

A man and a woman are looking at a document together. The man is pointing at a specific part of the document. The woman is resting her chin on her hand, looking at the document with a focused expression. The background is a blurred office or classroom setting with various papers and posters on the wall. The entire image has a warm, golden-yellow color overlay.

INDICATORS PART III

Context for Learning

TIME DEVOTED TO READING INSTRUCTION DURING THE SCHOOL WEEK

G-8 Countries Included: England, France, Germany, Italy, Russian Federation, Scotland, United States

The United States had the highest percentage of fourth-graders with teachers who reported spending more than 6 hours on reading instruction in a typical week. It was most common for U.S. fourth-graders to spend more than 6 hours in reading instruction, unlike students in the other participating G-8 countries.

Using data from the 2006 Progress in International Reading Literacy Study (PIRLS 2006), this indicator presents the reports of teachers of fourth-graders about how much time in a typical week they spend on reading instruction. As reported in this indicator, the average number of hours spent on reading instruction is grouped into three categories: 3 hours or less, more than 3 and up to and including 6 hours, and more than 6 hours.

Teachers' reports of the average number of hours spent on reading instruction each week generally varied widely both across and within the participating G-8 countries¹⁸ (figure 14). For example,

in 2006, the percentage of fourth-graders whose teachers reported spending 3 hours or less in a typical week on reading instruction ranged from 10 percent in the United States to 71 percent in Germany. This category was reported more frequently than the other two categories in three G-8 countries, including Germany (71 percent), England (67 percent), and Italy (51 percent). For the category of more than 3 and up to and including 6 hours of reading instruction, the percentages ranged from 22 percent in the United States to 60 percent in the Russian Federation. This category was reported more frequently than the other two categories in two G-8 countries, including the Russian Federation (60 percent) and France (48 percent). For the category of more than 6 hours of reading instruction, the percentages ranged from 6 percent in Germany to 68 percent in the United States. The United States not only had the highest percentage of fourth-graders with teachers who reported spending more than 6 hours on reading instruction in a typical week, but it also was the only participating G-8 country to cite this category more frequently than any other category.

Definitions and Methodology

Data for this indicator are from the PIRLS 2006 fourth-grade teacher questionnaire, which was administered to the teachers of the students sampled for PIRLS. The questionnaire included questions on teachers' background and on their teaching practices in the sampled students' classes. One or two classes were randomly sampled in each school, and teachers were asked to complete a questionnaire for each class they taught that contained sampled students. Thus, if a teacher taught two classes with sampled students, he or she was expected to complete a questionnaire for each of these classes. It should be noted that the PIRLS 2006 fourth-grade teachers do not constitute representative samples of teachers. Rather, they are the teachers for nationally representative samples of fourth-grade students. Thus, the teacher data presented in this indicator were analyzed at the student level.

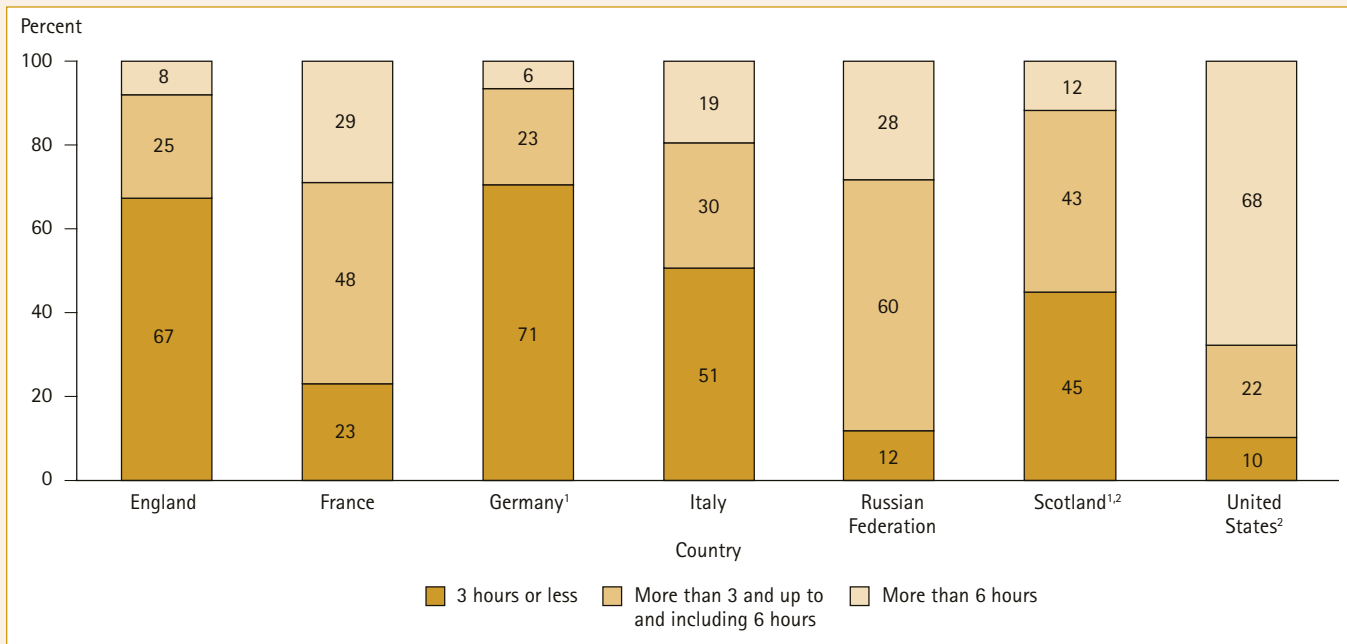
In PIRLS 2006, countries were required to sample students in the grade that corresponded to the end of 4 years of formal schooling,

providing that the mean age at the time of testing was at least 9.5 years. As defined by PIRLS, the 1st year of formal schooling begins with the 1st year of primary school (ISCED97 level 1), which should mark the beginning of formal instruction in reading, writing, and mathematics. Note that kindergarten is not counted. For most countries, the target grade was fourth grade, or its national equivalent.

Teachers' reports of how much time in a typical week is spent on reading instruction are based on the following question: "Regardless of whether or not you have formally scheduled time for reading instruction, in a typical week about how much time do you spend on reading instruction and/or activities with the students? *Include things you do across curriculum areas and during formally scheduled time for reading instruction.*" Teachers were asked to write in the hours and minutes per week.

¹⁸ Canada also participated in PIRLS 2006 but not at the national level. Canada participated as separate provinces (Alberta, British Columbia, Nova Scotia, Ontario, and Quebec). Data corresponding with this indicator for the participating Canadian provinces can be found in appendix table B4.

Figure 14. Percentage distribution of fourth-grade students receiving reading instruction each week, by teacher reports of average number of hours spent on reading instruction each week and country: 2006



¹Data are available for at least 70 percent, but less than 85 percent, of the students. Missing data have not been explicitly accounted for in the data.

²Met international guidelines for participation rates only after substitute schools were included. That is, to avoid sample size losses resulting from sampled schools not participating, a mechanism was instituted to identify, a priori, substitute schools that have similar characteristics to the sampled schools that they may replace.

NOTE: Detail may not sum to totals because of rounding.

SOURCE: Mullis, I.V.S., Martin, M.O., Kennedy, A.M., and Foy, P. (2007). *PIRLS 2006 International Report: IEA's Progress in International Reading Literacy Study in Primary Schools in 40 Countries*, exhibit 5.11. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

FOURTH-GRADE TEACHERS' STRATEGIES FOR ASSISTING STUDENTS HAVING DIFFICULTY READING

G-8 Countries Included: England, France, Germany, Italy, Russian Federation, Scotland, United States

One of the most common strategies reported by teachers to assist fourth-graders having difficulty reading was to ask the parents to help their child with reading. Thirty-four percent of fourth-graders in the United States had teachers who reported always having a remedial reading specialist available (compared to less than 10 percent of fourth-graders in France, Germany, and Italy).

Using data from the 2006 Progress in International Reading Literacy Study (PIRLS 2006), this indicator presents teachers' reports about the strategies that they used to help fourth-graders having difficulty reading. Teachers were given a list of strategies and asked whether each one was used if a student begins to fall behind in reading.

In 2006, a combination of strategies was reportedly used to varying degrees in the participating G-8 countries¹⁹ to assist students having difficulty reading. One of the most common strategies was to ask parents to help their child with reading (table 4). The percentage of fourth-graders whose teachers reported asking parents to help their child with reading ranged from 84 percent in France to 99 percent in the Russian Federation and England. In the United States, this strategy was used more frequently than any of the others; 97 percent of fourth-graders had a teacher who reported using it.

A second strategy commonly used to assist students having difficulty reading was working with students individually. The percentage of fourth-graders whose teachers reported working with students individually ranged from 78 percent in England to 92 percent in Scotland and Italy. In the United States, 89 percent of fourth-graders had a teacher who reported doing this. In Italy, Scotland, and France, working with students individually was done about as frequently as asking the parents to help their child with reading.

A third strategy commonly used by several G-8 countries to assist students having difficulty reading was to have the student work with other students; its reported use ranged from 45 percent in Scotland to

83 percent in Italy. In the United States 80 percent of fourth-graders had a teacher who reported using this strategy.

There were a few strategies for assisting students having difficulty reading where reported use varied considerably across the G-8 countries. For example, the percentage of fourth-graders who had a teacher who reported assigning homework to help the student catch up ranged from 23 percent in France to 94 percent in the Russian Federation, with the United States at 45 percent. The reported use of the strategy of having the student work in the regular classroom with a teacher aide ranged from 8 percent in Germany to 72 percent in England, with the United States at 31 percent. The reported use of the strategy of waiting to see if performance improves with maturation ranged from 17 percent in Scotland to 65 percent in the Russian Federation, with the United States at 32 percent.

