Examining Gender and Fourth Graders' Reading Habits and Attitudes in PIRLS 2001 and 2006

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Abstract

In PIRLS 2001 and again in PIRLS 2006, girls had higher reading achievement than boys in nearly all participating countries. Analyses of the PIRLS 2001 and 2006 datasets investigate the extent to which girls and boys differ in their participation in literacy activities by the fourth grade. More specifically, analyses are used to create profiles of high-and low-achieving fourth-grade boys and girls with respect to reading habits, behaviors, and attitudes towards reading. Results, including trends for 26 countries, reveal differences between boys and girls in the top and bottom thirds of the achievement distribution. For example, regardless of achievement, girls had more positive attitudes towards reading than boys, and reported talking with others about reading, both at home and at school. These results provide valuable information to parents and teachers for understanding the intricate relationship between gender and reading outcomes.

Keywords: reading achievement, gender differences, attitudes, reading habits

Study Purpose

The purpose of this research is to investigate patterns of achievement motivation and reading behaviors among top- and bottom-achieving fourth grade boys and girls in PIRLS 2001 and 2006. Analyses aim to better understand the characteristics of the top- and bottom-performing boys and girls and their differences in terms of reading habits, both at home and in school, their attitudes toward reading, and their reading self-concept. Exploring these variables has the potential to further our understanding of achievement motivation and achievement in the primary grades. Using data from 2001 and 2006 shows the gains and continuing challenges in addressing these differences over time.

Educational or Academic Significance

Achievement motivation in any content area has many dimensions, including self-efficacy and intrinsic and extrinsic factors that encourage students' behaviors. Motivation is believed to play a complex and important role in the development of positive attitudes and habits associated with high achievement. Furthermore, within the school curricula, characteristics related to motivation are themselves viewed as learning outcomes or goals. That is, teachers often strive to foster an environment in which students are engaged and active learners. PIRLS also identifies student reading attitudes and behaviors as outcomes of reading instruction and experience, in addition to student achievement, in the PIRLS 2006 Assessment Framework and Specifications (Mullis, Kennedy, Martin, & Sainsbury, 2006).

Results from the Progress in International Reading Literacy Study (PIRLS) in 2001 and 2006 reveal a positive association between background variables associated with achievement motivation and reading achievement at the fourth grade (Mullis, Martin, Gonzalez, & Kennedy, 2003; Mullis, Martin, Kennedy, & Foy, 2007). PIRLS results from 2001 and 2006 also show an achievement gap between girls and boys, with girls outperforming boys in all participating countries in 2001 and all except Luxembourg and Spain in 2006. Identifying differences across the distributions of achievement scores for boys and girls will help inform decisions about literacy practices at home and in the classroom that promote engagement and a lifelong love of reading.

Theoretical Framework

Reading research devotes much effort to defining and examining multiple dimensions of motivation for reading, including the affective domain of student attitudes, students' reading self-efficacy, and intrinsic and extrinsic motivation for reading, and social aspects (Wigfield & Guthrie, 1997; Wigfield, Guthrie, Tonks, & Perencevich, 2004). The different dimensions of motivation work in some respects harmoniously with reciprocal effects.

Research suggests that motivational factors such as opportunity to read and autonomy and choice in reading promotes engaged readers, who in turn display more positive affect as well as self-efficacy. Studies by Baker & Wigfield (1999), Guthrie, Schafer & Huang (2001), and Leppanen, Aunola, & Nurmi (2005) have noted that as students' intrinsic motivation increases, so does engagement in reading activities. Of course, these studies also emphasize the dimension of reading skills and strategies that is critical for sustaining an environment that fosters engaged readers.

The link between student attitudes and achievement across the curricula has been extensively studied and debated (Abu-Hilal, 2000), but it is generally agreed that there is a reciprocal relationship (Marsh, Koller, Trautwein, Ludtke, & Baumert, 2005; Mullis, Kennedy, Martin, & Sainsbury, 2006; Valentine, 2004). That is, students with more positive attitudes have higher achievement, which then feeds into more positive attitudes. Taube & Mejding (1996) found that the strength of the relationship between students' reading self-concept and achievement increased from fourth grade to eighth grade, suggesting that confidence improves with competence and experience.

Studies have also shown that girls and boys differ in their reading attitudes and other measures of motivation, with girls typically having more positive attitudes toward reading, demonstrating more positive reading self-concept, and engaging more often in reading activities outside of school (Gambell & Hunter, 1999; Mullis, Martin, Gonzalez, & Kennedy, 2003; Meece, Glienke, & Burg, 2006). These differences have often been cited as explanation of national and international results showing that girls have higher reading achievement than boys (Wagemaker, 1996; Mullis, Martin, Gonzalez & Kennedy, 2003; Perie, Grieg, & Donahue, 2005).

Methodology and Data Sources

This study examines background variables related to reading motivation through the lenses of gender and achievement using achievement data and common background variables from PIRLS 2001 and 2006. These included questions from the student, parent (home), and school questionnaires. Academic achievement was measured using the overall reading literacy scale scores.

Of the participants in PIRLS 2006, Table 1 shows that 26 countries participated in both PIRLS 2001 and PIRLS 2006. Thirteen new countries, including both separate education systems in Belgium, participated in PIRLS for the first time in 2006.

[Take in Table 1 about here]

To create groups for analyses, separate achievement distributions for boys and girls on the PIRLS reading scale are partitioned into thirds. The following groups are retained for analysis: top 1/3 achieving boys, top 1/3 achieving girls, bottom 1/3 achieving boys, and bottom 1/3 achieving girls. Dummy-coded variables are created for gender and ability groups.

This study presents the average overall reading scale scores for the top and bottom 1/3 of the distributions for girls and boys in PIRLS 2006, in addition to the achievement score gaps

between the top and bottom thirds of the achievement distribution within each country. Trend analyses compare the scale score distributions of boys and girls in 2001 and 2006. Building on the work by Kennedy and Trong (2006), the study focuses on the proportions of top- and bottom-achieving boys and girls having positive characteristics with regard to reading habits and attitudes for those countries participating in 2006, with a discussion of similarities in patterns to those identified using the PIRLS 2001 international database.

