireland	2 (0.3)	~ ~	26 (1.1)	515 (5.3)	59 (1.2)	530 (5.3)	13 (0.9)	551 (8.1)
<i>Israel</i>	2 (0.5)	~ ~	25 (1.9)	523 (7.9)	56 (1.7)	524 (6.4)	17 (1.4)	527 (8.8)
Japan	4 (0.4)	558 (7.1)	44 (1.2)	592 (2.7)	48 (1.3)	619 (2.0)	3 (0.2)	649 (8.7)
Korea	2 (0.2)	~ ~	48 (1.1)	581 (3.0)	46 (1.1)	630 (3.4)	5 (0.4)	680 (9.9)
<i>Kuwait</i>	3 (0.5)	372 (8.3)	15 (1.5)	385 (4.2)	48 (1.5)	390 (3.1)	34 (2.2)	400 (3.0)
Latvia (LSS)	1 (0.2)	~ ~	28 (1.3)	478 (4.1)	62 (1.3)	496 (3.7)	8 (0.7)	526 (5.9)
Lithuania	2 (0.4)	~ ~	38 (1.3)	467 (3.9)	53 (1.4)	480 (4.1)	7 (0.6)	513 (9.3)
<i>Netherlands</i>	4 (0.5)	506 (14.7)	40 (1.9)	526 (9.1)	50 (1.8)	554 (6.2)	6 (0.8)	570 (10.6)
New Zealand	2 (0.3)	~ ~	23 (0.9)	491 (4.4)	60 (0.9)	511 (5.0)	15 (0.8)	530 (6.4)
Norway	3 (0.3)	456 (8.3)	30 (0.9)	481 (2.9)	55 (0.8)	511 (2.7)	12 (0.7)	538 (4.6)
Portugal	2 (0.3)	~ ~	24 (1.2)	436 (3.0)	58 (1.0)	456 (2.5)	16 (1.1)	480 (3.9)
<i>Romania</i>	1 (0.1)	~ ~	25 (1.0)	465 (5.7)	60 (1.0)	480 (4.2)	15 (0.9)	520 (6.2)
Russian Federation	1 (0.2)	~ ~	24 (1.1)	512 (5.4)	63 (1.2)	538 (6.1)	12 (0.8)	570 (5.5)
<i>Scotland</i>	7 (0.6)	458 (6.4)	19 (0.9)	493 (5.3)	57 (1.0)	498 (6.0)	17 (1.0)	529 (9.8)
Singapore	1 (0.2)	~ ~	16 (0.8)	609 (6.2)	62 (0.9)	646 (4.9)	20 (1.0)	666 (5.7)
Slovak Republic	1 (0.3)	~ ~	30 (1.0)	516 (3.7)	60 (1.0)	556 (3.7)	9 (0.6)	601 (5.4)
<i>Slovenia</i>	3 (0.4)	535 (11.2)	33 (1.3)	519 (3.7)	57 (1.4)	546 (3.5)	8 (0.7)	601 (6.8)
Spain	3 (0.4)	459 (5.9)	33 (1.0)	474 (2.8)	52 (1.0)	491 (2.2)	13 (0.8)	513 (4.3)
Sweden	2 (0.3)	~ ~	33 (1.1)	503 (3.3)	55 (0.9)	523 (3.2)	10 (0.7)	553 (5.0)
Switzerland	3 (0.3)	532 (9.2)	28 (1.1)	540 (4.1)	53 (1.2)	549 (3.0)	16 (0.6)	554 (5.5)
<i>Thailand</i>	0 (0.1)	~ ~	12 (1.1)	503 (7.3)	72 (1.0)	520 (5.3)	16 (1.2)	551 (9.1)
United States	4 (0.3)	481 (7.5)	26 (0.9)	483 (5.0)	55 (1.0)	503 (4.8)	15 (0.7)	526 (6.8)

¹Index of overall attitudes towards mathematics is based on average of responses to the following statements: 1) I would like a job that involved using mathematics; 2) Mathematics is important to everyone's life; 3) Mathematics is boring (reversed scale); 4) I enjoy learning mathematics; 5) I like mathematics.

*Eighth grade in most countries; see Table 2 for more 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.

Countries shown in italics did not satisfy one or more guidelines for sample participation rates, age/grade specifications, or classroom sampling procedures (see Figure A.3). Background data for Bulgaria and South Africa are unavailable.