A reading specialist may also be used to assist students having difficulty reading. In most of the G-8 countries, this was more likely to take place in a remedial classroom than in the regular classroom. For example, in England, the United States, and Scotland, about half of fourth-graders had a teacher who reported having students work in a remedial classroom with a reading specialist, which compares to 28, 15, and 18 percent, respectively, for having students work in the regular classroom with a reading specialist.

PIRLS also asked teachers of fourth-graders about their access to remedial reading specialists. Thirty-four percent of fourth-graders in the United States and 24 percent of fourth-graders in England had teachers who reported always having a remedial reading specialist available (figure 15). Less than 10 percent of fourth-graders in France, Germany, and Italy had teachers who reported always having a remedial reading specialist available. England had the lowest percentage of fourth-graders whose teachers never had access to a remedial reading specialist (16 percent), while Italy had the highest (95 percent). In the United States, 29 percent of fourth-graders had teachers who reported never having access to a remedial reading specialist.

Definitions and Methodology

Data for this indicator are from the PIRLS 2006 fourth-grade teacher questionnaire, which was administered to the teachers of the students sampled for PIRLS. The questionnaire included questions on teachers' background and on their teaching practices in the sampled students' classes. One or two classes were randomly sampled in each school, and teachers were asked to complete a questionnaire for each class they taught that contained sampled students. Thus, if a teacher taught two classes with sampled students, he or she was expected to complete a questionnaire for each of these classes. It should be noted that the PIRLS 2006 fourth-grade teachers do not constitute representative samples of teachers. Rather, they are the teachers for nationally representative samples of fourth-grade students. Thus, the teacher data presented in this indicator were analyzed at the student level.

In PIRLS 2006, countries were required to sample students in the grade that corresponded to the end of 4 years of formal schooling, providing that the mean age at the time of testing was at least 9.5 years. As defined by PIRLS, the 1st year of formal schooling begins with the

1st year of primary school (ISCED97 level 1), which should mark the beginning of formal instruction in reading, writing, and mathematics. Note that kindergarten is not counted. For most countries, the target grade was fourth grade, or its national equivalent.

Teachers' reports about whether or not they used various strategies to help fourth-graders who are having difficulty reading are based on the percentages of students whose teachers responded "yes" to a list of strategies that follow the question, "What do you usually do if a student begins to fall behind in reading?"

Teachers' reports about the availability of remedial reading specialists to assist fourth-graders who are having difficulty reading were based on teachers' responses to the question, "Are the following resources available to you to deal with students who have difficulty with reading?" As shown in figure 15, results are based on the percentages of students whose teachers responded "always," "sometimes," or "never" to the availability of a remedial reading specialist either in the classroom or in a remedial reading classroom.

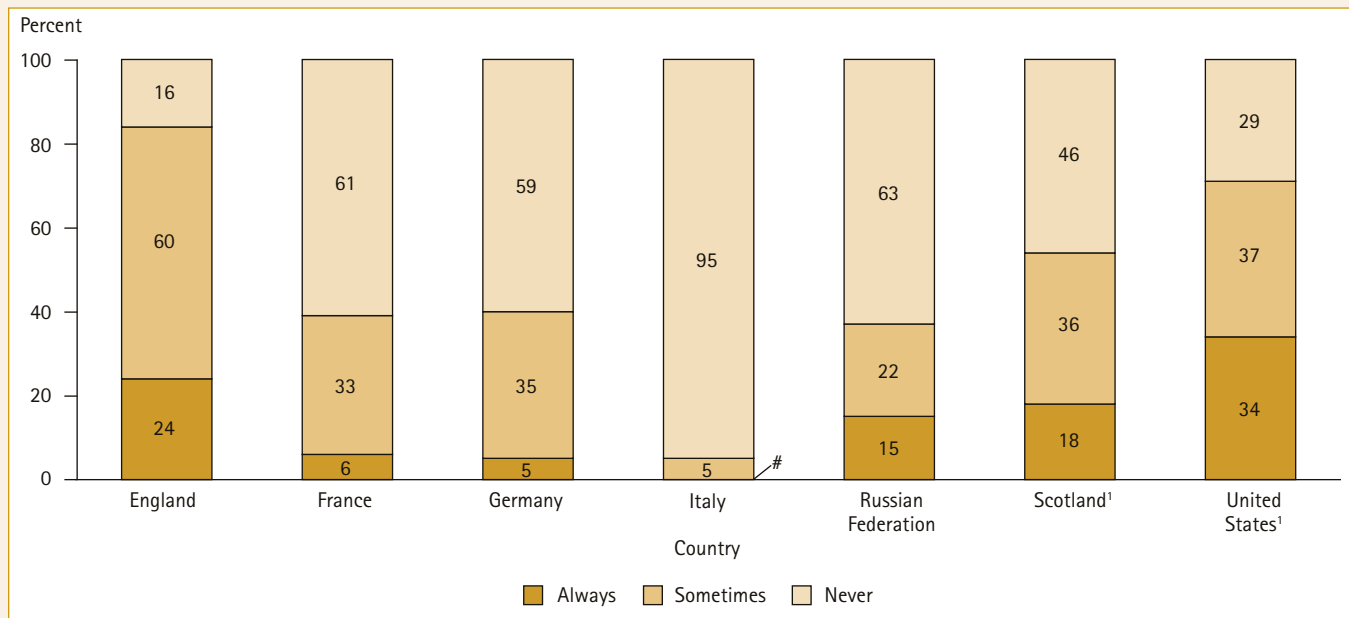
¹⁹ Canada also participated in PIRLS 2006 but not at the national level. Canada participated as separate provinces (Alberta, British Columbia, Nova Scotia, Ontario, and Quebec). Data corresponding with this indicator for the participating Canadian provinces can be found in appendix tables B5 and B6.

Table 4. Percentage of fourth-graders whose teachers reported employing specific strategies for assisting students having difficulty reading, by country: 2006

Country	Wait to see if performance improves with maturation	Work with student individually	Have other students work with student	Assign homework to help student catch up	Ask parents to help student with reading	Have student work in regular classroom with teacher aide	Have student work in regular classroom with reading specialist	Have student work in remedial classroom with reading specialist
England	34	78	53	39	99	72	28	50
France	41	82	58	23	84	11	14	23
Germany	25	80	69	63	98	8	5	33
Italy	48	92	83	72	93	22	1	4
Russian Federation	65	89	67	94	99	26	5	27
Scotland ¹	17	92	45	68	96	67	18	51
United States ¹	32	89	80	45	97	31	15	50

¹ Met international guidelines for participation rates only after substitute schools were included. That is, to avoid sample size losses resulting from sampled schools not participating, a mechanism was instituted to identify, a priori, substitute schools that have similar characteristics to the sampled schools that they may replace.
 SOURCE: International Association for the Evaluation of Educational Achievement, Progress in International Reading Literacy Study (PIRLS), 2006.

Figure 15. Percentage distribution of fourth-graders, by teacher reports of availability of remedial reading specialist and country: 2006



Rounds to zero.

¹ Met international guidelines for participation rates only after substitute schools were included. That is, to avoid sample size losses resulting from sampled schools not participating, a mechanism was instituted to identify, a priori, substitute schools that have similar characteristics to the sampled schools that they may replace.

NOTE: Availability of remedial reading specialist indicates that a specialist was available either in the classroom or in a remedial reading classroom. Detail may not sum to totals because of rounding.

SOURCE: Mullis, I.V.S., Martin, M.O., Kennedy, A.M., and Foy, P. (2007). *PIRLS 2006 International Report: IEA's Study of Reading Literacy Achievement in Primary Schools in 40 Countries*, exhibit 5.18. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

TRENDS IN TEACHERS' AGE AND EXPERIENCE

G-8 Countries Included: England, France, Germany, Italy, Russian Federation, Scotland, United States

In England and the United States, the average years of teaching experience among teachers of fourth-graders was lower than in all other participating G-8 countries in 2006. In France, Germany, and the United States, average teaching experience was 3 years lower in 2006 compared to 2001.

Using data from the Progress in International Reading Literacy Study (PIRLS) administrations of 2001 and 2006, this indicator reports trends in the age and experience of fourth grade teachers.

Across the G-8 countries in 2006, the percentage of fourth-graders with teachers reporting their age as 29 years or younger at the time of the assessment ranged from 2 percent in Italy to 30 percent in England, with the United States at 21 percent (data not shown). In Scotland and the United States, the estimates were 12 and 8 percentage points higher, respectively, in 2006 compared to 2001 (figure 16a). The only measurable decrease from 2001 to 2006 in the percentage of fourth-graders with teachers reporting their age as 29 years or younger was in the Russian Federation, where it was 11 percentage points lower in 2006 compared to 2001.

The percentage of fourth-graders with teachers reporting their age as 50 years or older in 2006 ranged from 18 percent in France

to 49 percent in Germany, with the United States at 25 percent (data not shown). Among the G-8 countries, the only measurable difference from 2001 to 2006 in the percentage of fourth-graders with teachers reporting their age as 50 years or older was in the United States, where it was 12 percentage points lower in 2006 compared to 2001 (figure 16a).

Teachers of fourth-graders also reported their years of teaching experience (at all grades). Across the G-8 countries,²⁰ the average years of teaching experience ranged from 12 years in England and the United States to 22 years in Italy and the Russian Federation in 2006 (figure 16b). The average years of teaching experience in England and the United States was lower than in all other participating G-8 countries. In France, Germany, and the United States, average teaching experience was 3 years lower in 2006 compared to 2001. The only increase in average years of teaching experience from 2001 to 2006 was in the Russian Federation, where it was 2 years higher in 2006 compared to 2001. Thus, comparing data from 2001 and 2006 on teachers' age and experience, the Russian Federation showed a pattern where fourth-graders had a decrease in the percentage of beginning teachers and an increase in teachers' years of teaching experience, while the United States showed the opposite pattern.