Variables used in the analyses include measures associated with motivation for reading, including reading attitudes and self-concept. Appendix A lists the student background variables included in the analyses according to the location in the questionnaire and provides a brief description of each variable. The indices measuring the constructs of reading attitudes and self-concept were created from a set of PIRLS variables and were computed as follows:

- The Index of Students' Reading Self-Concept is based on students' agreement with the following: reading is very easy for me; I do not read as well as other students in my class; when I am reading by myself, I understand almost everything I read; and I read slower than other students in my class. An average is computed on a 4-point scale: disagree a lot=1, disagree a little=2, agree a little=3, and agree a lot=4. Responses for negative statements were reverse-coded. High indicates an average of greater than 3 through 4. Medium indicates an average of 2 through 3. Low indicates an average of 1 to less than 2.

- The Index of Students' Attitudes Toward Reading is based on students' agreement with the following: I read only if I have to; I like talking about books with other people; I would be happy of someone gave me a book as a present; I think reading is boring; and I enjoy reading. An average is computed on a 4-point scale: disagree a lot=1, disagree a little=2, agree a little=3, and agree a lot=4. Responses for negative statements were reverse-coded. High indicates an average of greater than 3 through 4. Medium indicates an average of 2 through 3. Low indicates an average of 1 to less than 2.

Separate regression analyses were conducted using PIRLS 2006 data, with the Index of Student Attitudes Toward Reading and Index of Students' Reading Self-Concept as dependent variables and the dummy-coded gender and ability, with an interaction between the two as independent variables. Similar analyses were conducted with the same independent variables and the remaining variables in the PIRLS student background questionnaire as outcomes.

Findings and Discussion

Achievement Scale Scores

To get a better understanding o the relationship between reading achievement and motivation in each of the countries participating in PIRLS 2006, boys' and girls' scale score distributions were partitioned and analyses were conducted with the following groups: top 1/3 achieving girls, bottom 1/3 achieving girls, top 1/3 achieving boys, and bottom 1/3 achieving boys. Table 2 presents the average reading scale scores for each group within each participating country in PIRLS 2006.

[Take in Table 2 about here]

In all countries the average scale score in PIRLS 2006 was higher for girls than for boys, with boys in the bottom third of the distribution having the lowest average scale scores. The difference between the top- and bottom-achieving boys is larger than that for the girls in all countries, except in England and Italy where there is no difference, and in Denmark, Hungary, Iran, and South Africa, where the differences between girls are larger than for boys. Furthermore, the gap between the girls and boys in the top third of their distributions was less than that between girls and boys in the bottom thirds in most countries. Countries where the gap between the bottom-achieving boys and girls was more than 10 score points greater than the gap between the top-achieving boys and girls include Morocco, New Zealand, Qatar, Slovak Republic, Slovenia, Trinidad and Tobago, and the United States.

Table 3 presents the trends in average scale scores for the top-achieving and bottom-achieving boys and girls from 2001 to 2006. Four countries—Hong Kong, the Russian Federation, Singapore, and Slovenia—showed the largest increases in achievement scale scores from 2001 to 2006 in both the top and bottom portions of the boys' and girls' distributions. It is interesting to note that Hong Kong showed its largest increase in average scale score among the bottom third of the boys' distribution, Singapore seems to have improved the scale scores of the bottom distribution for both boys and girls, while the changes in the Russian Federation and Slovenia were more consistent across the four groups. In Norway and the United States, increases in the scale scores among the bottom-achieving boys were offset by nearly identical decreases in scale scores among top-achieving girls. The two countries with the largest scale score decreases in all four groups are Morocco and Romania.

[Take in Table 3 about here]

Gender and Achievement Differences in Attitudes and Self-Concept

Regression analyses were conducted to determine whether group differences in students' attitudes and self-concept indices were significant. To illustrate the group differences, Tables 4 and 5 show the percent of students by group in the High category of the Index of Students' Reading Attitudes Toward Reading and Index of Students' Reading Self-Concept, respectively.

The effects of both gender and achievement on students' attitudes toward reading were significant ($p<.05$) in all countries except Indonesia, where only achievement effects were significant. The findings in Table 4 show that, similar to results using PIRLS 2001 data, enjoying reading appears to be related to both gender and achievement. Top-achieving students had more positive attitudes than low-achieving students, with top-achieving girls more prevalent in the high category of the Index of Students Attitudes Toward Reading than any other group. Only about half as many low-achieving boys in the Slovak Republic, Qatar, and the United States reported positive attitudes compared to low-achieving girls.

[Take in Table 4 about here]

In terms of reading self-concept (see Table 5), top-achieving students had higher reading self-concept than low-achieving students, with a significant achievement effect in all participating countries. However, gender effects were not significant in nearly half the countries included in the analysis. There was little difference between top-achieving girls and boys in the high category of the Index of Students' Reading Self-Concept. In contrast to students' reading attitudes, it appears that self-concept is primarily related to reading achievement and less to gender.

[Take in Table 5 about here]

Gender and Achievement Differences in Reading Habits

Additional regression analyses were conducted with background variables associated with achievement motivation to determine whether the effects of gender and achievement were significant. When effects were significant, percentages of students were calculated within the most desirable category of the variable to determine whether a consistent pattern occurred between top- and bottom-achieving boys and girls to that of either the student attitudes or reading self-concept indices. Variables for which analyses were significant for the majority of countries are listed in Appendix B. The following paragraphs summarize the findings across theses analyses.

Results for 2006 are very similar to those using the PIRLS 2001 international database, with three emerging patterns for groups of student background variables: 1) differences between top- and bottom-achieving students, regardless of gender 2) differences between girls and boys, regardless of achievement, and 3) an interaction between achievement and gender.

Differences between top- and bottom achieving students, regardless of their gender are found among those variables related to educational resources and access that is in many ways dependent on social class or socioeconomic status. Variables in this category include the number of books in the home, and how often students reported reading stories or articles on the Internet.

Differences between boys and girls, regardless of their reading achievement, are evident among variables measuring the social dimension of motivation (e.g., talking with others at home about what they are reading), with girls reporting talking more often than boys. Other variables that fall within this pattern of boy-girl differences are related to intrinsic motivation, such as borrowing books from the school or local library, with girls participating more frequently than boys in the reading activities.