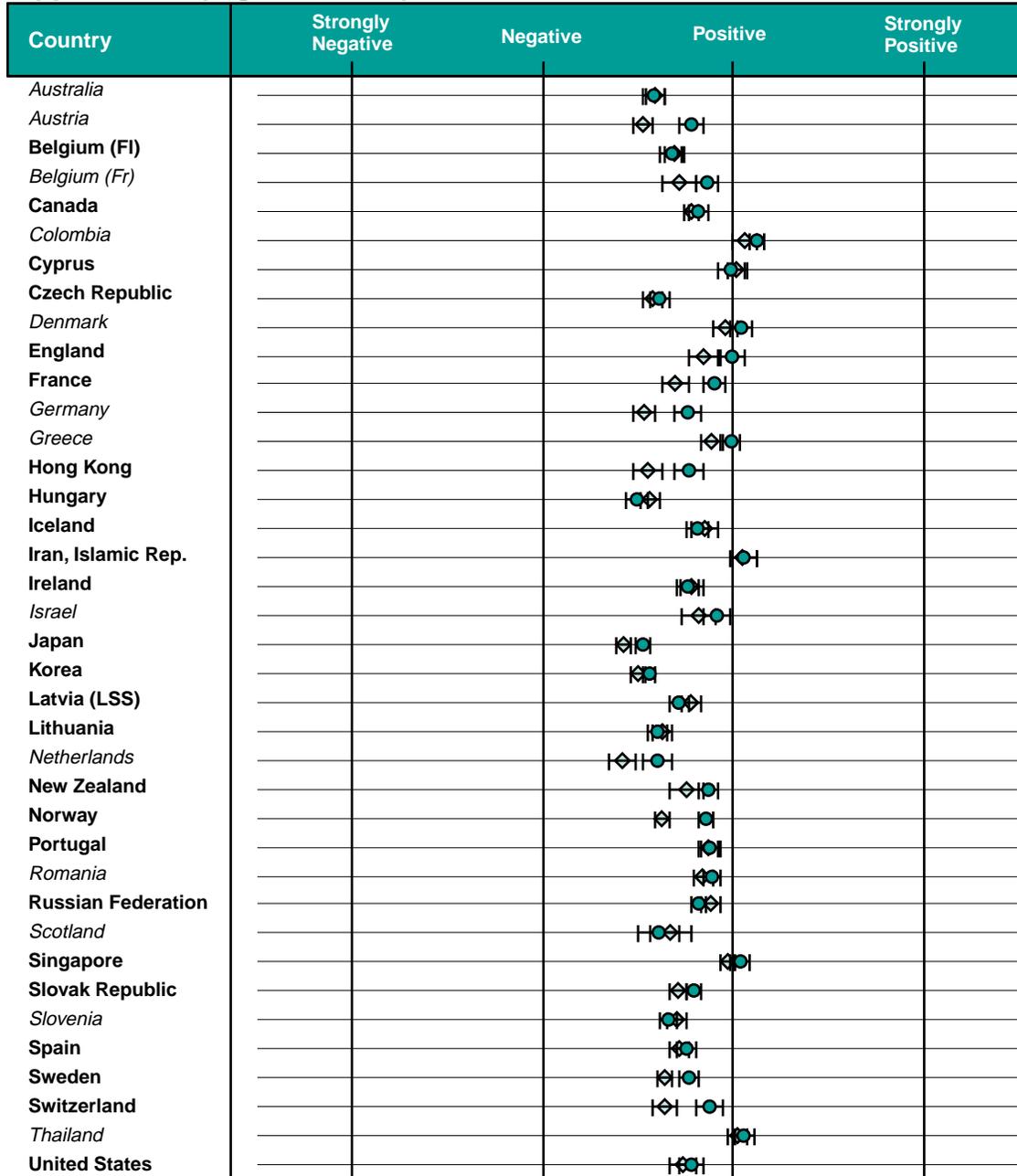
Because population coverage falls below 65%, Latvia is annotated LSS for Latvian Speaking Schools only.

A tilde (~) indicates insufficient data to report achievement.

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

Figure 4.4

Gender Differences in Students' Overall Attitudes¹ Towards Mathematics Upper Grade (Eighth Grade*)



◆ = Average for Girls (±2SE)
● = Average for Boys (±2SE)

¹Index of overall attitudes towards mathematics is based on average of responses to the following statements: 1) I would like a job that involved using mathematics; 2) Mathematics is important to everyone's life; 3) Mathematics is boring (reversed scale); 4) I enjoy learning mathematics; 5) I like mathematics.

*Eighth grade in most countries; see Table 2 for more information about the grades tested in each country. Countries shown in italics did not satisfy one or more guidelines for sample participation rates, age/grade specifications, or classroom sampling procedures (see Figure A.3). Background data for Bulgaria and South Africa are unavailable. Because population coverage falls below 65%, Latvia is annotated LSS for Latvian Speaking Schools only.

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

