ADDITIONAL ANALYSES OF THE PISA 2003 DATA FOR NORTHERN IRELAND

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Preface

The second cycle of the Programme for International Student Assessment (PISA) was administered in 2003. Mathematical literacy was the major assessment domain in PISA 2003, while cross-curricular problem solving, reading literacy and scientific literacy were minor domains. Hence, mathematics was assessed more extensively than the other domains.

PISA 2003 was administered to representative national samples of 15-year olds attending schools in 41 participating countries, including all 30 OECD member countries. The United Kingdom (an OECD country) included separate samples for England, Scotland and Northern Ireland. This report describes aspects of the performance of students in Northern Ireland relative to 29 member countries of the OECD and Scotland. Neither the UK as a whole nor England are included.[1] In Northern Ireland, 2853 15-year olds in 118 schools participated in PISA 2003.

The current report, which was commissioned by the Department of Education in Northern Ireland (DENI), builds an earlier report, *Student Achievement in Northern Ireland: Results in Mathematical, Reading and Scientific Literacy among 15-year Olds from the OECD PISA 2003 Study* (Goodard, Ahmed, Hill & Gosden, 2005). In the current report, mathematical literacy (combined scale only), problem solving, reading literacy and scientific literacy, are dealt with in Chapters 1 to 4, respectively. The analyses on problem solving are new, as are the detailed analyses of gender differences at key benchmarks (the 5th, 25th, 75th and 95th percentiles) in each PISA assessment domain. Chapter 5 deals with variables associated with performance on combined mathematical literacy including school, family and student characteristics. Most of the analyses in this chapter refer to Northern Ireland only. In Chapter 6, a multi-level model of mathematical literacy in Northern Ireland is described. The model allows readers to evaluate the relative contributions of key school and student variables to performance in mathematical literacy.

All the analyses in this report draw the data for Northern Ireland and for other countries that are publicly available on the OECD PISA website (www.pisa.oecd.org). Although we sought to replicate, for mathematical literacy, several of the analyses involving factors associated with reading achievement in Northern Ireland in the first cycle of PISA (Gill, Dunn & Goddard, 2002), it was not possible to do so for school variables involving school type (secondary, grammar), management type (Catholic, Other), or percentage of students in receipt of free meals, as data on these variables were not available to us in the 2003 dataset.

In line with international reports on PISA 2003 (e.g., OECD, 2004), the analyses in this report involving multiple comparisons used the Bonferroni adjustment method. For each such comparison, performance in Northern Ireland is compared with performance in 30 other countries. Hence, the overall alpha level (0.05) is divided by 30, resulting in conservative estimates of critical values. In most analyses, this method results in three groups of countries (for example, those with higher mean scores than

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[1] There were response rate difficulties in England. Hence, achievement data for England and the United Kingdom =are not given in international reports on PISA 2003 (e.g., OECD, 2004).

Northern Ireland, countries with mean scores that are not significantly different, and countries with significantly lower mean scores).

The authors wish to acknowledge the assistance and encouragement of Ivor Johnston of DENI. Thanks are also due to the staff at the Australian Council for Educational Research, who provided advice on aspects of the analyses, to Nick Sofroniou at the Educational Research Centre, for his advice on multi-level modelling, and to Eemer Eivers, also of the Educational Research Centre, for commenting on earlier drafts of this report.

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1. Achievement on Combined Mathematical Literacy

Mathematical literacy was a major assessment domain in PISA 2003. In this chapter, data on overall performance on combined mathematical literacy is provided, and gender differences on the scale are considered.

Overall Performance on Combined Mathematical Literacy

Table 1.1 provides mean scores for the 29 OECD countries for which data were released, and for Northern Ireland and Scotland. The table shows that the mean score for Northern Ireland (515) is significantly higher than the OECD country average of 500. Northern Ireland ranked 13 of 31 countries. The highest-performing countries were Finland (544), Korea (542), the Netherlands (538) and Japan (534).

Performance on Combined Mathematical Literacy at Key Benchmarks

Table 1.2 shows the scores of the 31 countries at key benchmarks – the 5th, 25th, 75th and 95th percentile ranks. Performance at the 5th percentile may be taken as indicative of the standard among low achievers in a country, while performance at the 95th percentile can be taken as indicative of high achievers. Table 1.3 provides information needed to interpret the scores in Table 1.2. It indicates that the scores for students in Northern Ireland at the 5th (354 points) and 25th (450) percentiles are significantly higher than the corresponding OECD country average scores (332 and 432 respectively), but that scores at the 75th (580) and 95th percentiles (666) are not significantly different. [Additional information on these comparisons is given in Appendix Tables A1.1 to A1.4].

The last two columns in Table 1.2 provide an indication of the range of achievement in each comparison country. Differences between the 5th and 95th percentiles can provide an indication of the spread between high-achieving and low-achieving students. The gap in Northern Ireland is 312 points. This is smaller than the OECD average country difference (328 points), but larger than the difference in some higher-achieving countries such as Finland (274), Korea (302) and the Netherlands (298). It is also greater than for Scotland (279) and the Republic of Ireland (281).

The difference between the 25th and 75th percentiles (sometimes called the inter-quartile range) is 130 points for Northern Ireland. Again, this is marginally smaller than the corresponding OECD country average (138), but greater than for a number of countries including Finland (114), Canada (119), Scotland (115) and the Republic of Ireland (117).

Table 1.3 also compares the scores of students in Northern Ireland at the 5th, 25th, 75th and 95th percentiles with those of their counterparts in other countries. Whereas four countries had scores that were significantly higher than Northern Ireland's at the 5th percentile, just one (Belgium) had a significantly higher score at the 95th percentile. Although differences between the scores of students in Northern Ireland and Scotland are not statistically significant, the Republic of Ireland's scores at the 75th and 95th percentiles are significantly lower than those of students in Northern

Ireland. [Additional data on these comparisons are given in Appendix Tables A1.5 to A1.8].

Table 1.1: *Mean Scores and Standard Deviations on Combined Mathematical Literacy, by Country, and Comparisons with OECD Country Average*

Countries in descending order of mean score on combined mathematical literacy	Mean		Comparison with OECD country average	Standard deviation	
	Score	S.E.		SD	S.E.
Finland	544	(1.9)	+	84	(1.1)
Korea	542	(3.2)	+	92	(2.1)
Netherlands	538	(3.1)	+	93	(2.3)
Japan	534	(4.0)	+	101	(2.8)
Canada	532	(1.8)	+	87	(1.0)
Belgium	529	(2.3)	+	110	(1.8)
Switzerland	527	(3.4)	+	98	(2.0)
Australia	524	(2.1)	+	95	(1.5)
Scotland	524	(2.3)	+	84	(1.7)
New Zealand	523	(2.3)	+	98	(1.2)
Czech Republic	516	(3.5)	+	96	(1.9)
Iceland	515	(1.4)	+	90	(1.2)
Northern Ireland	515	(2.8)	+	94	(2.0)
Denmark	514	(2.7)	+	91	(1.4)
France	511	(2.5)	+	92	(1.8)
Sweden	509	(2.6)	+	95	(1.8)
Austria	506	(3.3)	0	93	(1.7)
Germany	503	(3.3)	0	103	(1.8)
Republic of Ireland	503	(2.4)	0	85	(1.3)
Slovak Republic	498	(3.3)	0	93	(2.3)
Norway	495	(2.4)	–	92	(1.2)
Luxembourg	493	(1.0)	–	92	(1.0)
Poland	490	(2.5)	–	90	(1.3)
Hungary	490	(2.8)	–	94	(2.0)
Spain	485	(2.4)	–	88	(1.3)
United States	483	(2.9)	–	95	(1.3)
Portugal	466	(3.4)	–	88	(1.7)
Italy	466	(3.1)	–	96	(1.9)
Greece	445	(3.9)	–	94	(1.8)
Turkey	423	(6.7)	–	105	(5.3)
Mexico	385	(3.6)	–	85	(1.9)
OECD average	500	(0.6)		100	(0.4)

 + Country mean score is significantly higher than OECD country average
 0 Country mean score is not significantly different from OECD country average
 – Country mean score is significantly lower than OECD country average

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Table 1.2:   *Distribution of Student Performance on Combined Mathematical Literacy, by Country*

Countries in descending order of mean score in combined mathematical literacy	Percentiles								95th - 5th Percentiles	75th - 25th Percentiles
	5th		25th		75th		95th			
	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.		
Finland	406	(3.8)	488	(2.2)	603	(2.3)	680	(3.1)	274	114
Korea	388	(4.6)	479	(3.7)	606	(4.2)	690	(6.8)	302	127
Netherlands	385	(6.9)	471	(5.4)	608	(3.8)	683	(3.4)	298	137
Japan	361	(8.2)	467	(5.4)	605	(4.4)	690	(6.6)	329	138
Canada	386	(3.0)	474	(2.2)	593	(2.1)	673	(3.4)	286	119
Belgium	334	(6.5)	456	(3.4)	611	(2.5)	693	(2.4)	360	155
Switzerland	359	(4.8)	461	(3.6)	595	(4.9)	684	(6.8)	325	134
Australia	364	(4.4)	460	(2.7)	592	(2.5)	676	(3.5)	311	132
Scotland	380	(6.0)	468	(3.4)	583	(2.5)	660	(4.3)	279	115
New Zealand	358	(4.1)	455	(2.9)	593	(2.2)	682	(2.9)	324	138
Czech Republic	358	(6.2)	449	(4.5)	584	(4.0)	672	(4.9)	314	135
Iceland	362	(4.0)	454	(2.8)	578	(1.9)	658	(3.8)	295	124
Northern Ireland	354	(5.5)	450	(4.7)	580	(3.5)	666	(4.1)	312	130
Denmark	361	(4.4)	453	(3.7)	578	(3.1)	662	(4.7)	301	125
France	352	(6.0)	449	(3.7)	575	(3.0)	656	(3.5)	304	126
Sweden	353	(5.3)	446	(3.0)	576	(3.2)	662	(4.8)	309	129
Austria	353	(6.6)	439	(4.0)	571	(4.2)	658	(5.0)	305	132
Germany	324	(6.1)	432	(4.7)	578	(3.5)	662	(3.6)	338	146
Republic of Ireland	360	(4.7)	445	(3.4)	562	(3.0)	641	(3.3)	281	117
Slovak Republic	342	(6.9)	436	(4.6)	565	(3.8)	648	(4.1)	306	129
Norway	343	(4.0)	433	(2.9)	560	(3.3)	645	(3.9)	301	127
Luxembourg	338	(3.9)	430	(2.2)	557	(1.9)	641	(2.7)	303	127
Poland	343	(5.8)	428	(3.1)	553	(2.9)	640	(3.5)	297	125
Hungary	335	(5.6)	426	(3.0)	556	(3.9)	644	(4.6)	309	130
Spain	335	(5.1)	426	(3.0)	546	(3.1)	626	(3.7)	291	120
United States	323	(4.9)	418	(3.7)	550	(3.4)	638	(5.1)	315	132
Portugal	321	(6.3)	406	(5.0)	526	(3.5)	610	(3.7)	289	120
Italy	307	(6.4)	400	(4.3)	530	(3.0)	623	(3.7)	316	130
Greece	288	(5.4)	382	(4.6)	508	(4.3)	598	(5.1)	310	126
Turkey	270	(5.8)	351	(5.3)	485	(8.5)	614	(22.7)	344	134
Mexico	247	(5.4)	327	(4.3)	444	(4.5)	527	(5.6)	280	117
OECD average	332	(1.3)	432	(0.9)	571	(0.7)	660	(1.0)	328	138

Table 1.3: *Comparison of Country Scores on Mathematical Literacy at the 5th, 25th, 75th and 95th Percentile Ranks, with OECD Country Average and with Northern Ireland*

Countries in descending order of mean score on combined mathematical literacy	Comparision with OECD Average Score				Comparision with Score for N. Ireland			
	5th Percentile	25th Percentile	75th Percentile	95th Percentile	5th Percentile	25th Percentile	75th Percentile	95th Percentile
Finland	+	+	+	+	+	+	+	0
Korea	+	+	+	+	+	+	+	0
Netherlands	+	+	+	+	+	0	+	0
Japan	+	+	+	+	0	0	+	0
Canada	+	+	+	+	+	+	0	0
Belgium	0	+	+	+	0	0	+	+
Switzerland	+	+	+	+	0	0	0	0
Australia	+	+	+	+	0	0	0	0
Scotland	+	+	+	0	0	0	0	0
New Zealand	+	+	+	+	0	0	0	0
Czech Republic	+	+	+	0	0	0	0	0
Iceland	+	+	+	0	0	0	0	0
Northern Ireland	+	+	0	0				
Denmark	+	+	0	0	0	0	0	0
France	+	+	0	0	0	0	0	0
Sweden	+	+	0	0	0	0	0	0
Austria	0	+	0	0	0	0	0	0
Germany	0	0	0	0	–	0	0	0
Republic of Ireland	+	+	0	–	0	0	–	–
Slovak Republic	0	0	0	0	0	0	0	0
Norway	0	0	0	–	0	0	–	–
Luxembourg	0	0	–	–	0	–	–	–
Poland	0	0	–	–	0	–	–	–
Hungary	0	0	–	–	0	–	–	–
Spain	0	0	–	–	0	–	–	–
United States	0	–	–	–	–	–	–	–
Portugal	0	–	–	–	–	–	–	–
Italy	–	–	–	–	–	–	–	–
Greece	–	–	–	–	–	–	–	–
Turkey	–	–	–	–	–	–	–	–
Mexico	–	–	–	–	–	–	–	–

Data columns 1-8 are based on Appendix Tables A1.1 to A1.8, respectively.

+ Country score is significantly higher than OECD average (data columns 1-4) or score for N. Ireland (5-8)

0 Country score is not significantly different from OECD average (data columns 1-4) or score for N. Ireland (5-8)

– Country score is significantly lower than OECD average (data columns 1-4) or score for N. Ireland (5-8)

Gender Differences on Combined Mathematical Literacy

Table 1.4 shows the differences between the mean scores of girls and boys on the combined mathematical literacy scale in each comparison country. The mean scores for girls and boys in Northern Ireland were 513 and 517, respectively. The difference, 4 score points in favour of boys, was the smallest among comparison countries, and is not statistically significant. The table shows that, in 21 countries, including the Republic of Ireland, boys achieved a significantly higher mean score than girls. The OECD country average difference (11 points in favour of boys) is also statistically significant. Iceland was the only country in which girls (523) significantly outperformed boys (508). Differences are illustrated graphically in Figure 1.1.

Table 1.5 shows the mean scores on combined mathematical literacy for girls and differences in mean scores between girls in Northern Ireland and in each comparison country. Girls in 14 countries scored significantly lower than girls in Northern Ireland. These include the United States (33 points lower), Germany (24), Norway (21) and the Republic of Ireland (17). Countries in which girls scored significantly higher than in Northern Ireland include Finland (28 points higher), the Netherlands (22 points) and Canada (17). Girls in 13 countries, including Scotland, have mean scores on combined mathematics that are not significantly different from the mean score of girls in Northern Ireland.

Table 1.6 provides corresponding data for boys. Boys in nine countries, including the United States (31 points difference) and Spain (27) have mean scores that are significantly lower than boys in Northern Ireland. Boys in four countries, Korea (35 points higher), Finland (31 points), the Netherlands (24 points) and Canada (24 points) achieved mean scores that are significantly higher. Boys in 17 countries, including Scotland and the Republic of Ireland, had mean scores that are not significantly different from boys in Northern Ireland.

The first four data columns in Table 1.7 compare the scores of girls in Northern Ireland scoring at the 5th, 25th, 75th and 95th percentiles, with girls in other countries. The first column shows that girls in two countries, Finland and Canada, achieve significantly higher scores than girls in Northern Ireland scoring at the 5th percentile, while girls in seven countries achieve significantly lower scores. Girls in 21 countries, including Scotland and the Republic of Ireland achieved scores that are not significantly different. Whereas girls in Finland achieved scores that are significantly higher than girls in Northern Ireland at the 5th, 25th and 75th percentiles, the difference at the 95th percentile is not statistically significant. Indeed, no country had a significantly higher mean score for girls at the 95th percentile than Northern Ireland. Girls in six countries, including the United States and Portugal, achieved scores that are significantly lower than girls in Northern Ireland at all four benchmarks. [Additional data on these comparisons are given in Appendix Tables A1.9 to A1.12].

The last four data columns in Table 1.7 summarise differences between boys in Northern Ireland scoring at the 5th, 25th, 75th and 95th percentiles on the combined mathematical literacy scale, and boys in the comparison countries. Whereas boys in Finland, Korea and Canada achieve significantly higher scores than Northern Ireland at the 5th, 25th, and 75th percentiles, the differences in scores at the 95th percentile are not statistically significant, indicating that the highest-achieving boys in Northern Ireland perform as well as the highest-achieving boys in these countries. Only boys in

Belgium achieve a significantly higher score than boys in Northern Ireland at the 95th percentile. Boys in Scotland and in the Republic of Ireland do not perform significantly differently from boys in Northern Ireland at the 5th, 25th, 75th and 95th percentiles. [Additional data on these comparisons are given in Appendix Tables A1.13 to A1.16].

Table 1.4: *Mean Scores on Combined Mathematical Literacy, by Gender and Country*

Countries in order of ascending size of difference between girls and boys on combined mathematical literacy	Girls		Boys		Difference (Advantage to Boys)	S.E. of the Difference	Significant Difference within Country?
	Mean	S.E.	Mean	S.E.			
Iceland	523	(2.2)	508	(2.3)	-15	(3.5)	Girls +
Northern Ireland	513	(4.0)	517	(5.3)	4	(7.5)	No
Netherlands	535	(3.5)	540	(4.1)	5	(4.3)	0
Australia	522	(2.7)	527	(3.0)	5	(3.8)	0
Poland	487	(2.9)	493	(3.0)	6	(3.1)	0
Norway	492	(2.9)	498	(2.8)	6	(3.2)	0
United States	480	(3.2)	486	(3.3)	6	(2.9)	Boys +
Sweden	506	(3.1)	512	(3.0)	7	(3.3)	Boys +
Scotland	520	(2.9)	527	(3.3)	7	(4.1)	0
Finland	541	(2.1)	548	(2.5)	7	(2.7)	Boys +
Belgium	525	(3.2)	533	(3.4)	8	(4.8)	0
Austria	502	(4.0)	509	(4.0)	8	(4.4)	0
Hungary	486	(3.3)	494	(3.3)	8	(3.5)	Boys +
Japan	530	(4.0)	539	(5.8)	8	(5.9)	0
France	507	(2.9)	515	(3.6)	9	(4.2)	Boys +
Spain	481	(2.2)	490	(3.4)	9	(3.0)	Boys +
Mexico	380	(4.1)	391	(4.3)	11	(3.9)	Boys +
Canada	530	(1.9)	541	(2.1)	11	(2.1)	Boys +
Portugal	460	(3.4)	472	(4.2)	12	(3.3)	Boys +
New Zealand	516	(3.2)	531	(2.8)	14	(3.9)	Boys +
Republic of Ireland	495	(3.4)	510	(3.0)	15	(4.2)	Boys +
Czech Republic	509	(4.4)	524	(4.3)	15	(5.1)	Boys +
Turkey	415	(6.7)	430	(7.9)	15	(6.2)	Boys +
Denmark	506	(3.0)	523	(3.4)	17	(3.2)	Boys +
Switzerland	518	(3.6)	535	(4.7)	17	(4.9)	Boys +
Luxembourg	485	(1.5)	502	(1.9)	17	(2.8)	Boys +
Italy	457	(3.8)	475	(4.6)	18	(5.9)	Boys +
Slovak Republic	489	(3.6)	507	(3.9)	19	(3.7)	Boys +
Germany	489	(3.6)	507	(3.9)	19	(3.7)	Boys +
Greece	436	(3.8)	455	(4.8)	19	(3.6)	Boys +
Korea	528	(5.3)	552	(4.4)	23	(6.8)	Boys +
OECD average	494	(0.8)	506	(0.8)	11	(0.8)	Boys +

Girls+ Within country mean score significantly higher for girls
 0 Within country mean scores for boys and girls not significantly different
 Boys+ Within country mean score significantly higher for boys

Figure 1.1: *Gender Differences on Combined Mathematical Literacy, by Country*
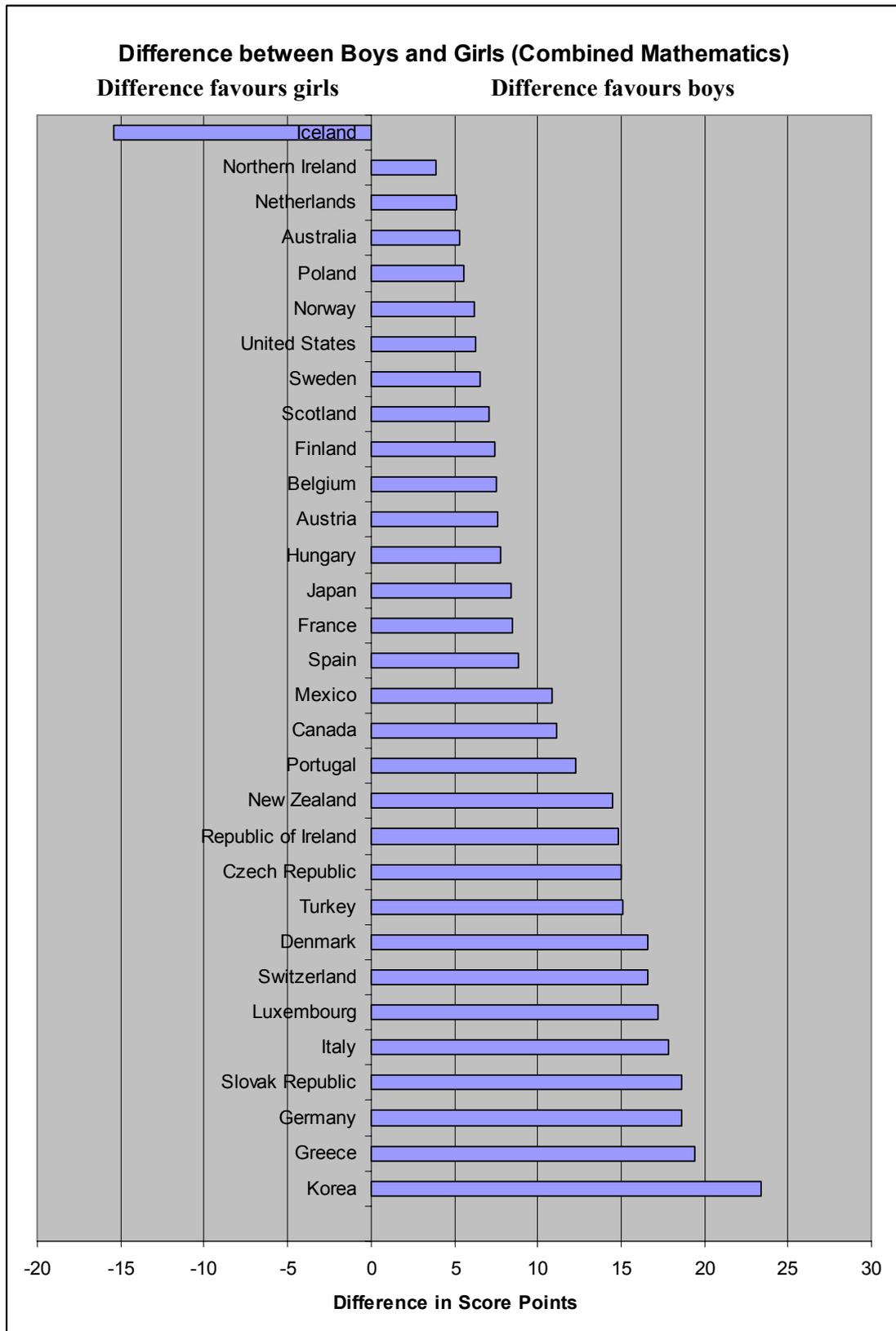
Table 1.5: *Mean Score of Girls on Combined Mathematical Literacy, by Country, and Comparison with Northern Ireland*

Countries ordered in ascending size of difference from N. Ireland mean score on combined mathematical literacy - girls	Girls				
	Mean	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland?
Mexico	380	(4.1)	-133	(5.7)	−
Turkey	415	(6.7)	-98	(7.8)	−
Greece	436	(3.8)	-77	(5.6)	−
Italy	457	(3.8)	-56	(5.6)	−
Portugal	460	(3.4)	-53	(5.3)	−
United States	480	(3.2)	-33	(5.2)	−
Spain	481	(2.2)	-32	(4.6)	−
Luxembourg	485	(1.5)	-28	(4.3)	−
Hungary	486	(3.3)	-27	(5.2)	−
Poland	487	(2.9)	-25	(5.0)	−
Germany	489	(3.6)	-24	(5.4)	−
Slovak Republic	489	(3.6)	-24	(5.4)	−
Norway	492	(2.9)	-21	(5.0)	−
Republic of Ireland	495	(3.4)	-17	(5.3)	−
Austria	502	(4.0)	-11	(5.7)	0
Sweden	506	(3.1)	-7	(5.1)	0
Denmark	506	(3.0)	-7	(5.0)	0
France	507	(2.9)	-6	(5.0)	0
Czech Republic	509	(4.4)	-4	(5.9)	0
New Zealand	516	(3.2)	4	(5.1)	0
Switzerland	518	(3.6)	5	(5.4)	0
Scotland	520	(2.9)	8	(5.0)	0
Australia	522	(2.7)	9	(4.9)	0
Iceland	523	(2.2)	10	(4.6)	0
Belgium	525	(3.2)	13	(5.2)	0
Korea	528	(5.3)	16	(6.7)	0
Canada	530	(1.9)	17	(4.4)	+
Japan	530	(4.0)	17	(5.7)	0
Netherlands	535	(3.5)	22	(5.3)	+
Finland	541	(2.1)	28	(4.6)	+
Northern Ireland	513	(4.0)			

+ Country mean score is significantly higher than mean score for N. Ireland
0 Country mean score not significantly different from mean score for N. Ireland
− Country mean score is significantly lower than mean score for N. Ireland

Table 1.6: *Mean Score of Boys on Combined Mathematical Literacy, by Country, and Comparison with Northern Ireland*

Countries ordered in ascending size of difference from N. Ireland mean score on combined mathematical literacy - boys	Boys				
	Mean	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland?
Mexico	391	(4.3)	-126	(6.8)	–
Turkey	430	(7.9)	-86	(9.5)	–
Greece	455	(4.8)	-62	(7.1)	–
Portugal	472	(4.2)	-44	(6.7)	–
Italy	475	(4.6)	-42	(7.0)	–
United States	486	(3.3)	-31	(6.3)	–
Spain	490	(3.4)	-27	(6.3)	–
Poland	493	(3.0)	-24	(6.1)	–
Hungary	494	(3.3)	-23	(6.3)	–
Norway	498	(2.8)	-18	(6.0)	0
Luxembourg	502	(1.9)	-15	(5.6)	0
Germany	507	(3.9)	-9	(6.6)	0
Slovak Republic	507	(3.9)	-9	(6.6)	0
Iceland	508	(2.3)	-9	(5.8)	0
Austria	509	(4.0)	-7	(6.6)	0
Republic of Ireland	510	(3.0)	-6	(6.1)	0
Sweden	512	(3.0)	-4	(6.1)	0
France	515	(3.6)	-1	(6.4)	0
Denmark	523	(3.4)	6	(6.3)	0
Czech Republic	524	(4.3)	7	(6.8)	0
Australia	527	(3.0)	10	(6.1)	0
Scotland	527	(3.3)	11	(6.2)	0
New Zealand	531	(2.8)	14	(6.0)	0
Belgium	533	(3.4)	16	(6.3)	0
Switzerland	535	(4.7)	18	(7.1)	0
Japan	539	(5.8)	22	(7.9)	0
Netherlands	540	(4.1)	24	(6.7)	+
Canada	541	(2.1)	24	(5.7)	+
Finland	548	(2.5)	31	(5.8)	+
Korea	552	(4.4)	35	(6.9)	+
Northern Ireland	517	(5.3)			

+ Country mean score is significantly higher than mean score for N. Ireland
0 Country mean score not significantly different from mean score for N. Ireland
– Country mean score is significantly lower than mean score for N. Ireland

Table 1.7: *Comparisons of Country Scores on Combined Mathematical Literacy at 5th, 25th, 75th and 95th Percentiles, with Scores in Northern Ireland, by Gender*

Countries in descending order of mean score on combined mathematical literacy	Girls - Score at Percentile Rank Compared with N. Ireland				Boys - Score at Percentile Rank Compared with N. Ireland			
	5th Percentile	25th Percentile	75th Percentile	95th Percentile	5th Percentile	25th Percentile	75th Percentile	95th Percentile
Finland	+	+	+	0	+	+	+	0
Korea	0	0	0	0	+	+	+	0
Netherlands	0	0	+	0	+	0	+	0
Japan	0	0	+	0	0	0	+	0
Canada	+	+	0	0	+	+	+	0
Belgium	0	0	+	0	0	0	+	+
Switzerland	0	0	0	0	0	0	0	0
Australia	0	0	0	0	0	0	0	0
Scotland	0	0	0	0	0	0	0	0
New Zealand	0	0	0	0	0	0	0	0
Czech Republic	0	0	0	0	0	0	0	0
Iceland	0	0	0	0	0	0	0	0
Northern Ireland								
Denmark	0	0	0	0	0	0	0	0
France	0	0	0	0	0	0	0	0
Sweden	0	0	0	0	0	0	0	0
Austria	0	0	0	0	0	0	0	0
Germany	–	0	0	0	0	0	0	0
Republic of Ireland	0	0	0	0	0	0	0	0
Slovak Republic	0	0	–	0	0	0	0	0
Norway	0	0	0	0	0	0	0	0
Luxembourg	0	–	–	–	0	0	0	0
Poland	0	0	–	–	0	0	–	0
Hungary	0	–	–	0	0	0	–	0
Spain	0	–	–	–	0	0	–	–
United States	–	–	–	–	0	–	–	0
Portugal	–	–	–	–	0	–	–	–
Italy	–	–	–	–	0	–	–	–
Greece	–	–	–	–	–	–	–	–
Turkey	–	–	–	–	–	–	–	0
Mexico	–	–	–	–	–	–	–	–

Data columns 1-8 are based on Appendix Tables A1.9 to A1.16, respectively.

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

2. Achievement on Cross-curricular Problem Solving

Introduction

Cross-curricular problem solving was included as a minor assessment domain in PISA 2003. The assessment was designed to measure students' ability to solve real-life problems set in contexts different from those used to assess mathematical literacy, reading literacy or scientific literacy. In PISA 2003, cross-curricular problem solving was defined as:

> . . . an individual's ability to use cognitive processes to confront and resolve real, cross-disciplinary situations where the solution path is not immediately obvious and where the literacy domains or curricular areas that might be applicable are not within a single domain of mathematics, science or reading. (OECD, 2003, p.156)

The assessment of cross-curricular problem solving incorporated three problem types: decision-making (where students make decisions under specified constraints), system analysis and design (where students evaluate and design systems for a particular situation), and trouble-shooting (where students identify why a device is malfunctioning, based on a set of symptoms). Nineteen problem-solving items set in units consisting of two to three items were presented. Although problem-solving items appeared in only seven of the 13 PISA test booklets, scores on the problem solving scale were imputed for all students in PISA 2003.

This chapter presents the results of the assessment of cross-curricular problem solving.

Overall Performance on Problem Solving

Performance on the assessment of cross-curricular problem solving was reported on a single scale with an OECD country average of 500 and a standard deviation of 100. Sixteen countries achieved mean scores that are significantly higher than the OECD country average, including Korea, Finland, and Scotland (Table 2.1). Four countries, including Northern Ireland (mean = 508 points) and the Republic of Ireland (498) had mean scores that are not significantly different from the OECD country average. Eleven countries, including Norway, Poland and the United States of America, had mean scores that are significantly lower.

Students in Northern Ireland achieved a mean score on problem solving that was significantly higher than the mean scores of students in 11 countries, including Norway, Poland, the United States and Italy (Figure 2.1). The mean score of students in Northern Ireland is not significantly different from the mean scores of students in 12 countries, including Switzerland, the Netherlands, France, Germany, Iceland and the Republic of Ireland. The mean scores of students in 7 countries, including Korea, Finland, Japan and Scotland, are significantly higher than Northern Ireland.

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Table 2.1: *Mean Scores and Standard Deviations on Problem Solving, by Country, and Comparisons with OECD Country Average*

Countries in descending order of mean score on problem solving	Mean		Comparison with OECD country average	Standard deviation	
	Score	S.E.		SD	S.E.
Korea	550	(3.1)	+	86.4	(2.0)
Finland	548	(1.9)	+	82.0	(1.2)
Japan	547	(4.1)	+	104.9	(2.7)
New Zealand	533	(2.2)	+	95.7	(1.2)
Australia	530	(2.0)	+	91.4	(1.4)
Canada	529	(1.7)	+	88.4	(0.9)
Scotland	526	(2.3)	+	85.3	(1.6)
Belgium	525	(2.2)	+	103.9	(1.5)
Switzerland	521	(3.0)	+	94.0	(1.9)
Netherlands	520	(3.0)	+	89.4	(2.0)
France	519	(2.7)	+	92.9	(2.1)
Denmark	517	(2.5)	+	87.3	(1.5)
Czech Republic	516	(3.4)	+	92.9	(1.9)
Germany	513	(3.2)	+	94.8	(1.8)
Sweden	509	(2.4)	+	88.4	(1.6)
Northern Ireland	508	(2.8)	0	94.7	(2.1)
Austria	506	(3.2)	0	90.0	(1.7)
Iceland	505	(1.4)	+	84.8	(1.1)
Hungary	501	(2.9)	0	94.1	(2.0)
Republic of Ireland	498	(2.3)	0	79.6	(1.4)
Luxembourg	494	(1.4)	–	91.6	(1.0)
Slovak Republic	492	(3.4)	–	92.8	(2.4)
Norway	490	(2.6)	–	98.8	(1.7)
Poland	487	(2.8)	–	90.4	(1.7)
Spain	482	(2.7)	–	93.6	(1.3)
United States	477	(3.1)	–	98.1	(1.3)
Portugal	470	(3.9)	–	92.5	(2.1)
Italy	469	(3.1)	–	102.2	(2.1)
Greece	448	(4.0)	–	98.8	(1.7)
Turkey	408	(6.0)	–	96.7	(4.4)
Mexico	384	(4.3)	–	96.1	(2.0)
OECD average	500	(0.6)		100.0	(0.4)

+ Country mean score is significantly higher than OECD country average
0 Country mean score is not significantly different from OECD country average
– Country mean score is significantly lower than OECD country average

Figure 2.1:   *Multiple Comparisons of Mean Performance on the Problem Solving Scale, by Country*

Country	Mean Score	S.E.	Korea	Finland	Japan	New Zealand	Australia	Canada	Scotland	Belgium	Switzerland	Netherlands	France	Denmark	Czech Republic	Germany	Sweden	Northern Ireland	Austria	Iceland	Hungary	Rep. of Ireland	Luxembourg	Slovak Republic	Norway	Poland	Spain	United States	Portugal	Italy	Greece	Turkey	Mexico
(column mean)			550	548	547	533	530	529	526	525	521	520	519	517	516	513	509	508	506	505	501	498	494	492	490	487	482	477	470	469	448	408	384
(column S.E.)			3.1	1.9	4.1	2.2	2.0	1.7	2.3	2.2	3.0	3.0	2.7	2.5	3.4	3.2	2.4	2.8	3.2	1.4	2.9	2.3	1.4	3.4	2.6	2.8	2.7	3.1	3.9	3.1	4.0	6.0	4.3
Korea	550	3.1		●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Finland	548	1.9	●		●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Japan	547	4.1	●	●		●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
New Zealand	533	2.2	▼	▼	●		●	●	●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Australia	530	2.0	▼	▼	▼	●		●	●	●	●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Canada	529	1.7	▼	▼	▼	●	●		●	●	●	●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Scotland	526	2.3	▼	▼	▼	●	●	●		●	●	●	●	●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Belgium	525	2.2	▼	▼	▼	●	●	●	●		●	●	●	●	●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Switzerland	521	3.0	▼	▼	▼	▼	●	●	●	●		●	●	●	●	●	●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Netherlands	520	3.0	▼	▼	▼	▼	●	●	●	●	●		●	●	●	●	●	●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
France	519	2.7	▼	▼	▼	▼	▼	●	●	●	●	●		●	●	●	●	●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Denmark	517	2.5	▼	▼	▼	▼	▼	▼	●	●	●	●	●		●	●	●	●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Czech Republic	516	3.4	▼	▼	▼	▼	▼	▼	●	●	●	●	●	●		●	●	●	●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Germany	513	3.2	▼	▼	▼	▼	▼	▼	▼	●	●	●	●	●	●		●	●	●	●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Sweden	509	2.4	▼	▼	▼	▼	▼	▼	▼	▼	●	●	●	●	●	●		●	●	●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Northern Ireland	508	2.8	▼	▼	▼	▼	▼	▼	▼	▼	●	●	●	●	●	●	●		●	●	●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Austria	506	3.2	▼	▼	▼	▼	▼	▼	▼	▼	▼	●	●	●	●	●	●	●		●	●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Iceland	505	1.4	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	●	●	●	●	●		●	●	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hungary	501	2.9	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	●	●	●	●	●		●	●	●	●	▲	▲	▲	▲	▲	▲	▲	▲
Rep. of Ireland	498	2.3	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	●	●	●	●		●	●	●	●	▲	▲	▲	▲	▲	▲	▲
Luxembourg	494	1.4	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	●	●		●	●	●	▲	▲	▲	▲	▲	▲	▲
Slovak Republic	492	3.4	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	●	●	●		●	●	●	▲	▲	▲	▲	▲	▲
Norway	490	2.6	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	●	●	●	●		●	●	▲	▲	▲	▲	▲	▲
Poland	487	2.8	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	●	●	●	●		●	●	▲	▲	▲	▲	▲
Spain	482	2.7	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	●	●	●		●	●	●	▲	▲	▲
United States	477	3.1	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	●	●		●	●	▲	▲	▲
Portugal	470	3.9	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	●	●		●	▲	▲	▲
Italy	469	3.1	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	●	●	●		▲	▲	▲
Greece	448	4.0	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▲	▲
Turkey	408	6.0	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		●
Mexico	384	4.3	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	●	

Key: ▲ Significantly higher than comparison country mean score.
● Not significantly different from comparison country mean score
▼ Significantly lower than comparison country mean score

Performance on Problem Solving at Key Benchmarks

Table 2.2 shows the scores of students scoring at four key benchmarks on the problem solving scale – the 5th, 25th, 75th and 95th percentiles. The score of students at the 5th percentile in a country can be taken as an indicator of performance among lowest-achieving students, while the score of students at the 95th percentile can be taken as a summary of the performance among the highest-achieving students. Students scoring at the 5th percentile in Northern Ireland achieved a score of 348, while their counterparts scoring at the 95th percentile achieved a score of 656 points. These scores can be compared with the scores achieved by students in other countries scoring at these benchmarks, using Table 2.3 as a guide. [Additional data on these comparisons are given in Appendix Tables A2.1 to A2.8].