Most interesting of the findings are those variables in the third category of emerging patterns, for which there is an interaction between gender and ability. Consistently among these variables, differences between top-achieving girls and boys are smaller than those between bottom-achieving boys and girls, with more girls than boys taking part in activities or behaviors with more positive value or benefit to reading. Tables 6 and 7 below are examples of variables with interaction effects within some countries.

Table 6 shows the percentages of top- and bottom-achieving boys and girls who reported reading silently on their own and reading books that they chose themselves in school every day or almost every day. Girls generally read self-selected books daily more often than boys. In Norway and Sweden, whereas there are little or no differences between top-achieving boys' and girls' reading behaviors, differences are apparent between boys and girls at the bottom of the distributions. In Norway and Sweden, as well as in Denmark, Germany, Luxembourg, and the Russian Federation, bottom-achieving girls surpass even the top-achieving students in the percentage of students engaging in silent and selective reading every day or every other day in school.

[Take in Table 6 about here]

A similar pattern is shown in Table 7 in the percentages of students who reported having books of their very own (excluding school books) at home. In most countries, the differences between the percentage of top-achieving boys and girls are much smaller than those between

bottom-achieving boys and girls. In Austria, England, New Zealand, and the United States, the difference between the top-achieving students is no more than 2 percentage points, whereas the difference between the bottom-achieving students is at least 10 percentage points.

[Take in Table 7 about here]

Conclusion and Implications

Examining differences in student characteristics at different points of the achievement distribution rather than focusing on group averages allows for different patterns in gender differences to emerge. While boys and girls differ in many of their reading habits and behaviors, these differences tend to be smaller within the top-achieving group, with the gap between boys and girls increasing within the low-achieving group. It is apparent from these results that the bottom third of the boys' achievement distribution are at a more serious disadvantage than bottom-achieving girls, both in terms of their average reading achievement and their reading habits and attitudes.

The scope of this study did not permit in-depth within-country analyses within those countries that showed noticeable increases in bottom-achieving students' average scale scores from 2001 to 2006. A closer examination of those countries with significant gains in achievement is warranted to determine whether there are noticeable changes in attitudes or reading behaviors within student subpopulations.

Looking beyond student background variables to home and classroom factors related to reading motivation is required to fully understand the ways in which the home and school create an environment that nurtures intrinsic motivation and provides instruction in the reading skills and strategies required to thrive as an independent reader. A new research model using the PIRLS data should examine the complex relationships among the various dimensions of motivation, student background characteristics, and student achievement.

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Table 1 Countries Used in Analyses by Study Cycle		
Country	2006	2001
Austria	x	
Belgium (Flemish)	x	
Belgium (French)	x	
Bulgaria	x	x
Chinese Taipei	x	
Denmark	x	
England	x	x
France	x	x
Georgia	x	
Germany	x	x
Hong Kong SAR	x	x
Hungary	x	x
Iceland	x	x
Indonesia	x	
Iran, Islamic Rep. of	x	x
Israel	x	x
Italy	x	x
Kuwait *	x	x
Latvia	x	x
Lithuania	x	x
Luxembourg	x	
Macedonia, Rep. of	x	x
Moldova, Rep. of	x	x
Morocco	x	x
Netherlands	x	x
New Zealand	x	x
Norway	x	x
Poland	x	
Qatar	x	
Romania	x	x
Russian Federation	x	x
Scotland	x	x
Singapore	x	x
Slovak Republic	x	x
Slovenia	x	x
South Africa	x	
Spain	x	
Sweden	x	x
Trinidad and Tobago	x	
United States	x	x

Table 2 PIRLS 2006 Average Overall Reading Scale Score by Top and Bottom Thirds of the Girls' and Boys' Achievement Distributions

	PIRLS 2006 Average Scale Score			
	Girls		Boys	
Country	Top Third	Bottom Third	Top Third	Bottom Third
Austria	608 (1.3)	475 (1.4)	603 (1.2)	461 (1.9)
Belgium (Flemish)	609 (1.2)	492 (1.6)	604 (1.0)	481 (1.6)
Belgium (French)	575 (1.5)	427 (1.8)	572 (1.4)	421 (2.0)
Bulgaria	640 (1.8)	469 (3.6)	623 (1.5)	447 (4.2)
Chinese Taipei	608 (1.1)	475 (1.6)	599 (1.4)	458 (1.9)
Denmark	624 (1.6)	476 (2.8)	610 (1.4)	463 (2.6)
England	638 (2.1)	452 (3.0)	621 (1.9)	436 (2.5)
France	598 (1.1)	454 (2.0)	588 (1.5)	441 (1.7)
Georgia	558 (1.6)	399 (2.5)	545 (2.2)	378 (2.3)
Germany	619 (1.3)	479 (2.0)	612 (1.4)	470 (2.0)
Hong Kong, SAR	628 (1.2)	507 (1.6)	624 (1.1)	492 (1.9)
Hungary	627 (1.6)	476 (3.2)	621 (1.1)	472 (2.7)
Iceland	590 (1.1)	448 (1.8)	576 (1.5)	424 (1.7)
Indonesia	497 (1.8)	328 (2.7)	484 (1.8)	306 (2.9)
Iran	531 (1.7)	319 (3.4)	516 (2.0)	310 (3.2)
Israel	618 (2.0)	411 (4.3)	607 (1.9)	390 (4.0)
Italy	629 (1.8)	481 (2.0)	621 (1.7)	472 (2.0)
Kuwait	476 (2.0)	249 (3.7)	421 (2.8)	186 (2.3)
Latvia	617 (1.2)	486 (1.7)	597 (1.4)	463 (2.4)
Lithuania	606 (1.2)	486 (1.8)	589 (1.3)	467 (1.2)
Luxembourg	631 (1.1)	487 (1.1)	628 (1.1)	483 (1.4)
Macedonia	562 (2.8)	341 (3.4)	543 (2.2)	318 (3.7)
Moldova	578 (1.5)	432 (2.1)	568 (1.9)	413 (2.1)
Morocco	451 (3.3)	216 (3.3)	440 (3.5)	193 (5.2)
Netherlands	606 (1.0)	494 (1.4)	601 (1.1)	484 (1.6)
New Zealand	628 (1.2)	454 (1.9)	614 (1.6)	419 (2.2)
Norway	574 (1.8)	436 (2.8)	561 (1.7)	414 (2.2)
Poland	606 (1.4)	446 (2.1)	593 (1.6)	426 (2.1)
Qatar	472 (1.2)	270 (1.3)	444 (1.3)	230 (1.4)
Romania	588 (1.8)	398 (5.0)	575 (1.8)	379 (4.5)
Russian Federation	645 (2.1)	500 (2.9)	629 (1.5)	480 (3.1)
Scotland	623 (2.2)	454 (2.5)	600 (1.7)	424 (2.7)
Singapore	643 (1.5)	487 (2.1)	632 (1.5)	462 (2.2)
Slovak Republic	609 (1.4)	458 (2.9)	602 (1.1)	441 (3.3)
Slovenia	601 (1.2)	457 (1.6)	590 (1.6)	430 (1.7)
South Africa	478 (6.6)	183 (1.9)	439 (5.6)	148 (1.5)
Spain	590 (1.5)	438 (2.5)	585 (1.5)	432 (3.0)
Sweden	622 (1.4)	489 (2.0)	607 (1.5)	470 (2.1)
Trinidad And Tobago	556 (3.0)	342 (3.1)	535 (2.7)	299 (4.1)
United States	619 (1.6)	466 (2.2)	617 (1.6)	450 (2.1)