Definitions and Methodology

Data for this indicator are from the PIRLS fourth-grade teacher questionnaire, which was administered to the teachers of the students sampled for PIRLS in 2001 and 2006. The questionnaire included questions on teachers' background and on their teaching practices in the sampled students' classes. One or two classes were randomly sampled in each school, and teachers were asked to complete a questionnaire for each class they taught that contained sampled students. Thus, if a teacher taught two classes with sampled students, he or she was expected to complete a questionnaire for each of these classes. It should be noted that the PIRLS fourth-grade teachers do not constitute representative samples of teachers in 2001 and 2006. Rather, they are the teachers for nationally representative samples of fourth-grade students. Thus, the teacher data presented in this indicator were analyzed at the student level.

In PIRLS 2006, countries were required to sample students in the grade that corresponded to the end of 4 years of formal schooling, providing that the mean age at the time of testing was at least 9.5 years. As defined by PIRLS, the 1st year of formal schooling

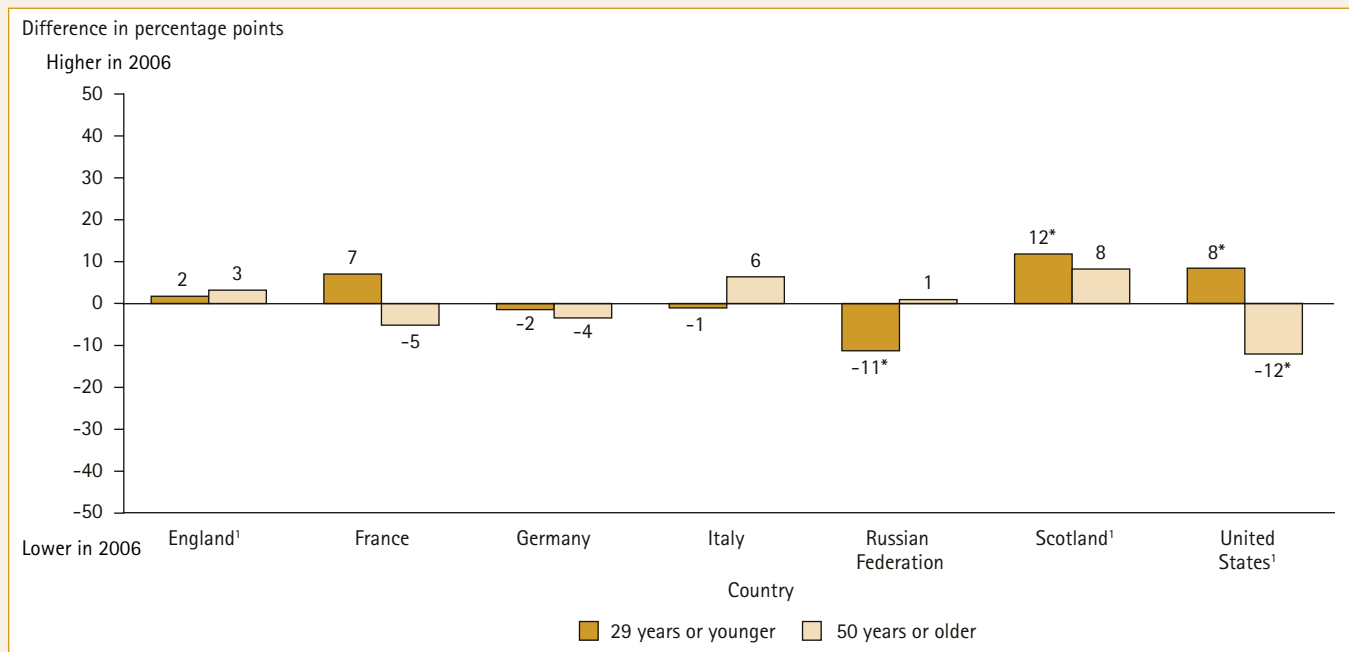
begins with the 1st year of primary school (ISCED97 level 1), which should mark the beginning of formal instruction in reading, writing, and mathematics. Note that kindergarten is not counted. For most countries, the target grade was fourth grade, or its national equivalent.

For teachers' reports of their age, teachers were given the following response options in the PIRLS teacher questionnaire: (1) under 25; (2) 25 to 29; (3) 30 to 39; (4) 40 to 49; (5) 50 to 59; or (6) 60 or more. For the purposes of this indicator, the bottom two categories were combined and the top two categories were combined. The categories of "29 years or younger" and "50 years or older" were used in this indicator in order to highlight the percentage of fourth-graders with beginning teachers and the percentage with teachers nearing retirement.

As presented in the text or shown in figure 16a, differences from 2001 to 2006 were computed from unrounded numbers; therefore, they may differ from computations made using the rounded numbers cited in the text or shown in figure 16b.

²⁰ Canada also participated in PIRLS 2006 but not at the national level. Canada participated as separate provinces (Alberta, British Columbia, Nova Scotia, Ontario, and Quebec). Data corresponding with this indicator for the participating Canadian provinces can be found in appendix tables B7 and B8.

Figure 16a. Difference in percentage points of fourth-grade students with teachers ages 29 years or younger and 50 years or older as reported by teachers, by country: 2001 and 2006

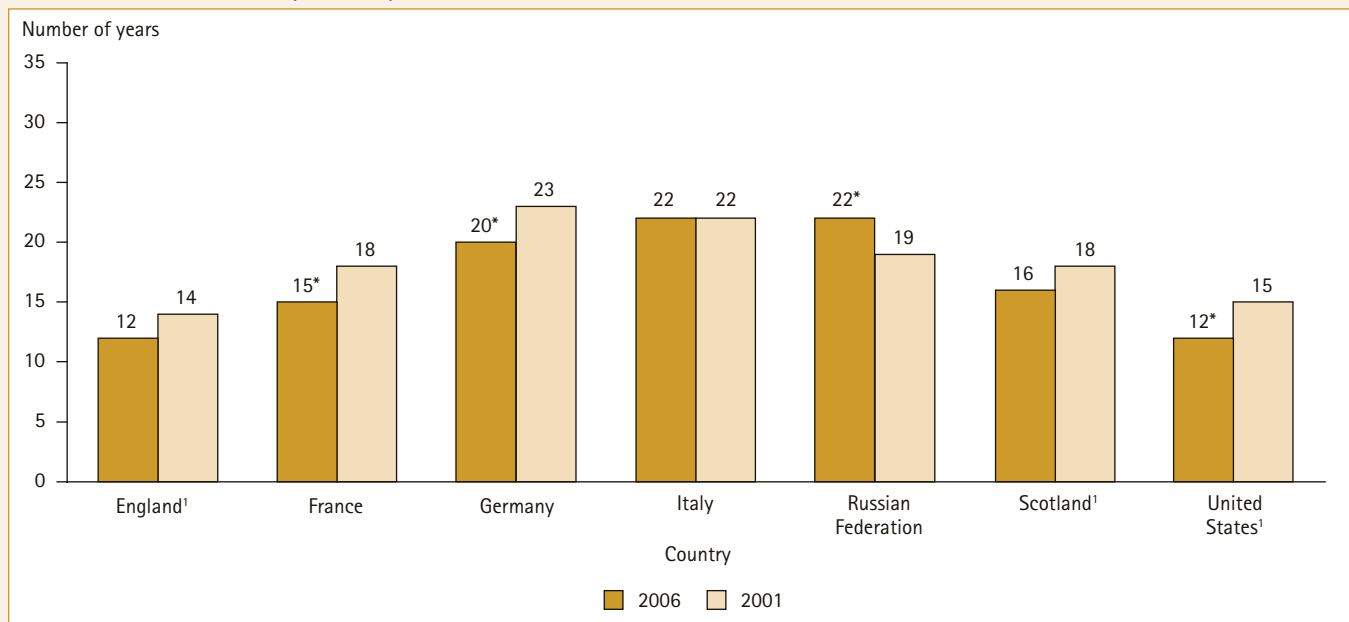


* $p < .05$ (difference in the percentage points of students from 2001 to 2006 is statistically significant).

¹ Met international guidelines for participation rates only after substitute schools were included. That is, to avoid sample size losses resulting from sampled schools not participating, a mechanism was instituted to identify, a priori, substitute schools that have similar characteristics to the sampled schools that they may replace. For England, this applies to 2001 only.

SOURCE: Mullis, I.V.S., Martin, M.O., Gonzalez, E.J., and Kennedy, A.M. (2003). *PIRLS 2001 International Report: IEA's Study of Reading Literacy Achievement in Primary Schools in 35 Countries*, exhibit 6.1. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College; Mullis, I.V.S., Martin, M.O., Kennedy, A.M., and Foy, P. (2007). *PIRLS 2006 International Report: IEA's Progress in International Reading Literacy Study in Primary Schools in 40 Countries*, exhibit 6.3. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Figure 16b. Average number of years of teaching experience (at all grades) as reported by teachers of fourth-grade students, by country: 2001 and 2006



* $p < .05$ (difference in the number of years teaching in 2006 compared to 2001 is statistically significant).

¹ Met international guidelines for participation rates only after substitute schools were included. That is, to avoid sample size losses resulting from sampled schools not participating, a mechanism was instituted to identify, a priori, substitute schools that have similar characteristics to the sampled schools that they may replace. For England, this applies to 2001 only.