The scores for students in Northern Ireland are not significantly different from the OECD country average scores at the 5th, 75th and 95th percentiles, while the score for Northern Ireland at the 25th percentile is significantly higher (Table 2.3). Countries that are not significantly different from Northern Ireland at the 5th, 25th, 75th and 95th percentiles include France, the Czech Republic, Germany, Sweden and Austria. The Republic of Ireland has significantly lower scores than Northern Ireland on problem solving at the 75th and 95th percentiles.

Table 2.2 also provides information on the distribution of scores in problem solving in comparison countries by indicating the difference between the 5th and 95th percentiles in each country (second last column). The difference for Northern Ireland is 308 points. This is lower than the OECD average difference of 327, but higher than the difference in a number of countries including Korea (282), Scotland (279) and the Republic of Ireland (261).

The gap between the scores of students at the 25th and 75th percentiles in Northern Ireland is 129 points (Table 2.2, last column). Although smaller than the OECD average difference (137), it is greater than the differences for Korea (116), Finland (110), Scotland (117) and the Republic of Ireland (110). Hence, there is evidence of a wider spread of scores in problem solving in Northern Ireland than in these comparison countries.

Table 2.2: *Distribution of Student Performance on Problem Solving, by Country*

Countries in descending order of mean score in problem solving	Percentiles								95th - 5th Percentiles	75th - 25th Percentiles
	5th		25th		75th		95th			
	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.		
Korea	404	(4.6)	494	(3.9)	610	(3.5)	686	(5.5)	282	116
Finland	409	(4.7)	495	(2.5)	604	(2.3)	677	(3.6)	268	110
Japan	362	(8.3)	481	(5.7)	621	(4.2)	705	(6.0)	343	140
New Zealand	370	(3.8)	468	(3.7)	601	(2.4)	682	(2.8)	313	133
Australia	371	(4.1)	469	(2.8)	594	(2.1)	672	(3.4)	301	125
Canada	379	(2.4)	471	(2.5)	591	(1.9)	669	(2.4)	290	120
Scotland	381	(6.1)	468	(3.4)	585	(2.6)	661	(2.9)	279	117
Belgium	340	(5.0)	456	(3.3)	602	(2.6)	681	(2.0)	341	146
Switzerland	358	(5.7)	461	(3.3)	587	(3.9)	666	(5.2)	308	126
Netherlands	372	(5.9)	456	(4.9)	587	(3.6)	662	(3.7)	290	131
France	358	(6.1)	459	(3.9)	586	(3.1)	662	(4.5)	304	127
Denmark	369	(5.0)	459	(3.1)	578	(2.8)	655	(3.7)	286	120
Czech Republic	356	(8.6)	454	(4.4)	582	(3.6)	663	(4.0)	307	128
Germany	351	(5.9)	447	(4.8)	583	(4.3)	658	(3.2)	308	136
Sweden	360	(6.4)	451	(3.1)	571	(3.1)	647	(3.6)	287	120
Northern Ireland	348	(7.9)	446	(3.7)	575	(3.4)	656	(4.8)	308	129
Austria	357	(5.1)	443	(4.1)	569	(4.0)	651	(4.6)	294	126
Iceland	358	(5.5)	450	(2.2)	564	(2.0)	634	(3.6)	276	115
Hungary	343	(5.8)	436	(3.8)	567	(3.9)	653	(5.4)	310	130
Republic of Ireland	364	(4.5)	445	(3.1)	555	(2.7)	625	(3.2)	261	110
Luxembourg	339	(3.7)	432	(2.4)	558	(2.2)	640	(3.4)	301	126
Slovak Republic	337	(7.1)	430	(4.7)	558	(3.6)	638	(4.2)	302	128
Norway	322	(5.5)	424	(3.7)	559	(3.3)	645	(4.4)	323	134
Poland	338	(5.6)	428	(3.1)	548	(3.0)	632	(4.5)	294	119
Spain	322	(4.8)	421	(3.6)	547	(3.2)	629	(3.3)	308	126
United States	312	(5.6)	410	(4.1)	548	(3.3)	635	(4.2)	323	138
Portugal	311	(7.9)	409	(5.7)	534	(3.6)	614	(3.5)	303	126
Italy	289	(8.7)	406	(4.7)	540	(3.0)	627	(3.6)	338	134
Greece	283	(5.6)	383	(4.5)	517	(4.6)	607	(5.6)	324	134
Turkey	257	(7.8)	343	(5.2)	467	(7.7)	577	(18.6)	320	124
Mexico	227	(5.4)	317	(5.2)	451	(5.1)	542	(6.5)	315	134
OECD average	328	(1.7)	434	(1.1)	571	(0.8)	656	(0.8)	327	137

Table 2.3: *Comparison of Country Scores on Problem Solving at the 5th, 25th, 75th and 95th Percentile Ranks, with OECD Country Average and with Northern Ireland*

Countries in descending order of mean score on problem solving	Comparision with OECD Average Score				Comparision with Score for N. Ireland			
	5th Percentile	25th Percentile	75th Percentile	95th Percentile	5th Percentile	25th Percentile	75th Percentile	95th Percentile
Korea	+	+	+	+	+	+	+	+
Finland	+	+	+	+	+	+	+	+
Japan	+	+	+	+	0	+	+	+
New Zealand	+	+	+	+	0	+	+	+
Australia	+	+	+	0	0	+	+	0
Canada	+	+	+	0	+	+	+	0
Scotland	+	+	+	0	+	+	0	0
Belgium	0	+	+	+	0	0	+	+
Switzerland	+	+	+	0	0	0	0	0
Netherlands	+	+	+	0	0	0	0	0
France	+	+	+	0	0	0	0	0
Denmark	+	+	0	0	0	0	0	0
Czech Republic	0	+	0	0	0	0	0	0
Germany	+	0	0	0	0	0	0	0
Sweden	+	+	0	0	0	0	0	0
Northern Ireland	0	+	0	0				
Austria	+	0	0	0	0	0	0	0
Iceland	+	+	0	–	0	0	0	–
Hungary	0	0	0	0	0	0	0	0
Republic of Ireland	+	+	–	–	0	0	–	–
Luxembourg	0	0	–	–	0	0	–	0
Slovak Republic	0	0	–	–	0	0	–	0
Norway	0	0	–	0	0	–	–	0
Poland	0	0	–	–	0	–	–	–
Spain	0	0	–	–	0	–	–	–
United States	0	–	–	–	–	–	–	–
Portugal	0	–	–	–	–	–	–	–
Italy	–	–	–	–	–	–	–	–
Greece	–	–	–	–	–	–	–	–
Turkey	–	–	–	–	–	–	–	–
Mexico	–	–	–	–	–	–	–	–

Data columns 1-8 are based on Tables A1 to A8, respectively.

+ Country score is significantly higher than OECD average (data columns 1-4) or average for N. Ireland (5-8)
0 Country score is not significantly different from OECD average (data columns 1-4) or average for N. Ireland (5-8)
− Country score is significantly lower than OECD average (data columns 1-4) or average for N. Ireland (5-8)

Gender Differences on Problem Solving

Table 2.4 gives the mean scores of girls and boys on problem solving in each country. In 19 countries, including Northern Ireland, girls have a higher mean score than boys. However, the difference is statistically significant in just four – Finland, Sweden, Iceland and Norway. Although boys had higher mean scores than girls in 10 countries, including Korea, Denmark and the Slovak Republic, none of the differences is statistically significant.

Table 2.5 compares the mean problem solving score obtained by girls in Northern Ireland with mean scores obtained by girls in other countries. The table shows that girls in six countries, including Canada, New Zealand and Australia, achieved significantly higher mean scores than girls in Northern Ireland. Girls in 13 countries, including Scotland, France, and the Republic of Ireland, had mean scores that were not significantly different from the mean score of girls in Northern Ireland. Girls in 11 countries, including the Slovak Republic, Norway and the United States, had mean scores that were significantly lower than the mean score of girls in Northern Ireland.

Table 2.6 looks at how boys in Northern Ireland compared with boys in each comparison country in terms of their mean scores on problem solving. The table shows that boys in eight countries, including Canada, New Zealand, Australia and Scotland, achieved significantly higher mean scores than boys in Northern Ireland. Boys in 15 countries, including the Netherlands, France, and the Republic of Ireland, had mean scores that were not significantly different from the mean score of boys in Northern Ireland. Boys in seven countries, including Spain and the United States, had mean scores that were significantly lower than the mean score of boys in Northern Ireland.

Table 2.7 compares the performance of students in Northern Ireland scoring at the 5th, 25th, 75th and 95th percentiles with their same-gender counterparts in other countries. The table shows that, where girls are concerned, just three countries had significantly higher scores than Northern Ireland at the 5th percentile, five at the 25th percentile, six at the 75th percentile, and just one country (Japan) had a significantly higher score at the 95th percentile. The table also shows that, for boys, two countries (Korea and Finland) had higher scores than Northern Ireland at the 5th percentile, four at the 25th percentile, seven at the 75th percentile, and four at the 95th percentile. The scores of students in Scotland did not differ from those of students in Northern Ireland at any of these benchmarks. [Additional data on these comparisons are given in Appendix Tables A2.9 to A2.16].

Table 2.4: *Mean Scores on Cross-curricular Problem Solving, by Gender and Country*

Countries in order of ascending size of difference between girls and boys on problem solving	Girls		Boys		Difference (Advantage to Girls)	S.E. of the Difference	Significant Difference within Country?
	Mean	S.E.	Mean	S.E.			
Iceland	520	(2.5)	490	(2.2)	-30	(3.9)	Girls +
Northern Ireland	513	(4.0)	503	(5.1)	-11	(7.3)	0
Finland	553	(2.2)	543	(2.5)	-10	(3.0)	Girls +
Sweden	514	(2.8)	504	(3.0)	-10	(3.1)	Girls +
Norway	494	(3.2)	486	(3.1)	-8	(3.6)	Girls +
Australia	533	(2.5)	527	(2.7)	-6	(3.3)	0
Spain	485	(2.6)	479	(3.6)	-6	(3.1)	0
Germany	517	(3.7)	511	(3.9)	-6	(3.9)	0
Scotland	528	(3.1)	523	(3.2)	-5	(4.3)	0
Belgium	527	(3.2)	522	(3.1)	-5	(4.5)	0
Italy	471	(3.5)	467	(5.0)	-4	(6.0)	0
Hungary	503	(3.4)	499	(3.4)	-4	(3.7)	0
New Zealand	534	(3.1)	531	(2.6)	-3	(3.8)	0
Austria	508	(3.8)	505	(3.9)	-3	(4.3)	0
Switzerland	523	(3.3)	520	(4.0)	-2	(4.1)	0
Japan	548	(4.1)	546	(5.7)	-2	(5.7)	0
Poland	487	(3.0)	486	(3.4)	-1	(3.1)	0
United States	478	(3.5)	477	(3.4)	-1	(3.0)	0
France	520	(2.9)	519	(3.8)	-1	(4.1)	0
Portugal	470	(3.9)	470	(4.6)	0	(3.5)	0
Canada	532	(1.8)	533	(2.0)	0	(2.1)	0
Republic of Ireland	498	(3.5)	499	(2.8)	1	(4.2)	0
Greece	448	(4.1)	450	(4.9)	2	(4.4)	0
Turkey	406	(5.8)	408	(7.3)	2	(5.8)	0
Luxembourg	493	(1.9)	495	(2.4)	2	(3.3)	0
Netherlands	518	(3.6)	522	(3.6)	4	(4.1)	0
Denmark	514	(2.9)	519	(3.1)	5	(3.2)	0
Mexico	382	(4.7)	387	(5.0)	5	(4.5)	0
Czech Republic	513	(4.3)	520	(4.1)	7	(5.0)	0
Slovak Republic	488	(3.6)	495	(4.1)	7	(3.7)	0
Korea	546	(4.8)	554	(4.0)	8	(6.1)	0
OECD average	501	(0.8)	499	(0.8)	2	(0.8)	0

Girls+ Within country mean score significantly higher for girls
0 Within country mean scores for boys and girls not significantly different
Boys+ Within country mean score significantly higher for boys

Table 2.5: *Mean Score of Girls on Problem Solving, by Country, and Comparison with Northern Ireland*

Countries ordered in ascending size of difference from N. Ireland mean score on problem solving - girls	Girls				
	Mean	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland?
Mexico	382	(4.7)	-131	(6.2)	–
Turkey	406	(5.8)	-107	(7.1)	–
Greece	448	(4.1)	-66	(5.8)	–
Portugal	470	(3.9)	-43	(5.6)	–
Italy	471	(3.5)	-42	(5.4)	–
United States	478	(3.5)	-35	(5.4)	–
Spain	485	(2.6)	-28	(4.8)	–
Poland	487	(3.0)	-26	(5.0)	–
Slovak Republic	488	(3.6)	-25	(5.4)	–
Luxembourg	493	(1.9)	-21	(4.5)	–
Norway	494	(3.2)	-19	(5.2)	–
Republic of Ireland	498	(3.5)	-15	(5.4)	0
Hungary	503	(3.4)	-10	(5.3)	0
Austria	508	(3.8)	-6	(5.6)	0
Czech Republic	513	(4.3)	0	(5.9)	0
Sweden	514	(2.8)	0	(4.9)	0
Denmark	514	(2.9)	1	(5.0)	0
Germany	517	(3.7)	4	(5.5)	0
Netherlands	518	(3.6)	5	(5.4)	0
France	520	(2.9)	6	(5.0)	0
Iceland	520	(2.5)	7	(4.8)	0
Switzerland	523	(3.3)	9	(5.2)	0
Belgium	527	(3.2)	14	(5.2)	0
Scotland	528	(3.1)	15	(5.1)	0
Canada	532	(1.8)	19	(4.4)	+
Australia	533	(2.5)	20	(4.8)	+
New Zealand	534	(3.1)	21	(5.1)	+
Korea	546	(4.8)	32	(6.3)	+
Japan	548	(4.1)	35	(5.8)	+
Finland	553	(2.2)	39	(4.6)	+
Northern Ireland	513	(4.0)			

+ Country mean score is significantly higher than mean score for N. Ireland
0 Country mean score not significantly different from mean score for N. Ireland
– Country mean score is significantly lower than mean score for N. Ireland

Table 2.6: *Mean Score of Boys on Problem Solving, by Country, and Comparison with Northern Ireland*

Countries ordered in ascending size of difference from N. Ireland mean score on problem solving - boys	Boys				
	Mean	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland?
Mexico	387	(5.0)	-115	(7.2)	–
Turkey	408	(7.3)	-94	(8.9)	–
Greece	450	(4.9)	-53	(7.1)	–
Italy	467	(5.0)	-35	(7.2)	–
Portugal	470	(4.6)	-33	(6.9)	–
United States	477	(3.4)	-26	(6.2)	–
Spain	479	(3.6)	-23	(6.3)	–
Norway	486	(3.1)	-17	(6.0)	0
Poland	486	(3.4)	-16	(6.2)	0
Iceland	490	(2.2)	-13	(5.6)	0
Luxembourg	495	(2.4)	-8	(5.7)	0
Slovak Republic	495	(4.1)	-7	(6.6)	0
Republic of Ireland	499	(2.8)	-4	(5.9)	0
Hungary	499	(3.4)	-3	(6.2)	0
Sweden	504	(3.0)	1	(6.0)	0
Austria	505	(3.9)	2	(6.5)	0
Germany	511	(3.9)	8	(6.5)	0
France	519	(3.8)	16	(6.4)	0
Denmark	519	(3.1)	17	(6.0)	0
Czech Republic	520	(4.1)	17	(6.6)	0
Switzerland	520	(4.0)	18	(6.5)	0
Netherlands	522	(3.6)	20	(6.3)	0
Belgium	522	(3.1)	20	(6.0)	+
Scotland	523	(3.2)	20	(6.1)	+
Australia	527	(2.7)	24	(5.8)	+
New Zealand	531	(2.6)	29	(5.8)	+
Canada	533	(2.0)	30	(5.5)	+
Finland	543	(2.5)	40	(5.7)	+
Japan	546	(5.7)	44	(7.7)	+
Korea	554	(4.0)	51	(6.5)	+
Northern Ireland	503	(5.1)			

+ Country mean score is significantly higher than mean score for N. Ireland
0 Country mean score not significantly different from mean score for N. Ireland
– Country mean score is significantly lower than mean score for N. Ireland

Table 2.7: *Comparisons of Country Scores on Problem Solving at the 5th, 25th, 75th and 95th Percentiles, with Scores in Northern Ireland, by Gender*

Countries in descending order of mean score on problem solving	Girls - Score at Percentile Rank Compared with N. Ireland				Boys - Score at Percentile Rank Compared with N. Ireland			
	5th Percentile	25th Percentile	75th Percentile	95th Percentile	5th Percentile	25th Percentile	75th Percentile	95th Percentile
Korea	+	+	+	0	+	+	+	+
Finland	+	+	+	0	+	+	+	0
Japan	0	+	+	+	0	+	+	+
New Zealand	0	0	+	0	0	0	+	+
Australia	0	+	+	0	0	0	+	0
Canada	+	+	0	0	0	+	+	0
Scotland	0	0	0	0	0	0	0	0
Belgium	0	0	+	0	0	0	+	+
Switzerland	0	0	0	0	0	0	0	0
Netherlands	0	0	0	0	0	0	0	0
France	0	0	0	0	0	0	0	0
Denmark	0	0	0	0	0	0	0	0
Czech Republic	0	0	0	0	0	0	0	0
Germany	0	0	0	0	0	0	0	0
Sweden	0	0	0	0	0	0	0	0
Northern Ireland								
Austria	0	0	0	0	0	0	0	0
Iceland	0	0	0	0	0	0	–	0
Hungary	0	0	0	0	0	0	0	0
Republic of Irelan	0	0	–	–	0	0	0	0
Luxembourg	0	0	–	0	0	0	0	0
Slovak Republic	0	0	–	–	0	0	0	0
Norway	0	0	0	0	0	0	0	0
Poland	0	0	–	–	0	0	–	0
Spain	0	–	–	–	0	0	–	0
United States	–	–	–	0	0	0	–	0
Portugal	–	–	–	–	0	–	–	–
Italy	–	–	–	–	–	–	–	0
Greece	–	–	–	–	–	–	–	–
Turkey	–	–	–	–	–	–	–	–
Mexico	–	–	–	–	–	–	–	–

Data columns 1-8 are based on Appendix Tables A2.9 to A2.16, respectively.

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

3.   Achievement on Reading Literacy

Reading literacy was a minor assessment domain in PISA 2003. This meant that, relative to PISA 2000, fewer items were used to assess reading literacy, and it was not possible to report performance on subscales.

Overall Performance on Reading Literacy

Overall country mean scores in reading literacy in 2003 are reported in Table 3.1. The mean score for Northern Ireland was 517 scale score points. This is significantly higher than the OECD country average of 494 points. Other countries with mean scores that are significantly higher than the OECD country average include Finland (543, the highest-scoring country), Scotland (516) and the Republic of Ireland (515).

The table also shows that the standard deviation for Northern Ireland (98 points) is close to the OECD country average standard deviation of 100, but somewhat larger than the standard deviations of countries with similar levels of overall achievement, including Scotland (86), the Republic of Ireland (87) and the Netherlands (85). This indicates a broader range of achievement in Northern Ireland relative to these comparison countries.

Performance on Reading Literacy at Key Benchmarks

Table 3.2 provides the scores of students in Northern Ireland and in other countries at four key benchmarks (the 5th, 25th, 75th and 95th percentile ranks), as well as differences between scores at these benchmarks. For Northern Ireland, the difference between the 5th and the 95th percentile ranks is 319 points. This is marginally lower than the OECD average difference of 329, but is greater than the difference for a number of countries with high levels of reading literacy, including Korea (266), Canada (291), Scotland (281) and the Republic of Ireland (284). This indicates that the spread of achievement, defined here as the gap between the scores of students at these benchmarks, is somewhat greater in Northern Ireland than in these comparison countries.

A similar analysis, using the difference between the 25th and 75th percentiles, shows a spread of scores in Northern Ireland (133) that is much greater than that found in Finland (105 points) and Korea (106), and somewhat greater than in the Republic of Ireland (117) and Scotland (116). On the other hand, countries such as Germany (153), Belgium (146) and Austria (142) have larger differences between the 25th and 75th percentiles than Northern Ireland.

Table 3.3 (first four data columns) shows that students in Northern Ireland achieve scores in reading literacy that are significantly above the OECD country average score at the 5th, 25th, 75th and 95th percentiles. Other countries with this pattern include Finland, Canada, Australia and Sweden. Although students at the 5th, 25th and 75th percentiles in Scotland, the Republic of Ireland and the Netherlands are above the OECD average at these benchmarks, students at the 95th percentile in these countries achieve scores that are not significantly different from the OECD average. Hence, in these countries, higher-achieving students do less well than might be expected, based

on overall performance on reading literacy. [Additional data on these comparisons are given in Appendix Tables A3.1 to A3.4].

Table 3.3 (last four data columns) shows the performance of students at key benchmarks in other countries relative to their counterparts in Northern Ireland. For example, students in Finland and Korea scoring at the 5th percentile achieve significantly higher scores than students in Northern Ireland scoring at the same benchmark. Whereas students scoring at the 25th percentile in both the Republic of Ireland and Scotland achieve significantly higher scores than their counterparts in Northern Ireland, students scoring at the 95th percentile in the two countries achieve scores that are significantly lower than students in Northern Ireland. [Additional data on these comparisons are given in Appendix Tables A3.5 to A3.8].

Table 3.1: *Mean Scores and Standard Deviations on Reading Literacy, by Country, and Comparisons with OECD Country Average*

Countries in descending order of mean score on reading literacy	Mean		Comparison with OECD country average	Standard deviation	
	Score	S.E.		SD	S.E.
Finland	543	(1.6)	+	81	1.1
Korea	534	(3.1)	+	83	2.0
Canada	528	(1.7)	+	89	0.9
Australia	525	(2.1)	+	97	1.5
New Zealand	522	(2.5)	+	105	1.5
Northern Ireland	517	(3.1)	+	98	2.7
Scotland	516	(2.5)	+	86	1.7
Republic of Ireland	515	(2.6)	+	87	1.7
Sweden	514	(2.4)	+	96	1.9
Netherlands	513	(2.9)	+	85	2.0
Belgium	508	(2.6)	+	109	2.2
Norway	500	(2.8)	0	102	1.8
Switzerland	499	(3.3)	0	95	1.9
Japan	498	(3.9)	0	106	2.5
Poland	497	(2.9)	0	96	1.8
France	496	(2.7)	0	97	2.2
United States	495	(3.2)	0	101	1.4
Denmark	492	(2.8)	0	88	1.8
Iceland	492	(1.6)	0	98	1.4
Germany	491	(3.4)	0	109	2.3
Austria	491	(3.8)	0	103	2.3
Czech Republic	489	(3.5)	0	96	2.4
Hungary	482	(2.5)	–	92	1.8
Spain	481	(2.6)	–	95	1.5
Luxembourg	479	(1.5)	–	100	1.0
Portugal	478	(3.7)	–	93	2.1
Italy	476	(3.0)	–	101	2.2
Greece	472	(4.1)	–	105	2.0
Slovak Republic	469	(3.1)	–	93	2.0
Turkey	441	(5.8)	–	95	4.1
Mexico	400	(4.1)	–	95	1.9
OECD average	494	(0.6)		100	0.4

+ Country mean score is significantly higher than OECD country average
0 Country mean score is not significantly different from OECD country average
– Country mean score is significantly lower than OECD country average

Table 3.2: *Distribution of Student Performance in Reading Literacy, by Country*

Countries in descending order of mean score in reading literacy	Percentiles								95th - 5th Percentiles	75th - 25th Percentiles
	5th		25th		75th		95th			
	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.		
Finland	400	(4.8)	494	(2.4)	599	(1.7)	666	(2.5)	266	105
Korea	393	(6.0)	484	(4.1)	590	(2.8)	660	(5.0)	266	106
Canada	373	(3.1)	472	(2.3)	590	(2.1)	663	(2.5)	291	118
Australia	352	(4.8)	464	(3.0)	594	(2.5)	673	(3.1)	321	129
New Zealand	338	(6.2)	453	(3.5)	596	(2.8)	682	(3.4)	344	143
Northern Ireland	348	(7.2)	453	(4.5)	586	(4.3)	667	(4.0)	319	133
Scotland	365	(7.2)	461	(3.5)	577	(3.2)	646	(3.9)	281	116
Republic of Ireland	364	(7.3)	460	(3.8)	577	(2.8)	647	(3.3)	284	117
Sweden	349	(6.0)	453	(3.4)	582	(2.9)	660	(3.6)	312	128
Netherlands	369	(6.4)	454	(4.5)	576	(3.2)	645	(4.2)	276	122
Belgium	302	(8.4)	441	(3.7)	587	(2.1)	662	(3.5)	360	146
Norway	321	(6.1)	434	(3.8)	571	(3.6)	656	(3.9)	335	136
Switzerland	330	(5.8)	439	(4.5)	565	(3.7)	643	(5.0)	313	127
Japan	310	(7.3)	431	(5.4)	574	(3.7)	652	(4.7)	342	143
Poland	330	(6.3)	436	(3.6)	563	(3.1)	645	(4.4)	315	126
France	320	(7.7)	436	(4.0)	565	(2.8)	641	(3.3)	320	129
United States	319	(6.6)	429	(4.1)	568	(3.6)	651	(4.5)	332	139
Denmark	338	(6.6)	438	(4.0)	553	(3.0)	627	(3.9)	289	116
Iceland	316	(6.4)	431	(2.3)	560	(2.2)	640	(3.6)	323	130
Germany	295	(6.0)	419	(5.6)	572	(3.4)	652	(3.9)	357	153
Austria	313	(7.5)	423	(4.9)	565	(4.2)	646	(4.7)	333	142
Czech Republic	320	(9.5)	428	(4.7)	555	(4.0)	636	(4.0)	316	127
Hungary	324	(6.0)	422	(3.3)	546	(3.3)	625	(5.0)	301	124
Spain	313	(5.8)	421	(3.4)	548	(2.8)	625	(3.1)	312	128
Luxembourg	302	(3.8)	416	(2.8)	551	(1.9)	627	(2.7)	325	136
Portugal	311	(6.6)	418	(5.2)	544	(3.5)	617	(3.9)	306	126
Italy	295	(8.6)	411	(4.4)	547	(2.5)	627	(2.6)	332	136
Greece	288	(6.2)	406	(5.2)	546	(4.4)	631	(5.4)	343	140
Slovak Republic	310	(5.7)	408	(4.6)	535	(3.2)	613	(3.5)	303	127
Turkey	291	(6.1)	377	(5.7)	500	(6.6)	608	(19.4)	317	123
Thailand	293	(4.9)	366	(3.1)	472	(3.6)	550	(5.3)	257	106
Mexico	238	(6.1)	335	(4.9)	467	(4.3)	552	(5.5)	314	131
OECD average	318	(1.4)	430	(1.0)	565	(0.6)	646	(0.7)	329	135

Table 3.3: *Comparison of Country Scores on Reading Literacy at the 5th, 25th, 75th and 95th Percentile Ranks, with OECD Country Average and with Northern Ireland*

Countries in descending order of mean score on reading literacy	Comparision with OECD Average Score				Comparision with Score for N. Ireland			
	5th Percentile	25th Percentile	75th Percentile	95th Percentile	5th Percentile	25th Percentile	75th Percentile	95th Percentile
Finland	+	+	+	+	+	+	0	0
Korea	+	+	+	0	+	+	0	0
Canada	+	+	+	+	0	+	0	0
Australia	+	+	+	+	0	+	0	0
New Zealand	0	+	+	+	0	0	0	0
Northern Ireland	+	+	+	+				
Scotland	+	+	+	0	0	+	0	–
Republic of Ireland	+	+	+	0	0	+	0	–
Sweden	+	+	+	+	0	0	0	0
Netherlands	+	+	+	0	0	+	0	–
Belgium	0	0	+	+	–	0	0	0
Norway	0	0	0	0	0	0	0	0
Switzerland	0	0	0	0	0	0	–	–
Japan	0	0	0	0	–	0	0	0
Poland	0	0	0	0	0	0	–	–
France	0	0	0	0	0	0	–	–
United States	0	0	0	0	0	–	–	0
Denmark	0	0	–	–	0	0	–	–
Iceland	0	0	0	0	–	–	–	–
Germany	–	0	0	0	–	–	0	0
Austria	0	0	0	0	–	–	–	–
Czech Republic	0	0	0	0	0	–	–	–
Hungary	0	0	–	–	0	–	–	–
Spain	0	0	–	–	–	–	–	–
Luxembourg	0	–	–	–	–	–	–	–
Portugal	0	0	–	–	–	–	–	–
Italy	0	–	–	–	–	–	–	–
Greece	–	–	–	0	–	–	–	–
Slovak Republic	0	–	–	–	–	–	–	–
Turkey	–	–	–	–	–	–	–	–
Mexico	–	–	–	–	–	–	–	–

Data columns 1-8 are based on Tables A3.1 to A3.8, respectively.

+ Country score is significantly higher than OECD average (data columns 1-4) or score for N. Ireland (5-8)
0 Country score is not significantly different from OECD average (data columns 1-4) or score for N. Ireland (5-8)
– Country score is significantly lower than OECD average (data columns 1-4) or score for N. Ireland (5-8)

Gender Differences on Reading Literacy

Table 3.4 provides the mean scores in reading literacy for girls and boys, by country. Girls in Northern Ireland achieved a mean score of 533, while boys achieved a mean score of 500. The difference – 33 points, or about one-third of an international standard deviation – is statistically significant, and is close to the OECD average country difference of 34 points. In all participating countries, girls have a significantly higher mean score than boys, with Iceland (58 points) showing the largest difference, and Mexico, Korea and the Netherlands showing the smallest (21). The difference in the Republic of Ireland was 29 points, while in Scotland it was 24.

Table 3.5 compares the mean scores of girls in Northern Ireland with the mean scores of girls in the comparison countries. Girls in just one country, Finland, have a significantly higher mean score (by 32 score points) than girls in Northern Ireland. Although slightly lower, the mean scores for girls in the Republic of Ireland (530) and Scotland (527) are not significantly different from Northern Ireland (533).

Table 3.6 compares the mean scores of boys in Northern Ireland with the mean scores of boys in the comparison countries. Boys in just two countries, Korea (525) and Finland (521), have significantly higher mean scores than boys in Northern Ireland (500). Countries with mean scores for boys that are not significantly different from Northern Ireland include the Republic of Ireland (501) and Scotland (504).

The first four data columns in Table 3.7 compare the scores of girls in Northern Ireland at the 5th, 25th, 75th and 95th percentiles with their counterparts in each comparison country. Just one country, Finland, has significantly higher scores at the 5th and 25th percentiles than Northern Ireland. No country has significantly higher scores at the 75th and 95th percentiles. The scores of girls in the Republic of Ireland and Scotland are not significantly different to those of girls in Northern Ireland at any of the 4 benchmarks. [Additional data relevant to these comparisons may be found in Appendix Tables A3.9 to A3.12].

The last four data columns in Table 3.7 compare the scores of boys in Northern Ireland at the 5th, 25th, 75th and 95th percentiles with their counterparts in each comparison country. Just two countries, Finland and Korea, have significantly higher scores than Northern Ireland at the 5th and 25th percentiles. No countries have significantly higher scores at the 75th or 95th percentiles. The scores of boys in the Republic of Ireland and Scotland are not significantly different from the scores of boys in Northern Ireland at any of the four benchmarks. [Additional data relevant to these comparisons may be found in Appendix Tables A3.13 to A3.16].