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

Table 3 Trends in Average Overall Reading Scale Score by Girls' and Boys' Achievement Categories for 2001 to 2006

Country	Top Third Girls		Bottom Third Girls		Top Third Boys		Bottom Third Boys	
	PIRLS 2006 Avg Scale Score	2001 to 2006 Difference	PIRLS 2006 Avg Scale Score	2001 to 2006 Difference	PIRLS 2006 Avg Scale Score	2001 to 2006 Difference	PIRLS 2006 Avg Scale Score	2001 to 2006 Difference
Bulgaria	640 (1.8)	-5 (2.6)	469 (3.6)	-4 (4.8)	623 (1.5)	-1 (2.2)	447 (4.2)	3 (6.0)
England	638 (2.1)	-13 (2.7)	452 (3.0)	-21 (4.5)	621 (1.9)	-11 (2.9)	436 (2.5)	-9 (3.5)
France	598 (1.1)	-6 (2.4)	454 (2.0)	-1 (2.6)	588 (1.5)	-7 (2.0)	441 (1.7)	0 (3.7)
Germany	619 (1.3)	4 (1.7)	479 (2.0)	8 (2.5)	612 (1.4)	10 (1.7)	470 (2.0)	12 (2.7)
Hong Kong, SAR	628 (1.2)	28 (1.7)	507 (1.6)	35 (2.7)	624 (1.1)	38 (1.8)	492 (1.9)	47 (3.2)
Hungary	627 (1.6)	8 (2.2)	476 (3.2)	-5 (3.5)	621 (1.1)	16 (1.6)	472 (2.7)	9 (3.4)
Iceland	590 (1.1)	-8 (1.9)	448 (1.8)	6 (2.4)	576 (1.5)	-9 (1.9)	424 (1.7)	9 (2.5)
Iran	531 (1.7)	5 (2.8)	319 (3.4)	-6 (4.3)	516 (2.0)	14 (2.9)	310 (3.2)	13 (4.3)
Israel	618 (2.0)	7 (2.4)	411 (4.3)	-4 (5.2)	607 (1.9)	10 (2.8)	390 (4.0)	2 (5.3)
Italy	629 (1.8)	11 (2.1)	481 (2.0)	15 (3.3)	621 (1.7)	8 (2.2)	472 (2.0)	14 (2.9)
Latvia	617 (1.2)	-3 (1.7)	486 (1.7)	-2 (2.7)	597 (1.4)	1 (1.9)	463 (2.4)	-6 (3.0)
Lithuania	606 (1.2)	-12 (2.1)	486 (1.8)	4 (2.9)	589 (1.3)	-15 (2.1)	467 (1.2)	3 (2.5)
Macedonia	562 (2.8)	2 (3.5)	341 (3.4)	6 (4.7)	543 (2.2)	2 (3.2)	318 (3.7)	4 (4.9)
Moldova	578 (1.5)	-1 (3.5)	432 (2.1)	8 (3.4)	568 (1.9)	7 (3.2)	413 (2.1)	18 (3.6)
Morocco	451 (3.3)	-35 (11.5)	216 (3.3)	-23 (5.3)	440 (3.5)	-31 (9.8)	193 (5.2)	-28 (6.2)
Netherlands	606 (1.0)	-15 (1.6)	494 (1.4)	-6 (2.4)	601 (1.1)	-9 (1.7)	484 (1.6)	0 (2.8)
New Zealand	628 (1.2)	-10 (3.0)	454 (1.9)	9 (3.6)	614 (1.6)	0 (2.8)	419 (2.2)	13 (4.3)
Norway	574 (1.8)	-19 (2.4)	436 (2.8)	13 (4.0)	561 (1.7)	-15 (2.6)	414 (2.2)	19 (3.4)
Romania	588 (1.8)	-20 (3.2)	398 (5.0)	-27 (5.6)	575 (1.8)	-25 (3.5)	379 (4.5)	-23 (6.2)
Russian Federation	645 (2.1)	43 (2.7)	500 (2.9)	38 (5.9)	629 (1.5)	34 (2.4)	480 (3.1)	33 (6.3)
Scotland	623 (2.2)	-2 (2.9)	454 (2.5)	11 (4.0)	600 (1.7)	-7 (2.9)	424 (2.7)	-2 (4.2)
Singapore	643 (1.5)	15 (2.7)	487 (2.1)	43 (5.0)	632 (1.5)	22 (2.5)	462 (2.2)	51 (6.1)
Slovak Republic	609 (1.4)	12 (1.9)	458 (2.9)	5 (3.9)	602 (1.1)	18 (2.0)	441 (3.3)	9 (4.4)
Slovenia	601 (1.2)	17 (1.9)	457 (1.6)	24 (3.0)	590 (1.6)	22 (2.1)	430 (1.7)	20 (2.7)
Sweden	622 (1.4)	-17 (1.9)	489 (2.0)	-14 (3.1)	607 (1.5)	-12 (1.9)	470 (2.1)	-7 (2.8)
United States	619 (1.6)	-18 (2.5)	466 (2.2)	3 (3.2)	617 (1.6)	-1 (2.3)	450 (2.1)	17 (3.8)