SOURCE: Mullis, I.V.S., Martin, M.O., Gonzalez, E.J., and Kennedy, A.M. (2003). *PIRLS 2001 International Report: IEA's Study of Reading Literacy Achievement in Primary Schools in 35 Countries*, exhibit 6.1. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College; Mullis, I.V.S., Martin, M.O., Kennedy, A.M., and Foy, P. (2007). *PIRLS 2006 International Report: IEA's Progress in International Reading Literacy Study in Primary Schools in 40 Countries*, exhibit 6.3. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

TEACHERS' WORKING TIME

G-8 Countries Included: England, France, Germany, Italy, Japan, Russian Federation, Scotland, United States

Although teachers in the United States were contracted to teach more hours than their peers in the other reporting G-8 countries, they worked less total hours (teaching time plus related nonteaching time) than their peers in Japan and Germany.

This indicator presents two measures of teachers' average working time per year: (1) teaching hours—the amount of time spent instructing students, and (2) working time—the total amount of time spent teaching and doing other work-related activities (e.g., preparing lessons and correcting assignments and tests). It should be noted that these results are generally based on the amount of time that teachers are contracted to work and do not take into account the possible variation in the number of hours teachers actually work.

In 2006, teachers in the United States at the primary, lower secondary, and upper secondary levels were contracted to teach an average of 1,080 hours during the school year (figure 17). This was more than in any other G-8 country reporting data at these three levels. Besides the United States, the only other reporting G-8 country with the same number of teaching hours at the three education levels was Scotland (893 hours). In France, Germany, and Italy, primary school teachers were contracted to work more teaching hours than lower and upper secondary teachers; of these three countries,

France reported the greatest differential, with 276 more hours for primary school teachers than for lower secondary school teachers, and 294 more hours for primary school teachers than for upper secondary school teachers. The only reporting G-8 country in which primary school teachers spent fewer contracted hours teaching than lower and upper secondary teachers was the Russian Federation, with 290 fewer hours for primary school teachers.

Regulations on working time vary across the G-8 countries (see table 5). England and the United States specify the number of hours that teachers are required to be at school. Germany, Japan and Scotland specify statutory working time, which can occur at school or elsewhere. Although teachers in the United States were contracted to teach more hours than their peers in the other reporting G-8 countries, they worked less total hours than their peers in Japan and Germany when working time was defined not only as time spent on teaching but also as time spent on other work-related activities. For all three education levels, the statutory working time for teachers in Japan (1,952 hours per year) and Germany (1,765 hours per year) exceeded U.S. teachers' working time required at school (primary: 1,332 hours per year; lower and upper secondary: 1,368 hours per year). England required fewer total hours spent on teaching and other work-related activities (1,265 hours per year) than all other reporting G-8 countries and at all three education levels.

Definitions and Methodology

In this indicator, the term "teaching hours" refers to "net teaching hours," which are calculated as follows: annual number of weeks of instruction multiplied by the minimum/maximum number of periods that a teacher is supposed to spend teaching a class or group multiplied by the length of a period in minutes and divided by 60. Periods of time formally allowed for breaks between lessons or group of lessons, and days when schools are closed for public holidays and festivities, are excluded.

Working time refers to the normal working hours of a full-time teacher. According to the formal policy in a given country, working time can refer either to

- the time directly associated with teaching (and other curricular activities for students such as administering assignments and tests, but excluding annual examinations); or
- the time directly associated with teaching as well as the time devoted to other activities related to teaching (such as lesson preparation, counseling students, correcting assignments and tests, professional development, meetings with parents, staff meetings, and general school tasks).

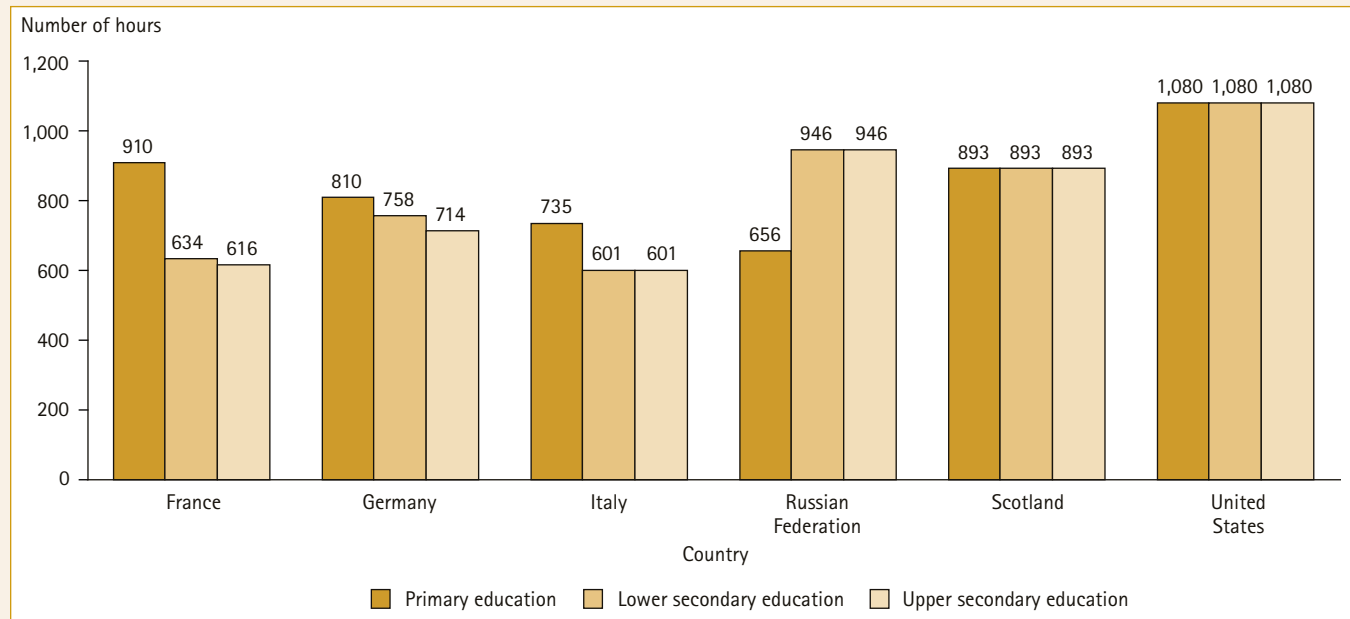
Working time does not include paid overtime.

Working time required at school refers to the working time teachers are supposed to be at school, including teaching time and nonteaching time.

Statutory working time refers to the normal working hours of a full-time teacher and includes net teaching hours (i.e., the time directly associated with teaching) as well as nonteaching hours devoted to activities related to teaching, such as lesson preparation, counseling students, and correcting assignments and tests. Statutory working time may include nonteaching time not spent at school.

Teaching staff include professional personnel directly involved in teaching students. The classification includes classroom teachers; special education teachers; and other teachers who work with a whole class of students in a classroom, in small groups in a resource room, or in one-to-one teaching situations inside or outside a regular classroom. Teaching staff also includes department chairpersons whose duties include some teaching, but excludes non-professional personnel who support teachers in providing instruction to students, such as teachers' aides and other paraprofessional personnel.

Figure 17. Average number of teaching hours over the school year, by level of education and country: 2006



NOTE: Shown are net teaching hours, which refer to the number of teaching hours per year. This excludes break periods between lessons and days when schools are closed for public holidays and festivities. In primary education, however, short breaks that teachers spend with the class are typically included. Data for England and Japan are not available. Education levels are defined according to the International Standard Classification of Education (ISCED97). Primary education refers to ISCED97 level 1, lower secondary to ISCED97 level 2, and upper secondary to ISCED97 level 3. For more information on the ISCED97 levels, see appendix A in this report.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2008). *Education at a Glance: OECD Indicators 2008*, table D4.1. Paris: Author.

Table 5. Teacher working time required at school and statutory working time in hours over the school year, by level of education and country: 2006

Country	Working time required at school in hours			Statutory working time required in hours		
	Primary education	Lower secondary education	Upper secondary education	Primary education	Lower secondary education	Upper secondary education
England	1,265	1,265	1,265	1,265	1,265	1,265
France	†	†	†	†	†	†
Germany	†	†	†	1,765	1,765	1,765
Italy	†	†	†	†	†	†
Japan	†	†	†	1,952	1,952	1,952
Scotland	†	†	†	1,365	1,365	1,365
United States ¹	1,332	1,368	1,368	†	†	†

† Not applicable. Not specified by legislation.

¹ Teachers' working time not collected through administrative records but from individual teachers' reports of number of hours required to be at school.

NOTE: Working time required at school refers to the working time teachers are supposed to be at school, including teaching time and nonteaching time. Nonteaching time refers to activities related to teaching, such as lesson preparation, counseling students, and correcting assignments and tests. Statutory working time refers to the normal working hours of a full-time teacher, and includes net teaching hours (i.e., the time directly associated with teaching) as well as nonteaching hours devoted to activities related to teaching. Statutory working time may include nonteaching time not spent at school. Data for the Russian Federation are not available. Education levels are defined according to the International Standard Classification of Education (ISCED97). Primary education refers to ISCED97 level 1, lower secondary to ISCED97 level 2, and upper secondary to ISCED97 level 3. For more information on the ISCED97 levels, see appendix A in this report.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2008). *Education at a Glance: OECD Indicators 2008*, table D4.1. Paris: Author.

TEACHER PROFESSIONAL DEVELOPMENT IN MATHEMATICS

G-8 Countries Included: England, Germany,²¹ Italy, Japan, Russian Federation, Scotland, United States

In 2007, about 60 percent of U.S. fourth-graders and 81 percent of U.S. eighth-graders had teachers who reported participating in professional development in mathematics content.