Table 3.4   *Mean Scores on Reading Literacy, by Gender and Country*

Countries in order of ascending size of difference between girls and boys on reading literacy	Girls		Boys		Difference (Advantage to Girls)	S.E. of the Difference	Significant Difference within Country?
	Mean	S.E.	Mean	S.E.			
Netherlands	524	(3.2)	503	(3.7)	21	(3.9)	Girls +
Korea	547	(4.3)	525	(3.7)	21	(5.6)	Girls +
Mexico	410	(4.6)	389	(4.6)	21	(4.4)	Girls +
Japan	509	(4.1)	487	(5.5)	22	(5.4)	Girls +
Scotland	527	(3.4)	504	(3.2)	24	(4.4)	Girls +
Denmark	505	(3.0)	479	(3.3)	25	(2.9)	Girls +
New Zealand	535	(3.3)	508	(3.1)	28	(4.4)	Girls +
Republic of Ireland	530	(3.7)	501	(3.3)	29	(4.6)	Girls +
Hungary	498	(3.0)	467	(3.2)	31	(3.8)	Girls +
Czech Republic	504	(4.4)	473	(4.1)	31	(4.9)	Girls +
Canada	546	(1.8)	514	(2.0)	32	(2.0)	Girls +
United States	511	(3.5)	479	(3.7)	32	(3.3)	Girls +
Slovak Republic	486	(3.3)	453	(3.8)	33	(3.5)	Girls +
Luxembourg	496	(1.8)	463	(2.6)	33	(3.4)	Girls +
Northern Ireland	533	(4.3)	500	(5.3)	33	(7.8)	Girls +
Turkey	459	(6.1)	426	(6.8)	33	(5.8)	Girls +
Switzerland	517	(3.1)	482	(4.4)	35	(4.7)	Girls +
Portugal	495	(3.7)	459	(4.3)	36	(3.3)	Girls +
Sweden	533	(2.9)	496	(2.8)	37	(3.2)	Girls +
Belgium	526	(3.3)	489	(3.8)	37	(4.7)	Girls +
Greece	490	(4.0)	453	(5.1)	37	(4.1)	Girls +
France	514	(3.2)	476	(3.8)	38	(4.5)	Girls +
Spain	500	(2.5)	461	(3.8)	39	(3.9)	Girls +
Australia	545	(2.6)	506	(2.8)	39	(3.6)	Girls +
Italy	495	(3.4)	455	(5.1)	39	(6.0)	Girls +
Poland	516	(3.2)	477	(3.6)	40	(3.7)	Girls +
Germany	513	(3.9)	471	(4.2)	42	(4.6)	Girls +
Finland	565	(2.0)	521	(2.2)	44	(2.7)	Girls +
Austria	514	(4.2)	467	(4.5)	47	(5.2)	Girls +
Norway	525	(3.4)	475	(3.4)	49	(3.7)	Girls +
Iceland	522	(2.2)	464	(2.3)	58	(3.5)	Girls +
OECD average	511	(0.7)	477	(0.7)	34	(0.8)	Girls +

Girls+ Within country mean score significantly higher for girls
0 Within country mean scores for boys and girls not significantly different
Boys+ Within country mean score significantly higher for boys

Table 3.5   *Mean Scores of Girls on Reading Literacy, by Country, and Comparison with Northern Ireland*

Countries ordered in ascending size of difference from N. Ireland mean score on reading literacy - girls	Girls				
	Mean	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland?
Mexico	410	4.57	-123	(6.3)	–
Turkey	459	6.12	-74	(7.5)	–
Slovak Republic	486	3.32	-47	(5.5)	–
Greece	490	3.96	-43	(5.9)	–
Italy	495	3.40	-39	(5.5)	–
Portugal	495	3.72	-38	(5.7)	–
Luxembourg	496	1.84	-38	(4.7)	–
Hungary	498	3.05	-35	(5.3)	–
Spain	500	2.48	-33	(5.0)	–
Czech Republic	504	4.42	-29	(6.2)	–
Denmark	505	2.98	-28	(5.3)	–
Japan	509	4.07	-24	(6.0)	–
United States	511	3.55	-22	(5.6)	–
Germany	513	3.91	-20	(5.8)	–
France	514	3.18	-19	(5.4)	–
Austria	514	4.21	-19	(6.1)	0
Poland	516	3.19	-17	(5.4)	0
Switzerland	517	3.10	-16	(5.3)	0
Iceland	522	2.22	-12	(4.9)	0
Netherlands	524	3.20	-9	(5.4)	0
Norway	525	3.38	-9	(5.5)	0
Belgium	526	3.30	-7	(5.5)	0
Scotland	527	3.35	-6	(5.5)	0
Republic of Ireland	530	3.71	-3	(5.7)	0
Sweden	533	2.89	-1	(5.2)	0
New Zealand	535	3.29	2	(5.5)	0
Australia	545	2.55	12	(5.0)	0
Canada	546	1.82	12	(4.7)	0
Korea	547	4.27	13	(6.1)	0
Finland	565	1.97	32	(4.8)	+
Northern Ireland	533	4.35			

+ Country mean score is significantly higher than mean score for N. Ireland
0 Country mean score not significantly different from mean score for N. Ireland
– Country mean score is significantly lower than mean score for N. Ireland

Table 3.6 *Mean Scores of Boys on Reading Literacy, by Country, and Comparison with Northern Ireland*

Countries ordered in ascending size of difference from N. Ireland mean score on reading literacy - boys	Boys				
	Mean	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland?
Mexico	389	(4.6)	-112	(7.0)	—
Turkey	426	(6.8)	-74	(8.6)	–
Greece	453	(5.1)	-47	(7.4)	–
Slovak Republic	453	(3.8)	-47	(6.6)	–
Italy	455	(5.1)	-45	(7.4)	–
Portugal	459	(4.3)	-42	(6.8)	–
Spain	461	(3.8)	-40	(6.5)	–
Luxembourg	463	(2.6)	-38	(5.9)	–
Iceland	464	(2.3)	-36	(5.8)	–
Austria	467	(4.5)	-33	(7.0)	–
Hungary	467	(3.2)	-33	(6.2)	–
Germany	471	(4.2)	-29	(6.8)	–
Czech Republic	473	(4.1)	-27	(6.7)	–
Norway	475	(3.4)	-25	(6.3)	–
France	476	(3.8)	-24	(6.5)	–
Poland	477	(3.6)	-23	(6.4)	–
United States	479	(3.7)	-21	(6.5)	0
Denmark	479	(3.3)	-21	(6.3)	–
Switzerland	482	(4.4)	-18	(6.9)	0
Japan	487	(5.5)	-14	(7.6)	0
Belgium	489	(3.8)	-11	(6.5)	0
Sweden	496	(2.8)	-4	(6.0)	0
Republic of Ireland	501	(3.3)	1	(6.3)	0
Netherlands	503	(3.7)	3	(6.5)	0
Scotland	504	(3.2)	3	(6.2)	0
Australia	506	(2.8)	6	(6.0)	0
New Zealand	508	(3.1)	7	(6.2)	0
Canada	514	(2.0)	14	(5.7)	0
Finland	521	(2.2)	21	(5.8)	+
Korea	525	(3.7)	25	(6.5)	+
Northern Ireland	500	(5.3)			

+ Country mean score is significantly higher than mean score for N. Ireland
0 Country mean score not significantly different from mean score for N. Ireland
− Country mean score is significantly lower than mean score for N. Ireland

Table 3.7: *Comparisons of Country Scores on Reading Literacy at 5th, 25th, 75th and 95th Percentiles, with Scores in Northern Ireland, by Gender*

Countries in descending order of mean score on reading literacy	Girls - Score at Percentile Rank Compared with N. Ireland				Boys - Score at Percentile Rank Compared with N. Ireland			
	5th Percentile	25th Percentile	75th Percentile	95th Percentile	5th Percentile	25th Percentile	75th Percentile	95th Percentile
Finland	+	+	0	0	+	+	0	0
Korea	0	0	0	0	+	+	0	0
Canada	0	0	0	0	0	0	0	0
Australia	0	0	0	0	0	0	0	0
New Zealand	0	0	0	0	0	0	0	0
Northern Ireland								
Scotland	0	0	0	0	0	0	0	0
Republic of Ireland	0	0	0	0	0	0	0	0
Sweden	0	0	0	0	0	0	0	0
Netherlands	0	0	0	0	0	0	0	0
Belgium	0	0	0	0	0	0	0	0
Norway	0	0	0	0	0	0	–	0
Switzerland	0	0	0	0	0	0	–	0
Japan	–	0	0	0	0	0	0	0
Poland	0	0	0	0	0	0	–	0
France	0	0	0	0	0	0	–	–
United States	0	0	0	0	0	0	0	0
Denmark	0	0	–	–	0	0	–	–
Iceland	0	0	0	0	0	–	–	–
Germany	–	0	0	0	0	–	0	0
Austria	0	0	0	0	0	–	–	–
Czech Republic	0	0	–	–	0	0	–	–
Hungary	0	–	–	–	0	–	–	–
Spain	0	–	–	–	0	0	–	–
Luxembourg	–	–	–	–	0	–	–	–
Portugal	0	–	–	–	0	–	–	–
Italy	–	–	–	–	0	–	–	–
Greece	–	–	–	–	0	–	–	–
Slovak Republic	–	–	–	–	0	–	–	–
Turkey	–	–	–	–	0	–	–	–
Mexico	–	–	–	–	–	–	–	–

Data columns 1-8 are based on Appendix Tables A3.9 to A3.16, respectively.

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

4.   Achievement on Scientific Literacy

Scientific literacy was a minor assessment domain in PISA in 2000 and 2003. Hence, performance is reported on a single scale only. This chapter summarises aspects of performance on scientific literacy.

Overall Performance on Scientific Literacy

Mean scores are reported in Table 4.1. The mean score for Northern Ireland was 524 scale score points. This is significantly higher than the OECD country average of 500 points. Other countries with mean scores that are significantly higher than the OECD country average include Finland (548), Japan (548), Korea (538), Scotland (514) and the Republic of Ireland (505).

The table also shows that the standard deviation for Northern Ireland is the same as the OECD country average standard deviation of 105, but somewhat larger than Finland (91), the Republic of Ireland (93) and Scotland (100), countries that also had mean scores above the OECD country average score. This indicates a broader range of achievement in Northern Ireland relative to these comparison countries.

Performance on Scientific Literacy at Key Benchmarks

Table 4.2 provides the scores of students in Northern Ireland and in other countries at four key benchmarks on the scientific literacy scale – the 5th, 25th, 75th and 95th percentile ranks. These scores can be used to examine the range of achievement in a country, as well as the performance of very high and very low achievers.

The difference between the 5th and 95th percentiles (an indicator of the spread of achievement in a country) ranges from 287 (Mexico) to 365 (Germany). The difference for Northern Ireland (344 points) is identical to the OECD average difference, and is greater than the difference in Finland (298), the Republic of Ireland (304) and Scotland (328). Again, this confirms a broader spread of achievement in Northern Ireland than in these comparison countries.

The range of achievement in countries can also be compared by taking the difference between the scores at the 25th and 75th percentiles (last column). Differences range from 115 points (Mexico) to 157 points (Germany). The difference for Northern Ireland (145 points) is marginally smaller than the OECD country average of 148, and around the same as Sweden (147), the Netherlands (147) and Switzerland (148). On the other hand, Finland (123), the Republic of Ireland (130) and Scotland (140) have somewhat narrower ranges of achievement between these benchmarks.

Table 4.3 can be used to interpret the scores reported in Table 4.2. The first four data columns in Table 4.3 compare country scores at the 5th, 25th, 75th and 95th percentile ranks with the corresponding OECD average scores. Students in Northern Ireland achieve scores that are above the OECD average at the 25th, 75th and 95th percentiles. The score of students in Northern Ireland at the 5th percentile (345) is not significantly different from the corresponding OECD average (324). In the Republic of Ireland, students scoring at the 5th and 25th percentiles have scores that are significantly higher than the OECD average scores at these benchmarks, while

students scoring at the 75th percentile have a score that was not significantly different from the OECD average, and students scoring at the 95th percentile have a score that is significantly lower. In Scotland, scores at the 5th and 25th percentiles are significantly higher than the corresponding OECD average scores, while scores at the 75th and 95th percentiles are not significantly different. [Additional data on these comparisons are given in Appendix Tables A4.1 to A4.4].

Finally, the last four columns in Table 4.3 compare the scores of students in Northern Ireland at the 5th, 25th, 75th and 95th percentile ranks with the scores of students at these benchmarks in each comparison country. One country, Finland, has significantly higher scores than Northern Ireland at the 5th and 25th percentiles, while another country, Japan, has a higher score at the 75th percentile. No country has a significantly higher mean score than Northern Ireland at the 95th percentile. The scores of students in the Republic of Ireland at the 5th and 25th percentiles are not significantly different from those of students in Northern Ireland, while students in the Republic at the 75th and 95th percentiles have significantly lower scores. There are no significant differences between the scores of students in Northern Ireland and Scotland at the 5th, 25th, 75th or 95th percentile ranks. [Additional data on these comparisons are given in Appendix Tables A4.5 to A4.8].

Table 4.1: *Mean Scores and Standard Deviations on Scientific Literacy, by Country, and Comparisons with OECD Country Average*

Countries in descending order of mean score on scientific literacy	Mean		Comparison with OECD country average	Standard deviation	
	Score	S.E.		SD	S.E.
Finland	548	(1.9)	+	91	(1.1)
Japan	548	(4.1)	+	109	(2.7)
Korea	538	(3.5)	+	101	(2.2)
Australia	525	(2.1)	+	102	(1.5)
Netherlands	524	(3.1)	+	99	(2.2)
Northern Ireland	524	(3.0)	+	105	(2.2)
Czech Republic	523	(3.4)	+	101	(1.7)
New Zealand	521	(2.4)	+	104	(1.4)
Canada	519	(2.0)	+	99	(1.0)
Scotland	514	(2.7)	+	100	(1.7)
Switzerland	513	(3.7)	+	108	(1.9)
France	511	(3.0)	+	111	(2.2)
Belgium	509	(2.5)	+	107	(1.8)
Sweden	506	(2.7)	+	107	(1.8)
Republic of Ireland	505	(2.7)	+	93	(1.3)
Hungary	503	(2.8)	0	97	(2.0)
Germany	502	(3.6)	0	111	(2.1)
Poland	498	(2.9)	0	102	(1.4)
Slovak Republic	495	(3.7)	0	102	(3.1)
Iceland	495	(1.5)	–	96	(1.4)
United States	491	(3.1)	–	102	(1.3)
Austria	491	(3.4)	–	97	(1.5)
Spain	487	(2.6)	–	100	(1.5)
Italy	486	(3.1)	–	108	(2.0)
Norway	484	(2.9)	–	104	(1.8)
Luxembourg	483	(1.5)	–	103	(1.1)
Greece	481	(3.8)	–	101	(1.6)
Denmark	475	(3.0)	–	102	(1.7)
Portugal	468	(3.5)	–	93	(1.7)
Turkey	434	(5.9)	–	96	(4.7)
Mexico	405	(3.5)	–	87	(2.2)
OECD average	500	(0.6)		105	(0.4)

+ Country mean score is significantly higher than OECD country average
0 Country mean score is not significantly different from OECD country average
– Country mean score is significantly lower than OECD country average

Table 4.2:   *Distribution of Student Performance in Scientific Literacy, by Country*

Countries in descending order of mean score in scientific literacy	Percentiles								95th - 5th Percentiles	75th - 25th Percentiles
	5th		25th		75th		95th			
	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.		
Finland	393	(3.5)	488	(2.8)	611	(2.2)	691	(3.5)	298	123
Japan	357	(7.0)	475	(6.1)	624	(4.2)	715	(7.9)	358	149
Korea	365	(6.3)	473	(4.8)	609	(4.3)	695	(5.8)	330	136
Australia	351	(4.2)	457	(3.1)	596	(2.7)	686	(3.7)	335	139
Netherlands	363	(6.6)	451	(5.3)	599	(4.0)	682	(4.3)	319	147
Northern Ireland	345	(7.8)	452	(4.3)	598	(4.8)	689	(4.7)	344	145
Czech Republic	356	(5.8)	453	(4.2)	594	(3.9)	686	(4.5)	330	141
New Zealand	347	(3.9)	448	(3.9)	596	(3.3)	687	(3.2)	339	148
Canada	352	(3.9)	452	(2.7)	588	(2.4)	676	(2.9)	324	136
Scotland	348	(6.6)	445	(4.2)	585	(3.3)	675	(3.8)	328	140
Switzerland	328	(5.8)	440	(4.5)	588	(4.6)	683	(6.8)	355	148
France	321	(6.7)	435	(4.4)	591	(3.4)	682	(4.5)	361	156
Belgium	320	(6.1)	436	(3.8)	588	(2.4)	668	(2.6)	349	152
Sweden	327	(6.5)	435	(3.5)	581	(4.0)	673	(4.8)	346	147
Republic of Ireland	348	(6.1)	442	(3.7)	572	(3.0)	652	(3.4)	304	130
Hungary	340	(5.9)	437	(3.1)	572	(3.9)	658	(4.6)	318	135
Germany	307	(7.1)	427	(5.8)	584	(4.0)	672	(3.5)	365	157
Poland	333	(5.3)	426	(4.3)	570	(3.5)	666	(6.3)	333	143
Slovak Republic	331	(7.0)	428	(4.6)	566	(3.6)	657	(3.9)	325	138
Iceland	331	(5.9)	432	(2.8)	562	(2.7)	647	(3.6)	315	130
United States	322	(5.4)	420	(3.8)	564	(3.3)	654	(3.5)	333	144
Austria	327	(6.6)	423	(4.1)	561	(4.0)	644	(4.4)	317	138
Spain	318	(5.8)	421	(3.4)	557	(3.1)	644	(3.8)	326	136
Italy	303	(7.3)	415	(4.9)	563	(2.8)	656	(3.9)	353	148
Norway	312	(5.3)	414	(4.0)	557	(3.8)	651	(6.1)	339	143
Luxembourg	309	(4.2)	413	(2.9)	556	(2.4)	645	(2.9)	336	144
Greece	315	(5.8)	412	(4.5)	552	(4.0)	643	(4.9)	329	140
Denmark	306	(6.4)	407	(3.9)	547	(3.6)	638	(4.4)	332	140
Portugal	310	(5.9)	405	(5.0)	533	(3.4)	618	(4.5)	309	128
Turkey	295	(5.0)	367	(4.9)	492	(8.4)	609	(20.0)	314	124
Mexico	264	(5.1)	347	(3.5)	462	(4.2)	551	(6.8)	287	115
OECD average	324	(1.2)	427	(1.0)	575	(0.8)	668	(1.0)	344	148

Table 4.3: *Comparison of Country Scores on Scientific Literacy at the 5th, 25th, 75th and 95th Percentile Ranks, with OECD Country Average and with Northern Ireland*

Countries in descending order of mean score on scientific literacy	Comparision with OECD Average Score				Comparision with Northern Ireland			
	5th Percentile	25th Percentile	75th Percentile	95th Percentile	5th Percentile	25th Percentile	75th Percentile	95th Percentile
Finland	+	+	+	+	+	+	0	0
Japan	+	+	+	+	0	0	+	0
Korea	+	+	+	+	0	0	0	0
Australia	+	+	+	+	0	0	0	0
Netherlands	+	+	+	+	0	0	0	0
Northern Ireland	0	+	+	+				
Czech Republic	+	+	+	+	0	0	0	0
New Zealand	+	+	+	+	0	0	0	0
Canada	+	+	+	0	0	0	0	0
Scotland	+	+	0	0	0	0	0	0
Switzerland	0	0	+	0	0	0	0	0
France	0	0	+	0	0	0	0	0
Belgium	0	0	+	0	0	0	0	–
Sweden	0	0	0	0	0	0	0	0
Republic of Ireland	+	+	0	–	0	0	–	–
Hungary	0	0	0	0	0	0	–	–
Germany	–	0	0	0	–	–	0	0
Poland	0	0	0	0	0	–	–	0
Slovak Republic	0	0	0	0	0	–	–	–
Iceland	0	0	–	–	0	–	–	–
United States	0	0	0	–	0	–	–	–
Austria	0	0	–	–	0	–	–	–
Spain	0	0	–	–	0	–	–	–
Italy	–	0	–	0	–	–	–	–
Norway	0	0	–	–	–	–	–	–
Luxembourg	–	–	–	–	–	–	–	–
Greece	0	–	–	–	0	–	–	–
Denmark	–	–	–	–	–	–	–	–
Portugal	0	–	–	–	–	–	–	–
Turkey	–	–	–	–	–	–	–	–
Mexico	–	–	–	–	–	–	–	–

Data columns 1-8 are based on Appendix Tables A4.1 to A4.8, respectively.

+ Country score is significantly higher than OECD average (data columns 1-4) or score for N. Ireland (5-8)
0 Country score is not significantly different from OECD average (data columns 1-4) or score for N. Ireland (5-8)
– Country score is significantly lower than OECD average (data columns 1-4) or score for N. Ireland (5-8)

Gender Differences on Scientific Literacy

Table 4.4 gives the mean scores for girls and boys in each country, as well as the difference in scores within each country, and indicates whether or not the difference is statistically significant. In Northern Ireland, the mean scores for boys and girls were identical (524 points), and the difference between them is not statistically significant. Indeed, we find no significant difference between girls and boys in 18 other countries, including the Republic of Ireland and Scotland. The OECD average difference between girls and boys is 6 points (in favour of boys), a difference that is statistically significant. Other countries in which boys outperform girls include Korea, Denmark, New Zealand, Canada and Switzerland. Girls significantly outperform boys in just two countries – Iceland and Finland.

Table 4.5 compares the mean scores of girls in Northern Ireland with girls in the 30 comparison countries. Girls in two countries, Finland (551 points) and Japan (546), have significantly higher mean scores than girls in Northern Ireland (524). Girls in Scotland have a mean score (510) that is not significantly different from that of girls in Northern Ireland, while girls in the Republic (504) have a significantly lower mean score.

Table 4.6 compares the mean scores of boys in Northern Ireland with the mean score of boys in each comparison country. Only boys in Finland (545 points) have a significantly higher mean score than boys in Northern Ireland (524). While boys in Japan (550, but with a larger standard error of difference than Finland), Korea, (546) and New Zealand (529) have scores that are higher than boys in Northern Ireland, differences are not statistically significant. Boys in the Republic of Ireland (506) and Scotland (518) have mean scores that are not significantly different from the mean score of boys in Northern Ireland.

The first four data columns in Table 4.7 compare the scores of girls in Northern Ireland at the 5th, 25th, 75th and 95th percentile ranks, with the scores of girls in each comparison country. Only girls in Finland have significantly higher scores than girls in Northern Ireland at the 5th and 25th percentiles. No country has significantly higher scores than Northern Ireland at the 75th and 95th percentile ranks. Girls in the Republic of Ireland have scores that are not significantly different from the scores of girls in Northern Ireland at the 5th, 25th and 75th percentiles, and a score that is significantly lower at the 95th percentile. The scores of girls in Scotland at all four benchmarks do not differ significantly from the scores of girls in Northern Ireland. [Additional data on these comparisons is given in Appendix Tables A4.9 to A4.12].

The final four columns in Table 4.7 compare the scores of boys in Northern Ireland at the 5th, 25th, 75th and 95th percentile ranks with the scores of boys in each comparison country at these benchmarks. Across all comparisons made, only boys in Finland scoring at the 25th percentile have a significantly higher score than boys in Northern Ireland. Boys in the Republic of Ireland have scores that are not significantly different from those of boys in Northern Ireland at the 5th and 25th percentiles, and scores that are significantly lower at the 75th and 95th percentile ranks. Boys in Scotland and Northern Ireland do not differ significantly from one another at any of the 4 benchmarks. [Additional data on these comparisons is given in Appendix Tables A4.13 to A4.16].

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Table 4.4: *Mean Scores on Scientific Literacy, by Gender and Country*

Countries in order of ascending size of difference between girls and boys on scientific literacy	Girls		Boys		Difference (Advantage to Boys)	S.E. of the Difference	Significant Difference within Country?
	Mean	S.E.	Mean	S.E.			
Iceland	500	(2.4)	490	(2.4)	-10	(3.8)	Girls+
Finland	551	(2.2)	545	(2.6)	-6	(2.8)	Girls+
Austria	492	(4.2)	490	(4.3)	-3	(5.0)	0
Hungary	504	(3.3)	503	(3.3)	-1	(3.7)	0
Australia	525	(2.8)	525	(2.9)	0	(3.8)	0
France	511	(3.5)	511	(4.1)	0	(4.8)	0
Belgium	509	(3.5)	509	(3.6)	0	(5.0)	0
Northern Ireland	524	(4.5)	524	(5.6)	0	(8.1)	0
Turkey	434	(6.4)	434	(6.7)	0	(5.8)	0
Norway	483	(3.3)	485	(3.5)	2	(3.6)	0
Republic of Ireland	504	(3.9)	506	(3.1)	2	(4.5)	0
Spain	485	(2.6)	489	(3.9)	4	(3.9)	0
Japan	546	(4.1)	550	(6.0)	4	(6.0)	0
Sweden	504	(3.5)	509	(3.1)	5	(3.6)	0
United States	489	(3.5)	494	(3.5)	5	(3.3)	0
Netherlands	522	(3.6)	527	(4.2)	5	(4.7)	0
Czech Republic	520	(4.1)	526	(4.3)	6	(4.9)	0
Germany	500	(4.2)	506	(4.5)	6	(4.8)	0
Italy	484	(3.6)	490	(5.2)	6	(6.3)	0
Portugal	465	(3.6)	471	(4.0)	6	(3.2)	0
Poland	494	(3.4)	501	(3.2)	7	(3.3)	Boys +
Scotland	510	(4.0)	518	(3.7)	8	(5.5)	0
Mexico	400	(4.2)	410	(3.9)	9	(4.1)	Boys +
Switzerland	508	(3.9)	518	(5.0)	10	(5.0)	Boys +
Canada	516	(2.2)	527	(2.3)	11	(2.6)	Boys +
Greece	475	(3.9)	487	(4.8)	12	(4.2)	Boys +
Luxembourg	477	(1.9)	489	(2.5)	13	(3.3)	Boys +
Slovak Republic	487	(3.9)	502	(4.3)	15	(3.7)	Boys +
New Zealand	513	(3.4)	529	(3.0)	16	(4.2)	Boys +
Denmark	467	(3.2)	484	(3.6)	17	(3.2)	Boys +
Korea	527	(5.5)	546	(4.7)	18	(7.0)	Boys +
OECD average	497	(0.8)	503	(0.7)	6	(0.9)	Boys +

Girls+ Within country mean score significantly higher for girls
0 Within country mean scores for boys and girls not significantly different
Boys+ Within country mean score significantly higher for boys

Table 4.5: *Mean Scores of Girls on Scientific Literacy, by Country, and Comparisons with Northern Ireland*

Countries ordered in ascending size of difference from N. Ireland mean score on scientific literacy - girls	Girls				
	Mean	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland?
Mexico	400	(4.2)	-124	(6.2)	–
Turkey	434	(6.4)	-90	(7.9)	–
Portugal	465	(3.6)	-59	(5.8)	–
Denmark	467	(3.2)	-57	(5.5)	–
Greece	475	(3.9)	-49	(6.0)	–
Luxembourg	477	(1.9)	-47	(4.9)	–
Norway	483	(3.3)	-41	(5.6)	–
Italy	484	(3.6)	-40	(5.8)	–
Spain	485	(2.6)	-39	(5.2)	–
Slovak Republic	487	(3.9)	-37	(6.0)	–
United States	489	(3.5)	-35	(5.7)	–
Austria	492	(4.2)	-32	(6.2)	–
Poland	494	(3.4)	-30	(5.6)	–
Germany	500	(4.2)	-24	(6.2)	–
Iceland	500	(2.4)	-24	(5.1)	–
Sweden	504	(3.5)	-20	(5.7)	–
Hungary	504	(3.3)	-20	(5.6)	–
Republic of Ireland	504	(3.9)	-19	(6.0)	–
Switzerland	508	(3.9)	-16	(6.0)	0
Belgium	509	(3.5)	-15	(5.7)	0
Scotland	510	(4.0)	-14	(6.0)	0
France	511	(3.5)	-13	(5.7)	0
New Zealand	513	(3.4)	-11	(5.6)	0
Canada	516	(2.2)	-8	(5.0)	0
Czech Republic	520	(4.1)	-4	(6.1)	0
Netherlands	522	(3.6)	-2	(5.8)	0
Australia	525	(2.8)	1	(5.3)	0
Korea	527	(5.5)	4	(7.1)	0
Japan	546	(4.1)	22	(6.1)	+
Finland	551	(2.2)	27	(5.0)	+
Northern Ireland	524	(4.5)			

+ Country mean score is significantly higher than mean score for N. Ireland
0 Country mean score not significantly different from mean score for N. Ireland
– Country mean score is significantly lower than mean score for N. Ireland

Table 4.6: *Mean Score of Boys on Scientific Literacy, by Country, and Comparison of Country Scores with Northern Ireland*

Countries ordered in ascending size of difference from N. Ireland mean score on scientific literacy - boys	Boys				
	Mean	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland?
Mexico	410	(3.9)	-114	(6.8)	–
Turkey	434	(6.7)	-89	(8.7)	–
Portugal	471	(4.0)	-53	(6.9)	–
Denmark	484	(3.6)	-40	(6.6)	–
Norway	485	(3.5)	-39	(6.6)	–
Greece	487	(4.8)	-36	(7.4)	–
Spain	489	(3.9)	-35	(6.8)	–
Luxembourg	489	(2.5)	-35	(6.1)	–
Italy	490	(5.2)	-34	(7.6)	–
Austria	490	(4.3)	-34	(7.0)	–
Iceland	490	(2.4)	-34	(6.1)	–
United States	494	(3.5)	-30	(6.6)	–
Poland	501	(3.2)	-23	(6.5)	–
Slovak Republic	502	(4.3)	-22	(7.0)	0
Hungary	503	(3.3)	-21	(6.5)	–
Germany	506	(4.5)	-18	(7.2)	0
Republic of Ireland	506	(3.1)	-17	(6.4)	0
Sweden	509	(3.1)	-15	(6.4)	0
Belgium	509	(3.6)	-15	(6.6)	0
France	511	(4.1)	-13	(7.0)	0
Scotland	518	(3.7)	-6	(6.7)	0
Switzerland	518	(5.0)	-6	(7.5)	0
Australia	525	(2.9)	1	(6.3)	0
Czech Republic	526	(4.3)	2	(7.0)	0
Netherlands	527	(4.2)	3	(7.0)	0
Canada	527	(2.3)	4	(6.0)	0
New Zealand	529	(3.0)	5	(6.3)	0
Finland	545	(2.6)	21	(6.1)	+
Korea	546	(4.7)	22	(7.3)	0
Japan	550	(6.0)	26	(8.2)	0
Northern Ireland	524	(5.6)			

+ Country mean score is significantly higher than mean score for N. Ireland
0 Country mean score not significantly different from mean score for N. Ireland
– Country mean score is significantly lower than mean score for N. Ireland

Table 4.7: *Comparisons of Country Scores on Scientific Literacy at 5th, 25th, 75th and 95th Percentiles, with Scores in Northern Ireland, by Gender*

Countries in descending order of mean score on scientific literacy	Girls - Score at Percentile Rank Compared with N. Ireland				Boys - Score at Percentile Rank Compared with N. Ireland			
	5th Percentile	25th Percentile	75th Percentile	95th Percentile	5th Percentile	25th Percentile	75th Percentile	95th Percentile
Finland	+	+	0	0	0	+	0	0
Japan	0	0	0	0	0	0	0	0
Korea	0	0	0	0	0	0	0	0
Australia	0	0	0	0	0	0	0	0
Netherlands	0	0	0	0	0	0	0	0
Northern Ireland								
Czech Republic	0	0	0	0	0	0	0	0
New Zealand	0	0	0	0	0	0	0	0
Canada	0	0	0	0	0	0	0	0
Scotland	0	0	0	0	0	0	0	0
Switzerland	0	0	0	0	0	0	0	0
France	0	0	0	0	0	0	0	0
Belgium	0	0	0	0	0	0	0	0
Sweden	0	0	0	0	0	0	0	0
Republic of Ireland	0	0	0	–	0	0	–	–
Hungary	0	0	0	–	0	0	0	0
Germany	–	0	0	0	0	0	0	0
Poland	0	–	–	0	0	0	0	0
Slovak Republic	0	–	–	–	0	0	0	0
Iceland	0	0	–	–	0	0	–	–
United States	0	–	–	–	0	0	–	0
Austria	0	0	–	–	0	–	–	–
Spain	0	–	–	–	0	–	–	–
Italy	–	–	–	–	0	–	–	0
Norway	0	–	–	–	0	–	–	0
Luxembourg	–	–	–	–	0	–	–	–
Greece	–	–	–	–	0	–	–	–
Denmark	–	–	–	–	0	–	–	–
Portugal	0	–	–	–	0	–	–	–
Turkey	–	–	–	–	0	–	–	–
Mexico	–	–	–	–	–	–	–	–

Data columns 1-8 are based on Appendix Tables A4.9 to A4.16, respectively

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

5. Variables Associated with Performance on Combined Mathematical Literacy

This chapter examines a range of variables associated with student performance on mathematical literacy in PISA 2003. Here, each variable is considered separately as it relates to mathematical literacy. In Chapter 6, where a multi-level model of achievement in mathematical literacy is described, the combined effects of several variables on achievement are considered. The following variables are described in this chapter:

Student Characteristics:
- Gender
- Year group (grade level)
- Country of birth

Family Characteristics:
- Socio-economic status
- Parental education
- Family type

School Characteristics:
- School disciplinary climate in mathematics classes
- School co-educational policy
- School size
- School socio-economic status

Other Student Variables of Interest:
- Attitude Towards School
- Sense of Belonging at School
- Use of Control Strategies
- Use of Elaboration Strategies
- Use of Memorisation/Rehearsal Strategies
- Instrumental Motivation
- Interest in and Enjoyment of Mathematics
- Self-concept in Mathematics
- Self-efficacy in Mathematics
- Anxiety in Mathematics

Student Characteristics

Three student characteristics are considered in this section: gender, year group (grade level) and country of birth. For each analysis, overall performance is considered first. Then the performance of students in subgroups, such as the top quarter, the middle 50%, and the bottom quarter, is considered.

Gender

As indicated in Chapter 1, girls in N. Ireland achieved a mean score on combined mathematical literacy that, although 4 points lower than boys, is not statistically significant (Table 5.1). Non significance is inferred since 0 (no difference) falls into the 95% confidence intervals around the difference score (i.e., -18.9 to 11.1).

Table 5.1: *Mean Scores and Differences in Achievement between Girls and Boys in Northern Ireland on Combined Mathematical Literacy*

	Mathematics Combined Score		Confidence Intervals		
Gender	Mean	S.E.	Lower 95%	Higher 95%	
Girls	513	(4.0)	505	521	
Boys	517	(5.3)	506	527	
	Difference	SE Diff	CI95L	CI95U	Significant?
Girls - Boys	-3.9	(7.5)	-18.9	11.1	Yes

Table 5.2 gives the percentages of girls and boys in Northern Ireland in each of the achievement intervals.

Table 5.2: *Percentages of Girls and Boys in Northern Ireland at Each of Three Achievement Bands on the PISA Combined Mathematical Literacy Scale*

	Achievement on combined mathematics scale					
	Lowest Quartile		Middle 50%		Highest Quartile	
	%	S.E.	%	S.E.	%	S.E.
Gender						
Girls	24.6	(1.8)	52.4	(1.5)	23.1	(1.5)
Boys	25.5	(2.0)	47.6	(1.8)	26.9	(2.0)

Row percentages sum to 100.

The mean score of girls at in the lowest quartile (399) is significantly lower than the mean score of girls in the highest quartile (625) (Table 5.3). The mean score of girls in the middle 50% (517) is also significantly lower than the mean score of girls in the top 25%.

Table 5.3: *Mean Mathematical Literacy Scores and Differences in Achievement among Girls in Northern Ireland at the Top, Middle and Bottom of the Combined Mathematical Literacy Scale*

Achievement band	Girls				
	Mathematics Combined Score		Confidence Intervals		
	Mean	S.E.	Lower 95%	Higher 95%	
Lowest 25%	399	(2.9)	393.0	404.6	
Middle 50%	517	(2.0)	512.6	520.6	
Highest 25%	625	(2.6)	620.1	630.3	
	Difference	S.E. Diff	CI95L	CI95U	Significant?
Low-High	-226	(4.1)	-235.7	-217.2	Yes
Medium-High	-109	(3.4)	-116.3	-100.9	Yes

Boys in the lowest quartile on the combined mathematical literacy scale achieved a mean score (392) that was significantly lower than that of boys in the highest quartile (632). Boys in the middle 50% also had a significantly lower mean score (518) than boys in the top quartile (Table 5.4).