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

Table 4 Percent of Students in High Category of Index of Students' Reading Attitudes

	Top-Achieving Third				Bottom-Achieving Third			
Country	Girls		Boys		Girls		Boys	
Austria	77	(2.1)	55	(1.9)	46	(2.3)	24	(2.0)
Belgium (Flemish)	64	(2.1)	44	(2.1)	31	(2.2)	16	(1.5)
Belgium (French)	72	(1.9)	64	(2.0)	45	(2.3)	28	(2.2)
Bulgaria	77	(2.0)	60	(2.7)	55	(3.0)	35	(2.9)
Chinese Taipei	75	(1.9)	58	(2.1)	48	(2.2)	28	(1.9)
Denmark	60	(2.8)	42	(2.8)	33	(2.6)	22	(2.2)
England	70	(2.3)	51	(2.8)	31	(2.1)	16	(1.7)
France	83	(1.5)	69	(1.9)	47	(2.3)	33	(1.9)
Georgia	68	(2.8)	55	(4.2)	43	(2.8)	29	(3.3)
Germany	82	(1.6)	66	(1.9)	51	(2.5)	28	(2.0)
Hong Kong, SAR	76	(2.0)	64	(1.7)	50	(2.2)	30	(2.1)
Hungary	76	(2.2)	55	(2.6)	44	(2.7)	25	(2.2)
Iceland	71	(1.8)	49	(1.8)	40	(2.0)	22	(1.8)
Indonesia	73	(1.8)	59	(2.2)	32	(2.5)	31	(2.2)
Iran	92	(1.1)	81	(1.9)	71	(3.0)	59	(3.3)
Israel	62	(2.2)	51	(2.8)	37	(2.2)	22	(1.9)
Italy	84	(1.6)	70	(2.1)	63	(2.8)	42	(2.9)
Kuwait	61	(2.8)	53	(3.2)	29	(2.2)	18	(2.6)
Latvia	53	(2.6)	38	(2.6)	29	(2.6)	15	(2.2)
Lithuania	74	(2.0)	42	(2.1)	51	(2.3)	24	(1.6)
Luxembourg	67	(1.9)	48	(1.5)	34	(1.9)	15	(1.2)
Macedonia	85	(1.5)	68	(2.5)	51	(2.6)	42	(2.9)
Moldova	77	(2.7)	58	(3.2)	49	(2.9)	40	(2.8)
Morocco	70	(3.9)	65	(3.4)	44	(3.2)	30	(3.3)
Netherlands	70	(2.1)	39	(2.0)	32	(2.1)	16	(1.6)
New Zealand	78	(1.6)	58	(2.0)	37	(1.7)	24	(1.9)
Norway	70	(2.8)	51	(2.7)	40	(3.2)	27	(2.6)
Poland	72	(2.2)	46	(2.2)	40	(2.8)	21	(1.9)
Qatar	66	(1.5)	46	(1.4)	27	(1.3)	13	(1.1)
Romania	82	(1.5)	64	(2.3)	48	(3.2)	37	(3.9)
Russian Federation	74	(1.6)	49	(2.5)	48	(2.0)	26	(1.8)
Scotland	73	(2.4)	48	(2.7)	34	(2.2)	20	(1.8)
Singapore	75	(1.8)	51	(1.8)	44	(1.9)	22	(1.4)
Slovak Republic	70	(1.5)	49	(2.5)	45	(2.6)	20	(2.1)
Slovenia	76	(1.8)	58	(1.7)	49	(2.0)	25	(1.8)
South Africa	59	(2.0)	39	(1.5)	24	(1.5)	19	(1.2)
Spain	73	(1.9)	58	(2.2)	52	(1.8)	35	(2.7)
Sweden	72	(2.0)	52	(2.1)	39	(2.1)	21	(1.8)
Trinidad And Tobago	80	(1.8)	59	(2.2)	44	(2.3)	32	(2.5)
United States	63	(2.1)	48	(2.2)	34	(2.1)	17	(1.4)

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

Table 5 Percent of Students in the High Category of the Index of Students' Reading Self-Concept