The 2007 Trends in International Mathematics and Science Study (TIMSS 2007) asked teachers of fourth- and eighth-graders to report on their participation in several areas of professional development in mathematics in the 2 years before the assessment. This indicator discusses the results for teachers of fourth- and eighth-graders in four areas of mathematics: content, pedagogy/instruction, improving students' critical thinking or problem-solving skills, and assessment.

In 2007, the percentage of fourth-graders whose teachers reported participating in professional development in mathematics content in the previous 2 years ranged from 22 percent in Italy to 66 percent in the Russian Federation (figure 18). A greater percentage of U.S. fourth-graders had teachers who reported participating in professional development in mathematics content (60 percent) than in any of the other professional development areas. The United States had a greater percentage of fourth-graders whose teachers reported participating in this area of professional development than in Italy, Scotland, Germany, and Japan. At eighth grade, the percentage of students whose teachers reported participating in professional development in mathematics content ranged from 16 percent in Italy to 84 percent in the Russian Federation. Eighty-one percent of U.S. eighth-graders had mathematics teachers who reported participating in this area of professional development, which was higher than in England and Italy.

The percentage of students whose teachers reported participating in professional development in mathematics pedagogy/instruction ranged from 25 percent in Italy to 70 percent in England at fourth grade and 34 percent in Italy to 93 percent in Scotland at eighth grade. About half of fourth-graders and three-quarters of eighth-graders in the United States had teachers who reported participating in this area of professional development. A greater percentage of fourth-graders in England, the Russian Federation, and Scotland than in the United States had teachers who reported participating in professional development in mathematics pedagogy/instruction (70, 67, and 62 percent vs. 50 percent). At eighth grade, Scotland

had a greater percentage of students whose mathematics teachers reported participating in this area of professional development than in the United States (93 vs. 76 percent).

The percentage of students whose teachers reported participating in professional development in mathematics on improving students' critical thinking or problem-solving skills ranged from 22 percent in Italy to 59 percent in England at fourth grade and 9 percent in Italy to 65 percent in the United States at eighth grade. A greater percentage of fourth-graders in the United States than in Germany, Japan, and Italy had teachers who reported participating in this area of professional development (51 percent vs. 28, 27, and 22 percent). At eighth grade, the United States had a greater percentage of students whose mathematics teachers reported participating in this area than in England, Japan, and Italy (65 percent vs. 40, 39, and 9 percent).

The percentage of students whose teachers reported participating in professional development in mathematics assessment ranged from 14 percent in Italy to 55 percent in the Russian Federation at fourth grade and 17 percent in Italy to 71 percent in Scotland at eighth grade. A greater percentage of fourth-graders in the United States than in Scotland, Germany, Japan, and Italy had teachers who reported participating in this area of professional development (47 percent vs. 33, 27, 21, and 14 percent). At eighth grade, the United States had a greater percentage of students whose mathematics teachers reported participating in this area than in the Russian Federation, England, Japan, and Italy (69 percent vs. 60, 58, 39, and 17 percent).

The Russian Federation was the only participating G-8 country where at least half of both fourth- and eighth-graders had teachers who reported participating in all four areas of professional development in mathematics. This level of participation was also found in the United States, except in assessment at grade 4, where 47 percent of students had teachers who reported participating. In several G-8 countries, there was often more reported participation at eighth grade than at fourth grade. In Japan and the United States, this was the case in all four professional development areas. Only in England and Italy for professional development in improving students' critical thinking or problem-solving skills was participation measurably higher at fourth grade than at eighth grade.

Definitions and Methodology

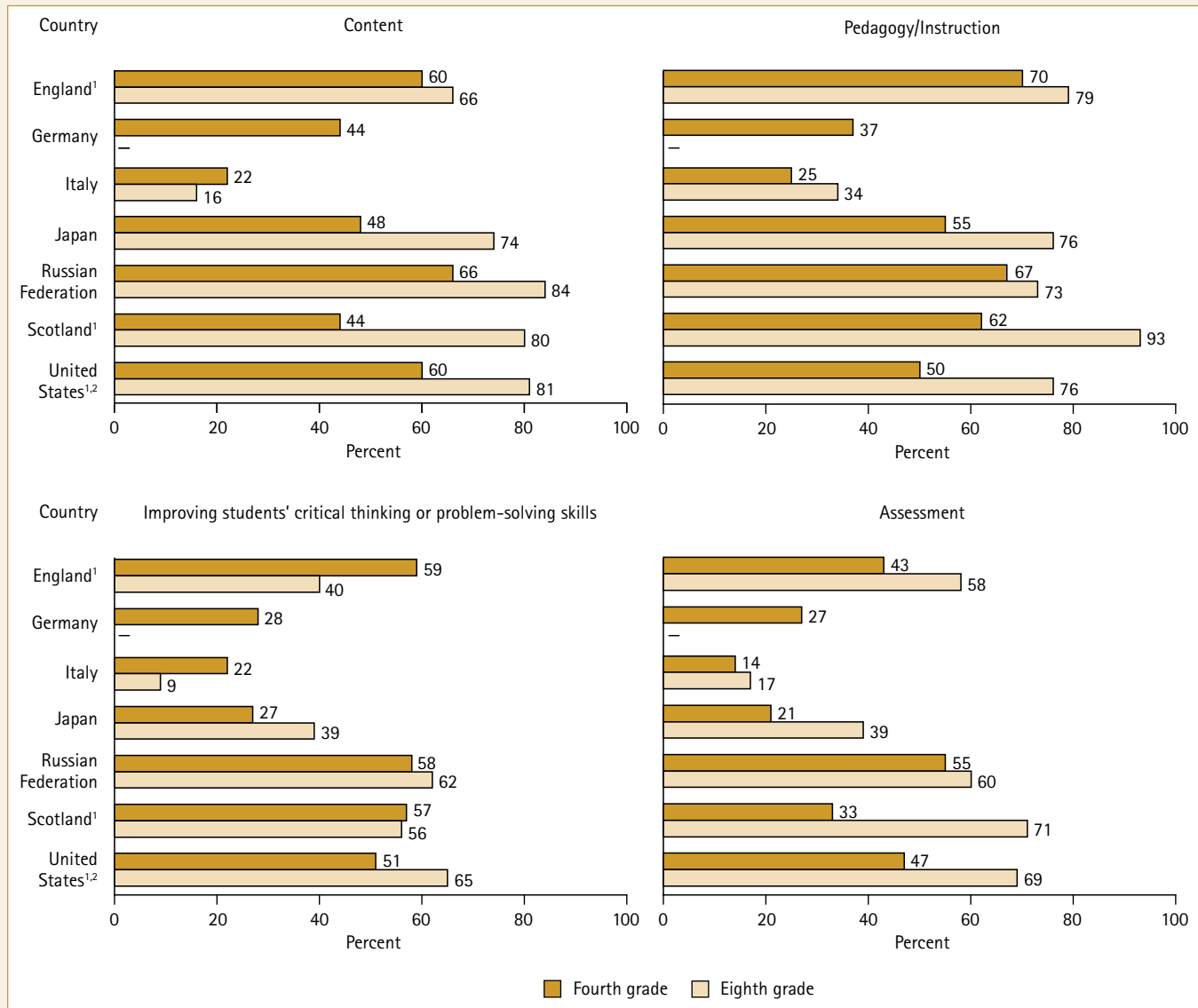
Data for this indicator are from the TIMSS 2007 teacher questionnaire, which was designed to obtain information about the classroom contexts for the teaching and learning of mathematics and science and about the implemented curriculum in these subjects. For each participating school, one teacher questionnaire that addressed both mathematics and science was administered to the classroom teacher of the sampled fourth-grade class, and separate versions of the questionnaire were administered to the mathematics teacher and the science teacher of the sampled eighth-grade class. It should be noted that the TIMSS 2007 teachers do not constitute representative samples of teachers. Rather, they are the teachers for nationally representative samples of fourth-grade and eighth-grade

students. Thus, the teacher data presented in this indicator were analyzed at the student level.

In TIMSS 2007 at fourth grade, countries were required to sample students in the grade that corresponded to the end of 4 years of formal schooling (the end of primary school), providing that the mean age at the time of testing was at least 9.5 years. At eighth grade, countries were required to sample students in the grade that corresponded to the end of 8 years of formal schooling (the end of lower secondary education), providing that the mean age at the time of testing was at least 13.5 years.

²¹ Data for Germany are only available at the fourth grade, as Germany did not participate in TIMSS 2007 at the eighth grade.

Figure 18. Percentage of fourth-grade and eighth-grade students whose teachers reported that they participated in various professional development activities in mathematics in the 2 years prior to assessment, by country: 2007



- Not available. Data for Germany are only available at the fourth grade, as Germany did not participate in TIMSS 2007 at the eighth grade.
¹Met international guidelines for participation rates only after substitute schools were included. That is, to avoid sample size losses resulting from sampled schools not participating, a mechanism was instituted to identify, a priori, substitute schools that have similar characteristics to the sampled schools that they may replace. For England, this applies to eighth grade only.
²National Defined Population covers 90 percent to 95 percent of National Target Population.
 SOURCE: Mullis, I.V.S., Martin, M.O., and Foy, P. (2008). *TIMSS 2007 International Mathematics Report: Findings From IEA's Trends in International Mathematics and Science Study at the Fourth and Eighth Grades*, exhibit 6.4. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

TEACHER PROFESSIONAL DEVELOPMENT IN SCIENCE

G-8 Countries Included: England, Germany,²² Italy, Japan, Russian Federation, Scotland, United States

Compared to other participating G-8 countries in 2007, the United States had a greater percentage of eighth-graders whose science teachers reported participating in professional development in improving students' critical thinking or problem-solving skills (73 percent) and content (82 percent).