Table 5.4: *Mean Mathematical Literacy Scores and Differences in Achievement among Boys in Northern Ireland at the Top, Middle and Bottom of the Combined Mathematical Literacy Scale*

Achievement band	Boys				
	Mathematics Combined Score		Confidence Intervals		
	Mean	S.E.	Lower 95%	Higher 95%	
Lowest 25%	392	(5.8)	380.3	403.4	
Middle 50%	518	(2.0)	514.4	522.2	
Highest 25%	632	(3.3)	625.3	638.3	
	Difference	S.E. Diff	CI95L	CI95U	Significant?
Low-High	-240	(6.7)	-255.2	-224.7	Yes
Medium-High	-113	(3.8)	-122.3	-104.7	Yes

Year Group (Grade Level)

Table 5.5 gives the percentages of students in Years 10, 11 and 12 who were in the lowest 25%, the middle 50%, and highest 25% on PISA combined mathematics within year level. Just one student (who scored in the lowest 25%) was in Year 10. The remaining students were distributed across Years 11 and 12, with roughly equal numbers in each. The table shows that relatively more students in Year 11 were in the lower achievement quartile (27%), and relatively fewer in the upper quartile (22%) than in Year 12 (24% and 29% respectively).

Table 5.5: *Percentages of Students in Northern Ireland in Three Achievement Bands on Combined Mathematical Literacy, by Year Group*

| | Achievement on combined mathematics scale | | | | | |
| | Lowest Quartile | | Middle 50% | | Highest Quartile | |
	%	S.E.	%	S.E.	%	S.E.
Year Group						
Year 10	100.0	(0.0)	.	.	.	.
Year 11	26.5	(1.4)	51.9	(1.7)	21.6	(1.5)
Year 12	23.5	(1.4)	48.0	(1.6)	28.5	(1.3)

Ns (unweighted): N = 1 (Year 10); N = 1429 (Year); N = 1423 (Year 12).
Row percentages sum to 100.

Table 5.6 shows that students in Year 12 achieved a mean score (523) on combined mathematical literacy that was significantly higher than the mean score of students in Year 11 (507). The difference was about one-sixth of a standard deviation.

Table 5.6: *Mean Achievement Scores and Differences in Achievement among Students in Northern Ireland, by Year Group*

| | Mathematics Combined Score | | Confidence Intervals | | |
Year Group	Mean	S.E.	Lower 95%	Higher 95%	
11	507	(3.4)	500.0	513.4	
12	523	(3.1)	516.8	529.1	
	Difference	S.E. Diff	CI95L	CI95U	Significant?
Yr 11 - Yr 12	-16	(3.4)	-23.0	-9.5	Yes

Country of Birth

Table 5.7 gives the percentages of students who were born in the UK and the percentages of those born outside the UK, in each of three achievement bands on combined mathematical literacy. More students born outside the UK achieved a score in the lowest quartile (28% vs. 24%), while fewer achieved a score in the highest quartile (24% vs. 26%). However, differences were not statistically significant (the standard errors around percentages born outside the UK are high). It should be noted that 2.8% of the unweighted sample did not respond to this question, while the percentage born outside the UK (3.6% unweighted) is also low.

Table 5.7: *Percentages of Students in Northern Ireland in Three Achievement Bands on Combined Mathematical Literacy, by Country of Birth*

| | Achievement on combined mathematics scale | | | | | |
| | Lowest Quartile | | Middle 50% | | Highest Quartile | |
	%	S.E.	%	S.E.	%	S.E.
Country of Birth						
UK	24.1	(1.1)	50.3	(1.3)	25.6	(1.1)
Outside UK	27.6	(6.1)	48.8	(6.3)	23.7	(4.6)
Missing	54.3	(5.2)	39.3	(5.0)	6.4	(2.2)

Ns (Unweighted): Born in UK: 2670; Born Outside UK: 102; Missing: 81.

Table 5.8 shows that the mean score of students born in the UK (517) was not significantly different from the mean score of students born outside the UK (503). Note that this finding arises, at least in part, because of the very large standard error around the mean score of students born outside the UK (SE = 13.7).

Table 5.8:   *Mean Achievement Scores and Differences in Northern Ireland at the Top, Middle and Bottom of the Combined Mathematical Literacy Scale, by Country of Birth*

	Mathematics Combined Score		Confidence Intervals		
Country of Birth	Mean	S.E.	Lower 95%	Higher 95%	
UK	517	(2.7)	512.0	522.6	
Outside UK	503	(13.7)	475.4	530.0	
Missing	442	(11.1)	420.3	464.5	
	Difference	S.E. Diff	CI95L	CI95U	Significant?
UK-Outside UK	15	(13.2)	-17.6	46.8	No
UK - Missing	75	(10.8)	48.3	101.4	Yes
Outside UK - Missing	60	(16.9)	19.0	101.6	Yes

Family Characteristics

Socio-economic Status (SES)

Students in PISA 2003 were asked to indicate their parents' main occupations. Responses were categorized according to the International Standard Classification of Occupation (ISCO) system. The resulting ISCO categories were transformed into an International Socio-economic Index (ISEI), which maximizes the indirect effect of education on income, net of occupation (both effects being net of age) (see Ganzeboom et al., 1992). The ISEI is a continuous, 72-point scale. The ISEI scores used in PISA are based on the highest ISEI score of either father or mother. Data were missing for 6.5% of students in Northern Ireland. Table 5.9 shows the mean scores of students in Northern Ireland, Scotland and 29 OECD countries at the lowest and highest quartiles on the SES scale. The chart shows that the difference in mean scores between students in these quartiles was highest in Belgium (108 points), and lowest in Iceland (40 points). The difference in Northern Ireland – 86 points – was similar to the difference in the Slovak Republic, the Czech Republic, Greece and the United States.

Table 5.9: *Mean Scores on the Combined Mathematical Literacy Scale among Students in the Lowest and Highest Quartiles of the Distribution of Socio-economic Status*

Countries in descending order of difference in mean scores between highest and lowest quartile.	Lowest quartile of SES		Highest quartile of SES		Diff	SE Diff	CI 95 L	CI 95 U	Sig
	Mean Score	SE	Mean Score	SE					
Belgium	483	(3.7)	591	(3.5)	108	(5.1)	98.1	118.5	+
Hungary	451	(3.8)	547	(3.9)	96	(5.6)	84.9	107.1	+
Germany	471	(4.3)	566	(4.0)	95	(5.4)	84.1	105.5	+
Luxembourg	449	(2.7)	542	(3.1)	94	(4.5)	84.9	102.7	+
France	470	(3.8)	559	(3.8)	89	(5.5)	78.6	100.3	+
Slovak Republic	459	(4.0)	546	(4.0)	87	(4.7)	77.6	96.5	+
Czech Republic	486	(3.7)	573	(4.7)	87	(5.2)	76.4	97.0	+
Northern Ireland	479	(3.9)	565	(4.3)	86	(5.0)	76.4	96.4	+
Greece	409	(4.3)	495	(5.0)	86	(6.1)	73.3	97.8	+
United States	447	(3.2)	532	(3.7)	85	(4.2)	76.5	93.1	+
Switzerland	483	(4.0)	567	(3.9)	84	(4.6)	75.1	93.3	+
Austria	466	(4.1)	549	(4.6)	83	(5.2)	72.2	92.8	+
Poland	455	(3.8)	536	(3.3)	81	(4.6)	72.3	90.4	+
Netherlands	505	(4.3)	586	(4.2)	81	(5.6)	70.2	92.4	+
Portugal	431	(5.0)	511	(3.9)	80	(5.0)	70.3	90.1	+
Australia	494	(2.9)	573	(3.9)	80	(4.5)	70.8	88.8	+
New Zealand	486	(3.6)	565	(3.4)	79	(4.6)	69.7	88.0	+
Sweden	480	(3.3)	554	(4.0)	75	(4.7)	65.5	84.3	+
Italy	433	(4.1)	507	(4.3)	75	(5.1)	64.4	84.7	+
Denmark	481	(3.3)	554	(3.5)	73	(4.8)	63.5	82.7	+
Scotland	493	(4.1)	566	(3.5)	73	(5.3)	62.4	83.7	+
Republic of Ireland	470	(3.7)	541	(3.5)	71	(5.0)	61.1	81.0	+
Norway	465	(3.1)	534	(4.3)	69	(5.3)	58.7	79.9	+
Spain	454	(3.6)	521	(3.4)	67	(4.1)	59.1	75.6	+
Mexico	359	(4.4)	425	(5.2)	66	(6.1)	53.4	77.8	+
Canada	503	(2.2)	568	(2.5)	64	(3.1)	58.0	70.5	+
Japan	505	(5.1)	569	(6.4)	63	(7.7)	48.0	78.6	+
Finland	515	(2.7)	577	(3.0)	62	(3.7)	54.3	68.9	+
Korea	512	(4.4)	568	(6.1)	56	(7.4)	41.1	70.6	+
Turkey	397	(5.6)	449	(9.7)	52	(10.0)	31.8	71.6	+
Iceland	499	(2.8)	538	(3.3)	40	(4.4)	30.9	48.5	+

+ indicates that the within-country mean score difference between upper and lower quartiles is statistically significant

Thirty-eight percent of students in Northern Ireland in the lowest SES quartile are in the lowest quartile on PISA combined mathematics, compared with just 10% of students in the top SES quartile. On the other hand, just 12% of students in the lowest SES quartile scored in the highest mathematics quartile, while 46% in the highest SES quartile scored in the highest mathematics quartile (Table 5.10). These data confirm an association between student-level socio-economic status and performance on combined mathematical literacy in PISA 2003.

Table 5.10: *Percentages of Students in Northern Ireland in Three Achievement Bands on Combined Mathematical Literacy, by Socio-economic Status*

| | Achievement on combined mathematics scale | | | | | |
| | Lowest Quartile | | Middle 50% | | Highest Quartile | |
SES	%	S.E.	%	S.E.	%	S.E.
Lowest quartile	38	(2.1)	51	(2.3)	12	(1.4)
Middle 50%	20	(1.2)	56	(1.5)	24	(1.2)
Highest Quartile	10	(1.2)	44	(2.3)	46	(2.5)

Row percentages sum to 100.

Table 5.11 provides mean scores of students in Northern Ireland for high, medium, and low levels of socio-economic status, as well as the mean score of students for whom information on socio-economic status was not available (the 'missing' category). The data supplements the information in Table 5.9. The mean score of students in the medium SES category (520) was significantly lower than the mean score of students in the high SES category (565). Students for whom data on SES were missing achieved a mean score (426) that was below the mean scores of students in other SES categories.

Table 5.11: *Mean Scores of Students in Northern Ireland on Combined Mathematical Literacy, by Socio-economic Status*

| | Mathematics Combined Score | | Confidence Intervals | | |
SES	Mean	S.E.	Lower 95%	Higher 95%	
Low	479	(4.0)	470.7	486.5	
Medium	520	(2.7)	514.4	525.2	
High	565	(4.4)	556.2	573.6	
Missing	426	(9.3)	407.8	444.9	
SES	Difference	S.E. Diff	CI95L	CI95U	Significant?
Low - High	-86	(5.2)	-99.13	-73.49	Yes
Medium - High	-45	(4.9)	-57.11	-33.11	Yes
Missing - High	-139	(10.5)	-164.39	-112.81	Yes

Parental Education

Students in PISA 2003 provided information on the educational attainment (highest level of education completed) of their parents. Where there was a difference between the educational attainment of a student's mother and father (if both were available), a the highest level was taken. Responses were classified according to the International Standard Classification of Education (ISCED). For analysis purposes, three categories were identified:

- Higher education (ISCED Level 5A, 5B or 6). This includes parents who completed a higher qualification below degree level, an undergraduate degree, a Masters degree, or a doctorate.
- Upper secondary education (ISCED Level 3A or 3C). This includes parents who left school after age 14 with some educational qualifications, e.g. O levels, CSEs, A-levels or equivalent qualifications
- No qualifications/primary. Primary or lower secondary education (ISCED Level 1 or Level 2), or no education. These include parents who did not attend school or left school with no qualifications.

Data on parent education were available for 92.6% of students in Northern Ireland in PISA 2003. Thirty-six percent of students whose parents had no qualifications scored in the lowest quartile on PISA combined mathematical literacy, while only 15% scored in the highest quartile. Conversely, just 13% of students whose parents had completed a higher education qualification scored in the lowest quartile, while 41% scored in the highest quartile (Table 5.12).

Table 5.12:   *Percentages of Students in Northern Ireland in Three Achievement Bands on Combined Mathematical Literacy, by Parent Educational Attainment*

| | Achievement on combined mathematics scale | | | | | |
| | Lowest Quartile | | Middle 50% | | Highest Quartile | |
Highest Education Level	%	S.E.	%	S.E.	%	S.E.
No Qualifications	36	(3.2)	49	(3.9)	15	(2.0)
Upper Secondary	26	(1.5)	54	(1.7)	20	(1.4)
Higher Education	13	(1.2)	46	(1.6)	41	(1.7)

Row percentages sum to 100

Table 5.13 provides mean scores of students in Northern Ireland for the three categories of parent educational attainment. It indicates that the mean score of students whose parents had no qualifications (487) is significantly lower than the mean scorees of those students whose parents' highest education levels were upper secondary (506) and higher education (552). Students whose parents had a higher education qualification also scored significantly higher on the combined mathematics scale than those students whose parents' highest education level was upper secondary.

Table 5.13:   *Mean Scores of Students in Northern Ireland on Combined Mathematical Literacy, by Parent Educational Attainment*

Highest Education Level	Mathematics Combined Score		Confidence Intervals		
	Mean	S.E.	Lower 95%	Higher 95%	
No Qualifications	487	(5.4)	476.2	497.9	
Upper Secondary	506	(3.4)	499.0	512.6	
Higher Education	552	(3.4)	544.9	558.4	
Comparison	Difference	S.E. Diff	CI95L	CI95U	Significant?
No Qualifications - Higher Education	-65	(5.9)	-79.1	-50.0	Yes
No Qualifications - Upper Secondary	-19	(6.0)	-33.5	-4.0	Yes
Higher Education - Upper Secondary	46	(4.5)	34.8	56.8	Yes

Family Type

Students in PISA 2003 were asked to indicate with whom they lived at home. Students living with two biological parents were categorised as living in a two-parent family (76% of students). Those living with one biological parent only were categorised as living in a lone-parent family (18%). Finally, those in other family types (e.g., biological mother, step father) were categorised as 'other family type' (6%). Table 5.14 shows the percentages of students in each family type who scored in the lowest quartile, the middle 50%, and the highest quartile on the combined mathematical literacy scale. Whereas 22% of students in two-parent families scored in the lowest quartile, about one-third of students in lone parent families and in other family types scored in that quartile. In contrast, while 29% of students in two-parent families scored in the highest quartile, 17% of students in lone-parent families and 13% in other family types scored in that quartile.

Table 5.14:   *Percentages of Students in Northern Ireland on Combined Mathematical Literacy, by Family Type*

Family Type	Achievement on combined mathematics scale					
	Lowest Quartile		Middle 50%		Highest Quartile	
	%	S.E.	%	S.E.	%	S.E.
Two Parent	22	(1.2)	50	(1.3)	29	(1.4)
Lone Parent	33	(2.4)	50	(2.7)	17	(2.0)
Other Family Type	35	(4.8)	52	(4.9)	13	(2.6)

Row percents sum to 100.

Table 5.15 indicates that students from two-parent families achieved a mean score (524) on the combined mathematics scale that was significantly higher than the mean scores of students from lone-parent families (494), and from other family types (486).

Table 5.15:   *Mean Scores of Students in Northern Ireland on Combined Mathematical Literacy, by Family Type*

Country of Birth	Mathematics Combined Score		Confidence Intervals	
	Mean	S.E.	Lower 95%	Higher 95%
Two parent	524	(3.3)	517.2	530.5
Lone parent	494	(5.0)	484.4	504.4
Other	486	(8.1)	469.9	502.0

	Difference	S.E. Diff	CI95L	CI95U	Significant?
Lone - Two	-29	(5.8)	-42.7	-16.2	Yes
Other - Two	-38	(8.6)	-57.5	-18.3	Yes

School Characteristics

School Disciplinary Climate in Mathematics Classes

Students were asked to indicate the frequency with which five events occurred in their mathematics classes, including 'there is noise and disorder', and 'students don't listen to what the teacher says'. A weighted likelihood composite estimate was created for each student, such that a positive score indicated a positive disciplinary climate and vice versa. For analysis purposes, disciplinary climate was averaged at the school level, and then each student was assigned the disciplinary climate score for his/her school. The resulting distribution was divided into quarters. Table 5.16 shows that students in the bottom quarter for school disciplinary climate are over-represented in the lowest quartile on the mathematics scale (38%) compared with students in the second (27%), the third (19%) and the fourth quarters (11%). Conversely, just 16% of students in the bottom quarter of the school disciplinary climate scale score in the highest quartile on the mathematics scale, compared with 21% in the second quarter, 27% in the third and 38% in the fourth.

Table 5.16:   *Percentages of Students in Northern Ireland in Three Achievement Bands on Combined Mathematical Literacy, by Disciplinary Climate in Mathematics Classes*

	Achievement on combined mathematics scale					
	Lowest Quartile		Middle 50%		Highest Quartile	
Disciplinary Climate	%	S.E.	%	S.E.	%	S.E.
Bottom Quarter	38	(2.3)	46	(2.1)	16	(1.5)
Second Quarter	27	(2.0)	52	(2.2)	21	(1.9)
Third Quarter	19	(1.6)	54	(2.4)	27	(2.3)
Top Quarter	11	(1.4)	51	(2.5)	38	(2.4)

Row and column percents sum to 100.

Table 5.17 illustrates the relatively strong association between school-level disciplinary climate in mathematics classes and student achievement in mathematics. Students in the bottom quarter on the school disciplinary climate scale achieved a mean score of 486 points. This was significantly lower than the mean achievement scores of students in the second, third and top quarters. The difference in mathematics

achievement between students in the top and bottom quarters was 64 points (over two-thirds of the standard deviation for combined mathematical literacy in Northern Ireland).

Table 5.17: *Mean Scores of Students in Northern Ireland on Combined Mathematical Literacy, by School Disciplinary Climate*

Disciplinary Climate	Mathematics Combined Score		Confidence Intervals		
	Mean	S.E.	Lower 95%	Higher 95%	
Bottom Quarter	486	(4.9)	475.8	495.4	
Second Quarter	509	(4.5)	499.6	517.5	
Third Quarter	525	(4.3)	516.8	533.7	
Top Quarter	550	(3.8)	542.1	557.1	
	Difference	S.E. Diff	CI95L	CI95U	Significant?
Second - Bottom	23	(5.9)	8.5	37.4	Yes
Third - Bottom	40	(5.6)	25.9	53.4	Yes
Top - Bottom	64	(5.8)	49.9	78.0	Yes

School Co-educational Policy

Schools were categorised according to co-educational policy. Each student was assigned one of the following categories:

- Girls in mixed school (i.e., girls attending a mixed school)
- Boys in mixed schools (i.e., boys attending a mixed school)
- Girls in all-girls school
- Boys in all-boys school

Table 5.18 shows that, whereas 17% of girls in all-girls schools score in the lowest quartile in mathematics, 27% of girls in mixed schools achieve scores in that category. In contrast, 30% of girls in all-girls schools score in the top quartile in mathematics, compared with 21% of girls attending mixed schools. Thirty-one percent of boys in all-boys schools and 25% of boys in mixed schools achieve scores in the top quarter in mathematical literacy.

Table 5.18: *Percentages of Students in Northern Ireland in Three Achievement Bands on Combined Mathematical Literacy, by Co-Educational Policy in Schools*

Co-educational Policy	Achievement on Combined Mathematics Scale					
	Lowest 25%		Middle 50%		Highest 25%	
	%	S.E.	%	S.E.	%	S.E.
Girls in mixed schools	27	(2.1)	52	(2.0)	21	(2.2)
Boys in mixed schools	25	(1.9)	50	(2.3)	25	(2.3)
Girls in all-girls schools	17	(4.7)	53	(3.0)	30	(4.8)
Boys in all-boys schools	27	(6.7)	42	(3.2)	31	(6.0)

Table 5.19 gives the mean scores on the combined mathematical literacy scale for boys and girls in mixed schools, girls in all-girls schools, and boys in all-boys schools. None of the differences between these groups that were examined are statistically different. This arises, at least in part, because of the large standard errors associated with the mean scores of the reference group (boys in all-boys schools).

Table 5.19:   *Mean Scores of Students in Northern Ireland on Combined Mathematical Literacy, by School Co-Educational Policy*

	Mathematics Combined Score		Confidence Intervals		
Co-educational Policy	Mean	S.E.	Lower 95%	Higher 95%	
Girls in mixed schools	506	(5.3)	495.5	516.6	
Boys in mixed schools	515	(5.3)	504.5	525.5	
Girls in all-girls schools	534	(12.8)	508.4	559.2	
Boys in all-boys schools	520	(18.2)	483.7	556.2	
	Difference	S.E. Diff	CI95L	CI95U	Significant?
Girls in mixed - boys in all-boys	-14	(20.6)	-64.3	36.5	No
Boys in mixed - boys in all-boys	-5	(20.4)	-54.8	44.9	No
Girls in all girls - boys in all-boys	14	(23.4)	-43.3	71.1	No

School Size

Using the number of students in each school in the PISA 2003 sample, it was possible to divide schools into quarters based on size. Table 5.20 gives the percentage of students in schools of varying size in each of three intervals on the mathematics achievement scale. Thirty-seven percent of students in the smallest schools (bottom quarter in terms of size) and 14% of students in large schools (top quarter in size) achieved in the lowest quartile in mathematics. In contrast, just 8% of students in the smallest schools (bottom quarter in size) achieved in the highest quartile in mathematics, compared with 40% of students in the largest schools.

Table 5.20:   *Percentages of Students in Northern Ireland in Three Achievement Bands on Combined Mathematical Literacy, by School Size*

	Achievement on combined mathematics scale					
	Lowest Quartile		Middle 50%		Highest Quartile	
School Size	%	S.E.	%	S.E.	%	S.E.
Bottom Quarter	37	(4.2)	56	(3.2)	8	(2.3)
Second Quarter	32	(3.9)	51	(3.2)	17	(2.9)
Third Quarter	17	(2.9)	46	(2.2)	37	(3.6)
Top Quarter	14	(1.7)	46	(2.6)	40	(2.8)

Row and column percents sum to 100.

Table 5.21 gives the mean scores for students in each quarter of school size. The mean score of students in the (the smallest schools) is not significantly different from the mean score of students in the second quarter. However, students in the top quarter have a mean score in mathematics that is significantly higher (76 points) than the mean score of students in the bottom quarter.

Table 5.21:   *Mean Scores of Students in Northern Ireland on Combined Mathematical Literacy, by School Size*

School Size	Mathematics Combined Score		Confidence Intervals		
	Mean	S.E.	Lower 95%	Higher 95%	
Bottom Quarter	475	(9.0)	456.9	492.8	
Second Quarter	493	(8.0)	476.7	508.5	
Third Quarter	542	(9.1)	524.0	560.2	
Top Quarter	551	(5.0)	540.8	560.6	
	Difference	S.E. Diff	CI95L	CI95U	Significant?
Second - Bottom	18	(12.7)	-13.2	48.8	No
Third - Bottom	67	(13.4)	34.4	100.2	Yes
Top - Bottom	76	(10.8)	49.6	102.2	Yes

School-level Socio-economic Status

An average SES score was computed for each school in Northern Ireland in PISA 2003 sample (based on the average of the ISEI scores of PISA students in the school), and each student in the sample was assigned the score corresponding to his/her school. Then students were divided into quartiles, based on the SES score of their schools. Table 5.22 gives the percentages of students in each school-level SES quartile in the top quarter, the middle half, and the bottom quarter of the mathematical literacy scale.

The table shows that, among students attending the lowest SES schools, 49% score in the lowest quartile in combined mathematical literacy. In contrast, among students attending the highest SES schools (the top third), just 1% score in the lowest quartile in mathematics.

Table 5.22:   *Percentages of Students in Northern Ireland in Three Achievement Bands on Combined Mathematical Literacy, by Average School Socio-economic Status*

	Achievement on Combined Mathematics Scale					
	Lowest achieving 25%		Middle 50%		Highest achieving 25%	
SES	%	S.E.	%	S.E.	%	S.E.
Lowest SES	49	(2.9)	47	(2.1)	4	(1.4)
Middle 50% SES	25	(2.1)	57	(1.9)	18	(1.8)
Highest SES	1	(0.4)	38	(3.0)	61	(3.1)

Row percents sum to 100.

Table 5.23 shows that students in the lowest SES schools have a mean combined mathematical literacy score that is 145 points lower than the mean score of students in highest SES schools. The difference in mathematics achievement between students in

the high-SES and medium-SES schools (90 points in favour of the former) is also statistically significant.

Table 5.23: *Mean Scores of Students in Northern Ireland on Combined Mathematical Literacy, by Average School Socio-economic Status*

	Mathematics Combined Score		Confidence Intervals	
SES	Mean	S.E.	Lower 95%	Higher 95%
Low	452	(6.5)	439.1	464.9
Medium	506	(5.0)	496.3	516.0
High	597	(4.1)	588.4	604.7

SES	Difference	S.E. Diff	CI95L	CI95U	Significant?
Low - High	-145	(7.5)	-161.8	-127.3	Yes
Medium - High	-90	(5.4)	-102.6	-78.2	Yes

Other Student Variables

This section provides data on a number of variables not considered for inclusion in the model of mathematics achievement in Chapter 6. Each variable is described and patterns in the data for students in Northern Ireland are summarised. It should be noted that the variables in this section are based on student self-reports, and may or may not be comparable across countries (i.e., students in different countries may respond in different ways to the questions).

Attitude towards School (Table 5.24)

The PISA index of **attitude towards school** was derived from students' reported agreement with the following statements: *i)* school has done little to prepare me for adult life when I leave school; *ii)* school has been a waste of time; *iii)* school helps to give me confidence to make decisions; and *iv)* school has taught me things which could be useful in a job. A four-point scale with response categories 'strongly agree' (=1), 'agree' (=2), 'disagree' (=3) and 'strongly disagree' (=4) was used. Items *iii)* and *iv)* were inverted for scaling. Scale construction was done using IRT scaling, such that the OECD country average score was set at 0 and the OECD country average standard deviation at 1.0. Higher values on the scale indicate a more positive attitude towards school.

The mean score of students in Northern Ireland on the index of attitude towards school was 0.25 (i.e., one-quarter of a standard deviation above the OECD average level), with boys having a mean of 0.17 and girls 0.33 (Table 5.24). The difference (0.16) is statistically significant. The difference in Northern Ireland is similar to the OECD average difference (0.18, also in favour of girls).

The mean attitude towards school score for students in the Republic of Ireland (0.13) is somewhat lower than in Northern Ireland, while the mean attitude towards school score in Scotland (0.22) is about the same. In addition to Northern Ireland, countries with high mean scores on this measure include Portugal (0.27) and Australia (0.25), while countries with low mean scores include Norway (-0.21), and Belgium (-0.19).

The association between attitude towards school and achievement is examined with reference to the difference in mean scores on combined mathematical literacy for students in the top and bottom quarters of the attitude towards school scale (Table 5.24). The difference in Northern Ireland (27 points) is statistically significant, with students who have a stronger attitude towards school achieving a higher mean score. The corresponding OECD average difference is just 3 points, indicating a weaker association between attitude towards school and performance on mathematical literacy across OECD countries.

Table 5.24:   *Index of Attitude toward School and Performance in Mathematics, by National Quarters of the Index*

Index of attitudes towards school

Country (countries in alphabetical order)	All students		Boys		Girls		Gender difference (B - G)		Bottom quarter		Second quarter		Third quarter		Top quarter	
	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.	Dif.	S.E.	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.
Australia	0.25	(0.01)	0.20	(0.02)	0.31	(0.02)	**-0.10**	(0.03)	-0.97	(0.01)	-0.20	(0.00)	0.48	(0.01)	1.70	(0.01)
Austria	0.12	(0.02)	0.06	(0.02)	0.17	(0.03)	**-0.11**	(0.03)	-1.16	(0.01)	-0.29	(0.01)	0.45	(0.01)	1.46	(0.02)
Belgium	-0.19	(0.02)	-0.27	(0.02)	-0.10	(0.02)	**-0.17**	(0.03)	-1.21	(0.01)	-0.52	(0.00)	-0.02	(0.01)	1.01	(0.02)
Canada	0.06	(0.01)	-0.06	(0.02)	0.17	(0.02)	**-0.23**	(0.02)	-1.14	(0.01)	-0.40	(0.00)	0.28	(0.01)	1.47	(0.02)
Czech Republic	-0.01	(0.02)	-0.08	(0.02)	0.06	(0.02)	**-0.14**	(0.03)	-1.06	(0.01)	-0.37	(0.00)	0.23	(0.01)	1.14	(0.02)
Denmark	-0.03	(0.02)	-0.09	(0.03)	0.02	(0.02)	**-0.11**	(0.03)	-1.14	(0.01)	-0.41	(0.01)	0.19	(0.01)	1.23	(0.02)
Finland	0.11	(0.02)	-0.02	(0.02)	0.24	(0.02)	**-0.26**	(0.03)	-0.97	(0.01)	-0.28	(0.00)	0.34	(0.01)	1.35	(0.02)
France	0.14	(0.02)	-0.01	(0.03)	0.28	(0.03)	**-0.29**	(0.04)	-1.08	(0.02)	-0.27	(0.01)	0.46	(0.01)	1.45	(0.02)
Germany	-0.08	(0.02)	-0.16	(0.02)	0.00	(0.02)	**-0.16**	(0.03)	-1.21	(0.01)	-0.47	(0.01)	0.14	(0.01)	1.23	(0.02)
Greece	0.08	(0.02)	-0.01	(0.02)	0.16	(0.03)	**-0.18**	(0.03)	-1.08	(0.02)	-0.33	(0.01)	0.38	(0.01)	1.34	(0.02)
Hungary	-0.22	(0.02)	-0.28	(0.02)	-0.16	(0.02)	**-0.12**	(0.02)	-1.16	(0.01)	-0.54	(0.01)	-0.06	(0.01)	0.87	(0.02)
Iceland	0.00	(0.02)	-0.16	(0.03)	0.17	(0.03)	**-0.33**	(0.05)	-1.29	(0.02)	-0.45	(0.01)	0.32	(0.01)	1.43	(0.02)
Italy	-0.06	(0.02)	-0.17	(0.02)	0.05	(0.02)	**-0.22**	(0.03)	-1.13	(0.01)	-0.40	(0.00)	0.19	(0.01)	1.11	(0.01)
Japan	-0.50	(0.01)	-0.60	(0.02)	-0.42	(0.02)	**-0.18**	(0.03)	-1.48	(0.02)	-0.83	(0.00)	-0.35	(0.01)	0.64	(0.02)
Korea	-0.37	(0.02)	-0.36	(0.02)	-0.39	(0.02)	0.03	(0.02)	-1.33	(0.01)	-0.68	(0.01)	-0.25	(0.00)	0.77	(0.02)
Luxembourg	-0.23	(0.02)	-0.32	(0.02)	-0.15	(0.02)	**-0.18**	(0.03)	-1.39	(0.01)	-0.63	(0.01)	-0.02	(0.01)	1.10	(0.02)
Mexico	0.42	(0.03)	0.31	(0.03)	0.53	(0.03)	**-0.23**	(0.03)	-0.90	(0.02)	-0.01	(0.01)	0.72	(0.01)	1.89	(0.02)
Netherlands	-0.19	(0.02)	-0.24	(0.03)	-0.15	(0.02)	**-0.09**	(0.03)	-1.06	(0.02)	-0.45	(0.01)	-0.05	(0.01)	0.79	(0.03)
New Zealand	0.10	(0.02)	0.07	(0.02)	0.12	(0.02)	-0.04	(0.03)	-1.08	(0.01)	-0.35	(0.00)	0.35	(0.01)	1.46	(0.02)
Northern Ireland	*0.25*	*(0.03)*	*0.17*	*(0.04)*	*0.33*	*(0.04)*	***-0.16***	*(0.05)*	*-1.01*	*(0.02)*	*-0.14*	*(0.01)*	*0.51*	*(0.01)*	*1.63*	*(0.03)*
Norway	-0.21	(0.02)	-0.31	(0.03)	-0.11	(0.03)	**-0.20**	(0.04)	-1.35	(0.02)	-0.55	(0.01)	0.01	(0.01)	1.05	(0.02)
Poland	-0.12	(0.02)	-0.24	(0.02)	0.00	(0.02)	**-0.24**	(0.03)	-1.27	(0.01)	-0.49	(0.01)	0.02	(0.01)	1.26	(0.02)
Portugal	0.27	(0.02)	0.12	(0.03)	0.40	(0.03)	**-0.28**	(0.03)	-0.84	(0.01)	-0.11	(0.01)	0.50	(0.01)	1.53	(0.02)
Rep of Ireland	0.13	(0.02)	0.02	(0.03)	0.24	(0.03)	**-0.22**	(0.04)	-1.08	(0.02)	-0.30	(0.01)	0.41	(0.01)	1.49	(0.02)
Scotland	0.22	(0.02)	0.20	(0.03)	0.23	(0.03)	-0.03	(0.04)	-1.00	(0.02)	-0.14	(0.01)	0.48	(0.01)	1.54	(0.02)
Slovak Republic	0.03	(0.02)	-0.04	(0.02)	0.11	(0.02)	**-0.15**	(0.03)	-0.98	(0.01)	-0.33	(0.00)	0.24	(0.01)	1.19	(0.02)
Spain	0.14	(0.02)	-0.01	(0.02)	0.28	(0.02)	**-0.29**	(0.03)	-1.05	(0.01)	-0.27	(0.01)	0.41	(0.01)	1.47	(0.02)
Sweden	0.02	(0.02)	-0.03	(0.03)	0.07	(0.02)	**-0.10**	(0.03)	-1.10	(0.01)	-0.40	(0.0)	0.27	(0.01)	1.31	(0.02)
Switzerland	0.03	(0.02)	-0.02	(0.03)	0.08	(0.02)	**-0.11**	(0.03)	-1.19	(0.02)	-0.42	(0.01)	0.35	(0.01)	1.37	(0.02)
Turkey	0.13	(0.03)	-0.01	(0.04)	0.29	(0.03)	**-0.31**	(0.05)	-1.11	(0.01)	-0.33	(0.01)	0.39	(0.01)	1.56	(0.02)
United States	0.09	(0.02)	-0.02	(0.03)	0.20	(0.03)	**-0.23**	(0.04)	-1.11	(0.01)	-0.37	(0.00)	0.29	(0.01)	1.55	(0.02)
OECD total	*0.01*	*(0.01)*	*-0.09*	*(0.01)*	*0.11*	*(0.01)*	*-0.20*	*(0.01)*	*-1.17*	*(0.00)*	*-0.42*	*(0.00)*	*0.22*	*(0.01)*	*1.39*	*(0.01)*
OECD average	*0.00*	*(0.00)*	*-0.09*	*(0.00)*	*0.09*	*(0.00)*	*-0.18*	*(0.01)*	*-1.15*	*(0.00)*	*-0.41*	*(0.00)*	*0.23*	*(0.01)*	*1.33*	*(0.01)*

Note: Values that are statistically significant are indicated in bold

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Table 5.24: *(Contd.)*

Country	Performance on the mathematics scale, by national quarters of the index of attitudes towards school								Change in the mathematics score per unit of the index of attitudes towards school		Explained variation in student performance (r-squared x 100)	
	Bottom quarter		Second quarter		Third quarter		Top quarter					
	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Mean score	S.E	Change	S.E.	Percent age	S.E.
Australia	**502**	(3.2)	521	(2.6)	536	(2.3)	**540**	(2.6)	**13.8**	(1.03)	2.4	(0.36)
Austria	501	(4.2)	517	(4.7)	516	(4.8)	496	(4.5)	-2.7	(1.72)	0.1	(0.14)
Belgium	528	(4.0)	544	(3.5)	540	(3.8)	523	(3.9)	**-4.3**	(2.16)	0.1	(0.14)
Canada	**524**	(2.4)	536	(2.2)	540	(2.4)	**545**	(2.4)	**7.2**	(1.00)	0.8	(0.21)
Czech Republic	**516**	(4.6)	522	(4.7)	528	(4.0)	**525**	(3.5)	**3.6**	(1.72)	0.1	(0.11)
Denmark	**503**	(4.0)	513	(4.3)	526	(3.7)	**520**	(4.4)	**7.0**	(1.78)	0.5	(0.27)
Finland	**525**	(2.9)	542	(2.4)	553	(2.7)	**558**	(3.4)	**12.5**	(1.50)	2.0	(0.47)
France	**495**	(3.5)	518	(3.6)	524	(3.8)	**513**	(4.2)	**6.8**	(1.69)	0.6	(0.30)
Germany	**516**	(4.8)	522	(4.5)	514	(4.8)	**496**	(4.5)	**-9.4**	(1.98)	0.9	(0.37)
Greece	**459**	(4.5)	450	(5.1)	443	(5.3)	**431**	(3.7)	**-11.4**	(1.74)	1.5	(0.43)
Hungary	**496**	(4.7)	493	(4.1)	487	(4.4)	**485**	(4.1)	**-6.5**	(2.28)	0.3	(0.24)
Iceland	**490**	(3.3)	511	(3.0)	526	(3.2)	**536**	(2.9)	**15.3**	(1.42)	3.4	(0.64)
Italy	**467**	(4.1)	472	(3.9)	468	(4.3)	**456**	(3.9)	**-5.6**	(1.73)	0.3	(0.17)
Japan	530	(5.0)	533	(5.4)	538	(4.9)	537	(4.7)	2.6	(2.03)	0.1	(0.09)
Korea	546	(4.0)	539	(4.0)	540	(4.0)	544	(4.8)	0.2	(1.78)	0.0	(0.03)
Luxembourg	**497**	(3.4)	506	(2.9)	497	(3.5)	**476**	(3.0)	**-9.2**	(1.46)	1.0	(0.33)
Mexico	**353**	(4.7)	385	(4.0)	394	(3.9)	**414**	(4.1)	**21.4**	(1.71)	7.6	(1.10)
Netherlands	532	(4.6)	547	(4.4)	548	(3.9)	545	(5.2)	3.8	(3.05)	0.1	(0.18)
New Zealand	**502**	(3.5)	522	(4.0)	529	(3.6)	**545**	(4.2)	**14.6**	(1.70)	2.3	(0.54)
Northern Ireland	*499*	*(4.6)*	*520*	*(5.2)*	*519*	*(4.0)*	*526*	*(3.6)*	*9.4*	*(1.93)*	*1.0*	*(0.50)*
Norway	**467**	(3.8)	497	(4.0)	512	(3.9)	**510**	(3.9)	**16.3**	(1.80)	2.9	(0.63)
Poland	489	(4.1)	496	(3.7)	496	(3.5)	483	(3.5)	-3.3	(1.73)	0.1	(0.14)
Portugal	**450**	(4.4)	465	(4.0)	475	(4.2)	**475**	(4.7)	**9.5**	(1.73)	1.1	(0.39)
Rep of Ireland	**491**	(4.0)	499	(4.0)	513	(3.7)	**508**	(3.8)	**6.8**	(1.53)	0.7	(0.31)
Scotland	**503**	(4.6)	526	(3.6)	530	(4.4)	**538**	(3.9)	**12.7**	(2.37)	2.4	(0.89)
Slovak Republic	**510**	(4.1)	500	(4.1)	502	(4.2)	**482**	(4.5)	**-10.5**	(1.51)	1.0	(0.27)
Spain	**477**	(4.2)	484	(2.8)	495	(3.8)	**487**	(3.5)	**4.2**	(1.41)	0.2	(0.16)
Sweden	**489**	(4.0)	509	(3.6)	515	(4.0)	**526**	(4.4)	**14.3**	(1.65)	2.2	(0.48)
Switzerland	517	(4.7)	535	(4.4)	536	(4.0)	521	(4.2)	1.1	(1.95)	0.0	(0.07)
Turkey	426	(11.1)	424	(7.3)	433	(6.4)	414	(7.1)	-3.3	(3.75)	0.1	(0.27)
United States	**470**	(4.3)	485	(3.9)	491	(4.3)	**489**	(4.8)	**6.6**	(1.39)	0.6	(0.23)
OECD total	*489*	*(1.5)*	*495*	*(1.3)*	*494*	*(1.5)*	*484*	*(1.5)*	*-1.8*	*(0.61)*	*0.0*	*(0.02)*
OECD average	*496*	*(0.9)*	*505*	*(0.8)*	*506*	*(0.8)*	*499*	*(0.9)*	*0.9*	*(0.35)*	*0.0*	*(0.01)*

Note: Values that are statistically significant are indicated in bold

Sense of Belonging at School (Table 5.25)

The PISA index of ***sense of belonging at school*** was derived from students' reported agreement that school is a place where: *i)* I feel like an outsider (or left out of things); *ii)* I make friends easily; *iii)* I feel like I belong; *iv)* I feel awkward and out of place; *v)* other students seem to like me; and *vi)* I feel lonely. A four-point scale with the response categories "strongly agree", "agree", "disagree" and "strongly disagree" was used. Items *ii)*, *iii)*, and *v)* were inverted for scaling. Scale construction was done using IRT scaling, such that the OECD country average score was set at 0 and the OECD country average standard deviation at 1.0. Higher values on the scale indicate more positive sense of belonging at school.