	Top-Achieving Third				Bottom-Achieving Third			
Country	Girls		Boys		Girls		Boys	
Austria	80	(2.0)	75	(1.8)	51	(2.2)	40	(2.0)
Belgium (Flemish)	68	(1.8)	72	(2.0)	33	(1.8)	31	(1.7)
Belgium (French)	51	(2.1)	56	(1.9)	25	(1.8)	25	(1.7)
Bulgaria	76	(2.1)	72	(2.3)	47	(3.3)	35	(3.0)
Chinese Taipei	68	(1.6)	61	(1.8)	29	(1.9)	21	(1.3)
Denmark	83	(1.7)	83	(1.8)	32	(2.5)	30	(2.2)
England	67	(2.3)	56	(2.4)	24	(2.1)	22	(2.2)
France	52	(2.2)	55	(1.9)	21	(1.9)	21	(1.8)
Georgia	73	(2.1)	60	(3.0)	39	(2.6)	24	(2.0)
Germany	80	(1.5)	74	(1.6)	36	(2.2)	39	(1.9)
Hong Kong, SAR	67	(2.1)	67	(1.8)	31	(1.9)	23	(1.5)
Hungary	71	(2.1)	62	(2.1)	26	(2.1)	25	(2.0)
Iceland	83	(1.6)	77	(1.7)	37	(2.0)	33	(2.0)
Indonesia	46	(1.8)	38	(2.7)	27	(2.0)	21	(2.1)
Iran	82	(1.5)	73	(2.2)	36	(2.8)	29	(2.0)
Israel	79	(1.8)	80	(1.7)	53	(2.0)	36	(2.0)
Italy	75	(1.9)	72	(2.3)	43	(2.6)	40	(2.7)
Kuwait	57	(2.9)	49	(3.1)	29	(2.3)	18	(2.5)
Latvia	67	(2.3)	57	(2.1)	27	(2.2)	19	(2.2)
Lithuania	66	(2.0)	52	(2.5)	27	(2.1)	19	(1.7)
Luxembourg	74	(1.2)	71	(1.7)	29	(1.6)	30	(1.5)
Macedonia	82	(2.1)	73	(1.6)	33	(2.7)	26	(2.6)
Moldova	50	(2.5)	38	(2.7)	25	(2.1)	16	(1.9)
Morocco	49	(3.2)	50	(2.7)	27	(2.3)	23	(2.6)
Netherlands	78	(1.5)	76	(2.0)	46	(1.8)	41	(2.6)
New Zealand	60	(1.8)	53	(2.0)	21	(1.5)	16	(1.5)
Norway	81	(2.0)	74	(2.6)	44	(2.8)	36	(2.6)
Poland	88	(1.2)	78	(1.7)	41	(2.5)	31	(2.3)
Qatar	84	(1.2)	78	(1.2)	33	(1.3)	18	(1.3)
Romania	73	(2.0)	33	(2.0)	67	(2.0)	73	(2.1)
Russian Federation	73	(2.2)	60	(3.4)	42	(2.5)	32	(1.9)
Scotland	60	(2.6)	58	(2.3)	30	(2.2)	23	(2.2)
Singapore	63	(1.7)	60	(2.0)	34	(1.8)	26	(1.7)
Slovak Republic	65	(1.7)	60	(2.0)	27	(1.7)	19	(1.9)
Slovenia	83	(1.2)	77	(1.6)	39	(1.7)	33	(2.0)
South Africa	52	(1.6)	41	(1.4)	18	(0.9)	16	(1.1)
Spain	63	(2.0)	66	(2.0)	32	(2.0)	31	(2.4)
Sweden	82	(1.7)	81	(1.7)	46	(2.2)	37	(2.2)
Trinidad And Tobago	78	(1.8)	64	(2.7)	29	(2.4)	19	(2.0)
United States	72	(1.9)	71	(1.7)	34	(2.3)	31	(1.7)

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

Table 6 Percent of Students Who Reported Reading Independently Every Day or Almost Every Day in School

	Top-Achieving Third				Bottom-Achieving Third			
Country	Girls		Boys		Girls		Boys	
Austria	68	(2.1)	54	(1.9)	69	(1.8)	59	(2.0)
Belgium (Flemish)	69	(2.9)	60	(2.8)	66	(1.8)	57	(2.4)
Belgium (French)	73	(2.3)	67	(2.4)	65	(2.4)	56	(2.1)
Bulgaria	72	(2.7)	66	(3.0)	65	(2.8)	58	(2.8)
Chinese Taipei	70	(2.3)	54	(2.2)	46	(2.5)	31	(1.9)
Denmark	71	(2.4)	60	(3.3)	74	(2.3)	66	(2.5)
England	89	(1.6)	82	(2.2)	81	(1.7)	65	(2.1)
France	71	(2.3)	63	(1.9)	69	(1.9)	59	(1.9)
Georgia	67	(2.7)	66	(3.5)	62	(2.9)	60	(2.8)
Germany	58	(2.1)	54	(2.0)	70	(1.9)	53	(2.0)
Hong Kong, SAR	68	(2.1)	59	(2.0)	52	(2.0)	40	(1.7)
Hungary	67	(2.1)	56	(2.4)	66	(2.5)	53	(2.2)
Iceland	79	(1.6)	73	(1.8)	76	(1.8)	66	(2.2)
Indonesia	73	(2.0)	68	(2.2)	53	(2.4)	49	(2.6)
Iran	61	(2.3)	54	(3.1)	44	(3.2)	45	(2.7)
Israel	80	(1.9)	70	(1.8)	63	(2.6)	50	(1.8)
Italy	65	(3.2)	53	(2.3)	59	(2.4)	51	(2.1)
Kuwait	63	(2.1)	49	(2.4)	42	(2.5)	32	(2.6)
Latvia	70	(2.5)	58	(2.6)	69	(2.3)	54	(2.8)
Lithuania	81	(1.8)	74	(1.5)	78	(1.9)	70	(2.3)
Luxembourg	39	(1.8)	35	(1.6)	47	(1.5)	36	(1.4)
Macedonia	76	(1.9)	70	(2.6)	75	(2.7)	69	(2.3)
Moldova	85	(1.9)	79	(2.6)	78	(2.1)	73	(2.1)
Morocco	40	(2.7)	36	(2.5)	30	(3.3)	30	(3.0)
Netherlands	78	(2.4)	71	(2.2)	74	(2.1)	69	(2.5)
New Zealand	94	(0.9)	88	(1.6)	83	(1.4)	67	(1.8)
Norway	76	(2.9)	77	(2.5)	80	(2.0)	73	(2.4)
Poland	75	(1.8)	63	(2.1)	66	(2.1)	52	(1.9)
Qatar	71	(1.2)	58	(1.4)	50	(1.5)	46	(1.6)
Romania	77	(2.1)	68	(2.3)	69	(2.8)	62	(3.8)
Russian Federation	69	(2.4)	65	(2.0)	71	(1.9)	64	(2.1)
Scotland	80	(2.5)	70	(2.6)	72	(2.6)	59	(3.0)
Singapore	92	(1.0)	84	(1.4)	73	(1.7)	58	(1.9)
Slovak Republic	64	(2.4)	53	(2.4)	60	(2.2)	54	(2.8)
Slovenia	70	(2.3)	63	(1.9)	68	(2.1)	54	(2.2)
South Africa	78	(1.6)	66	(1.4)	50	(2.2)	44	(2.0)
Spain	74	(2.3)	69	(2.1)	71	(2.0)	62	(2.3)
Sweden	72	(3.3)	72	(2.7)	81	(1.7)	72	(2.0)
Trinidad And Tobago	87	(1.4)	79	(2.5)	73	(2.6)	61	(2.5)
United States	95	(1.0)	88	(1.5)	83	(1.7)	72	(1.6)