The 2007 Trends in International Mathematics and Science Study (TIMSS 2007) asked teachers of fourth- and eighth-graders to report on their participation in several areas of professional development in science in the 2 years before the assessment. This indicator discusses the results for teachers of fourth- and eighth-graders in four areas of science: content, pedagogy/instruction, improving students' critical thinking or problem-solving skills, and assessment.

In 2007, the percentage of fourth-graders whose teachers reported participating in professional development in science content in the previous 2 years ranged from 16 percent in Italy to 58 percent in the Russian Federation, with the United States at 42 percent (figure 19). The percentage in the United States was higher than in England and Italy, but lower than in the Russian Federation. At eighth grade, the percentage of students whose teachers reported participating in professional development in science content ranged from 24 percent in Italy to 82 percent in the United States. The United States had a greater percentage of students whose science teachers reported participating in this area of professional development than in all other participating G-8 countries. A higher percentage of U.S. eighth-graders had science teachers who reported participating in professional development in science content than in any of the other professional development areas.

The percentage of fourth-graders whose teachers reported participating in professional development in science pedagogy/instruction ranged from 10 percent in Italy to 62 percent in the Russian Federation, with the United States at 29 percent. At eighth grade, the percentage of students whose science teachers reported participating in professional development in this area ranged from 28 percent in Italy to 84 percent in Scotland, with the United States at 64 percent. At fourth grade in Japan and at both fourth and eighth grades in England, the Russian Federation, and Scotland, a greater percentage of students had teachers who

reported participating in professional development in science pedagogy/instruction than their U.S. peers.

The percentage of students whose teachers reported participating in professional development in science on improving students' critical thinking or problem-solving skills ranged from 11 percent in Japan to 47 percent in Scotland at fourth grade and 10 percent in Italy to 73 percent in the United States at eighth grade. Thirty-six percent of U.S. fourth-graders had teachers who reported participating in this area of professional development, higher than in Germany, Italy, and Japan, but lower than in Scotland. At eighth grade, the United States had a greater percentage of students whose science teachers reported participating in this area than in all other participating G-8 countries.

The percentage of students whose teachers reported participating in professional development in science assessment ranged from 6 percent in Italy to 52 percent in the Russian Federation at fourth grade and 15 percent in Italy to 65 percent in England at eighth grade. About one-quarter of U.S. fourth-graders had teachers who reported participating in professional development in science assessment. The percentage in the United States was higher than in Japan (15 percent), Germany (15 percent), and Italy (6 percent), but lower than in England (36 percent) and the Russian Federation (52 percent). At eighth grade, 61 percent of U.S. students had science teachers who reported participating in professional development in science assessment, which was higher than in Japan (40 percent) and Italy (15 percent).

In several G-8 countries, there was often more reported participation in professional development in science at eighth grade than at fourth grade. In Scotland and the United States, this was the case in all four areas of professional development. In all participating G-8 countries, a greater percentage of eighth-graders than fourth-graders had teachers who reported participating in professional development in science pedagogy/instruction. Across all four areas of professional development in science, no participating G-8 country had a greater percentage of fourth-graders than eighth-graders with teachers reporting participation in professional development activities.

Definitions and Methodology

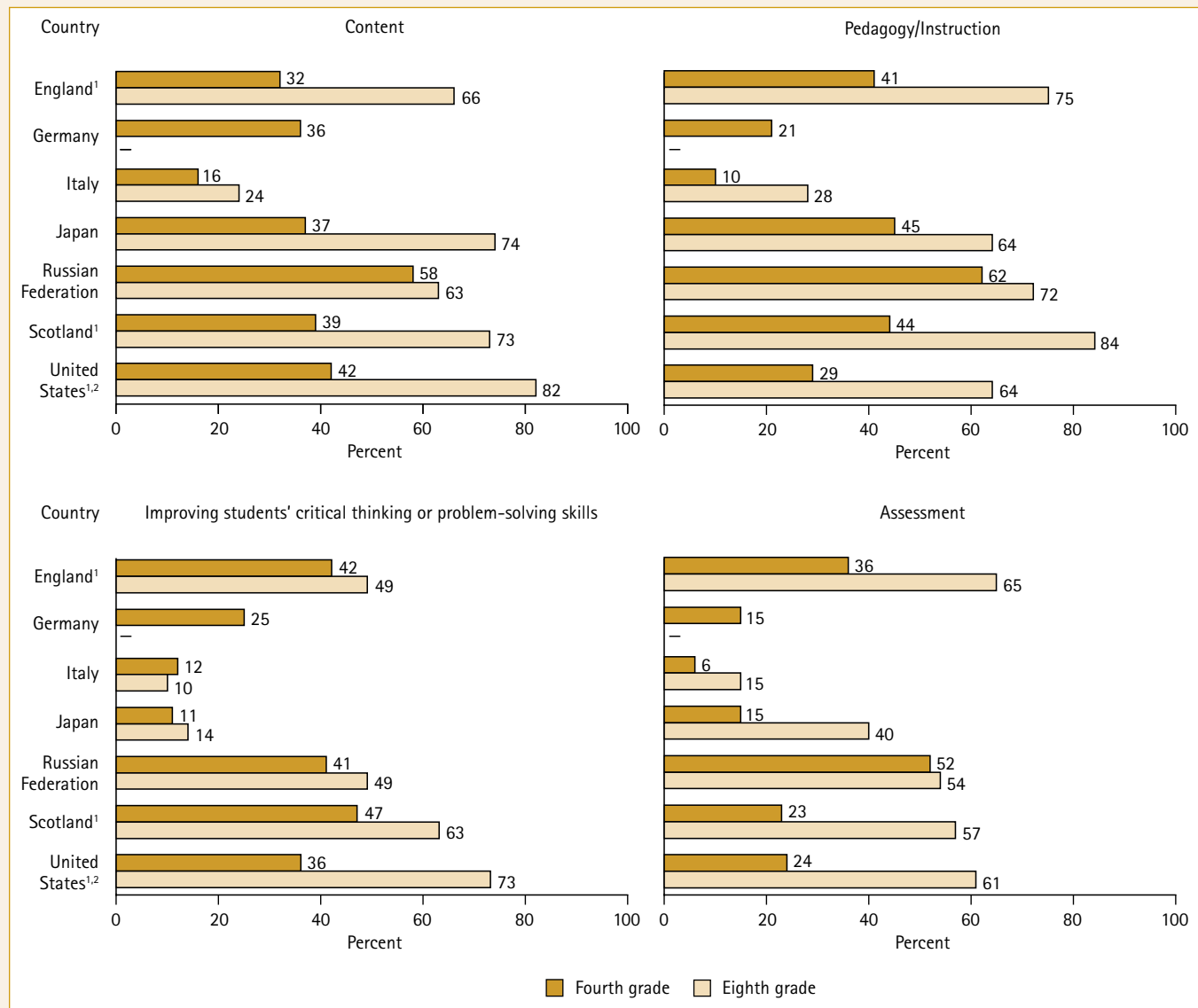
Data for this indicator are from the TIMSS 2007 teacher questionnaire, which was designed to obtain information about the classroom contexts for the teaching and learning of mathematics and science and about the implemented curriculum in these subjects. For each participating school, one teacher questionnaire that addressed both mathematics and science was administered to the classroom teacher of the sampled fourth-grade class, and separate versions of the questionnaire were administered to the mathematics teacher and the science teacher of the sampled eighth-grade class. It should be noted that the TIMSS 2007 teachers do not constitute representative samples of teachers. Rather, they are the teachers for nationally representative samples of fourth-grade and eighth-grade

students. Thus, the teacher data presented in this indicator were analyzed at the student level.

In TIMSS 2007 at fourth grade, countries were required to sample students in the grade that corresponded to the end of 4 years of formal schooling (the end of primary school), providing that the mean age at the time of testing was at least 9.5 years. At eighth grade, countries were required to sample students in the grade that corresponded to the end of 8 years of formal schooling (the end of lower secondary education), providing that the mean age at the time of testing was at least 13.5 years.

²² Data for Germany are only available at the fourth grade, as Germany did not participate in TIMSS 2007 at the eighth grade.

Figure 19. Percentage of fourth-grade and eighth-grade students whose teachers reported that they participated in various professional development activities in science in the 2 years prior to assessment, by country: 2007



- Not available. Data for Germany are only available at the fourth grade, as Germany did not participate in TIMSS 2007 at the eighth grade.

¹Met international guidelines for participation rates only after substitute schools were included. That is, to avoid sample size losses resulting from sampled schools not participating, a mechanism was instituted to identify, a priori, substitute schools that have similar characteristics to the sampled schools that they may replace. For England, this applies to eighth grade only.

²National Defined Population covers 90 percent to 95 percent of National Target Population.

SOURCE: Martin, M.O., Mullis, I.V.S., and Foy, P. (2008). *TIMSS 2007 International Science Report: Findings From IEA's Trends in International Mathematics and Science Study at the Fourth and Eighth Grades*, exhibit 6.4. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

SCHOOL PRINCIPALS' USES OF SUMMATIVE ACHIEVEMENT DATA

G-8 Countries Included: Canada, Germany, Italy, Japan, Russian Federation, United Kingdom, United States

In 2006, at least 90 percent of students in Canada, the United Kingdom, the United States, and the Russian Federation had principals who reported that school achievement data were tracked over time by an administrative authority.

Using data from the 2006 Program for International Student Assessment (PISA 2006), this indicator presents school principals' reports of ways in which summative achievement data (i.e., not student-level data) were used in their schools. Principals of 15-year-old students were given a list of five possible ways that school achievement data could be used and asked whether each one was used.