The mean score of students in Northern Ireland on the index of sense of belonging at school is 0.05 (i.e., close to the OECD average on the index) (Table 5.25). The corresponding mean scores for the Republic of Ireland and Scotland are 0.08 and 0.1 respectively. Countries with the highest sense of belonging to school mean scores were Austria (0.44) and Sweden (0.25). Countries with low mean scores included Japan (-0.53), Korea (-0.39) and Turkey (-0.44). Although girls in Northern Ireland had a marginally higher score (0.07) than boys (0.03), the difference between them is not statistically significant. The difference in mean mathematical literacy scores in Northern Ireland between students in the top and bottom quarters of the index of sense of belonging at school (6 points) is not statistically significant.

Table 5.25: *Index of Sense of Belonging at School and Performance in Mathematics, by National Quarters of the Index*

Index of sense of belonging

Country (countries in alphabetical order)	All students		Boys		Girls		Gender difference (B - G)		Bottom quarter		Second quarter		Third quarter		Top quarter	
	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.	Dif.	S.E.	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.
Australia	0.04	(0.02)	0.00	(0.02)	0.09	(0.02)	**-0.09**	(0.02)	-1.07	(0.01)	-0.48	(0.00)	0.29	(0.00)	1.43	(0.01)
Austria	0.44	(0.02)	0.41	(0.03)	0.47	(0.03)	-0.06	(0.04)	-0.98	(0.02)	0.20	(0.01)	0.85	(0.01)	1.71	(0.01)
Belgium	-0.28	(0.01)	-0.33	(0.02)	-0.23	(0.02)	**-0.10**	(0.03)	-1.30	(0.01)	-0.69	(0.00)	-0.09	(0.01)	0.94	(0.01)
Canada	0.02	(0.01)	-0.03	(0.02)	0.06	(0.02)	**-0.09**	(0.02)	-1.18	(0.01)	-0.51	(0.00)	0.26	(0.01)	1.50	(0.01)
Czech Republic	-0.27	(0.01)	-0.27	(0.02)	-0.28	(0.02)	0.01	(0.02)	-1.19	(0.01)	-0.63	(0.00)	-0.11	(0.01)	0.83	(0.01)
Denmark	0.01	(0.02)	0.01	(0.02)	0.01	(0.02)	0.01	(0.03)	-1.17	(0.01)	-0.37	(0.01)	0.31	(0.01)	1.28	(0.02)
Finland	-0.02	(0.02)	0.03	(0.02)	-0.07	(0.02)	**0.10**	(0.03)	-1.13	(0.01)	-0.46	(0.00)	0.31	(0.01)	1.22	(0.02)
France	-0.18	(0.02)	-0.19	(0.03)	-0.17	(0.02)	-0.02	(0.03)	-1.28	(0.01)	-0.58	(0.01)	0.08	(0.01)	1.05	(0.02)
Germany	0.24	(0.02)	0.24	(0.03)	0.24	(0.02)	0.00	(0.04)	-1.16	(0.02)	-0.08	(0.01)	0.65	(0.01)	1.56	(0.01)
Greece	0.04	(0.02)	0.03	(0.02)	0.04	(0.02)	-0.01	(0.03)	-1.01	(0.01)	-0.40	(0.01)	0.29	(0.01)	1.27	(0.02)
Hungary	0.08	(0.02)	0.04	(0.02)	0.13	(0.03)	**-0.09**	(0.03)	-1.08	(0.01)	-0.34	(0.01)	0.34	(0.01)	1.40	(0.02)
Iceland	0.16	(0.02)	0.19	(0.03)	0.13	(0.03)	0.06	(0.04)	-1.22	(0.02)	-0.30	(0.01)	0.49	(0.01)	1.67	(0.02)
Italy	0.05	(0.01)	0.05	(0.02)	0.05	(0.02)	0.01	(0.03)	-1.02	(0.01)	-0.35	(0.01)	0.32	(0.00)	1.25	(0.02)
Japan	-0.53	(0.02)	-0.59	(0.02)	-0.47	(0.02)	**-0.13**	(0.03)	-1.49	(0.01)	-0.88	(0.00)	-0.41	(0.01)	0.67	(0.02)
Korea	-0.39	(0.01)	-0.36	(0.02)	-0.43	(0.02)	**0.07**	(0.03)	-1.32	(0.01)	-0.80	(0.00)	-0.20	(0.01)	0.76	(0.02)
Luxembourg	0.23	(0.02)	0.23	(0.02)	0.22	(0.02)	0.01	(0.03)	-1.14	(0.01)	-0.15	(0.01)	0.58	(0.01)	1.62	(0.02)
Mexico	0.08	(0.02)	0.02	(0.03)	0.13	(0.02)	**-0.12**	(0.03)	-1.11	(0.01)	-0.44	(0.01)	0.36	(0.01)	1.50	(0.01)
Netherlands	-0.06	(0.02)	-0.08	(0.02)	-0.04	(0.02)	-0.04	(0.03)	-1.02	(0.01)	-0.45	(0.01)	0.24	(0.01)	1.00	(0.02)
New Zealand	-0.01	(0.01)	0.00	(0.02)	-0.02	(0.02)	0.02	(0.03)	-1.11	(0.01)	-0.49	(0.01)	0.26	(0.01)	1.31	(0.02)
Northern Ireland	*0.05*	*(0.02)*	*0.03*	*(0.03)*	*0.07*	*(0.02)*	*-0.04*	*(0.04)*	*-1.05*	*(0.02)*	*-0.42*	*(0.01)*	*0.32*	*(0.01)*	*1.34*	*(0.03)*
Norway	0.24	(0.02)	0.27	(0.03)	0.21	(0.03)	0.06	(0.04)	-1.09	(0.01)	-0.13	(0.01)	0.57	(0.01)	1.60	(0.02)
Poland	-0.17	(0.02)	-0.20	(0.02)	-0.14	(0.02)	**-0.06**	(0.03)	-1.21	(0.01)	-0.60	(0.00)	0.04	(0.01)	1.10	(0.02)
Portugal	0.09	(0.02)	0.09	(0.03)	0.10	(0.02)	-0.01	(0.04)	-0.99	(0.01)	-0.31	(0.01)	0.33	(0.01)	1.34	(0.02)
Republic of Ireland	0.08	(0.02)	0.04	(0.02)	0.12	(0.03)	**-0.07**	(0.04)	-1.02	(0.01)	-0.42	(0.01)	0.32	(0.01)	1.43	(0.02)
Scotland	0.10	(0.02)	0.14	(0.03)	0.06	(0.03)	0.08	(0.05)	-1.03	(0.02)	-0.36	(0.01)	0.38	(0.01)	1.43	(0.02)
Slovak Republic	-0.16	(0.01)	-0.16	(0.02)	-0.16	(0.02)	0.00	(0.03)	-1.13	(0.01)	-0.56	(0.00)	0.00	(0.01)	1.05	(0.02)
Spain	0.20	(0.02)	0.24	(0.02)	0.16	(0.03)	**0.08**	(0.04)	-1.00	(0.01)	-0.21	(0.01)	0.48	(0.01)	1.54	(0.01)
Sweden	0.25	(0.02)	0.35	(0.02)	0.14	(0.03)	**0.21**	(0.03)	-1.06	(0.02)	-0.10	(0.01)	0.56	(0.00)	1.58	(0.02)
Switzerland	0.19	(0.03)	0.17	(0.04)	0.22	(0.02)	-0.04	(0.05)	-1.15	(0.02)	-0.18	(0.01)	0.59	(0.01)	1.50	(0.01)
Turkey	-0.44	(0.02)	-0.48	(0.02)	-0.39	(0.03)	**-0.09**	(0.04)	-1.44	(0.01)	-0.83	(0.00)	-0.26	(0.01)	0.76	(0.02)
United States	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
OECD total	*-0.09*	*(0.01)*	*-0.12*	*(0.01)*	*-0.07*	*(0.01)*	*-0.05*	*(0.01)*	*-1.26*	*(0.00)*	*-0.53*	*(0.00)*	*0.18*	*(0.01)*	*1.23*	*(0.01)*
OECD average	*0.00*	*(0.00)*	*-0.01*	*(0.00)*	*0.01*	*(0.00)*	*-0.02*	*(0.01)*	*-1.17*	*(0.00)*	*-0.46*	*(0.00)*	*0.30*	*(0.00)*	*1.33*	*(0.01)*

Note: Values that are statistically significant are indicated in bold

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Table 5.25: *(Contd.)*

Country	Performance on the mathematics scale, by national quarters of the index of sense of belonging								Change in the mathematics score per unit of the index of sense of belonging		Explained variation in student performance (r-squared x 100)	
	Bottom quarter		Second quarter		Third quarter		Top quarter					
	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Mean score	S.E	Change	S.E.	Percent age	S.E.
Australia	**518**	(3.8)	524	(2.7)	530	(2.9)	**527**	(2.7)	3.1	(1.63)	0.1	(0.12)
Austria	497	(3.8)	513	(4.4)	515	(4.3)	505	(4.4)	2.9	(1.64)	0.1	(0.11)
Belgium	**517**	(5.0)	537	(3.9)	543	(3.2)	**539**	(2.8)	**6.3**	(2.18)	0.3	(0.20)
Canada	534	(2.5)	541	(2.1)	538	(2.5)	532	(2.5)	-1.0	(0.85)	0.0	(0.03)
Czech Republic	**505**	(4.7)	516	(3.8)	532	(4.5)	**537**	(3.8)	**12.7**	(1.98)	1.3	(0.39)
Denmark	511	(4.1)	513	(4.1)	522	(4.5)	516	(4.1)	3.1	(1.92)	0.1	(0.14)
Finland	544	(3.5)	547	(2.7)	547	(3.1)	540	(3.2)	-1.9	(1.37)	0.0	(0.07)
France	505	(3.9)	516	(4.5)	515	(4.1)	513	(3.3)	1.2	(1.28)	0.0	(0.04)
Germany	509	(4.5)	516	(4.2)	519	(4.3)	504	(5.2)	-1.4	(1.81)	0.0	(0.07)
Greece	**433**	(5.1)	446	(4.5)	455	(4.3)	**448**	(5.1)	**5.8**	(1.69)	0.3	(0.18)
Hungary	**476**	(4.0)	484	(4.2)	500	(4.3)	**501**	(3.5)	**10.0**	(1.63)	1.1	(0.35)
Iceland	512	(3.7)	518	(3.8)	519	(3.7)	513	(3.8)	0.5	(1.55)	0.0	(0.04)
Italy	467	(4.4)	467	(3.9)	469	(3.8)	460	(4.6)	-3.7	(1.92)	0.1	(0.13)
Japan	**512**	(4.9)	535	(5.3)	546	(4.6)	**546**	(4.8)	**12.9**	(2.16)	1.3	(0.39)
Korea	**528**	(4.3)	539	(3.8)	549	(3.7)	**553**	(4.8)	**11.1**	(2.09)	1.0	(0.35)
Luxembourg	**482**	(3.1)	491	(3.2)	504	(2.7)	**497**	(3.3)	**5.9**	(1.45)	0.5	(0.24)
Mexico	**363**	(4.3)	383	(3.8)	398	(4.4)	**399**	(4.3)	**13.3**	(1.41)	2.6	(0.51)
Netherlands	**531**	(4.2)	539	(4.3)	553	(4.4)	**549**	(4.2)	**7.0**	(2.31)	0.4	(0.28)
New Zealand	515	(4.0)	529	(3.7)	532	(3.2)	523	(3.9)	2.6	(1.51)	0.1	(0.08)
Northern Ireland	*513*	*(5.2)*	*514*	*(3.8)*	*519*	*(4.5)*	*518*	*(3.9)*	*1.7*	*(2.12)*	*0.0*	*(0.09)*
Norway	492	(3.8)	499	(3.5)	504	(3.9)	490	(3.9)	0.1	(1.57)	0.0	(0.03)
Poland	**480**	(3.2)	484	(3.6)	499	(4.0)	**499**	(3.8)	**7.7**	(1.51)	0.6	(0.25)
Portugal	**438**	(4.7)	469	(4.4)	480	(3.8)	**479**	(3.9)	**15.7**	(1.72)	2.8	(0.58)
Republic of Ireland	**506**	(4.2)	503	(3.6)	511	(3.4)	**492**	(3.6)	**-5.2**	(1.55)	0.4	(0.22)
Scotland	530	(4.9)	522	(4.4)	526	(3.6)	519	(3.3)	-3.3	(2.30)	0.16	(0.23)
Slovak Republic	**489**	(4.0)	495	(3.9)	510	(3.9)	**499**	(4.9)	**3.1**	(1.41)	0.1	(0.08)
Spain	479	(3.3)	486	(2.6)	494	(3.1)	482	(4.1)	2.4	(1.34)	0.1	(0.10)
Sweden	506	(3.4)	512	(4.0)	516	(3.4)	505	(4.1)	0.3	(1.57)	0.0	(0.03)
Switzerland	**512**	(4.8)	523	(3.9)	540	(4.8)	**532**	(4.5)	**8.4**	(1.90)	0.8	(0.36)
Turkey	**390**	(6.6)	419	(7.0)	444	(8.2)	**442**	(8.0)	**21.0**	(2.87)	3.1	(0.83)
United States	m	m	m	m	m	m	m	m	m	m	m	m
OECD total	*485*	*(1.6)*	*494*	*(1.4)*	*500*	*(1.3)*	*492*	*(1.4)*	*2.0*	*(0.63)*	*0.0*	*(0.02)*
OECD average	*492*	*(1.0)*	*502*	*(0.8)*	*511*	*(0.7)*	*502*	*(0.9)*	*3.5*	*(0.38)*	*0.1*	*(0.03)*

Note: Values that are statistically significant are indicated in bold

Use of Control Strategies (Table 5.26)

The PISA index of **control strategies** was derived from students' reported agreement with the following statements: *i)* when I study for a mathematics test, I try to work out what are the most important parts to learn; *ii)* when I study mathematics, I make myself check to see if I remember the work I have already done; *iii)* when I study mathematics, I try to figure out which concepts I still have not understood properly; *iv)* when I cannot understand something in mathematics, I always search for more information to clarify the problem; and *v)* when I study mathematics, I start by working out exactly what I need to learn. A four-point scale with the response categories "strongly agree", "agree", "disagree" and "strongly disagree" was used. Scale construction was done using IRT scaling, such that the OECD country average score was set at 0 and the OECD country average standard deviation at 1.0. Higher values on the scale indicate more support for using control strategies.

The mean score of students in Northern Ireland on the index of control strategies was -0.11 (i.e., one-tenth of a standard deviation below the OECD average on the index) (Table 5.26). The corresponding mean scores for the Republic of Ireland and Scotland are -0.01 and 0.09 respectively. Countries with the highest average reported use of control strategies include Mexico (0.45), Austria (0.52) and Germany (0.38). Countries with low mean scores included Japan (-0.54), Korea (-0.49) and Finland (-0.48). Although girls in Northern Ireland had a marginally higher score (-0.11) than boys (-0.12), the difference between them is not statistically significant. The difference in mean mathematical literacy scores in Northern Ireland between students in the top and bottom quarters of the index of control strategies (13 points) is statistically significant. The OECD average difference between top and bottom quarters is just 1.5 points.

Table 5.26:   *Index of Control Strategies and Performance in Mathematics, by National Quarters of the Index*

Country (countries in alphabetical order)	Index of control strategies															
	All students		Boys		Girls		Gender difference (B - G)		Bottom quarter		Second quarter		Third quarter		Top quarter	
	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.	Dif.	S.E.	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.
Australia	0.01	(0.01)	-0.02	(0.02)	0.05	(0.01)	**-0.07**	(0.02)	-1.05	(0.01)	-0.28	(0.00)	0.13	(0.00)	1.24	(0.01)
Austria	0.52	(0.02)	0.42	(0.03)	0.62	(0.03)	**-0.20**	(0.04)	-0.90	(0.03)	0.17	(0.01)	0.90	(0.01)	1.92	(0.02)
Belgium	-0.05	(0.01)	-0.15	(0.02)	0.05	(0.02)	**-0.20**	(0.03)	-1.14	(0.02)	-0.36	(0.00)	0.11	(0.00)	1.18	(0.01)
Canada	0.06	(0.01)	-0.05	(0.02)	0.16	(0.02)	**-0.21**	(0.02)	-1.13	(0.01)	-0.24	(0.00)	0.21	(0.00)	1.39	(0.02)
Czech Republic	0.06	(0.02)	-0.01	(0.02)	0.12	(0.02)	**-0.13**	(0.02)	-0.84	(0.02)	-0.15	(0.01)	0.13	(0.00)	1.09	(0.02)
Denmark	-0.19	(0.01)	-0.18	(0.02)	-0.20	(0.02)	0.01	(0.03)	-1.10	(0.01)	-0.49	(0.00)	-0.04	(0.01)	0.87	(0.02)
Finland	-0.48	(0.01)	-0.46	(0.02)	-0.50	(0.02)	0.04	(0.02)	-1.39	(0.01)	-0.78	(0.00)	-0.30	(0.00)	0.54	(0.02)
France	0.15	(0.02)	0.02	(0.02)	0.27	(0.02)	**-0.25**	(0.03)	-1.06	(0.02)	-0.16	(0.01)	0.33	(0.01)	1.52	(0.02)
Germany	0.38	(0.02)	0.23	(0.02)	0.54	(0.03)	**-0.31**	(0.03)	-0.99	(0.02)	-0.04	(0.01)	0.75	(0.01)	1.81	(0.02)
Greece	0.27	(0.02)	0.21	(0.02)	0.33	(0.02)	**-0.11**	(0.03)	-0.82	(0.02)	-0.05	(0.01)	0.43	(0.01)	1.53	(0.02)
Hungary	0.06	(0.01)	-0.02	(0.02)	0.14	(0.02)	**-0.16**	(0.03)	-0.94	(0.02)	-0.21	(0.01)	0.19	(0.01)	1.19	(0.02)
Iceland	0.00	(0.02)	-0.03	(0.03)	0.04	(0.03)	-0.07	(0.04)	-1.19	(0.02)	-0.34	(0.01)	0.20	(0.01)	1.34	(0.02)
Italy	0.21	(0.02)	0.12	(0.03)	0.29	(0.03)	**-0.17**	(0.04)	-0.85	(0.02)	-0.07	(0.01)	0.32	(0.01)	1.46	(0.02)
Japan	-0.54	(0.02)	-0.49	(0.03)	-0.59	(0.03)	**0.10**	(0.04)	-1.71	(0.03)	-0.87	(0.00)	-0.36	(0.01)	0.79	(0.02)
Korea	-0.49	(0.02)	-0.46	(0.03)	-0.53	(0.04)	0.07	(0.05)	-1.63	(0.02)	-0.79	(0.00)	-0.23	(0.01)	0.71	(0.02)
Luxembourg	0.08	(0.02)	-0.03	(0.03)	0.18	(0.02)	**-0.21**	(0.03)	-1.26	(0.02)	-0.30	(0.01)	0.32	(0.01)	1.55	(0.02)
Mexico	0.45	(0.02)	0.37	(0.03)	0.52	(0.03)	**-0.16**	(0.03)	-0.72	(0.01)	0.02	(0.00)	0.63	(0.01)	1.87	(0.02)
Netherlands	-0.27	(0.02)	-0.27	(0.02)	-0.26	(0.02)	-0.01	(0.03)	-1.20	(0.03)	-0.52	(0.01)	-0.09	(0.01)	0.75	(0.02)
New Zealand	-0.03	(0.01)	-0.07	(0.02)	0.01	(0.02)	**-0.08**	(0.03)	-1.10	(0.02)	-0.34	(0.01)	0.10	(0.00)	1.21	(0.02)
Northern Ireland	*-0.11*	*(0.02)*	*-0.12*	*(0.03)*	*-0.11*	*(0.02)*	*-0.01*	*(0.03)*	*-1.06*	*(0.02)*	*-0.38*	*(0.01)*	*0.07*	*(0.00)*	*0.92*	*(0.03)*
Norway	-0.26	(0.02)	-0.28	(0.02)	-0.23	(0.02)	-0.05	(0.03)	-1.37	(0.02)	-0.55	(0.01)	-0.05	(0.01)	0.95	(0.02)
Poland	-0.03	(0.01)	-0.11	(0.02)	0.06	(0.02)	**-0.17**	(0.03)	-0.93	(0.02)	-0.25	(0.01)	0.07	(0.00)	0.99	(0.02)
Portugal	0.14	(0.02)	0.04	(0.03)	0.23	(0.02)	**-0.19**	(0.03)	-0.92	(0.03)	-0.06	(0.01)	0.23	(0.01)	1.32	(0.02)
Rep. of Ireland	-0.01	(0.02)	-0.05	(0.02)	0.02	(0.03)	**-0.07**	(0.03)	-1.05	(0.02)	-0.30	(0.01)	0.14	(0.00)	1.16	(0.02)
Scotland	0.09	(0.02)	0.06	(0.03)	0.12	(0.03)	-0.05	(0.04)	-0.91	(0.02)	-0.17	(0.01)	0.17	(0.01)	1.27	(0.03)
Slovak Republic	0.07	(0.01)	0.02	(0.02)	0.13	(0.02)	**-0.11**	(0.03)	-0.86	(0.02)	-0.18	(0.01)	0.14	(0.01)	1.18	(0.02)
Spain	-0.02	(0.02)	-0.12	(0.03)	0.09	(0.02)	**-0.21**	(0.03)	-1.16	(0.02)	-0.26	(0.01)	0.15	(0.00)	1.20	(0.02)
Sweden	-0.40	(0.01)	-0.40	(0.02)	-0.40	(0.02)	0.00	(0.03)	-1.36	(0.01)	-0.69	(0.00)	-0.23	(0.01)	0.67	(0.02)
Switzerland	0.19	(0.01)	0.13	(0.02)	0.26	(0.02)	**-0.14**	(0.03)	-1.06	(0.02)	-0.17	(0.01)	0.45	(0.01)	1.55	(0.02)
Turkey	0.26	(0.03)	0.15	(0.04)	0.40	(0.03)	**-0.25**	(0.04)	-1.12	(0.03)	-0.13	(0.01)	0.47	(0.01)	1.82	(0.02)
United States	0.01	(0.02)	-0.07	(0.02)	0.09	(0.02)	**-0.16**	(0.03)	-1.17	(0.02)	-0.29	(0.01)	0.13	(0.00)	1.36	(0.02)
OECD total	*0.01*	*(0.01)*	*-0.06*	*(0.01)*	*0.08*	*(0.01)*	*-0.14*	*(0.01)*	*-1.20*	*(0.01)*	*-0.32*	*(0.00)*	*0.18*	*(0.00)*	*1.37*	*(0.01)*
OECD average	*0.00*	*(0.00)*	*-0.06*	*(0.01)*	*0.06*	*(0.01)*	*-0.12*	*(0.01)*	*-1.16*	*(0.00)*	*-0.32*	*(0.00)*	*0.17*	*(0.01)*	*1.30*	*(0.01)*

Note: Values that are statistically significant are indicated in bold

Table 5.26: *(Contd.)*

Country	Performance on the mathematics scale, by national quarters of the index of control strategies								Change in the mathematics score per unit of the index of control strategies		Explained variation in student performance (r-squared x 100)	
	Bottom quarter		Second quarter		Third quarter		Top quarter					
	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Mean score	S.E	Change	S.E.	Percentage	S.E.
Australia	**503**	(3.4)	523	(2.2)	531	(2.7)	**545**	(3.1)	**15.6**	(1.14)	2.4	(0.35)
Austria	**511**	(4.0)	513	(4.1)	510	(4.5)	496	(4.5)	**-4.0**	(1.47)	0.2	(0.18)
Belgium	532	(4.1)	549	(3.1)	541	(3.3)	527	(3.2)	-1.7	(1.69)	0.0	(0.05)
Canada	**517**	(2.4)	535	(2.2)	540	(2.4)	**553**	(2.7)	**13.2**	(1.13)	2.4	(0.41)
Czech Republic	524	(4.4)	520	(4.0)	522	(3.6)	525	(4.5)	0.4	(2.10)	0.0	(0.03)
Denmark	511	(3.9)	517	(4.3)	515	(3.8)	519	(4.9)	4.6	(2.23)	0.2	(0.18)
Finland	**533**	(2.7)	547	(2.2)	542	(3.0)	**556**	(3.0)	**11.5**	(1.42)	1.2	(0.31)
France	**496**	(3.7)	516	(4.4)	522	(3.8)	**516**	(3.6)	**7.9**	(1.34)	0.8	(0.29)
Germany	**521**	(4.7)	517	(4.4)	517	(4.3)	496	(4.5)	**-7.3**	(1.87)	0.7	(0.38)
Greece	**434**	(4.8)	447	(5.3)	453	(5.0)	**451**	(4.8)	**6.8**	(1.55)	0.5	(0.22)
Hungary	496	(4.3)	489	(4.2)	487	(3.8)	490	(4.2)	**-4.4**	(1.99)	0.2	(0.16)
Iceland	**504**	(3.8)	522	(3.7)	518	(3.6)	**519**	(3.4)	**4.5**	(1.66)	0.3	(0.20)
Italy	457	(4.2)	469	(4.6)	473	(4.0)	464	(4.2)	3.6	(1.87)	0.1	(0.14)
Japan	**504**	(5.2)	541	(4.9)	546	(4.7)	**550**	(5.5)	**17.2**	(2.44)	3.2	(0.80)
Korea	**487**	(4.2)	533	(3.3)	563	(3.5)	**587**	(4.0)	**38.0**	(1.75)	16.0	(1.14)
Luxembourg	**500**	(2.8)	502	(2.6)	492	(2.9)	484	(2.9)	**-5.4**	(1.41)	0.4	(0.24)
Mexico	**375**	(4.8)	389	(3.7)	394	(4.2)	391	(4.8)	**7.1**	(1.77)	0.7	(0.36)
Netherlands	538	(4.9)	553	(4.8)	549	(4.8)	536	(4.7)	-1.2	(2.84)	0.0	(0.09)
New Zealand	**508**	(3.4)	525	(3.3)	527	(3.8)	**539**	(4.1)	**11.1**	(1.85)	1.1	(0.38)
Northern Ireland	*507*	*(4.3)*	*520*	*(4.8)*	*520*	*(4.5)*	*520*	*(4.0)*	*6.7*	*(2.63)*	*0.4*	*(0.28)*
Norway	**473**	(3.7)	502	(3.5)	502	(3.6)	**510**	(3.8)	**14.5**	(1.59)	2.3	(0.51)
Poland	**486**	(4.3)	490	(3.8)	492	(3.9)	497	(3.6)	**4.3**	(1.88)	0.2	(0.14)
Portugal	**441**	(4.9)	465	(4.5)	474	(4.2)	487	(4.9)	**18.2**	(1.79)	3.8	(0.73)
Rep. of Ireland	**495**	(3.1)	504	(4.1)	510	(4.7)	**505**	(4.0)	**3.9**	(1.54)	0.2	(0.14)
Scotland	**509**	(3.8)	527	(3.5)	528	(4.5)	**533**	(3.6)	**10.7**	(2.03)	1.3	(0.51)
Slovak Republic	**500**	(4.9)	502	(4.3)	501	(4.2)	491	(4.6)	**-4.7**	(1.93)	0.2	(0.15)
Spain	**464**	(3.6)	491	(3.2)	497	(3.4)	494	(3.0)	**12.6**	(1.22)	2.0	(0.42)
Sweden	507	(3.3)	517	(3.7)	511	(4.0)	506	(4.6)	-0.4	(1.95)	0.0	(0.03)
Switzerland	527	(4.5)	529	(5.4)	533	(4.0)	520	(3.7)	**-2.6**	(1.43)	0.1	(0.09)
Turkey	**398**	(5.8)	424	(7.0)	445	(9.3)	**440**	(8.6)	**14.4**	(2.15)	2.7	(0.77)
United States	**477**	(3.9)	487	(3.7)	486	(4.0)	**488**	(4.3)	**3.4**	(1.60)	0.1	(0.13)
OECD total	*489*	*(1.5)*	*496*	*(1.4)*	*492*	*(1.4)*	*488*	*(1.6)*	*-0.5*	*(0.73)*	*0.0*	*(0.01)*
OECD average	*498*	*(0.7)*	*506*	*(0.8)*	*503*	*(0.8)*	*500*	*(1.0)*	*0.6*	*(0.41)*	*0.0*	*(0.01)*

Note: Values that are statistically significant are indicated in bold

Use of Elaboration Strategies (Table 5.27)

The PISA index of *elaboration strategies* was derived from students' reported agreement with the following statements: *i)* when I am solving mathematics problems, I often think of new ways to get the answer; *ii)* I think how the mathematics I have learnt can be used in everyday life; *iii)* I try to understand new concepts in mathematics by relating them to things I already know; *iv)* when I am solving a mathematics problem, I often think about how the solution might be applied to other interesting questions; and *v)* when learning mathematics, I try to relate the work to things I have learnt in other subjects. A four-point scale with the response categories "strongly agree", "agree", "disagree" and "strongly disagree" was used. All of these items were inverted for scaling. Scale construction was done using IRT scaling, such that the OECD country average score was set at 0 and the OECD country average standard deviation at 1.0. Higher values on the scale indicate support for using elaboration strategies.

The mean score of students in Northern Ireland on the index of elaboration strategies is -0.04 (i.e., very close to the OECD average on the index) (Table 5.27). The corresponding mean scores for the Republic of Ireland and Scotland are -0.14 and 0.03 respectively. Countries with the highest average reported use of elaboration strategies included Mexico (0.85), Turkey (0.44), the Slovak Republic (0.38) and Greece (0.33). Countries with low mean scores included Japan (-0.75), Korea (-0.39) and Germany (-0.31). Boys in Northern Ireland had a higher score (0.06) than girls (-0.14). The difference between them (0.20 points) is statistically significant, and is close to the OECD average difference (0.23), which also favours boys. The difference in mean mathematical literacy scores in Northern Ireland between students in the top and bottom quarters of the index of use of elaboration strategies (30 points in favour of those in the bottom quarter) is statistically significant. The OECD average difference is 20 points, also in favour of the bottom quarter, suggesting that lower-achieving students are more likely than higher-achieving students to report engaging in the elaboration strategies described by PISA.