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

Table 7 Percent of Students Who Reported Having Books of Their Own at Home

	Top-Achieving Third				Bottom-Achieving Third			
Country	Girls		Boys		Girls		Boys	
Austria	99	(0.6)	97	(0.6)	88	(1.0)	75	(2.0)
Belgium (Flemish)	96	(0.8)	92	(1.4)	84	(1.3)	78	(1.6)
Belgium (French)	93	(0.9)	90	(1.2)	80	(1.7)	70	(1.8)
Bulgaria	93	(2.2)	88	(2.1)	76	(3.4)	70	(2.9)
Chinese Taipei	94	(0.8)	93	(1.0)	83	(1.6)	74	(1.6)
Denmark	98	(0.6)	97	(0.8)	93	(1.2)	87	(2.1)
England	99	(0.4)	97	(0.7)	89	(1.2)	77	(2.0)
France	96	(0.8)	92	(1.0)	78	(1.8)	75	(1.6)
Georgia	87	(2.2)	83	(1.9)	66	(2.8)	66	(2.8)
Germany	99	(0.4)	98	(0.6)	91	(1.2)	86	(1.5)
Hong Kong, SAR	91	(1.2)	90	(1.2)	85	(1.7)	77	(1.9)
Hungary	99	(0.4)	96	(0.8)	87	(1.4)	82	(1.9)
Iceland	99	(0.3)	97	(0.6)	93	(1.0)	84	(1.4)
Indonesia	87	(1.4)	80	(1.9)	69	(2.2)	69	(1.7)
Iran	92	(1.4)	83	(1.7)	56	(4.0)	50	(3.3)
Israel	92	(1.1)	88	(1.3)	75	(2.2)	69	(2.5)
Italy	93	(2.0)	90	(1.4)	78	(2.3)	69	(2.5)
Kuwait	72	(2.2)	69	(2.9)	71	(2.6)	60	(2.6)
Latvia	98	(0.6)	95	(0.9)	90	(1.5)	80	(2.1)
Lithuania	97	(0.7)	91	(1.2)	90	(1.4)	79	(1.8)
Luxembourg	98	(0.5)	97	(0.5)	91	(0.9)	83	(1.3)
Macedonia	94	(1.2)	89	(1.3)	74	(2.6)	72	(2.4)
Moldova	88	(1.7)	86	(1.8)	71	(2.4)	70	(1.9)
Morocco	60	(4.0)	62	(3.4)	40	(4.2)	43	(3.5)
Netherlands	99	(0.3)	95	(0.7)	88	(1.4)	73	(1.9)
New Zealand	98	(0.6)	97	(0.6)	89	(1.2)	77	(1.7)
Norway	97	(1.0)	92	(1.2)	87	(1.7)	82	(1.9)
Poland	97	(0.8)	94	(0.9)	82	(1.9)	74	(1.6)
Qatar	70	(1.3)	58	(1.6)	62	(1.4)	62	(1.5)
Romania	93	(1.4)	90	(1.2)	74	(3.0)	69	(4.0)
Russian Federation	98	(0.6)	94	(0.8)	87	(1.1)	83	(1.7)
Scotland	99	(0.4)	95	(1.1)	89	(1.6)	79	(2.0)
Singapore	96	(0.6)	95	(0.7)	85	(1.1)	75	(1.4)
Slovak Republic	98	(0.5)	97	(0.6)	88	(1.6)	80	(2.7)
Slovenia	91	(1.0)	86	(1.2)	82	(1.5)	72	(1.7)
South Africa	73	(1.5)	69	(1.7)	54	(2.0)	55	(2.1)
Spain	98	(0.6)	96	(0.9)	86	(1.7)	79	(1.8)
Sweden	98	(0.5)	95	(0.9)	95	(1.1)	88	(1.4)
Trinidad And Tobago	97	(0.7)	90	(1.3)	84	(2.1)	75	(2.9)
United States	97	(0.5)	96	(0.8)	80	(1.6)	70	(1.8)

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

Appendix A International Background Variables for the PIRLS 2006 Student Questionnaire Used in Analyses				
PIRLS 2006 Question Location	Variable Description	PIRLS 2006 Variable Name	PIRLS 2001 Variable Name	Trend Notes
SG1-03C	How often do you talk with your friends about what you are reading?	ASBGTOC3	ASBGTOC3	
SG1-03D	How often do you talk with your family about what you are reading?	ASBGTOC4	ASBGTOC4	
SG1-03E	How often do you read for fun outside of school?	ASBGTOC5	ASBGTOC5	
SG1-03F	How often do you read to find out about things you want to learn?	ASBGTOC6	ASBGTOC6	
SG1-04A	How often do you read comic books outside of school?	ASBGRTO1	ASBGROC1	
SG1-04B	How often do you read stories or novels outside of school?	ASBGRTO2	ASBGROC2	
SG1-04C	How often do you read books that explain things outside of school?	ASBGRTO3	ASBGROC3	
SG1-04D	How often do you read magazines outside of school?	ASBGRTO4	ASBGROC4	
SG1-04E	How often do you read newspapers outside of school?	ASBGRTO5	ASBGROC5	
SG1-04F	How often do you read directions or instructions outside of school?	ASBGRTO6	ASBGROC6	
SG1-04G	How often do you read brochures and catalogs outside of school?	ASBGRTO7	n/a	
SG1-05A	About how much time do you spend watching television or videos outside of school on a normal school day?	ASBGTSP1	ASBGTVDY	
SG1-05B	About how much time do you spend playing video or computer games outside of school on a normal school day?	ASBGTSP2	n/a	
SG1-05C	About how much time do you spend reading stories or articles on the Internet outside of school on a normal school day?	ASBGTSP3	n/a	
SG1-05D	About how much time do you spend reading stories or articles in books or magazines outside of school on a normal school day?	ASBGTSP4	n/a	
SG1-06A	In school, how often does your teacher read aloud to the class?	ASBGTHC1	ASBGTIC1	
SG1-06B	In school, how often do you read aloud to the whole class?	ASBGTHC2	ASBGTIC2	
SG1-06C	In school, how often do you read aloud to a small group of students in your class?	ASBGTHC3	ASBGTIC3	
SG1-06D	In school, how often do you read silently on your own?	ASBGTHC4	ASBGTIC4	
SG1-06E	In school, how often do you read books you choose yourself?	ASBGTHC5	ASBGTIC6	
SG1-07B	After you have read something in class, how often do you write something about what you have read?	ASBGAFR2	ASBGAFR2	
SG1-07C	After you have read something in class, how often do you answer questions aloud about what you have read?	ASBGAFR3	ASBGAFR3	
SG1-07D	After you have read something in class, how often do you talk with other students about what you have read?	ASBGAFR4	ASBGAFR4	
SG1-13A	How often do you borrow books from your school or local library?	ASBGBOFF	ASBGBLIB	
SG1-13B	When you borrow books from your school or local library, are they mainly in <language of test>?	ASBGBOLT	n/a	
SG1-14A	How much do you agree with the statement “I read only if I have to"?	ASBGRST1	ASBGRST1	