In 2006, at least 90 percent of 15-year-old students in the United States and the United Kingdom had principals who reported that school achievement data were posted publicly (e.g., in the media) (figure 20). This compares to 75 percent of students in the Russian Federation, 64 percent in Canada, and 33 percent in Italy. In Germany and Japan, 14 and 11 percent of students, respectively, had principals who reported that school achievement data were posted publicly.

About 90 percent of students in the Russian Federation and the United Kingdom had principals who reported that school achievement data were used in evaluation of the principal's performance. The corresponding percentages were lower in all other G-8 countries reporting data,²³ with the United States at 57 percent and the other G-8 countries ranging from 10 percent (Japan) to 22 percent (Canada).

The percentage of students with principals who reported that school achievement data were used in evaluation of teachers' performance

was highest in the Russian Federation (100 percent) followed by the United Kingdom (94 percent). The corresponding percentages were lower in all other reporting G-8 countries, with the United States at 42 percent and the other G-8 countries ranging from 19 percent (Canada) to 28 percent (Germany).

A greater percentage of 15-year-olds in the United States than in all other reporting G-8 countries had principals who reported that school achievement data were used in decisions about instructional resource allocation to the school. In the United States, 79 percent of students had principals who reported this use. In four other G-8 countries (Italy, Canada, the United Kingdom, and the Russian Federation), the corresponding percentages ranged from 54 to 66 percent. Japan and Germany had 6 and 26 percent of their students, respectively, with principals who reported this use.

At least 90 percent of students in Canada, the United Kingdom, the United States, and the Russian Federation had principals who reported that school achievement data were tracked over time by an administrative authority (such as a district, state, or national education agency). Sixteen percent of students in Japan, 22 percent in Italy, and 55 percent in Germany had principals who reported this use.

In the United States, the use for school achievement data most frequently cited was tracking over time by an administrative authority (97 percent of students had principals reporting this), followed by posting publicly (91 percent). The use for school achievement data least frequently cited in the United States was the evaluation of teachers' performance (42 percent).

Definitions and Methodology

Data for this indicator are from the PISA 2006 school questionnaire, which was designed to obtain information about a variety of school-related aspects, including school characteristics, the school's resources, the student body, teachers in the school, pedagogical practices of the school, and administrative structures within the school. At all schools with participating 15-year-old students, a school questionnaire was administered to the principal. It should be noted that the PISA 2006 principals do not constitute representative samples of principals. Rather, they are the principals for nationally representative samples of 15-year-old students. Thus,

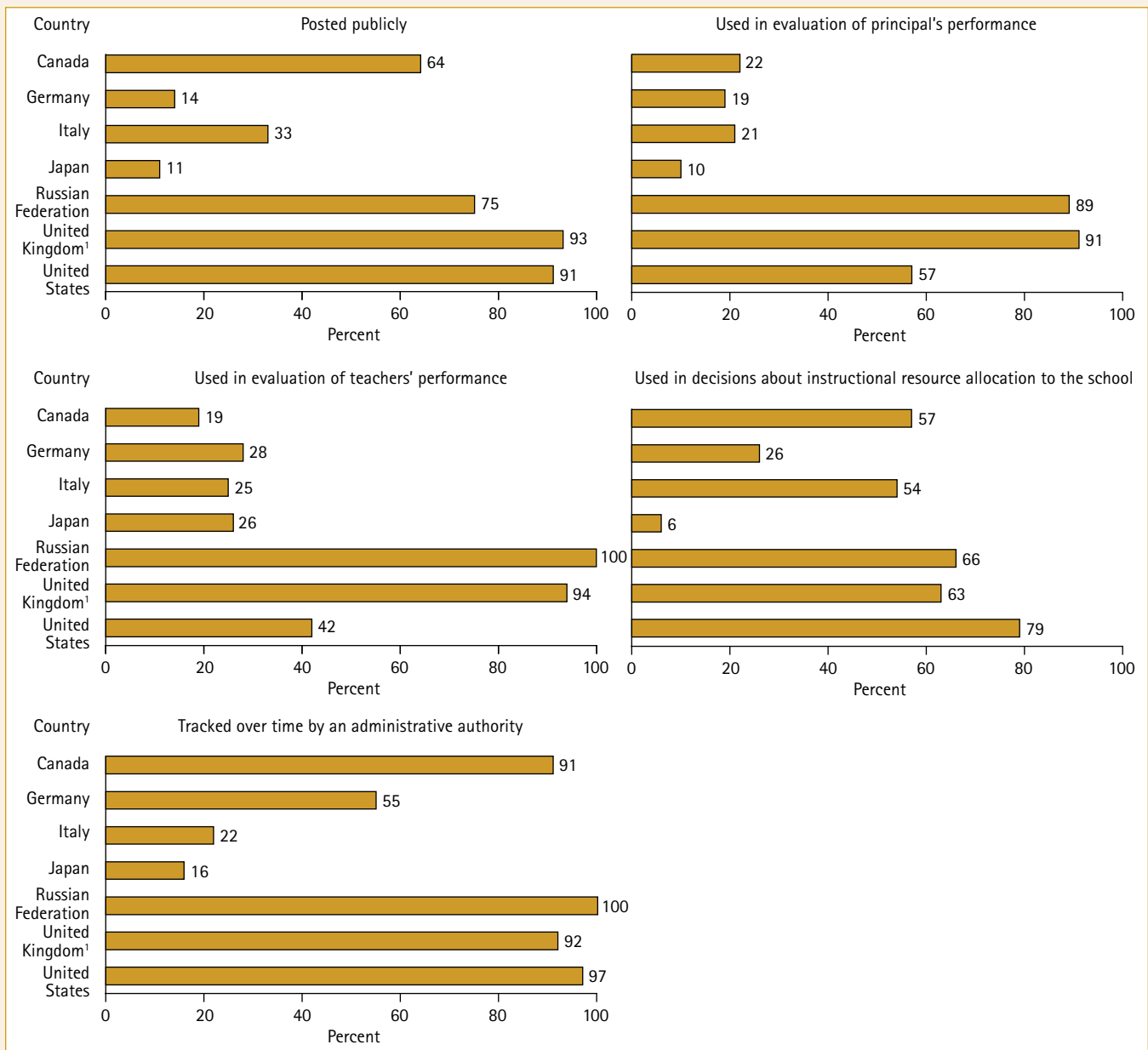
the school data presented in this indicator were analyzed at the student level.

In PISA, "15-year-olds" refers to students between 15 years and 3 months to 16 years and 2 months old at the time of the assessment and who have completed at least 6 years of formal schooling.

As stated in the school questionnaire, achievement data include aggregated school or grade-level test scores or grades, or graduation rates.

²³ Data for France have been withdrawn at the request of the country and thus are not shown in this indicator.

Figure 20. Percentage of 15-year-old students whose principals reported that they used summative achievement data in various ways, by country: 2006



¹The United Kingdom includes England, Northern Ireland, Scotland, and Wales.

NOTE: Data for France have been withdrawn at the request of the country and thus are not shown here.

SOURCE: Organization for Economic Cooperation and Development (OECD). (2007). *PISA 2006: Science Competencies for Tomorrow's World, Volume 2: Data*, table 5.8. Paris: Author.

FREQUENCY AND SEVERITY OF BEHAVIOR PROBLEMS

G-8 Countries Included: England, Italy, Japan, Russian Federation, Scotland, United States

In 2007, about 39 percent of U.S. eighth-graders had principals who reported at least a weekly occurrence of intimidation or verbal abuse of other students, which is higher than in all other participating G-8 countries.

Using eighth-grade data from the 2007 Trends in International Mathematics and Science Study (TIMSS 2007), this indicator presents school principals' reports of both the incidence of behaviors that threaten a safe and orderly environment and their perceptions of these behaviors as a "serious" problem. It should be noted that what constitutes a "serious" problem may differ from one country to another. A relatively low number of threatening behaviors may be perceived as a "serious" problem in one country, but not in another, because of cultural differences and other factors.

Of the seven problem behaviors shown in figure 21a, classroom disturbance was the most frequently cited in the United States. Across the participating G-8 countries,²⁴ the percentage of eighth-graders whose principals reported at least a weekly occurrence of a classroom disturbance ranged from 8 percent in Japan to 60 percent in Scotland, with the United States at 55 percent. The U.S. percentage was higher than in the Russian Federation and Japan but not measurably different from that in the other participating G-8 countries. The U.S. percentage for classroom disturbance in 2007 was lower than in 1999, when 69 percent of U.S. eighth-graders were in schools whose principals reported at least a weekly occurrence of a classroom disturbance (see indicator 14 in Sherman, Honegger, and McGivern 2003).

In 2007, intimidation or verbal abuse of other students was cited second most frequently in the United States. The percentage of eighth-graders in schools whose principals reported at least a weekly occurrence of intimidation or verbal abuse of other students ranged from 1 percent in the Russian Federation to 39 percent in the United States, with the U.S. percentage higher than in all other participating G-8 countries.

Definitions and Methodology

Data for this indicator are from the TIMSS 2007 eighth-grade school questionnaire, which asked school principals of the eighth-graders tested to provide information about curricular and instructional arrangements, school resources, and school climate. It should be noted that the TIMSS 2007 school principals do not constitute representative samples of school principals. Rather, they are the school principals for nationally representative samples of eighth-grade students. Thus, the school data presented in this indicator were analyzed at the student level. Countries were required to sample students in the grade that corresponded to the end of 8 years of formal schooling (the end of lower secondary education), providing that the mean age at the time of testing was at least 13.5 years.

As the data for this indicator, school principals were asked the following questions on the eighth-grade school questionnaire: "How often does each of the following problem behaviors occur among eighth-grade students in your school? If the behavior occurs,

In Japan, compared with other participating G-8 countries, relatively low percentages of eighth-graders had principals who reported problem behaviors occurring at least weekly, with a range from 1 percent for both cheating and theft to 8 percent for classroom disturbance. There were lower percentages of students in Japan than in England, Italy, Scotland, and the United States whose principals reported that classroom disturbances and intimidation or verbal abuse of other students occurred at least weekly.