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Table 5.27:   *Index of Elaboration Strategies and Performance in Mathematics, by National Quarters of the Index*

Index of elaboration strategies

Country (countries in alphabetical order)	All students		Boys		Girls		Gender difference (B - G)		Bottom quarter		Second quarter		Third quarter		Top quarter	
	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.	Dif.	S.E.	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.
Australia	0.06	(0.01)	0.20	(0.02)	-0.08	(0.01)	**0.28**	(0.02)	-0.97	(0.01)	-0.24	(0.00)	0.31	(0.00)	1.15	(0.02)
Austria	-0.27	(0.03)	-0.03	(0.03)	-0.51	(0.03)	**0.48**	(0.04)	-1.68	(0.02)	-0.60	(0.01)	0.08	(0.01)	1.13	(0.02)
Belgium	-0.17	(0.01)	-0.05	(0.02)	-0.31	(0.02)	**0.26**	(0.02)	-1.33	(0.02)	-0.44	(0.01)	0.07	(0.00)	1.01	(0.02)
Canada	0.08	(0.01)	0.20	(0.02)	-0.05	(0.02)	**0.25**	(0.02)	-1.09	(0.01)	-0.26	(0.00)	0.34	(0.00)	1.31	(0.02)
Czech Republic	0.13	(0.01)	0.22	(0.02)	0.04	(0.01)	**0.18**	(0.02)	-0.75	(0.01)	-0.08	(0.00)	0.31	(0.00)	1.04	(0.02)
Denmark	0.07	(0.01)	0.22	(0.02)	-0.07	(0.02)	**0.29**	(0.03)	-0.92	(0.02)	-0.24	(0.01)	0.30	(0.00)	1.15	(0.02)
Finland	-0.14	(0.01)	0.02	(0.02)	-0.30	(0.02)	**0.32**	(0.02)	-1.17	(0.02)	-0.38	(0.00)	0.06	(0.01)	0.92	(0.01)
France	-0.10	(0.02)	0.02	(0.02)	-0.21	(0.02)	**0.23**	(0.03)	-1.34	(0.02)	-0.36	(0.00)	0.18	(0.01)	1.11	(0.02)
Germany	-0.31	(0.02)	-0.13	(0.03)	-0.49	(0.03)	**0.36**	(0.03)	-1.66	(0.02)	-0.65	(0.01)	-0.04	(0.01)	1.09	(0.02)
Greece	0.33	(0.02)	0.47	(0.03)	0.20	(0.02)	**0.27**	(0.03)	-0.76	(0.02)	0.03	(0.01)	0.57	(0.01)	1.46	(0.02)
Hungary	-0.10	(0.01)	-0.02	(0.02)	-0.19	(0.02)	**0.17**	(0.03)	-1.07	(0.02)	-0.36	(0.01)	0.08	(0.01)	0.93	(0.02)
Iceland	-0.06	(0.02)	0.07	(0.03)	-0.21	(0.02)	**0.28**	(0.04)	-1.28	(0.02)	-0.36	(0.01)	0.19	(0.01)	1.19	(0.03)
Italy	0.04	(0.02)	0.15	(0.03)	-0.07	(0.03)	**0.21**	(0.04)	-1.10	(0.02)	-0.27	(0.00)	0.31	(0.00)	1.21	(0.02)
Japan	-0.75	(0.02)	-0.58	(0.03)	-0.91	(0.02)	**0.32**	(0.04)	-2.13	(0.03)	-0.97	(0.00)	-0.41	(0.01)	0.50	(0.02)
Korea	-0.39	(0.02)	-0.31	(0.02)	-0.51	(0.02)	**0.20**	(0.03)	-1.49	(0.02)	-0.63	(0.00)	-0.14	(0.00)	0.68	(0.01)
Luxembourg	-0.25	(0.02)	-0.03	(0.03)	-0.45	(0.03)	**0.42**	(0.04)	-1.66	(0.02)	-0.60	(0.01)	0.08	(0.01)	1.20	(0.02)
Mexico	0.85	(0.02)	0.88	(0.03)	0.83	(0.02)	0.06	(0.03)	-0.24	(0.02)	0.59	(0.01)	0.98	(0.01)	2.08	(0.02)
Netherlands	-0.26	(0.02)	-0.09	(0.03)	-0.43	(0.03)	**0.34**	(0.04)	-1.26	(0.02)	-0.50	(0.00)	-0.03	(0.01)	0.77	(0.02)
New Zealand	0.13	(0.02)	0.22	(0.02)	0.04	(0.03)	**0.18**	(0.03)	-0.89	(0.02)	-0.15	(0.01)	0.35	(0.01)	1.21	(0.02)
Northern Ireland	*-0.04*	*(0.02)*	*0.06*	*(0.03)*	*-0.14*	*(0.03)*	***0.20***	*(0.04)*	*-1.1*	*(0.03)*	*-0.32*	*(0.01)*	*0.23*	*(0.01)*	*1.03*	*(0.03)*
Norway	-0.16	(0.02)	-0.05	(0.03)	-0.28	(0.03)	**0.24**	(0.04)	-1.38	(0.03)	-0.41	(0.01)	0.10	(0.01)	1.03	(0.02)
Poland	0.25	(0.01)	0.31	(0.02)	0.20	(0.02)	**0.11**	(0.03)	-0.70	(0.02)	0.00	(0.01)	0.45	(0.01)	1.27	(0.02)
Portugal	0.16	(0.02)	0.23	(0.03)	0.10	(0.02)	**0.14**	(0.04)	-0.97	(0.02)	-0.04	(0.00)	0.45	(0.01)	1.21	(0.02)
Rep of Ireland	-0.14	(0.02)	-0.06	(0.02)	-0.22	(0.03)	**0.16**	(0.03)	-1.17	(0.02)	-0.39	(0.01)	0.08	(0.01)	0.93	(0.02)
Scotland	0.03	(0.02)	0.16	(0.03)	-0.09	(0.02)	**0.26**	(0.04)	-0.99	(0.02)	-0.3	(0.01)	0.28	(0.01)	1.14	(0.02)
Slovak Republic	0.38	(0.01)	0.47	(0.02)	0.29	(0.02)	**0.18**	(0.03)	-0.55	(0.02)	0.13	(0.00)	0.62	(0.01)	1.33	(0.02)
Spain	0.09	(0.02)	0.14	(0.02)	0.04	(0.02)	**0.09**	(0.03)	-1.08	(0.02)	-0.17	(0.01)	0.35	(0.00)	1.25	(0.02)
Sweden	-0.02	(0.02)	0.09	(0.02)	-0.14	(0.03)	**0.23**	(0.03)	-1.07	(0.02)	-0.28	(0.00)	0.23	(0.01)	1.04	(0.02)
Switzerland	-0.06	(0.02)	0.16	(0.02)	-0.30	(0.02)	**0.46**	(0.03)	-1.31	(0.02)	-0.36	(0.01)	0.22	(0.01)	1.22	(0.02)
Turkey	0.44	(0.03)	0.44	(0.04)	0.43	(0.03)	0.01	(0.04)	-0.90	(0.03)	0.16	(0.01)	0.71	(0.01)	1.78	(0.02)
United States	0.18	(0.02)	0.26	(0.02)	0.11	(0.04)	**0.16**	(0.04)	-1.08	(0.02)	-0.13	(0.01)	0.49	(0.01)	1.46	(0.02)
OECD total	*0.03*	*(0.01)*	*0.13*	*(0.01)*	*-0.06*	*(0.01)*	*0.19*	*(0.01)*	*-1.27*	*(0.01)*	*-0.29*	*(0.00)*	*0.34*	*(0.01)*	*1.34*	*(0.01)*
OECD average	*0.00*	*(0.00)*	*0.12*	*(0.00)*	*-0.12*	*(0.01)*	*0.23*	*(0.01)*	*-1.19*	*(0.00)*	*-0.31*	*(0.00)*	*0.29*	*(0.01)*	*1.21*	*(0.01)*

Note: Values that are statistically significant are indicated in bold

Table 5.27: *(Contd.)*

| Country | Performance on the mathematics scale, by national quarters of the index of elaboration strategies | | | | | | | | Change in the mathematics score per unit of the index of elaboration strategies | | Explained variation in student performance (r-squared x 100) | |
| | Bottom quarter | | Second quarter | | Third quarter | | Top quarter | | | | | |
	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Mean score	S.E	Change	S.E.	Percentage	S.E.
Australia	**528**	(3.2)	535	(2.8)	521	(2.3)	**518**	(3.1)	-2.1	(1.17)	0.0	(0.04)
Austria	**511**	(3.7)	513	(4.4)	508	(3.9)	**498**	(5.0)	**-4.1**	(1.59)	0.3	(0.22)
Belgium	**543**	(3.4)	554	(3.4)	541	(3.5)	**514**	(4.3)	**-10.6**	(1.92)	1.0	(0.36)
Canada	**532**	(2.2)	538	(2.2)	535	(2.7)	**540**	(2.6)	**6.2**	(1.12)	0.5	(0.18)
Czech Republic	**508**	(3.5)	522	(5.1)	528	(4.7)	**534**	(4.0)	**13.0**	(1.75)	1.1	(0.29)
Denmark	**506**	(3.6)	515	(3.7)	518	(4.1)	**525**	(4.4)	**10.4**	(2.13)	1.0	(0.41)
Finland	526	(2.5)	542	(2.9)	550	(3.3)	**560**	(3.4)	**16.9**	(1.52)	3.1	(0.55)
France	513	(3.2)	517	(3.5)	516	(3.8)	506	(4.6)	-1.2	(1.69)	0.0	(0.05)
Germany	**518**	(4.8)	518	(4.1)	518	(4.0)	**498**	(5.2)	**-5.5**	(1.71)	0.4	(0.26)
Greece	**435**	(4.3)	448	(4.5)	450	(4.6)	**453**	(5.6)	**8.9**	(1.82)	0.8	(0.33)
Hungary	**495**	(4.1)	494	(3.8)	489	(4.0)	**483**	(4.8)	**-4.9**	(2.23)	0.2	(0.18)
Iceland	509	(2.9)	525	(3.3)	519	(4.1)	510	(3.5)	0.1	(1.61)	0.0	(0.03)
Italy	**473**	(3.5)	469	(3.6)	463	(4.4)	**459**	(4.0)	**-3.9**	(1.46)	0.2	(0.12)
Japan	**514**	(4.7)	531	(4.2)	548	(5.2)	**548**	(6.7)	**14.4**	(2.39)	2.4	(0.73)
Korea	**510**	(3.7)	530	(4.0)	551	(3.8)	**579**	(4.4)	**30.0**	(1.64)	9.1	(0.82)
Luxembourg	**504**	(2.1)	505	(2.5)	491	(3.2)	**477**	(3.4)	**-7.7**	(1.25)	1.0	(0.31)
Mexico	**397**	(4.4)	390	(4.1)	387	(4.1)	**387**	(4.9)	-1.0	(1.63)	0.0	(0.05)
Netherlands	**545**	(4.3)	555	(3.9)	544	(4.0)	**533**	(5.5)	-3.5	(2.43)	0.1	(0.17)
New Zealand	**535**	(3.5)	533	(3.5)	523	(3.8)	**510**	(3.9)	**-8.2**	(2.04)	0.5	(0.27)
Northern Ireland	*528*	*(4.0)*	*526*	*(4.1)*	*514*	*(4.3)*	*498*	*(4.6)*	*-9.3*	*(2.14)*	*0.8*	*(0.37)*
Norway	**484**	(3.3)	501	(3.4)	503	(3.8)	**501**	(3.6)	**8.4**	(1.46)	0.8	(0.30)
Poland	488	(3.5)	491	(3.1)	492	(4.0)	494	(4.1)	**5.9**	(1.90)	0.3	(0.20)
Portugal	**456**	(3.5)	471	(4.1)	464	(5.2)	**474**	(4.8)	**9.2**	(2.07)	0.9	(0.43)
Republic of Ireland	506	(3.6)	512	(3.1)	501	(3.5)	496	(5.0)	-3.1	(2.16)	0.1	(0.15)
Scotland	530	(3.2)	527	(3.7)	520	(4.4)	520	(4.6)	-1.5	(2.33)	0.0	(0.10)
Slovak Republic	500	(4.7)	500	(3.5)	499	(4.0)	497	(4.7)	0.4	(1.79)	0.0	(0.02)
Spain	**472**	(3.5)	489	(3.5)	493	(3.2)	**491**	(3.1)	**10.2**	(1.41)	1.3	(0.38)
Sweden	**499**	(2.9)	512	(3.6)	513	(3.4)	**517**	(5.3)	**9.8**	(2.18)	0.9	(0.39)
Switzerland	**535**	(4.0)	534	(4.9)	525	(3.6)	**515**	(4.2)	**-5.9**	(1.42)	0.4	(0.18)
Turkey	**417**	(5.9)	435	(7.6)	431	(7.9)	**433**	(9.2)	**5.7**	(2.17)	0.4	(0.29)
United States	**496**	(3.4)	494	(3.7)	478	(3.8)	**470**	(4.1)	**-7.0**	(1.39)	0.6	(0.24)
OECD total	*506*	*(1.4)*	*507*	*(1.2)*	*489*	*(1.2)*	*467*	*(1.9)*	*-11.4*	*(0.76)*	*1.5*	*(0.19)*
OECD average	*508*	*(0.8)*	*512*	*(0.7)*	*502*	*(0.8)*	*488*	*(1.2)*	*-5.3*	*(0.43)*	*0.3*	*(0.05)*

Note: Values that are statistically significant are indicated in bold

Use of Memorisation Strategies (Table 5.28)

The PISA index of **memorisation/rehearsal** was derived from students' level of agreement with the four following statements: *i)* I go over some problems in mathematics so often that I feel as if I could solve them in my sleep; *ii)* when I study for mathematics, I try to learn the answers to problems off by heart; *iii)* in order to remember the method for solving a mathematics problem, I go through examples again and again; and *iv)* to learn mathematics, I try to remember every step in a procedure. A four-point scale with the response categories "strongly agree", "agree", "disagree" and "strongly disagree" was used. All of these items were inverted for IRT scaling. In the course of scaling, the OECD country average score was set at 0 and the OECD country average standard deviation at 1.0. A higher score on the index indicates more support for use of memorisation as a learning strategy.

The mean score of students in Northern Ireland on the index of memorisation/ rehearsal strategies was 0.13 (over one-tenth of a standard deviation above the OECD average on the index) (Table 5.28). The corresponding mean scores for the Republic of Ireland and Scotland are 0.11 and 0.23 respectively. Countries with the highest average reported use of memorisation/rehearsal strategies included Mexico (0.56), the United States (0.31). Countries with low mean scores included Japan (-0.56), Korea (-0.35) and Denmark (-0.27). Although boys in Northern Ireland had a higher score (0.15) than girls (0.12), the difference between mean scores is not statistically significant. The difference in mean mathematical literacy scores in Northern Ireland between students in the top and bottom quarters of the index of use of memorisation/rehearsal strategies (22 points in favour of those in the top quarter) is statistically significant. In Scotland, the corresponding difference was 43 points, while in the Republic of Ireland it was 12. Both differences were in favour of the student in the top quarter of the index, and both were statistically significant. In contrast, the OECD average difference of 16 points is in favour of students in the bottom quarter, suggesting that, across countries, lower-achieving students engage in memorisation/rehearsal more than the higher-achieving students.

Table 5.28: *Index of Use of Memorisation Strategies and Performance in Mathematics, by National Quarters of the Index*

Country (countries in alphabetical order)	All students		Boys		Girls		Gender difference (B - G)		Bottom quarter		Second quarter		Third quarter		Top quarter	
	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.	Dif.	S.E.	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.
Australia	0.17	(0.01)	0.19	(0.02)	0.14	(0.01)	**0.05**	(0.03)	-0.93	(0.02)	-0.07	(0.00)	0.39	(0.00)	1.29	(0.02)
Austria	0.06	(0.02)	-0.01	(0.03)	0.14	(0.03)	**-0.15**	(0.03)	-1.32	(0.03)	-0.28	(0.01)	0.42	(0.01)	1.43	(0.02)
Belgium	-0.09	(0.01)	-0.14	(0.02)	-0.04	(0.02)	**-0.11**	(0.02)	-1.17	(0.02)	-0.29	(0.00)	0.13	(0.00)	0.97	(0.02)
Canada	0.16	(0.01)	0.14	(0.02)	0.19	(0.02)	**-0.04**	(0.02)	-1.01	(0.01)	-0.10	(0.00)	0.41	(0.00)	1.36	(0.02)
Czech Republic	-0.05	(0.02)	-0.08	(0.02)	-0.02	(0.02)	**-0.06**	(0.03)	-1.05	(0.01)	-0.27	(0.01)	0.16	(0.01)	0.96	(0.02)
Denmark	-0.27	(0.02)	-0.17	(0.03)	-0.37	(0.02)	**0.20**	(0.03)	-1.39	(0.02)	-0.51	(0.00)	-0.01	(0.01)	0.83	(0.02)
Finland	-0.19	(0.01)	-0.15	(0.02)	-0.24	(0.02)	**0.10**	(0.03)	-1.35	(0.02)	-0.40	(0.01)	0.07	(0.01)	0.90	(0.02)
France	-0.06	(0.02)	-0.16	(0.03)	0.03	(0.03)	**-0.18**	(0.03)	-1.30	(0.03)	-0.28	(0.01)	0.17	(0.01)	1.17	(0.02)
Germany	-0.06	(0.02)	-0.14	(0.03)	0.03	(0.03)	**-0.17**	(0.04)	-1.56	(0.02)	-0.37	(0.01)	0.26	(0.01)	1.43	(0.02)
Greece	0.20	(0.02)	0.21	(0.02)	0.18	(0.02)	0.03	(0.03)	-0.88	(0.02)	-0.04	(0.00)	0.39	(0.01)	1.32	(0.03)
Hungary	0.16	(0.02)	0.08	(0.02)	0.25	(0.02)	**-0.17**	(0.03)	-0.89	(0.02)	-0.11	(0.00)	0.37	(0.00)	1.25	(0.02)
Iceland	-0.03	(0.02)	-0.02	(0.03)	-0.05	(0.03)	0.03	(0.04)	-1.34	(0.03)	-0.32	(0.01)	0.21	(0.01)	1.32	(0.03)
Italy	0.03	(0.02)	0.00	(0.02)	0.06	(0.02)	**-0.07**	(0.03)	-1.01	(0.02)	-0.17	(0.00)	0.22	(0.01)	1.08	(0.02)
Japan	-0.56	(0.02)	-0.51	(0.03)	-0.61	(0.02)	**0.10**	(0.03)	-1.78	(0.03)	-0.74	(0.01)	-0.26	(0.01)	0.54	(0.02)
Korea	-0.35	(0.02)	-0.35	(0.02)	-0.34	(0.03)	-0.01	(0.03)	-1.47	(0.02)	-0.51	(0.01)	-0.05	(0.00)	0.64	(0.01)
Luxembourg	-0.05	(0.02)	-0.11	(0.02)	0.01	(0.02)	**-0.13**	(0.04)	-1.43	(0.03)	-0.32	(0.01)	0.25	(0.01)	1.31	(0.02)
Mexico	0.56	(0.02)	0.55	(0.03)	0.56	(0.02)	-0.01	(0.03)	-0.54	(0.02)	0.19	(0.00)	0.71	(0.01)	1.86	(0.02)
Netherlands	-0.16	(0.02)	-0.07	(0.02)	-0.25	(0.02)	**0.17**	(0.03)	-1.11	(0.03)	-0.37	(0.01)	0.06	(0.01)	0.78	(0.02)
New Zealand	0.13	(0.02)	0.14	(0.02)	0.12	(0.02)	0.02	(0.03)	-0.97	(0.02)	-0.10	(0.00)	0.37	(0.00)	1.22	(0.02)
Northern Ireland	*0.13*	*(0.02)*	*0.15*	*(0.02)*	*0.12*	*(0.03)*	*0.02*	*(0.04)*	*-0.95*	*(0.02)*	*-0.06*	*(0.01)*	*0.36*	*(0.01)*	*1.19*	*(0.02)*
Norway	-0.12	(0.02)	0.00	(0.03)	-0.25	(0.02)	**0.24**	(0.04)	-1.41	(0.03)	-0.34	(0.01)	0.14	(0.01)	1.12	(0.02)
Poland	0.15	(0.01)	0.13	(0.02)	0.16	(0.02)	-0.02	(0.03)	-0.88	(0.02)	-0.05	(0.00)	0.36	(0.00)	1.15	(0.02)
Portugal	-0.11	(0.02)	-0.14	(0.03)	-0.09	(0.02)	-0.05	(0.03)	-1.27	(0.03)	-0.29	(0.01)	0.17	(0.01)	0.94	(0.02)
Rep of Ireland	0.11	(0.02)	0.08	(0.02)	0.13	(0.02)	-0.04	(0.03)	-0.98	(0.02)	-0.13	(0.00)	0.34	(0.00)	1.20	(0.02)
Scotland	0.23	(0.02)	0.25	(0.03)	0.2	(0.03)	0.05	(0.05)	-0.94	(0.03)	-0.01	(0.01)	0.44	(0.01)	1.43	(0.03)
Slovak Republic	0.13	(0.01)	0.08	(0.02)	0.18	(0.01)	**-0.11**	(0.02)	-0.87	(0.02)	-0.12	(0.00)	0.34	(0.00)	1.16	(0.02)
Spain	0.07	(0.02)	0.02	(0.02)	0.11	(0.02)	**-0.09**	(0.03)	-1.08	(0.03)	-0.12	(0.00)	0.30	(0.00)	1.18	(0.02)
Sweden	-0.08	(0.02)	-0.01	(0.02)	-0.15	(0.03)	**0.14**	(0.03)	-1.25	(0.02)	-0.32	(0.01)	0.17	(0.01)	1.08	(0.02)
Switzerland	-0.19	(0.02)	-0.18	(0.03)	-0.20	(0.03)	0.03	(0.04)	-1.55	(0.02)	-0.48	(0.01)	0.11	(0.01)	1.16	(0.02)
Turkey	0.10	(0.02)	0.07	(0.03)	0.13	(0.02)	-0.06	(0.03)	-1.09	(0.02)	-0.16	(0.00)	0.37	(0.01)	1.28	(0.03)
United States	0.31	(0.02)	0.29	(0.03)	0.33	(0.02)	-0.05	(0.03)	-0.87	(0.02)	0.04	(0.01)	0.53	(0.01)	1.54	(0.03)
OECD total	*0.07*	*(0.01)*	*0.05*	*(0.01)*	*0.09*	*(0.01)*	*-0.04*	*(0.01)*	*-1.16*	*(0.01)*	*-0.22*	*(0.00)*	*0.33*	*(0.01)*	*1.31*	*(0.01)*
OECD average	*0.00*	*(0.00)*	*-0.01*	*(0.00)*	*0.01*	*(0.00)*	*-0.02*	*(0.01)*	*-1.18*	*(0.01)*	*-0.25*	*(0.00)*	*0.23*	*(0.00)*	*1.19*	*(0.01)*

Note: Values that are statistically significant are indicated in bold

Table 5.28: *(Contd.)*

| Country | Performance on the mathematics scale, by national quarters of the index of memorisation strategies | | | | | | | | Change in the mathematics score per unit of the index of memorisation strategies | | Explained variation in student performance (r-squared x 100) | |
| | Bottom quarter | | Second quarter | | Third quarter | | Top quarter | | | | | |
	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Mean score	S.E	Change	S.E.	Percentage	S.E.
Australia	**515**	(3.2)	526	(2.6)	527	(2.8)	**535**	(3.2)	**9.7**	(1.29)	0.9	(0.25)
Austria	**535**	(4.3)	516	(3.6)	499	(4.0)	481	(4.5)	**-18.5**	(1.72)	5.1	(0.84)
Belgium	**544**	(4.4)	551	(3.0)	540	(3.4)	**517**	(3.3)	**-9.3**	(1.96)	0.7	(0.30)
Canada	**531**	(2.3)	537	(2.5)	534	(2.1)	**544**	(2.4)	**6.2**	(1.02)	0.5	(0.17)
Czech Republic	**543**	(4.4)	525	(4.6)	513	(3.8)	**511**	(4.4)	**-14.2**	(2.06)	1.7	(0.47)
Denmark	**506**	(4.3)	516	(3.5)	520	(3.6)	**524**	(3.9)	**9.3**	(1.79)	0.9	(0.36)
Finland	**535**	(2.9)	548	(3.5)	548	(3.0)	**546**	(3.3)	**6.7**	(1.53)	0.6	(0.27)
France	513	(3.7)	520	(3.8)	514	(3.6)	506	(4.0)	-0.9	(1.41)	0.0	(0.03)
Germany	**543**	(4.3)	521	(4.0)	505	(4.1)	483	(4.6)	**-17.9**	(1.46)	5.1	(0.82)
Greece	**454**	(5.7)	446	(4.4)	443	(4.6)	443	(4.4)	-2.9	(2.09)	0.1	(0.12)
Hungary	**500**	(4.1)	489	(3.8)	489	(3.7)	485	(3.3)	**-7.3**	(1.88)	0.5	(0.25)
Iceland	515	(3.5)	519	(4.2)	520	(3.4)	509	(3.1)	-0.7	(1.50)	0.0	(0.05)
Italy	**479**	(4.2)	470	(4.4)	467	(3.6)	**448**	(4.4)	**-11.8**	(1.97)	1.2	(0.38)
Japan	**513**	(5.9)	541	(4.9)	546	(4.3)	**540**	(5.3)	**13.9**	(2.30)	1.9	(0.62)
Korea	**517**	(4.7)	545	(4.4)	551	(3.9)	**558**	(3.4)	**19.6**	(1.77)	3.6	(0.65)
Luxembourg	**504**	(2.7)	499	(2.8)	496	(2.6)	480	(2.7)	**-8.6**	(1.39)	1.1	(0.36)
Mexico	389	(4.5)	395	(4.3)	386	(3.9)	393	(4.8)	2.0	(1.42)	0.1	(0.08)
Netherlands	**526**	(4.4)	545	(4.3)	554	(4.0)	**551**	(4.0)	**12.8**	(2.08)	1.4	(0.46)
New Zealand	523	(3.5)	528	(3.4)	525	(3.4)	527	(4.1)	**4.3**	(1.96)	0.2	(0.16)
Northern Ireland	***505***	*(4.4)*	*516*	*(4.8)*	*519*	*(4.4)*	***527***	*(3.7)*	***10.8***	*(2.04)*	*1.1*	*(0.41)*
Norway	**459**	(3.2)	498	(4.0)	512	(4.7)	**520**	(3.9)	**22.3**	(1.48)	6.7	(0.84)
Poland	**500**	(3.9)	495	(3.4)	482	(3.9)	489	(3.4)	**-4.5**	(1.85)	0.2	(0.15)
Portugal	**477**	(4.8)	473	(4.2)	462	(4.3)	454	(5.0)	**-5.4**	(1.87)	0.4	(0.24)
Rep of Ireland	**496**	(3.3)	510	(3.7)	503	(4.0)	**506**	(3.7)	**5.0**	(1.74)	0.3	(0.21)
Scotland	**500**	(4.3)	523	(3.8)	532	(3.7)	**543**	(3.3)	**16.3**	(1.68)	3.7	(0.73)
Slovak Republic	**512**	(4.8)	501	(4.7)	496	(3.2)	486	(4.2)	**-10.5**	(1.92)	0.9	(0.33)
Spain	**477**	(3.4)	494	(3.5)	491	(3.3)	**485**	(3.0)	**7.7**	(1.45)	0.7	(0.29)
Sweden	**493**	(3.4)	508	(3.4)	517	(3.7)	**524**	(4.7)	**14.1**	(1.88)	2.2	(0.62)
Switzerland	**555**	(5.3)	531	(3.9)	521	(4.2)	**502**	(3.7)	**-17.1**	(1.64)	3.9	(0.68)
Turkey	427	(9.1)	435	(8.1)	432	(6.9)	424	(7.0)	1.2	(2.62)	0.0	(0.09)
United States	485	(4.0)	488	(4.0)	484	(4.1)	481	(4.3)	0.3	(1.38)	0.0	(0.02)
OECD total	*503*	*(1.5)*	*501*	*(1.2)*	*489*	*(1.4)*	*476*	*(1.8)*	*-7.5*	*(0.72)*	*0.6*	*(0.11)*
OECD average	*508*	*(0.9)*	*509*	*(0.8)*	*502*	*(0.8)*	*492*	*(0.9)*	*-4.5*	*(0.41)*	*0.2*	*(0.04)*

Note: Values that are statistically significant are indicated in bold

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Instrumental Motivation in Mathematics (Table 5.29)

The PISA index of ***instrumental motivation in mathematics*** was derived from students' reported agreement with the following statements: *i)* making an effort in mathematics is worth it because it will help me in the work that I want to do later on; *ii)* learning mathematics is important because it will help me with the subjects that I want to study further on in school; *iii)* mathematics is an important subject for me because I need it for what I want to study later on; and *iv)* I will learn many things in mathematics that will help me get a job. A four-point scale with the response categories "strongly agree", "agree", "disagree" and "strongly disagree" was used. All items were inverted for scaling. Scale construction was done using IRT scaling, such that the OECD country average score was set at 0 and the OECD country average standard deviation at 1.0. Higher values on the scale indicate greater instrumental motivation for learning.

The mean score of students in Northern Ireland on the index of instrumental motivation in mathematics was 0.21 (one-fifth of a standard deviation above the OECD average on the index) (Table 5.29). The corresponding mean scores for the Republic of Ireland and Scotland are 0.10 and 0.20 respectively. Countries with the highest reported average instrumental motivation in mathematics score include Mexico (0.58), Denmark (0.37) and Iceland (0.31). Countries with low mean scores include Japan (-0.66), Austria (-0.49), and Korea (-0.44). Boys in Northern Ireland had a higher mean score (0.30) than girls (0.12). The difference between them (0.18 points) is statistically significant, and approaches the OECD average difference (0.25), which also favours boys. The difference in mean mathematical literacy scores in Northern Ireland between students in the top and bottom quarters of the index of instrumental motivation in mathematics (3 points in favour of those in the bottom quarter) is not statistically significant. The OECD average difference is 20 points, in favour of the top quarter, indicating that, across countries, students with high instrumental motivation in mathematics perform better on average than those with low instrumental motivation.

Table 5.29: *Index of Instrumental Motivation and Performance in Mathematics, by National Quarters of the Index*

Index of instrumental motivation in mathematics

Country (countries in alphabetical order)	All students		Boys		Girls		Gender difference (B - G)		Bottom quarter		Second quarter		Third quarter		Top quarter	
	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.	Dif.	S.E.	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.
Australia	0.23	(0.02)	0.34	(0.02)	0.11	(0.02)	**0.23**	(0.02)	-0.99	(0.02)	-0.04	(0.00)	0.42	(0.01)	1.52	(0.01)
Austria	-0.49	(0.03)	-0.20	(0.03)	-0.78	(0.03)	**0.58**	(0.04)	-1.68	(0.01)	-0.90	(0.01)	-0.26	(0.01)	0.87	(0.01)
Belgium	-0.32	(0.02)	-0.17	(0.02)	-0.49	(0.02)	**0.32**	(0.03)	-1.54	(0.01)	-0.66	(0.00)	-0.04	(0.00)	0.95	(0.01)
Canada	0.23	(0.01)	0.30	(0.02)	0.17	(0.02)	**0.13**	(0.02)	-1.09	(0.01)	-0.06	(0.00)	0.50	(0.01)	1.57	(0.00)
Czech Republic	0.01	(0.02)	0.12	(0.02)	-0.10	(0.03)	**0.22**	(0.03)	-1.05	(0.01)	-0.21	(0.01)	0.15	(0.00)	1.14	(0.01)
Denmark	0.37	(0.02)	0.57	(0.02)	0.19	(0.02)	**0.38**	(0.03)	-0.77	(0.02)	0.03	(0.00)	0.70	(0.01)	1.54	(0.01)
Finland	0.06	(0.01)	0.22	(0.02)	-0.10	(0.02)	**0.32**	(0.03)	-1.06	(0.01)	-0.16	(0.01)	0.20	(0.01)	1.27	(0.01)
France	-0.08	(0.02)	0.11	(0.03)	-0.25	(0.03)	**0.36**	(0.03)	-1.37	(0.02)	-0.44	(0.01)	0.22	(0.01)	1.26	(0.01)
Germany	-0.04	(0.02)	0.18	(0.02)	-0.26	(0.02)	**0.44**	(0.03)	-1.25	(0.01)	-0.47	(0.01)	0.26	(0.01)	1.30	(0.01)
Greece	-0.05	(0.02)	0.09	(0.03)	-0.18	(0.03)	**0.27**	(0.03)	-1.31	(0.02)	-0.38	(0.01)	0.22	(0.01)	1.28	(0.01)
Hungary	-0.11	(0.02)	-0.02	(0.02)	-0.22	(0.02)	**0.19**	(0.02)	-1.18	(0.02)	-0.39	(0.01)	0.10	(0.00)	1.02	(0.01)
Iceland	0.31	(0.02)	0.34	(0.02)	0.28	(0.03)	0.06	(0.04)	-1.01	(0.02)	0.02	(0.01)	0.63	(0.01)	1.60	(0.01)
Italy	-0.15	(0.02)	-0.04	(0.02)	-0.26	(0.03)	**0.21**	(0.03)	-1.32	(0.02)	-0.45	(0.01)	0.10	(0.00)	1.05	(0.01)
Japan	-0.66	(0.03)	-0.49	(0.04)	-0.81	(0.03)	**0.32**	(0.04)	-1.92	(0.01)	-1.03	(0.00)	-0.39	(0.01)	0.71	(0.02)
Korea	-0.44	(0.02)	-0.36	(0.02)	-0.55	(0.04)	**0.20**	(0.05)	-1.59	(0.01)	-0.81	(0.01)	-0.15	(0.01)	0.81	(0.02)
Luxembourg	-0.41	(0.02)	-0.16	(0.03)	-0.64	(0.02)	**0.48**	(0.03)	-1.80	(0.01)	-0.88	(0.01)	-0.09	(0.01)	1.14	(0.02)
Mexico	0.58	(0.02)	0.59	(0.02)	0.57	(0.02)	0.02	(0.03)	-0.44	(0.01)	0.22	(0.01)	0.94	(0.01)	1.60	(0.01)
Netherlands	-0.26	(0.02)	-0.04	(0.02)	-0.48	(0.03)	**0.44**	(0.03)	-1.37	(0.02)	-0.52	(0.01)	0.05	(0.00)	0.82	(0.02)
New Zealand	0.29	(0.02)	0.37	(0.02)	0.21	(0.02)	**0.16**	(0.03)	-0.87	(0.02)	0.02	(0.01)	0.49	(0.01)	1.52	(0.01)
Northern Ireland	*0.21*	*(0.03)*	*0.3*	*(0.03)*	*0.12*	*(0.03)*	***0.18***	*(0.04)*	*-0.92*	*(0.02)*	*-0.05*	*(0.01)*	*0.4*	*(0.01)*	*1.41*	*(0.01)*
Norway	0.15	(0.02)	0.27	(0.03)	0.03	(0.03)	**0.24**	(0.04)	-1.16	(0.02)	-0.11	(0.01)	0.41	(0.01)	1.47	(0.01)
Poland	0.04	(0.02)	0.06	(0.02)	0.02	(0.02)	0.04	(0.03)	-0.95	(0.02)	-0.08	(0.01)	0.10	(0.00)	1.10	(0.02)
Portugal	0.27	(0.02)	0.30	(0.03)	0.25	(0.02)	0.05	(0.04)	-0.93	(0.02)	0.03	(0.01)	0.47	(0.01)	1.51	(0.01)
Rep. of Ireland	0.10	(0.02)	0.25	(0.03)	-0.06	(0.03)	**0.31**	(0.04)	-1.11	(0.02)	-0.15	(0.01)	0.30	(0.01)	1.35	(0.01)
Scotland	0.20	(0.02)	0.35	(0.03)	0.05	(0.03)	**0.3**	(0.04)	-1.04	(0.02)	-0.11	(0.01)	0.45	(0.01)	1.51	(0.01)
Slovak Republic	-0.05	(0.02)	0.05	(0.02)	-0.15	(0.03)	**0.20**	(0.03)	-1.10	(0.02)	-0.28	(0.01)	0.11	(0.00)	1.08	(0.01)
Spain	-0.05	(0.02)	0.00	(0.03)	-0.09	(0.03)	**0.09**	(0.03)	-1.35	(0.02)	-0.34	(0.01)	0.21	(0.00)	1.28	(0.01)
Sweden	0.02	(0.02)	0.17	(0.02)	-0.13	(0.02)	**0.30**	(0.03)	-1.12	(0.02)	-0.30	(0.01)	0.21	(0.01)	1.30	(0.01)
Switzerland	-0.04	(0.02)	0.30	(0.02)	-0.40	(0.02)	**0.70**	(0.03)	-1.34	(0.01)	-0.47	(0.01)	0.30	(0.01)	1.34	(0.01)
Turkey	0.23	(0.02)	0.20	(0.03)	0.26	(0.03)	-0.06	(0.04)	-1.04	(0.02)	-0.09	(0.01)	0.54	(0.01)	1.49	(0.01)
United States	0.17	(0.02)	0.22	(0.02)	0.12	(0.02)	**0.10**	(0.03)	-1.05	(0.02)	-0.07	(0.01)	0.34	(0.01)	1.47	(0.01)
OECD total	*0.02*	*(0.01)*	*0.11*	*(0.01)*	*-0.08*	*(0.01)*	*0.19*	*(0.01)*	*-1.27*	*(0.01)*	*-0.28*	*(0.00)*	*0.25*	*(0.00)*	*1.35*	*(0.01)*
OECD average	*0.00*	*(0.00)*	*0.12*	*(0.00)*	*-0.12*	*(0.00)*	*0.25*	*(0.01)*	*-1.26*	*(0.00)*	*-0.30*	*(0.00)*	*0.23*	*(0.01)*	*1.31*	*(0.01)*