SG1-14B	How much do you agree with the statement “I like talking about books with other people"?	ASBGRST2	ASBGRST2	
SG1-14C	How much do you agree with the statement “I would be happy if someone gave me a book as a present"?	ASBGRST3	ASBGRST3	
SG1-14D	How much do you agree with the statement “I think reading is boring"?	ASBGRST4	ASBGRST4	
SG1-14E	How much do you agree with the statement “I need to read well for my future"?	ASBGRST5	ASBGRST5	
SG1-14F	How much do you agree with the statement “I enjoy reading"?	ASBGRST6	ASBGRST6	
SG1-15A	How much do you agree with the statement “reading is very easy for me"?	ASBGRD1	ASBGRAB1	
SG1-15B	How much do you agree with the statement “I do not read as well as other students in my class"?	ASBGRD2	ASBGRAB2	
SG1-15C	How much do you agree with the statement “when I am reading by myself, I understand almost everything I read"?	ASBGRD3	ASBGRAB3	
SG1-15D	I read slower than other students in my class	ASBGRD4	n/a	
SG1-20	About how many books are there in your home?	ASBGBOOK	ASBGBOOK	
SG1-21C	Do you have books of your very own (not school books) at home?	ASBGTA3	ASBGPS3	
Derived Variable	Students read for information outside school	ASDGINFR		
Derived Variable	Index of students' attitudes toward reading	ASDGSATR		
Derived Variable	Index of students' reading self-concept	ASDGSRSC		
Derived Variable	Students read independently (silently on own, books of own choosing)	ASDGTHC2		

Appendix B PIRLS 2006 Regression Analyses with Significant Effects (p<.05) for a Majority of Participating Countries		
PIRLS 2006 Variable Name	**Variable Description**	**Significant Effect(s)**
ASBGTOC3	How often do you talk with your friends about what you are reading?	Achievement
ASBGTOC4	How often do you talk with your family about what you are reading?	Sex
ASBGTOC5	How often do you read for fun outside of school?	sex and achievement
ASBGTOC6	How often do you read to find out about things you want to learn?	sex, achievement, and interaction
ASBGRTO1	How often do you read comic books outside of school?	sex and achievement
ASBGRTO2	How often do you read stories or novels outside of school?	sex and achievement
ASBGRTO4	How often do you read magazines outside of school?	Sex
ASBGRTO6	How often do you read directions or instructions outside of school?	Achievement
ASBGTSP1	About how much time do you spend watching television or videos outside of school on a normal school day?	sex, achievement, and interaction
ASBGTSP2	About how much time do you spend playing video or computer games outside of school on a normal school day?	sex, achievement, and interaction
ASBGTSP3	About how much time do you spend reading stories or articles on the Internet outside of school on a normal school day?	Achievement
ASBGTSP4	About how much time do you spend reading stories or articles in books or magazines outside of school on a normal school day?	sex and achievement
ASBGTHC1	In school, how often does your teacher read aloud to the class?	Achievement
ASBGTHC2	In school, how often do you read aloud to the whole class?	Sex
ASBGTHC3	In school, how often do you read aloud to a small group of students in your class?	Achievement
ASBGTHC4	In school, how often do you read silently on your own?	sex and achievement
ASBGTHC5	In school, how often do you read books you choose yourself?	sex and achievement
ASBGAFR2	After you have read something in class, how often do you write something about what you have read?	sex and achievement
ASBGAFR3	After you have read something in class, how often do you answer questions aloud about what you have read?	Achievement
ASBGBOFF	How often do you borrow books from your school or local library?	Sex
ASBGRST1	How much do you agree with the statement “I read only if I have to"?	sex, achievement, and interaction
ASBGRST2	How much do you agree with the statement “I like talking about books with other people"?	sex and achievement
ASBGRST3	How much do you agree with the statement “I would be happy if someone gave me a book as a present"?	sex and achievement
ASBGRST4	How much do you agree with the statement “I think reading is boring"?	sex and achievement

ASBGRST5	How much do you agree with the statement “I need to read well for my future"?	sex, achievement, and interaction
ASBGRST6	How much do you agree with the statement “I enjoy reading"?	sex, achievement, and interaction
ASBGRD1	How much do you agree with the statement “reading is very easy for me"?	Achievement
ASBGRD2	How much do you agree with the statement “I do not read as well as other students in my class"?	Achievement
ASBGRD3	How much do you agree with the statement “when I am reading by myself, I understand almost everything I read"?	sex and achievement
ASBGRD4	I read slower than other students in my class	Achievement
ASBGBOOK	About how many books are there in your home?	Achievement
ASBGTA3	Do you have books of your very own (not school books) at home?	sex, achievement, and interaction
ASDGINFR	Students read for information outside school	sex and achievement
ASDGSATR	Index of students' attitudes toward reading	sex and achievement
ASDGSRSC	Index of students' reading self-concept	sex and achievement
ASDGTHC2	Students read independently (silently on own, books of own choosing)	sex, achievement, and interaction