Figure 21b shown principals' perceptions of these behaviors as a "serious" problem. In the United States in 2007, intimidation or verbal abuse of other students was cited most frequently as a serious problem (26 percent), followed by classroom disturbance (17 percent).²⁵ The percentage of U.S. eighth-graders whose principals reported intimidation or verbal abuse of other students as a serious problem was about 10 percentage points higher in 2007 than in 1999 (see indicator 14 in Sherman, Honegger, and McGivern 2003).

In 2007, the percentages of eighth-graders in Japan whose principals reported the problem behaviors as serious problems ranged from 24 percent for cheating to 39 percent for intimidation or verbal abuse of other students. No particular behavior was cited most frequently as a serious problem in Japan (i.e., no measurable differences at the high end of the range).

In Italy, the percentages of eighth-graders whose principals reported the problem behaviors as serious problems ranged from 8 percent for cheating to 31 percent for classroom disturbance. Classroom disturbance was cited more frequently as a serious problem in Italy than all other behaviors except intimidation or verbal abuse of other students (there was no measurable difference in reports of these two behaviors as serious problems).

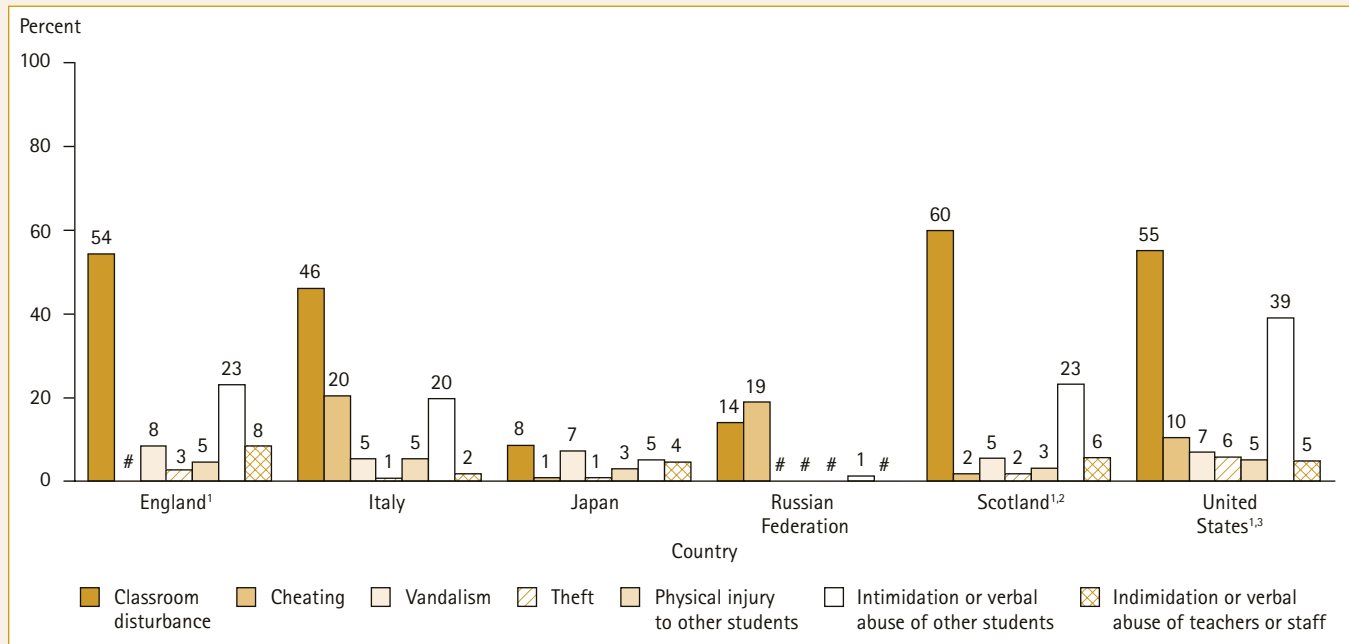
In England, the Russian Federation, and Scotland, the percentages of eighth-graders whose principals reported the problem behaviors as serious problems were no higher than 8 percent for all of the behaviors.

how severe a problem does it present?" The behaviors specified in the question were as follows: arriving late at school; absenteeism (i.e., unjustified absences); skipping class hours/periods; violating dress code; classroom disturbance; cheating; profanity; vandalism; theft; intimidation or verbal abuse of other students; physical injury to other students; intimidation or verbal abuse of teachers or staff; and physical injury to teachers or staff. The results for seven of these problem behaviors are presented in this indicator. Response options for frequency included "never," "rarely," "monthly," "weekly," and "daily." For this analysis, the latter two categories were combined. Response options for the severity of the problem included "not a problem," "minor problem," and "serious problem." For the reports of a behavior as a serious problem, the denominator for the percentages is students at all schools, not just students at schools whose principals report the occurrence of the behavior at least weekly.

²⁴ Although Germany participated in TIMSS 2007 at the fourth grade, it did not participate at the eighth grade. Therefore, there are no data to report for Germany in this indicator.

²⁵ For the reports of a behavior as a serious problem, the percentages are based on students at all schools, not just students at schools whose principals report the occurrence of the behavior at least weekly.

Figure 21a. Percentage of eighth-grade students whose principals reported that behavior threatening a safe and orderly environment occurs at least weekly, by selected behavior and country: 2007



Rounds to zero.

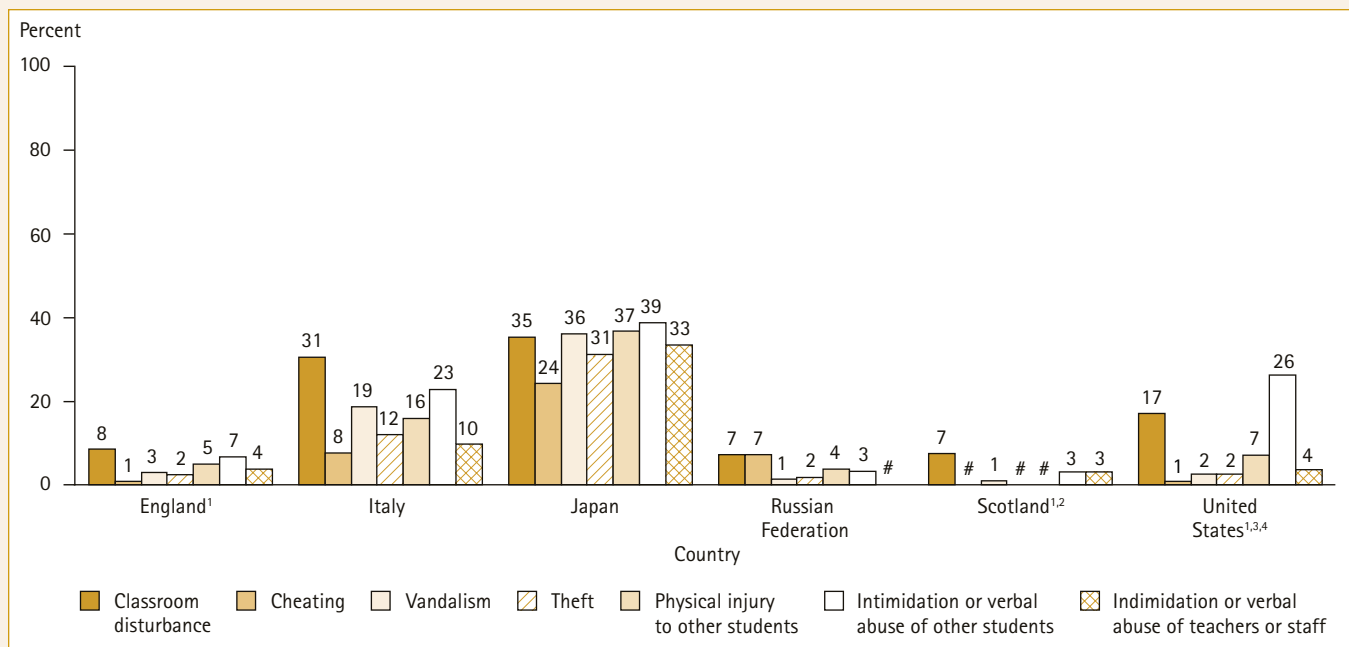
¹ Met international guidelines for participation rates only after substitute schools were included. That is, to avoid sample size losses resulting from sampled schools not participating, a mechanism was instituted to identify, a priori, substitute schools that have similar characteristics to the sampled schools that they may replace.

² Data for cheating are available for at least 70 percent, but less than 85 percent, of the students. Missing data have not been explicitly accounted for in the data.

³ National Defined Population covers 90 percent to 95 percent of National Target Population.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2007.

Figure 21b. Percentage of eighth-grade students whose principals reported that behavior threatening a safe and orderly environment is a serious problem, by selected behavior and country: 2007



Rounds to zero.

¹ Met international guidelines for participation rates only after substitute schools were included. That is, to avoid sample size losses resulting from sampled schools not participating, a mechanism was instituted to identify, a priori, substitute schools that have similar characteristics to the sampled schools that they may replace.

² Data for cheating, vandalism, theft, and intimidation or verbal abuse of teachers or staff are available for at least 70 percent, but less than 85 percent, of the students. Missing data have not been explicitly accounted for in the data.

³ Data are available for at least 70 percent, but less than 85 percent, of the students. Missing data have not been explicitly accounted for in the data.

⁴ National Defined Population covers 90 percent to 95 percent of National Target Population.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2007.