Note: Values that are statistically significant are indicated in bold

Table 5.29: *(Contd.)*

Country	Performance on the mathematics scale, by national quarters of the index of instrumental motivation in mathematics								Change in the mathematics score per unit of the index of instrumental motivation in mathematics		Explained variation in student performance (r-squared x 100)	
	Bottom quarter		Second quarter		Third quarter		Top quarter					
	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Mean score	S.E	Change	S.E.	Percentage	S.E.
Australia	**508**	(3.0)	518	(3.1)	527	(3.6)	**548**	(2.9)	**16.9**	(0.91)	3.0	(0.33)
Austria	511	(3.9)	511	(4.2)	506	(4.8)	503	(4.1)	**-3.7**	(1.60)	0.2	(0.15)
Belgium	**520**	(3.3)	533	(3.4)	547	(3.1)	**546**	(3.9)	**11.0**	(1.63)	1.1	(0.33)
Canada	**513**	(2.4)	528	(2.0)	540	(2.5)	**564**	(2.3)	**19.8**	(0.96)	5.4	(0.54)
Czech Republic	**513**	(3.9)	518	(4.5)	526	(4.2)	**535**	(4.5)	**10.7**	(1.82)	1.0	(0.35)
Denmark	**489**	(4.0)	510	(3.8)	522	(4.1)	**540**	(3.8)	**20.9**	(1.77)	4.3	(0.74)
Finland	**517**	(2.7)	536	(2.5)	548	(2.8)	**579**	(3.4)	**26.9**	(1.70)	8.5	(1.06)
France	**492**	(3.0)	509	(2.9)	519	(4.4)	**529**	(4.3)	**13.7**	(1.61)	2.4	(0.59)
Germany	509	(4.3)	512	(4.2)	518	(4.7)	509	(4.8)	1.1	(1.93)	0.0	(0.06)
Greece	**428**	(4.1)	438	(4.3)	450	(5.1)	**468**	(4.8)	**14.9**	(1.76)	2.6	(0.58)
Hungary	**489**	(3.9)	479	(3.8)	487	(3.9)	**506**	(4.9)	**7.9**	(1.90)	0.5	(0.26)
Iceland	**494**	(3.5)	509	(3.8)	523	(3.0)	**537**	(3.2)	**17.7**	(1.72)	4.0	(0.78)
Italy	**456**	(3.9)	461	(3.8)	477	(3.8)	**471**	(4.9)	**8.5**	(1.58)	0.7	(0.27)
Japan	**500**	(4.9)	534	(4.3)	541	(5.5)	**565**	(5.5)	**23.9**	(2.25)	6.2	(1.04)
Korea	**504**	(3.8)	527	(3.8)	556	(4.2)	**583**	(4.1)	**32.8**	(1.77)	12.0	(1.05)
Luxembourg	492	(2.7)	498	(3.3)	494	(2.9)	491	(3.0)	0.0	(1.35)	0.0	(0.03)
Mexico	382	(5.4)	388	(4.0)	388	(4.6)	390	(4.9)	**5.4**	(2.44)	0.3	(0.24)
Netherlands	**534**	(4.0)	547	(4.5)	546	(4.4)	**546**	(5.1)	**6.1**	(2.00)	0.4	(0.24)
New Zealand	**508**	(3.5)	520	(3.7)	525	(3.9)	**546**	(4.2)	**15.6**	(1.81)	2.2	(0.51)
Northern Ireland	*522*	*(4.2)*	*509*	*(4.8)*	*514*	*(4.0)*	*519*	*(3.5)*	*1.0*	*(2.09)*	*0.0*	*(0.05)*
Norway	**457**	(3.6)	491	(3.0)	503	(3.9)	**534**	(3.8)	**28.5**	(1.49)	10.1	(1.06)
Poland	**475**	(3.6)	488	(3.4)	491	(4.6)	**510**	(4.1)	**17.0**	(1.82)	2.4	(0.51)
Portugal	**446**	(4.1)	461	(4.7)	471	(4.6)	**489**	(5.1)	**17.3**	(2.04)	3.5	(0.84)
Rep. of Ireland	**498**	(3.4)	500	(3.8)	501	(4.1)	**514**	(3.5)	**7.7**	(1.45)	0.7	(0.29)
Scotland	**508**	(3.8)	521	(3.9)	530	(3.9)	**540**	(4.0)	**12.8**	(1.98)	2.3	(0.69)
Slovak Republic	**492**	(3.6)	495	(4.5)	503	(4.4)	**505**	(4.7)	**6.3**	(1.98)	0.3	(0.21)
Spain	**461**	(2.9)	479	(3.0)	494	(3.8)	**511**	(3.6)	**19.4**	(1.39)	5.1	(0.74)
Sweden	**485**	(2.9)	504	(3.0)	511	(3.6)	**540**	(4.9)	**23.0**	(2.00)	5.3	(0.88)
Switzerland	529	(5.1)	529	(4.2)	526	(3.9)	525	(3.6)	-2.4	(1.62)	0.1	(0.09)
Turkey	**411**	(6.4)	424	(8.2)	434	(7.6)	**441**	(8.9)	**12.9**	(2.39)	1.5	(0.55)
United States	**470**	(3.5)	483	(3.6)	482	(4.2)	**503**	(4.2)	**13.6**	(1.52)	2.0	(0.44)
OECD total	*490*	*(1.4)*	*490*	*(1.3)*	*491*	*(1.6)*	*493*	*(1.8)*	*3.0*	*(0.75)*	*0.1*	*(0.04)*
OECD average	*493*	*(0.8)*	*498*	*(0.9)*	*503*	*(0.8)*	*513*	*(1.0)*	*8.5*	*(0.41)*	*0.7*	*(0.07)*

Note: Values that are statistically significant are indicated in bold

Interest in and Enjoyment of Mathematics (Table 5.30)

The PISA index of **interest in and enjoyment of mathematics** was derived from students' reported agreement with the following statements: *i)* I enjoy reading about mathematics; *ii)* I look forward to my mathematics lessons; *iii)* I do mathematics because I enjoy it; and *iv)* I am interested in the things I learn in mathematics. A four-point scale with the response categories "strongly agree", "agree", "disagree" and "strongly disagree" was used. All items were inverted for IRT scaling. In the course of constructing the scale, the OECD country average score was set at 0 and the OECD country average standard deviation at 1.0. Higher values on the scale indicate greater interest in and enjoyment of mathematics.

The mean score of students in Northern Ireland on the index of interest in and enjoyment of mathematics was 0.02 (i.e., close to the OECD average of 0.0) (Table 5.30). The corresponding mean scores for the Republic of Ireland and Scotland are -0.05 and -0.08 respectively. Countries with the highest average reported interest in and enjoyment of mathematics include Mexico (0.58) and Turkey (0.55). Countries with low mean scores include Japan (-0.39), Austria (-0.28), and Finland (-0.24). Boys in Northern Ireland had a higher mean score (0.08) than girls (-0.03). The difference between them (0.11 points) is statistically significant, though smaller than the OECD average difference (0.21), which also favours boys. The difference in mean mathematical literacy scores in Northern Ireland between students in the top and bottom quarters of the index of interest in and enjoyment of mathematics (24 points in favour of those in the top quarter) is statistically significant. The OECD average difference is 29 points, also in favour of the top quarter, indicating that, across countries, students with high interest in and enjoyment of mathematics perform better on average than those with low interest and enjoyment.

Table 5.30: *Index of Interest in and Enjoyment of Mathematics and Performance in Mathematics, by National Quarters of the Index*

Country (countries in alphabetical order)	All students		Boys		Girls		Gender difference (B - G)		Bottom quarter		Second quarter		Third quarter		Top quarter	
	Index of interest and enjoyment in mathematics															
	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.	Dif.	S.E.	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.
Australia	0.01	(0.02)	0.12	(0.02)	-0.10	(0.02)	**0.22**	(0.02)	-1.22	(0.01)	-0.26	(0.00)	0.32	(0.01)	1.20	(0.01)
Austria	-0.28	(0.02)	-0.08	(0.03)	-0.49	(0.02)	**0.42**	(0.04)	-1.60	(0.01)	-0.67	(0.01)	0.02	(0.01)	1.10	(0.02)
Belgium	-0.17	(0.02)	-0.07	(0.02)	-0.27	(0.02)	**0.20**	(0.03)	-1.44	(0.01)	-0.45	(0.00)	0.17	(0.00)	1.07	(0.01)
Canada	-0.01	(0.01)	0.08	(0.02)	-0.10	(0.02)	**0.18**	(0.02)	-1.35	(0.01)	-0.34	(0.00)	0.33	(0.00)	1.32	(0.01)
Czech Republic	-0.19	(0.02)	-0.09	(0.02)	-0.29	(0.02)	**0.21**	(0.03)	-1.21	(0.02)	-0.42	(0.00)	0.03	(0.01)	0.85	(0.01)
Denmark	0.41	(0.02)	0.56	(0.02)	0.27	(0.02)	**0.29**	(0.03)	-0.85	(0.02)	0.11	(0.01)	0.80	(0.01)	1.59	(0.02)
Finland	-0.24	(0.02)	-0.09	(0.02)	-0.40	(0.02)	**0.31**	(0.03)	-1.41	(0.01)	-0.49	(0.01)	-0.01	(0.01)	0.94	(0.02)
France	0.04	(0.02)	0.17	(0.03)	-0.06	(0.02)	**0.23**	(0.03)	-1.24	(0.01)	-0.21	(0.01)	0.41	(0.01)	1.22	(0.01)
Germany	0.04	(0.02)	0.25	(0.03)	-0.16	(0.03)	**0.41**	(0.04)	-1.38	(0.01)	-0.39	(0.01)	0.41	(0.01)	1.54	(0.02)
Greece	0.10	(0.02)	0.27	(0.03)	-0.05	(0.03)	**0.32**	(0.03)	-1.20	(0.01)	-0.22	(0.01)	0.42	(0.01)	1.41	(0.02)
Hungary	-0.21	(0.02)	-0.16	(0.02)	-0.27	(0.02)	**0.11**	(0.03)	-1.33	(0.01)	-0.44	(0.01)	0.01	(0.01)	0.92	(0.01)
Iceland	-0.11	(0.02)	-0.08	(0.02)	-0.15	(0.03)	0.07	(0.04)	-1.52	(0.01)	-0.48	(0.01)	0.29	(0.01)	1.26	(0.02)
Italy	0.07	(0.02)	0.12	(0.03)	0.02	(0.03)	**0.10**	(0.04)	-1.17	(0.01)	-0.21	(0.01)	0.41	(0.01)	1.24	(0.01)
Japan	-0.39	(0.03)	-0.25	(0.03)	-0.51	(0.03)	**0.26**	(0.04)	-1.68	(0.01)	-0.69	(0.01)	-0.14	(0.01)	0.96	(0.02)
Korea	-0.12	(0.02)	-0.06	(0.03)	-0.21	(0.03)	**0.16**	(0.04)	-1.41	(0.01)	-0.40	(0.00)	0.14	(0.01)	1.19	(0.02)
Luxembourg	-0.26	(0.02)	-0.08	(0.02)	-0.43	(0.02)	**0.35**	(0.03)	-1.64	(0.01)	-0.68	(0.01)	0.08	(0.01)	1.21	(0.02)
Mexico	0.58	(0.02)	0.65	(0.02)	0.52	(0.02)	**0.13**	(0.02)	-0.42	(0.01)	0.35	(0.00)	0.84	(0.00)	1.54	(0.02)
Netherlands	-0.20	(0.02)	-0.05	(0.03)	-0.35	(0.03)	**0.30**	(0.03)	-1.38	(0.01)	-0.43	(0.01)	0.10	(0.01)	0.93	(0.01)
New Zealand	0.12	(0.02)	0.23	(0.02)	0.01	(0.03)	**0.22**	(0.04)	-1.11	(0.02)	-0.17	(0.01)	0.46	(0.01)	1.32	(0.01)
Northern Ireland	*0.02*	*(0.03)*	*0.08*	*(0.03)*	*-0.03*	*(0.04)*	***0.11***	*(0.05)*	*-1.23*	*(0.02)*	*-0.25*	*(0.01)*	*0.36*	*(0.01)*	*1.21*	*(0.02)*
Norway	-0.17	(0.02)	-0.03	(0.03)	-0.30	(0.03)	**0.26**	(0.04)	-1.54	(0.01)	-0.54	(0.01)	0.20	(0.01)	1.23	(0.02)
Poland	0.11	(0.02)	0.16	(0.02)	0.05	(0.02)	**0.10**	(0.03)	-1.03	(0.02)	-0.20	(0.01)	0.39	(0.01)	1.26	(0.02)
Portugal	0.16	(0.02)	0.17	(0.03)	0.15	(0.02)	0.02	(0.04)	-0.94	(0.02)	-0.05	(0.01)	0.47	(0.01)	1.16	(0.01)
Rep of Ireland	-0.05	(0.02)	-0.03	(0.03)	-0.07	(0.03)	0.04	(0.04)	-1.28	(0.01)	-0.34	(0.01)	0.26	(0.01)	1.16	(0.02)
Scotland	-0.08	(0.02)	-0.04	(0.03)	-0.12	(0.03)	**0.08**	(0.04)	-1.28	(0.02)	-0.36	(0.01)	0.2	(0.01)	1.11	(0.02)
Slovak Republic	0.03	(0.02)	0.10	(0.02)	-0.04	(0.02)	**0.14**	(0.03)	-1.01	(0.02)	-0.20	(0.00)	0.26	(0.01)	1.07	(0.01)
Spain	-0.07	(0.02)	-0.06	(0.02)	-0.08	(0.02)	0.03	(0.03)	-1.34	(0.01)	-0.35	(0.01)	0.26	(0.01)	1.14	(0.01)
Sweden	0.09	(0.02)	0.18	(0.03)	-0.01	(0.03)	**0.19**	(0.04)	-1.23	(0.01)	-0.21	(0.01)	0.43	(0.01)	1.36	(0.02)
Switzerland	0.12	(0.02)	0.41	(0.02)	-0.19	(0.02)	**0.60**	(0.03)	-1.22	(0.02)	-0.23	(0.01)	0.49	(0.01)	1.43	(0.02)
Turkey	0.55	(0.03)	0.60	(0.04)	0.49	(0.04)	**0.10**	(0.04)	-0.85	(0.02)	0.23	(0.01)	0.94	(0.01)	1.89	(0.02)
United States	0.04	(0.02)	0.13	(0.03)	-0.04	(0.02)	**0.17**	(0.03)	-1.30	(0.01)	-0.29	(0.00)	0.37	(0.01)	1.40	(0.01)
OECD total	*0.04*	*(0.01)*	*0.14*	*(0.01)*	*-0.05*	*(0.01)*	*0.19*	*(0.01)*	*-1.28*	*(0.00)*	*-0.28*	*(0.00)*	*0.38*	*(0.00)*	*1.34*	*(0.01)*
OECD average	*0.00*	*(0.00)*	*0.10*	*(0.00)*	*-0.11*	*(0.01)*	*0.21*	*(0.01)*	*-1.29*	*(0.00)*	*-0.31*	*(0.00)*	*0.33*	*(0.01)*	*1.26*	*(0.01)*

Note: Values that are statistically significant are indicated in bold

Table 5.30: *(Contd.)*

| Country | Performance on the mathematics scale, by national quarters of the index of interest and enjoyment in mathematics | | | | | | | | Change in the mathematics score per unit of the index of interest and enjoyment in mathematics | | Explained variation in student performance (r-squared x 100) | |
| | Bottom quarter | | Second quarter | | Third quarter | | Top quarter | | | | | |
	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Mean score	S.E	Change	S.E.	Percentage	S.E.
Australia	**502**	(3.3)	517	(2.5)	535	(2.6)	**547**	(3.0)	**18.6**	(1.36)	3.5	(0.49)
Austria	**495**	(3.9)	503	(3.4)	512	(5.0)	**520**	(5.3)	**8.7**	(1.92)	1.0	(0.43)
Belgium	**514**	(3.2)	533	(3.3)	544	(3.4)	**554**	(3.5)	**15.0**	(1.55)	1.9	(0.41)
Canada	**511**	(2.0)	527	(2.1)	543	(2.8)	**564**	(2.5)	**20.3**	(0.96)	5.8	(0.58)
Czech Republic	**505**	(3.4)	509	(4.1)	524	(4.8)	**552**	(5.0)	**22.5**	(2.22)	3.9	(0.77)
Denmark	**478**	(3.3)	505	(3.9)	532	(4.0)	**546**	(4.4)	**27.7**	(1.71)	8.8	(1.11)
Finland	**511**	(2.6)	536	(2.5)	550	(2.8)	**583**	(3.4)	**30.5**	(1.59)	11.2	(1.11)
France	**487**	(3.4)	500	(3.1)	526	(4.0)	**537**	(4.1)	**20.9**	(1.76)	4.9	(0.85)
Germany	**493**	(4.9)	510	(3.9)	521	(4.4)	**524**	(4.7)	**10.2**	(1.67)	1.4	(0.46)
Greece	**418**	(4.0)	431	(4.9)	459	(4.4)	**476**	(5.4)	**23.7**	(1.88)	6.7	(0.97)
Hungary	**486**	(3.5)	482	(3.9)	484	(4.3)	**509**	(4.9)	**10.0**	(2.30)	0.9	(0.42)
Iceland	**477**	(3.1)	507	(3.6)	531	(3.7)	**547**	(3.2)	**24.5**	(1.44)	8.6	(1.00)
Italy	**450**	(3.6)	462	(3.8)	481	(4.4)	**471**	(4.5)	**10.3**	(1.70)	1.0	(0.35)
Japan	**494**	(4.7)	531	(4.6)	543	(5.0)	**572**	(5.9)	**27.6**	(2.44)	7.9	(1.21)
Korea	**500**	(3.9)	520	(4.0)	557	(4.6)	**593**	(3.8)	**36.2**	(1.62)	15.5	(1.05)
Luxembourg	**485**	(2.6)	489	(3.1)	498	(2.9)	**503**	(3.5)	**6.7**	(1.48)	0.6	(0.28)
Mexico	**395**	(4.3)	393	(3.9)	389	(4.6)	**381**	(5.6)	**-6.3**	(2.50)	0.4	(0.29)
Netherlands	**525**	(4.0)	541	(4.7)	548	(4.0)	**559**	(4.9)	**14.3**	(2.09)	2.1	(0.63)
New Zealand	**513**	(3.5)	519	(3.3)	533	(4.1)	**534**	(4.0)	**11.4**	(1.72)	1.3	(0.39)
Northern Ireland	*506*	*(4.1)*	*507*	*(4.2)*	*522*	*(4.9)*	*530*	*(4.4)*	*10.8*	*(1.92)*	*1.2*	*(0.44)*
Norway	**447**	(3.1)	481	(3.3)	512	(4.0)	**544**	(3.6)	**34.3**	(1.41)	16.2	(1.30)
Poland	**479**	(3.1)	478	(3.2)	495	(4.0)	**511**	(3.9)	**15.6**	(1.48)	2.5	(0.50)
Portugal	**452**	(3.7)	462	(3.9)	475	(4.6)	**479**	(5.3)	**14.2**	(2.20)	1.9	(0.59)
Rep of Ireland	**482**	(3.3)	499	(3.3)	507	(3.6)	**524**	(4.1)	**17.4**	(1.78)	3.8	(0.79)
Scotland	**508**	(3.6)	519	(3.6)	527	(4.2)	**545**	(4.4)	**14.2**	(2.43)	2.5	(0.83)
Slovak Republic	**488**	(3.9)	492	(4.5)	504	(4.0)	**513**	(5.1)	**12.1**	(2.26)	1.2	(0.44)
Spain	**460**	(2.8)	479	(2.8)	494	(3.7)	**511**	(4.1)	**20.4**	(1.61)	5.1	(0.83)
Sweden	**476**	(2.5)	499	(3.6)	522	(4.1)	**543**	(4.6)	**27.0**	(1.79)	8.4	(1.07)
Switzerland	**513**	(4.2)	519	(4.6)	538	(4.4)	**538**	(4.2)	**10.4**	(1.47)	1.2	(0.35)
Turkey	**401**	(4.8)	421	(7.3)	434	(8.8)	**452**	(10.0)	**16.9**	(3.08)	3.0	(1.01)
United States	**472**	(3.2)	486	(3.9)	484	(4.1)	**494**	(4.9)	**7.8**	(1.47)	0.7	(0.28)
OECD total	*483*	*(1.3)*	*492*	*(1.3)*	*495*	*(1.6)*	*494*	*(1.9)*	*5.1*	*(0.72)*	*0.3*	*(0.07)*
OECD average	*486*	*(0.7)*	*498*	*(0.7)*	*509*	*(0.9)*	*515*	*(1.1)*	*11.9*	*(0.45)*	*1.5*	*(0.11)*

Note: Values that are statistically significant are indicated in bold

Self-concept in Mathematics (Table 5.31)

The PISA index of **self-concept in mathematics** is derived from students' level of agreement with the following statements: *i)* I am just not good at mathematics; *ii)* I get good marks in mathematics; *iii)* I learn mathematics quickly; *iv)* I have always believed that mathematics is one of my best subjects; and *v)* in my mathematics class, I understand even the most difficult work. A four-point scale with the response categories "strongly agree", "agree", "disagree" and "strongly disagree" was used. Items *ii)*, *iii)*, *iv)*, and *v)* were inverted for scaling. Scale construction was done using IRT scaling, such that the OECD country average score was set at 0 and the OECD country average standard deviation at 1.0. Higher values on the scale indicate more positive self-concept in mathematics.

The mean score of students in Northern Ireland on self-concept in mathematics was 0.06 (i.e., marginally higher than the OECD average of 0.0) (Table 5.31). The corresponding mean scores for the Republic of Ireland and Scotland are -0.03 and 0.10 respectively. Countries with the highest average reported self concept in mathematics scores include the United States (0.25) and Denmark (0.24). Countries with low mean scores include Japan (-0.53) and Korea (-0.35). Boys in Northern Ireland had a higher mean score (0.24) than girls (-0.12). The difference between them (0.36 points) is statistically significant, and similar in size to the OECD average difference (0.33), which also favours boys. The difference in mean mathematical literacy scores in Northern Ireland between students in the top and bottom quarters of the index of self-concept in mathematics (76 points in favour of those in the top quarter) is statistically significant. The OECD average difference is 83 points, also in favour of the top quarter, indicating that, across countries, students with high self-concept in mathematics perform better on average than those with low self-concept.

Table 5.31: *Index of Self-concept in Mathematics and Performance in Mathematics, by National Quarters of the Index*

Index of self-concept in mathematics

Country (countries in alphabetical order)	All students		Boys		Girls		Gender difference (B - G)		Bottom quarter		Second quarter		Third quarter		Top quarter	
	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.	Dif.	S.E.	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.
Australia	0.13	(0.02)	0.28	(0.02)	-0.03	(0.02)	**0.31**	(0.02)	-1.03	(0.02)	-0.14	(0.00)	0.43	(0.00)	1.26	(0.01)
Austria	0.07	(0.02)	0.31	(0.03)	-0.17	(0.03)	**0.47**	(0.04)	-1.29	(0.02)	-0.30	(0.01)	0.43	(0.01)	1.44	(0.02)
Belgium	-0.03	(0.02)	0.14	(0.02)	-0.21	(0.02)	**0.34**	(0.03)	-1.28	(0.01)	-0.30	(0.01)	0.28	(0.00)	1.18	(0.01)
Canada	0.19	(0.01)	0.37	(0.02)	0.01	(0.02)	**0.36**	(0.02)	-1.19	(0.01)	-0.17	(0.01)	0.53	(0.00)	1.58	(0.01)
Czech Republic	-0.09	(0.02)	0.07	(0.02)	-0.26	(0.03)	**0.33**	(0.03)	-1.26	(0.01)	-0.36	(0.01)	0.18	(0.01)	1.06	(0.02)
Denmark	0.24	(0.02)	0.49	(0.02)	0.00	(0.02)	**0.49**	(0.03)	-1.09	(0.02)	-0.06	(0.01)	0.60	(0.01)	1.52	(0.02)
Finland	0.01	(0.02)	0.25	(0.02)	-0.23	(0.02)	**0.47**	(0.03)	-1.34	(0.02)	-0.33	(0.01)	0.38	(0.01)	1.33	(0.02)
France	-0.17	(0.02)	0.03	(0.03)	-0.35	(0.02)	**0.38**	(0.03)	-1.51	(0.02)	-0.47	(0.01)	0.21	(0.01)	1.10	(0.02)
Germany	0.15	(0.02)	0.44	(0.02)	-0.13	(0.03)	**0.56**	(0.04)	-1.30	(0.01)	-0.25	(0.01)	0.53	(0.01)	1.62	(0.01)
Greece	0.11	(0.02)	0.25	(0.03)	-0.02	(0.02)	**0.27**	(0.03)	-0.97	(0.01)	-0.20	(0.01)	0.37	(0.00)	1.24	(0.01)
Hungary	-0.15	(0.02)	-0.06	(0.02)	-0.26	(0.02)	**0.20**	(0.03)	-1.19	(0.01)	-0.40	(0.00)	0.06	(0.00)	0.92	(0.01)
Iceland	0.03	(0.02)	0.16	(0.03)	-0.10	(0.03)	**0.26**	(0.05)	-1.46	(0.02)	-0.36	(0.01)	0.45	(0.01)	1.50	(0.02)
Italy	0.00	(0.02)	0.08	(0.03)	-0.07	(0.02)	**0.14**	(0.03)	-1.26	(0.02)	-0.34	(0.01)	0.34	(0.01)	1.27	(0.02)
Japan	-0.53	(0.02)	-0.35	(0.03)	-0.70	(0.02)	**0.35**	(0.03)	-1.78	(0.01)	-0.76	(0.01)	-0.24	(0.01)	0.67	(0.02)
Korea	-0.35	(0.02)	-0.26	(0.03)	-0.49	(0.03)	**0.24**	(0.04)	-1.49	(0.01)	-0.60	(0.00)	-0.12	(0.00)	0.81	(0.01)
Luxembourg	0.07	(0.02)	0.34	(0.02)	-0.20	(0.02)	**0.54**	(0.03)	-1.35	(0.02)	-0.30	(0.01)	0.45	(0.01)	1.47	(0.02)
Mexico	0.17	(0.02)	0.24	(0.02)	0.12	(0.02)	**0.12**	(0.02)	-0.79	(0.01)	-0.12	(0.00)	0.39	(0.00)	1.22	(0.02)
Netherlands	0.00	(0.02)	0.26	(0.03)	-0.28	(0.03)	**0.55**	(0.04)	-1.28	(0.02)	-0.28	(0.01)	0.33	(0.01)	1.22	(0.02)
New Zealand	0.15	(0.02)	0.31	(0.02)	*-0.01*	(0.02)	**0.32**	(0.03)	-0.98	(0.02)	-0.11	(0.01)	0.44	(0.01)	1.25	(0.02)
Northern Ireland	*0.06*	*(0.02)*	*0.24*	*(0.03)*	*-0.12*	*(0.03)*	***0.36***	*(0.04)*	*-1.11*	*(0.02)*	*-0.19*	*(0.01)*	*0.38*	*(0.01)*	*1.16*	*(0.02)*
Norway	-0.18	(0.02)	0.06	(0.03)	-0.41	(0.03)	**0.47**	(0.04)	-1.59	(0.01)	-0.55	(0.01)	0.18	(0.01)	1.25	(0.02)
Poland	0.03	(0.02)	0.11	(0.02)	-0.05	(0.02)	**0.17**	(0.03)	-1.02	(0.02)	-0.33	(0.00)	0.25	(0.01)	1.21	(0.02)
Portugal	-0.18	(0.02)	-0.08	(0.02)	-0.28	(0.02)	**0.20**	(0.03)	-1.37	(0.02)	-0.45	(0.00)	0.11	(0.01)	0.98	(0.02)
Rep of Ireland	-0.03	(0.02)	0.08	(0.02)	-0.14	(0.03)	**0.21**	(0.03)	-1.20	(0.02)	-0.29	(0.01)	0.26	(0.01)	1.11	(0.02)
Scotland	0.10	(0.02)	0.28	(0.03)	-0.08	(0.02)	**0.37**	(0.04)	-1.07	(0.02)	-0.2	(0.01)	0.38	(0.01)	1.26	(0.02)
Slovak Republic	-0.05	(0.02)	0.07	(0.02)	-0.18	(0.02)	**0.25**	(0.02)	-1.06	(0.01)	-0.33	(0.00)	0.18	(0.00)	1.01	(0.02)
Spain	-0.19	(0.02)	-0.06	(0.03)	-0.31	(0.03)	**0.25**	(0.03)	-1.47	(0.01)	-0.49	(0.00)	0.15	(0.01)	1.06	(0.01)
Sweden	0.13	(0.02)	0.30	(0.03)	-0.05	(0.03)	**0.35**	(0.04)	-1.11	(0.01)	-0.20	(0.01)	0.43	(0.01)	1.39	(0.01)
Switzerland	0.13	(0.02)	0.48	(0.02)	-0.23	(0.02)	**0.72**	(0.03)	-1.21	(0.02)	-0.23	(0.01)	0.49	(0.01)	1.49	(0.01)
Turkey	0.02	(0.03)	0.10	(0.04)	-0.09	(0.04)	**0.19**	(0.04)	-1.17	(0.02)	-0.35	(0.01)	0.27	(0.01)	1.32	(0.02)
United States	0.25	(0.02)	0.39	(0.02)	0.11	(0.02)	**0.28**	(0.03)	-1.04	(0.02)	-0.08	(0.01)	0.56	(0.01)	1.58	(0.02)
OECD total	*0.02*	*(0.01)*	*0.17*	*(0.01)*	*-0.13*	*(0.01)*	*0.30*	*(0.01)*	*-1.25*	*(0.01)*	*-0.30*	*(0.00)*	*0.33*	*(0.01)*	*1.31*	*(0.01)*
OECD average	*0.00*	*(0.00)*	*0.17*	*(0.00)*	*-0.17*	*(0.00)*	*0.33*	*(0.01)*	*-1.26*	*(0.00)*	*-0.32*	*(0.00)*	*0.30*	*(0.01)*	*1.27*	*(0.01)*

Note: Values that are statistically significant are indicated in bold

Table 5.31: *(Contd.)*

Country	Performance on the mathematics scale, by national quarters of the index of self-concept in mathematics								Change in the mathematics score per unit of the index of self-concept in mathematics		Explained variation in student performance (r^2 X 100)	
	Bottom quarter		Second quarter		Third quarter		Top quarter					
	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Mean score	S.E	Change	S.E.	Percentage	S.E.
Australia	**479**	(2.8)	507	(2.2)	537	(3.0)	**579**	(3.1)	**42.3**	(1.40)	16.8	(0.99)
Austria	**474**	(3.7)	497	(3.7)	511	(4.6)	**549**	(4.3)	**25.7**	(1.75)	8.9	(1.15)
Belgium	**506**	(3.2)	529	(3.5)	546	(3.4)	**567**	(3.9)	**23.3**	(1.44)	4.8	(0.62)
Canada	**490**	(2.0)	516	(2.2)	548	(2.5)	**590**	(2.1)	**35.9**	(0.78)	19.9	(0.84)
Czech Republic	**481**	(3.6)	499	(3.6)	535	(4.2)	**575**	(3.9)	**39.8**	(1.60)	15.8	(1.07)
Denmark	**456**	(3.0)	493	(3.7)	536	(3.5)	**578**	(3.6)	**46.5**	(1.32)	27.6	(1.32)
Finland	**488**	(2.2)	517	(2.5)	562	(2.3)	**611**	(3.0)	**45.5**	(1.12)	33.0	(1.40)
France	**475**	(3.2)	500	(3.4)	523	(3.9)	**552**	(4.0)	**28.3**	(1.71)	10.3	(1.21)
Germany	**484**	(4.6)	498	(4.3)	516	(4.0)	**551**	(4.6)	**22.7**	(1.51)	7.1	(0.90)
Greece	**400**	(3.5)	423	(4.5)	464	(4.7)	**498**	(4.5)	**42.6**	(1.88)	16.6	(1.23)
Hungary	**471**	(3.2)	473	(3.6)	488	(3.7)	**531**	(4.8)	**28.4**	(1.99)	6.6	(0.94)
Iceland	**461**	(3.0)	489	(3.2)	534	(3.2)	**580**	(2.8)	**39.7**	(1.15)	26.4	(1.26)
Italy	**436**	(3.9)	448	(4.0)	476	(3.5)	**505**	(3.5)	**25.3**	(1.43)	7.1	(0.73)
Japan	**505**	(4.8)	532	(4.7)	545	(4.7)	**558**	(5.4)	**21.2**	(1.96)	4.1	(0.72)
Korea	**493**	(3.3)	517	(4.1)	555	(3.7)	**604**	(4.1)	**47.3**	(1.89)	21.4	(1.24)
Luxembourg	**474**	(2.8)	478	(2.8)	498	(2.7)	**526**	(3.0)	**19.1**	(1.35)	5.3	(0.71)
Mexico	**373**	(3.3)	378	(3.5)	387	(4.3)	**419**	(6.4)	**24.1**	(2.42)	5.4	(1.09)
Netherlands	**518**	(4.0)	534	(4.0)	549	(4.0)	**574**	(4.1)	**22.2**	(1.75)	6.1	(0.95)
New Zealand	**476**	(3.5)	510	(3.1)	530	(3.7)	**583**	(3.6)	**44.9**	(1.47)	17.0	(1.06)
Northern Ireland	*484*	*(4.3)*	*499*	*(4.4)*	*524*	*(4.2)*	*560*	*(4.1)*	*31.5*	*(2.29)*	*9.5*	*(1.22)*
Norway	**435**	(2.3)	470	(2.9)	510	(3.5)	**570**	(3.2)	**46.6**	(1.16)	31.6	(1.51)
Poland	**451**	(3.2)	464	(3.5)	497	(3.6)	**554**	(3.6)	**46.0**	(1.48)	21.6	(1.28)
Portugal	**426**	(3.4)	449	(4.6)	478	(3.8)	**513**	(4.4)	**36.8**	(1.53)	15.4	(1.37)
Rep of Ireland	**467**	(3.4)	488	(3.4)	513	(3.7)	**546**	(3.9)	**34.4**	(1.77)	14.1	(1.44)
Scotland	**486**	(3.7)	506	(3.8)	528	(4.6)	**578**	(3.6)	**38.0**	(1.78)	17.8	(1.47)
Slovak Republic	**457**	(4.0)	477	(4.6)	512	(3.0)	**551**	(5.0)	**44.5**	(1.89)	16.1	(1.63)
Spain	**447**	(2.7)	470	(3.4)	497	(2.9)	**531**	(4.3)	**31.9**	(1.61)	13.2	(1.30)
Sweden	**458**	(3.0)	487	(3.2)	519	(3.4)	**577**	(4.4)	**47.0**	(1.70)	24.4	(1.47)
Switzerland	**498**	(3.8)	511	(4.7)	536	(4.4)	**564**	(4.3)	**24.2**	(1.47)	6.9	(0.80)
Turkey	**387**	(4.5)	409	(5.6)	431	(7.1)	**484**	(11.5)	**34.8**	(4.23)	11.0	(1.77)
United States	**443**	(3.5)	465	(3.8)	494	(3.6)	**536**	(3.9)	**35.1**	(1.54)	14.6	(1.18)
OECD total	*465*	*(1.3)*	*474*	*(1.4)*	*494*	*(1.6)*	*532*	*(1.6)*	*25.5*	*(0.65)*	*6.4*	*(0.34)*
OECD average	*467*	*(0.7)*	*482*	*(0.9)*	*509*	*(0.8)*	*550*	*(0.9)*	*32.4*	*(0.37)*	*10.8*	*(0.24)*

Note: Values that are statistically significant are indicated in bold

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Self-efficacy in Mathematics (Table 5.32)

The PISA index of **self-efficacy in mathematics** was derived from students' reported level of confidence with the following calculations: *i)* using a train timetable, how long it would take to get from Zedville to Zedtown; *ii)* calculating how much cheaper a TV would be after a 30 per cent discount; *iii)* calculating how many square metres of tiles you need to cover a floor; *iv)* understanding graphs presented in newspapers; *v)* solving an equation like $3x + 5 = 17$; *vi)* finding the actual distance between two places on a map with a 1:10,000 scale; *vii)* solving an equation like $2(x+3) = (x + 3)(x - 3)$; and *viii)* calculating the petrol consumption rate of a car. A four-point scale with the response categories "very confident", "confident", "not very confident", "not at all confident" was used. All items were inverted for scaling. Scale construction was done using IRT scaling, such that the OECD country average score was set at 0 and the OECD country average standard deviation at 1.0. Higher values on the scale indicate higher levels of self-efficacy in mathematics.

The mean score of students in Northern Ireland on self-efficacy in mathematics was -0.05 (Table 5.32), indicating that students had an average level of self-efficacy that is close to the OECD average level. The corresponding mean scores for the Republic of Ireland and Scotland are -0.03 and 0.18 respectively. Countries with the highest average reported self-efficacy in mathematics include the Slovak Republic (0.39), Hungary (0.36) and Switzerland (0.32). Countries with low mean scores include Japan (-0.53) and Korea (-0.42). Boys in Northern Ireland had a higher mean score (0.14) than girls (-0.23). The difference between them (0.37 points in favour of boys) is statistically significant, and similar in size to the OECD average difference (0.34), which also favours boys. The difference in mean mathematical literacy scores in Northern Ireland between students in the top and bottom quarters of the index of self-efficacy in mathematics (139 points in favour of those in the top quarter) is statistically significant. The OECD average difference is 126 points, also in favour of the top quarter, indicated that, across countries, students with high self-efficacy in mathematics perform better on average than those with low self-efficacy. In interpreting these data, consideration should be given to the possibility that self-efficacy in mathematics may be a proxy for mathematics achievement.

Table 5.32: *Index of Self-efficacy in Mathematics and Performance in Mathematics, by National Quarters of the Index*

Index of self-efficacy in mathematics

Country (countries in alphabetical order)	All students		Boys		Girls		Gender difference (B - G)		Bottom quarter		Second quarter		Third quarter		Top quarter	
	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.	Dif.	S.E.	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.
Australia	0.10	(0.02)	0.28	(0.03)	-0.09	(0.02)	**0.37**	(0.03)	-0.97	(0.01)	-0.31	(0.00)	0.22	(0.01)	1.47	(0.02)
Austria	0.16	(0.02)	0.39	(0.03)	-0.07	(0.03)	**0.46**	(0.03)	-1.00	(0.02)	-0.21	(0.01)	0.37	(0.01)	1.48	(0.02)
Belgium	-0.04	(0.02)	0.12	(0.02)	-0.22	(0.02)	**0.35**	(0.03)	-1.11	(0.02)	-0.40	(0.00)	0.11	(0.00)	1.23	(0.02)
Canada	0.25	(0.02)	0.44	(0.02)	0.07	(0.02)	**0.37**	(0.03)	-0.93	(0.01)	-0.20	(0.00)	0.42	(0.01)	1.71	(0.02)
Czech Republic	0.16	(0.02)	0.35	(0.03)	-0.04	(0.02)	**0.39**	(0.03)	-0.88	(0.01)	-0.23	(0.00)	0.34	(0.01)	1.41	(0.02)
Denmark	-0.07	(0.02)	0.15	(0.0)	-0.27	(0.02)	**0.42**	(0.03)	-1.11	(0.02)	-0.43	(0.00)	0.10	(0.01)	1.17	(0.02)
Finland	-0.15	(0.02)	0.12	(0.02)	-0.42	(0.02)	**0.53**	(0.03)	-1.21	(0.02)	-0.52	(0.00)	0.01	(0.01)	1.11	(0.02)
France	-0.01	(0.02)	0.15	(0.04)	-0.15	(0.02)	**0.29**	(0.04)	-1.07	(0.02)	-0.38	(0.00)	0.15	(0.01)	1.28	(0.02)
Germany	0.15	(0.02)	0.39	(0.03)	-0.07	(0.02)	**0.45**	(0.04)	-0.97	(0.02)	-0.21	(0.01)	0.35	(0.01)	1.44	(0.02)
Greece	-0.26	(0.02)	-0.06	(0.03)	-0.45	(0.02)	**0.39**	(0.03)	-1.28	(0.02)	-0.56	(0.00)	-0.07	(0.00)	0.86	(0.02)
Hungary	0.36	(0.02)	0.52	(0.03)	0.17	(0.03)	**0.35**	(0.03)	-0.71	(0.01)	-0.13	(0.00)	0.51	(0.01)	1.75	(0.02)
Iceland	0.04	(0.02)	0.17	(0.03)	-0.10	(0.03)	**0.28**	(0.04)	-1.24	(0.03)	-0.36	(0.01)	0.23	(0.01)	1.51	(0.02)
Italy	-0.11	(0.02)	0.05	(0.03)	-0.25	(0.02)	**0.30**	(0.03)	-0.99	(0.02)	-0.41	(0.00)	0.00	(0.00)	0.98	(0.02)
Japan	-0.53	(0.04)	-0.35	(0.05)	-0.69	(0.03)	**0.33**	(0.06)	-1.77	(0.03)	-0.76	(0.00)	-0.30	(0.00)	0.73	(0.04)
Korea	-0.42	(0.02)	-0.34	(0.03)	-0.54	(0.04)	**0.19**	(0.05)	-1.48	(0.02)	-0.73	(0.00)	-0.29	(0.00)	0.83	(0.03)
Luxembourg	0.10	(0.02)	0.33	(0.03)	-0.12	(0.02)	**0.45**	(0.03)	-1.07	(0.02)	-0.29	(0.00)	0.27	(0.01)	1.49	(0.02)
Mexico	-0.22	(0.02)	-0.14	(0.02)	-0.30	(0.03)	**0.15**	(0.03)	-1.15	(0.01)	-0.56	(0.00)	-0.09	(0.00)	0.91	(0.02)
Netherlands	-0.09	(0.02)	0.17	(0.02)	-0.37	(0.02)	**0.53**	(0.03)	-1.09	(0.03)	-0.42	(0.00)	0.03	(0.01)	1.11	(0.03)
New Zealand	0.01	(0.02)	0.19	(0.02)	-0.17	(0.02)	**0.36**	(0.03)	-1.02	(0.02)	-0.40	(0.00)	0.11	(0.01)	1.34	(0.02)
Northern Ireland	*-0.05*	*(0.03)*	*0.14*	*(0.04)*	*-0.23*	*(0.03)*	***0.37***	*(0.05)*	*-1.09*	*(0.02)*	*-0.45*	*(0.01)*	*0.05*	*(0.01)*	*1.29*	*(0.03)*
Norway	-0.04	(0.02)	0.15	(0.03)	-0.24	(0.03)	**0.40**	(0.04)	-1.28	(0.02)	-0.43	(0.01)	0.16	(0.01)	1.37	(0.02)
Poland	0.05	(0.02)	0.12	(0.03)	-0.03	(0.02)	**0.16**	(0.03)	-0.93	(0.01)	-0.34	(0.00)	0.14	(0.01)	1.32	(0.02)
Portugal	-0.06	(0.02)	0.05	(0.02)	-0.15	(0.03)	**0.20**	(0.03)	-0.95	(0.02)	-0.39	(0.00)	0.05	(0.01)	1.06	(0.02)
Rep of Ireland	-0.03	(0.02)	0.11	(0.02)	-0.17	(0.03)	**0.28**	(0.04)	-1.07	(0.02)	-0.39	(0.00)	0.13	(0.01)	1.22	(0.02)
Scotland	0.18	(0.02)	0.38	(0.03)	-0.01	(0.03)	**0.40**	(0.03)	-0.86	(0.02)	-0.26	(0.01)	0.33	(0.01)	1.53	(0.03)
Slovak Republic	0.39	(0.03)	0.55	(0.04)	0.22	(0.03)	**0.33**	(0.04)	-0.73	(0.03)	-0.04	(0.00)	0.60	(0.01)	1.73	(0.02)
Spain	-0.04	(0.02)	0.09	(0.03)	-0.16	(0.02)	**0.25**	(0.03)	-1.02	(0.02)	-0.33	(0.00)	0.09	(0.00)	1.10	(0.02)
Sweden	0.03	(0.03)	0.17	(0.03)	-0.10	(0.03)	**0.27**	(0.04)	-1.09	(0.02)	-0.38	(0.00)	0.21	(0.01)	1.39	(0.02)
Switzerland	0.32	(0.03)	0.59	(0.04)	0.04	(0.03)	**0.55**	(0.04)	-0.84	(0.02)	-0.08	(0.01)	0.56	(0.01)	1.67	(0.02)
Turkey	-0.18	(0.05)	-0.05	(0.06)	-0.33	(0.05)	**0.28**	(0.05)	-1.42	(0.02)	-0.51	(0.00)	0.00	(0.01)	1.22	(0.05)
United States	0.27	(0.02)	0.37	(0.03)	0.16	(0.03)	**0.21**	(0.03)	-0.88	(0.02)	-0.18	(0.00)	0.39	(0.01)	1.73	(0.02)
OECD total	*-0.02*	*(0.01)*	*0.12*	*(0.01)*	*-0.16*	*(0.01)*	*0.28*	*(0.01)*	*-1.15*	*(0.01)*	*-0.39*	*(0.00)*	*0.12*	*(0.00)*	*1.35*	*(0.01)*
OECD average	*0.00*	*(0.00)*	*0.17*	*(0.01)*	*-0.17*	*(0.01)*	*0.34*	*(0.01)*	*-1.11*	*(0.00)*	*-0.38*	*(0.00)*	*0.15*	*(0.01)*	*1.33*	*(0.01)*

Note: Values that are statistically significant are indicated in bold

Table 5.32: *(Contd.)*

| Country | Performance on the mathematics scale, by national quarters of the index of self-efficacy in mathematics | | | | | | | | Change in the mathematics score per unit of the index of self-efficacy in mathematics | | Explained variation in student performance (r-squared x 100) | |
| | Bottom quarter | | Second quarter | | Third quarter | | Top quarter | | | | | |
	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Mean score	S.E	Change	S.E.	Percentage	S.E.
Australia	**461**	(2.5)	507	(2.5)	541	(2.2)	**593**	(2.9)	**49.6**	(1.28)	27.3	(1.18)
Austria	**449**	(3.4)	488	(3.5)	523	(3.4)	**571**	(4.5)	**45.5**	(1.80)	24.6	(1.67)
Belgium	**471**	(3.5)	526	(3.1)	559	(3.0)	**590**	(2.7)	**45.2**	(1.52)	17.7	(0.98)
Canada	**475**	(2.0)	516	(2.2)	555	(1.9)	**599**	(1.9)	**43.8**	(0.77)	28.9	(0.99)
Czech Republic	**454**	(3.7)	502	(3.5)	543	(3.6)	**591**	(3.4)	**55.5**	(1.54)	31.0	(1.30)
Denmark	**449**	(3.0)	498	(3.2)	536	(3.6)	**579**	(3.5)	**50.8**	(1.80)	27.4	(1.39)
Finland	**488**	(2.5)	527	(2.3)	559	(2.3)	**606**	(3.0)	**45.9**	(1.41)	27.5	(1.50)
France	**451**	(3.8)	497	(3.0)	528	(3.6)	**574**	(3.1)	**47.4**	(1.72)	25.4	(1.42)
Germany	**442**	(3.7)	497	(3.8)	537	(4.1)	**574**	(3.9)	**50.2**	(1.86)	25.8	(1.59)
Greece	**394**	(3.8)	433	(4.0)	461	(4.0)	**500**	(4.8)	**45.5**	(2.13)	18.4	(1.35)
Hungary	**420**	(3.5)	471	(3.1)	510	(3.1)	**560**	(3.9)	**52.6**	(1.74)	31.0	(1.58)
Iceland	**453**	(3.1)	498	(2.7)	537	(2.8)	**577**	(2.6)	**40.2**	(1.33)	25.3	(1.36)
Italy	**407**	(4.7)	449	(3.1)	482	(3.0)	**525**	(3.8)	**52.4**	(2.24)	20.8	(1.51)
Japan	**452**	(4.8)	519	(3.4)	559	(3.2)	**609**	(5.3)	**54.9**	(2.06)	34.3	(2.21)
Korea	**469**	(3.6)	524	(2.8)	559	(2.8)	**617**	(4.2)	**54.0**	(1.71)	33.2	(1.48)
Luxembourg	**436**	(2.3)	481	(2.6)	509	(2.6)	**552**	(2.7)	**40.5**	(1.37)	21.8	(1.18)
Mexico	**353**	(4.0)	376	(3.7)	391	(3.9)	**426**	(4.8)	**30.9**	(2.20)	9.5	(1.20)
Netherlands	**490**	(4.2)	529	(3.8)	554	(3.8)	**602**	(3.4)	**44.6**	(1.99)	20.8	(1.42)
New Zealand	**464**	(3.4)	503	(3.2)	535	(3.5)	**597**	(3.0)	**52.0**	(1.44)	27.1	(1.17)
Northern Ireland	*450*	*(3.7)*	*496*	*(3.9)*	*531*	*(3.5)*	*589*	*(3.7)*	*52.1*	*(1.89)*	*29.8*	*(1.85)*
Norway	**431**	(2.6)	474	(3.3)	516	(2.9)	**565**	(3.6)	**46.8**	(1.49)	30.4	(1.58)
Poland	**426**	(2.8)	471	(3.2)	505	(3.1)	**562**	(3.0)	**53.3**	(1.98)	29.9	(1.52)
Portugal	**407**	(4.0)	448	(4.0)	479	(3.5)	**532**	(3.3)	**55.3**	(1.92)	28.1	(1.56)
Rep of Ireland	**446**	(2.6)	488	(3.0)	515	(3.1)	**565**	(3.1)	**47.5**	(1.32)	28.0	(1.43)
Scotland	**463**	(3.6)	509	(3.2)	541	(3.6)	**584**	(2.8)	**45.6**	(1.56)	28.0	(1.55)
Slovak Republic	**424**	(4.3)	479	(3.2)	522	(2.8)	**570**	(2.9)	**55.0**	(1.99)	34.8	(1.61)
Spain	**434**	(2.6)	470	(2.9)	503	(2.7)	**539**	(3.0)	**42.7**	(1.46)	19.4	(1.00)
Sweden	**443**	(3.0)	485	(2.8)	528	(3.3)	**583**	(3.6)	**52.8**	(1.65)	31.8	(1.57)
Switzerland	**456**	(3.1)	505	(3.0)	552	(3.3)	**595**	(5.4)	**53.2**	(2.33)	29.8	(2.27)
Turkey	**366**	(3.8)	405	(5.1)	432	(6.3)	**503**	(13.5)	**48.6**	(5.07)	25.7	(4.11)
United States	**425**	(2.9)	457	(2.7)	502	(3.4)	**554**	(3.9)	**46.7**	(1.30)	27.4	(1.38)
OECD total	*434*	*(1.4)*	*472*	*(1.3)*	*502*	*(1.4)*	*555*	*(1.7)*	*44.4*	*(0.71)*	*19.8*	*(0.58)*
OECD average	*441*	*(0.8)*	*482*	*(0.7)*	*516*	*(0.8)*	*567*	*(0.9)*	*47.2*	*(0.42)*	*22.7*	*(0.34)*

Note: Values that are statistically significant are indicated in bold

Anxiety in Mathematics (Table 5.33)

The PISA index of ***anxiety in mathematics*** was derived from students' reported agreement with the following statements: *i)* I often worry that it will be difficult for me in mathematics classes; *ii)* I get very tense when I have to do mathematics homework; *iii)* I get very nervous doing mathematics problems; *iv)* I feel helpless when doing a mathematics problem; and *v)* I worry that I will get poor <marks> in mathematics. A four-point scale with the response categories "strongly agree", "agree", "disagree" and "strongly disagree" was used. All items were inverted for scaling. Scale construction was done using IRT scaling, such that the OECD country average score was set at 0 and the OECD country average standard deviation at 1.0. Higher values on the scale indicate greater levels of anxiety in mathematics.

The mean score of students in Northern Ireland on anxiety in mathematics was 0.03 (Table 5.33), indicating that students had an average level of anxiety that is close to the OECD average level. The corresponding mean scores for the Republic of Ireland and Scotland are 0.07 and -0.06 respectively. Countries with the highest average reported anxiety in mathematics include Mexico (0.47), Japan (0.44), Korea (0.41) and Italy (0.29). Countries with low mean scores include Denmark (-0.46), the Netherlands (-0.38), and Sweden (-0.49). Girls in Northern Ireland had a higher mean score (0.20) (indicating higher levels of anxiety) than boys (-0.14). The difference (-0.34 points, favouring girls) is statistically significant, and a little bigger than the OECD average difference (-0.28), which also favours girls. The difference in mean mathematical literacy scores in Northern Ireland between students in the top and bottom quarters of the index of anxiety in mathematics (76 points in favour of those in the bottom quarter) is statistically significant. The OECD average difference is 92 points, also in favour of the bottom quarter, indicating that, across countries, students with high anxiety in mathematics perform less well on average than those with low anxiety.

Table 5.33: *Index of Anxiety about Mathematics and Performance in Mathematics, by National Quarters of the Index*

Index of anxiety in mathematics

Country (countries in alphabetical order)	All students		Boys		Girls		Gender difference (B - G)		Bottom quarter		Second quarter		Third quarter		Top quarter	
	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.	Dif.	S.E.	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.	Mean index	S.E.
Australia	-0.05	(0.01)	-0.19	(0.02)	0.09	(0.02)	**-0.28**	(0.02)	-1.13	(0.02)	-0.29	(0.00)	0.21	(0.00)	0.99	(0.01)
Austria	-0.27	(0.02)	-0.47	(0.03)	-0.06	(0.03)	**-0.42**	(0.04)	-1.77	(0.02)	-0.61	(0.01)	0.12	(0.01)	1.18	(0.02)
Belgium	0.09	(0.02)	-0.06	(0.02)	0.24	(0.02)	**-0.30**	(0.02)	-1.09	(0.02)	-0.14	(0.00)	0.36	(0.00)	1.22	(0.01)
Canada	-0.04	(0.01)	-0.23	(0.02)	0.13	(0.02)	**-0.36**	(0.02)	-1.42	(0.02)	-0.30	(0.00)	0.30	(0.00)	1.24	(0.01)
Czech Republic	-0.05	(0.02)	-0.16	(0.02)	0.07	(0.03)	**-0.23**	(0.03)	-1.13	(0.02)	-0.31	(0.00)	0.22	(0.00)	1.05	(0.02)
Denmark	-0.46	(0.02)	-0.66	(0.03)	-0.26	(0.03)	**-0.40**	(0.03)	-1.87	(0.02)	-0.65	(0.01)	-0.10	(0.01)	0.81	(0.02)
Finland	-0.31	(0.01)	-0.49	(0.02)	-0.14	(0.02)	**-0.35**	(0.02)	-1.47	(0.02)	-0.51	(0.00)	-0.02	(0.00)	0.74	(0.01)
France	0.34	(0.02)	0.15	(0.02)	0.51	(0.02)	**-0.35**	(0.03)	-0.81	(0.02)	0.11	(0.01)	0.64	(0.01)	1.43	(0.02)
Germany	-0.25	(0.02)	-0.48	(0.03)	-0.03	(0.03)	**-0.44**	(0.04)	-1.79	(0.02)	-0.59	(0.01)	0.15	(0.01)	1.20	(0.02)
Greece	0.16	(0.02)	0.03	(0.03)	0.28	(0.03)	**-0.25**	(0.03)	-1.06	(0.02)	-0.07	(0.01)	0.51	(0.01)	1.28	(0.01)
Hungary	-0.01	(0.02)	-0.09	(0.02)	0.08	(0.02)	**-0.17**	(0.03)	-1.13	(0.02)	-0.22	(0.01)	0.26	(0.00)	1.06	(0.02)
Iceland	-0.20	(0.02)	-0.34	(0.02)	-0.06	(0.03)	**-0.29**	(0.04)	-1.62	(0.02)	-0.43	(0.01)	0.15	(0.01)	1.08	(0.02)
Italy	0.29	(0.01)	0.21	(0.02)	0.35	(0.02)	**-0.14**	(0.02)	-0.79	(0.02)	0.08	(0.00)	0.58	(0.00)	1.27	(0.01)
Japan	0.44	(0.02)	0.31	(0.03)	0.57	(0.02)	**-0.26**	(0.03)	-0.76	(0.02)	0.12	(0.01)	0.70	(0.01)	1.73	(0.02)
Korea	0.41	(0.01)	0.37	(0.02)	0.48	(0.02)	**-0.12**	(0.03)	-0.60	(0.01)	0.21	(0.00)	0.64	(0.00)	1.40	(0.02)
Luxembourg	-0.01	(0.02)	-0.26	(0.02)	0.23	(0.02)	**-0.50**	(0.03)	-1.50	(0.02)	-0.30	(0.01)	0.39	(0.01)	1.37	(0.02)
Mexico	0.47	(0.02)	0.42	(0.02)	0.52	(0.02)	**-0.10**	(0.02)	-0.44	(0.02)	0.28	(0.00)	0.70	(0.00)	1.35	(0.01)
Netherlands	-0.38	(0.02)	-0.54	(0.03)	-0.21	(0.02)	**-0.33**	(0.03)	-1.52	(0.02)	-0.51	(0.00)	-0.13	(0.01)	0.64	(0.02)
New Zealand	-0.10	(0.02)	-0.23	(0.02)	0.04	(0.02)	**-0.27**	(0.03)	-1.20	(0.02)	-0.30	(0.00)	0.18	(0.01)	0.94	(0.02)
Northern Ireland	*0.03*	*(0.02)*	*-0.14*	*(0.03)*	*0.20*	*(0.02)*	***-0.34***	*(0.04)*	*-1.03*	*(0.03)*	*-0.22*	*(0.01)*	*0.27*	*(0.01)*	*1.12*	*(0.02)*
Norway	-0.05	(0.02)	-0.25	(0.03)	0.14	(0.02)	**-0.39**	(0.04)	-1.45	(0.02)	-0.33	(0.00)	0.31	(0.01)	1.26	(0.02)
Poland	0.04	(0.02)	0.02	(0.02)	0.05	(0.02)	-0.03	(0.03)	-1.17	(0.02)	-0.16	(0.01)	0.37	(0.01)	1.11	(0.02)
Portugal	0.15	(0.02)	0.06	(0.02)	0.24	(0.03)	**-0.18**	(0.03)	-0.90	(0.02)	-0.03	(0.01)	0.40	(0.01)	1.14	(0.02)
Rep of Ireland	0.07	(0.02)	-0.06	(0.02)	0.20	(0.03)	**-0.27**	(0.03)	-1.06	(0.03)	-0.18	(0.01)	0.32	(0.01)	1.20	(0.02)
Scotland	-0.06	(0.02)	-0.24	(0.02)	0.12	(0.02)	**-0.36**	(0.03)	-1.14	(0.03)	-0.28	(0.01)	0.22	(0.01)	0.98	(0.02)
Slovak Republic	0.04	(0.02)	-0.06	(0.02)	0.15	(0.02)	**-0.21**	(0.03)	-0.99	(0.02)	-0.21	(0.00)	0.30	(0.00)	1.07	(0.02)
Spain	0.28	(0.01)	0.13	(0.02)	0.42	(0.02)	**-0.29**	(0.03)	-0.79	(0.02)	0.07	(0.01)	0.54	(0.00)	1.30	(0.01)
Sweden	-0.49	(0.02)	-0.64	(0.02)	-0.34	(0.03)	**-0.30**	(0.03)	-1.82	(0.02)	-0.66	(0.01)	-0.17	(0.01)	0.68	(0.01)
Switzerland	-0.29	(0.02)	-0.52	(0.02)	-0.05	(0.03)	**-0.47**	(0.03)	-1.71	(0.02)	-0.56	(0.01)	0.08	(0.01)	1.03	(0.02)
Turkey	0.34	(0.03)	0.25	(0.04)	0.45	(0.04)	**-0.20**	(0.04)	-0.97	(0.02)	0.10	(0.01)	0.68	(0.01)	1.55	(0.02)
United States	-0.10	(0.02)	-0.22	(0.02)	0.03	(0.02)	**-0.25**	(0.03)	-1.51	(0.02)	-0.34	(0.00)	0.26	(0.01)	1.21	(0.02)
OECD total	*0.10*	*(0.01)*	*-0.03*	*(0.01)*	*0.22*	*(0.01)*	*-0.25*	*(0.01)*	*-1.20*	*(0.01)*	*-0.15*	*(0.00)*	*0.43*	*(0.00)*	*1.30*	*(0.01)*
OECD average	*0.00*	*(0.00)*	*-0.14*	*(0.00)*	*0.14*	*(0.00)*	*-0.28*	*(0.01)*	*-1.28*	*(0.00)*	*-0.24*	*(0.00)*	*0.33*	*(0.01)*	*1.19*	*(0.01)*

Note: Values that are statistically significant are indicated in bold

Table 5.33: *(Contd.)*

Country

	Performance on the mathematics scale, by national quarters of the index of anxiety in mathematics								Change in the mathematics score per unit of the index of anxiety in mathematics		Explained variation in student performance (r-squared x 100)	
	Bottom quarter		Second quarter		Third quarter		Top quarter					
	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Mean score	S.E	Change	S.E.	Percentage	S.E.
Australia	**569**	(3.2)	536	(2.4)	515	(2.5)	**483**	(3.3)	**-37.8**	(1.50)	12.4	(0.85)
Austria	**545**	(5.0)	518	(4.1)	496	(4.0)	**470**	(3.7)	**-25.1**	(1.67)	9.8	(1.25)
Belgium	**568**	(3.4)	552	(3.6)	529	(3.2)	**499**	(3.5)	**-26.1**	(1.72)	5.6	(0.71)
Canada	**584**	(2.0)	545	(2.3)	522	(2.4)	**493**	(2.1)	**-32.6**	(0.81)	16.0	(0.72)
Czech Republic	**574**	(3.7)	538	(3.9)	507	(3.8)	**472**	(3.9)	**-42.1**	(1.88)	16.8	(1.15)
Denmark	**578**	(3.5)	532	(3.1)	497	(3.6)	**455**	(3.5)	**-44.6**	(1.50)	26.5	(1.48)
Finland	**594**	(3.1)	556	(2.7)	530	(2.5)	**499**	(2.6)	**-41.9**	(1.53)	19.7	(1.23)
France	**540**	(3.5)	527	(3.6)	502	(3.0)	**482**	(3.8)	**-25.0**	(1.68)	6.4	(0.82)
Germany	**556**	(4.0)	525	(3.7)	497	(4.2)	**471**	(5.1)	**-28.1**	(1.42)	11.6	(1.06)
Greece	**496**	(4.7)	457	(4.5)	424	(4.1)	**408**	(3.5)	**-34.5**	(1.75)	12.4	(1.20)
Hungary	**534**	(4.6)	499	(4.0)	475	(3.5)	**455**	(3.7)	**-33.2**	(1.83)	10.1	(1.09)
Iceland	**568**	(2.8)	526	(3.3)	500	(3.7)	**470**	(3.1)	**-33.4**	(1.36)	15.9	(1.22)
Italy	**505**	(3.8)	479	(3.6)	451	(3.8)	**431**	(4.0)	**-33.2**	(1.70)	8.6	(0.85)
Japan	**548**	(6.2)	547	(4.4)	531	(4.4)	**514**	(4.7)	**-14.3**	(2.06)	2.1	(0.59)
Korea	**571**	(4.6)	547	(3.9)	530	(4.0)	**521**	(3.4)	**-24.5**	(1.66)	4.8	(0.64)
Luxembourg	**531**	(2.8)	505	(2.9)	482	(2.8)	**458**	(3.2)	**-25.0**	(1.43)	9.8	(1.04)
Mexico	**422**	(6.0)	392	(4.1)	377	(3.2)	**359**	(3.7)	**-34.0**	(2.61)	8.6	(1.32)
Netherlands	**568**	(4.2)	551	(4.5)	541	(4.1)	**515**	(4.3)	**-22.6**	(2.32)	4.9	(0.95)
New Zealand	**581**	(3.0)	539	(3.3)	508	(3.2)	**473**	(4.0)	**-48.0**	(1.56)	19.2	(1.12)
Northern Ireland	*553*	*(4.3)*	*528*	*(4.5)*	*508*	*(4.2)*	*477*	*(4.0)*	*-30.8*	*(2.45)*	*8.7*	*(1.21)*
Norway	**558**	(3.5)	513	(3.1)	474	(3.1)	**441**	(2.9)	**-42.1**	(1.22)	24.5	(1.42)
Poland	**554**	(3.4)	503	(3.5)	466	(3.3)	**441**	(2.9)	**-46.4**	(1.53)	24.0	(1.24)
Portugal	**506**	(4.2)	472	(4.1)	458	(4.4)	**431**	(3.9)	**-34.2**	(1.81)	10.7	(1.10)
Rep of Ireland	**541**	(4.2)	513	(3.8)	495	(4.1)	**465**	(3.0)	**-32.9**	(1.65)	13.2	(1.29)
Scotland	**559**	(3.8)	530	(3.8)	510	(4.3)	**499**	(3.1)	**-28.9**	(1.84)	9.1	(1.06)
Slovak Republic	**547**	(4.1)	511	(3.9)	490	(3.1)	**447**	(4.7)	**-44.8**	(1.71)	16.7	(1.40)
Spain	**519**	(4.0)	497	(3.4)	474	(2.9)	**455**	(2.7)	**-26.7**	(1.79)	6.9	(0.88)
Sweden	**568**	(3.3)	520	(3.8)	494	(3.5)	**458**	(3.8)	**-42.8**	(1.69)	19.9	(1.21)
Switzerland	**568**	(5.2)	539	(4.7)	517	(4.1)	**486**	(3.6)	**-28.9**	(1.73)	10.1	(1.03)
Turkey	**484**	(11.5)	433	(6.6)	401	(5.3)	**389**	(5.6)	**-34.6**	(4.01)	11.7	(1.79)
United States	**537**	(4.1)	495	(3.3)	470	(3.8)	**436**	(3.5)	**-34.4**	(1.52)	15.7	(1.21)
OECD total	*537*	*(1.4)*	*502*	*(1.3)*	*474*	*(1.4)*	*452*	*(1.5)*	*-31.9*	*(0.61)*	*10.1*	*(0.34)*
OECD average	*550*	*(0.8)*	*515*	*(0.7)*	*486*	*(0.8)*	*458*	*(0.9)*	*-35.3*	*(0.37)*	*12.7*	*(0.22)*

Note: Values that are statistically significant are indicated in bold

6. A Multi-level Model of Mathematical Literacy

In order to better understand relationships among variables associated with combined mathematical literacy, it was decided to develop a multi-level model of performance in mathematical literacy. This enabled the evaluation of the simultaneous contributions of both student (Level 1) and school (Level 2) variables to achievement.

First, student and school variables for possible inclusion in the model were considered. The selection of variables was based on their importance for explaining mathematical literacy (for example, it was known from Chapter 5 that variables such as school and student socio-economic status, and school disciplinary climate in mathematics classes should be considered). Second, certain variables were of interest because of their policy relevance (school co-educational policy was selected for this reason). Some variables that might have been of interest, such as school type – grammar or secondary – were not available for analysis. Others that might help to explain performance in mathematics, such as frequency of absence from school, were not available in the international database, as data on them had not been gathered. A small number of variables, such as anxiety about mathematics and self-efficacy in mathematics, were considered to be outcomes of mathematics teaching and learning, rather than potential explanatory variables, and therefore were not included in building the model.

Second, all cases for which data were missing were removed from the data set. This resulted in a data set of 114 schools (information on number of boys and girls in each school, and hence school size was missing for four schools). Students for whom socio-economic status or combined parent education information was missing were removed from the data set prior to modelling. One student who was in Grade 10 was re-assigned to Grade 11.

The models described below were run in HLM 6 (Raudenbush, Bryk, Cheong, & Congdon, 2004). The models were unweighted, as variables used in sampling, such as school size, were included as model components. All variables were entered into the models as 'uncentered'.

Between-school Variance in Achievement

First, a random-intercept only null model, with combined mathematics achievement as the outcome variable, was run. In this model, the parameter for the intercept was 516.05 (SE = 6.2). The proportion of total variation in scores suggested to occur at the school level, as given by the intra-class correlation of the null random intercept model, is 47.6%. The proportion of variance that is within schools is 52.4%. This includes variation within classes and students. A goal of model building is to ascertain the proportion of school- and student-level variation in achievement that can be explained by a set of key variables.

Evaluating the Model Fit

Models were estimated by full maximum likelihood, which allows deviance tests of the significance of both fixed and random effects to be conducted. A deviance test is a measure of the goodness-of-fit of a model. First, each variable was entered separately into a random intercept model, and those variables which significantly improved the fit of the model were retained (Table 6.1 and 6.2). Just one variable, co-educational policy, was dropped as a result of this process. It was also decided to collapse the 'Parents highest level of education' into two levels: Higher education and Other, and to collapse 'School size' into two: Other quartiles and Upper quartile.

Table 6.1: *Achievement in Mathematical Literacy: All Student-level Variables Tested as Separate Models by Addition to the Null Random Intercept Model*

	Parameter	SE	Test Statistic	df	p-value
Gender: boy - girl	11.814	3.468	t = 3.406	1103	0.001
Socioeconomic status	0.801	0.093	t = 8.649	289	<0.001
Year Group: Grade 12 - Grade 11	19.850	3.037	t = 6.537	106	<0.001
Country of Birth: Outside UK- UK	-16.067	7.858	t = -2.045	354	0.041
Parents Highest Level of Education			Ddiff = 30.901	2	<0.001
Upper Secondary - No Qualifications	2.734	4.754			
Higher Education - No Qualifications	18.689	5.151			
Family Structure			Ddiff = 22.909	2	<0.001
Lone parent - Two parent	-14.602	4.104			
Other family type - Two parent	-18.215	6.174			

Note: Ddiff = deviance difference, tested using the chi-squared distribution.
Categorical variables with more than two levels are in italics.

Table 6.2: *Achievement in Mathematical Literacy: All School-level Variables Tested as Separate Models by Addition to the Null Random Intercept Model*

	Parameter	SE	Test Statistic	df	p-value
School mean socioeconomic status	6.771	0.497	t = 13.636	112	<0.001
Disciplinary climate	76.567	15.402	t = 4.971	112	<0.001
School size - Other quartiles - upper quartile	-51.542	13.334	t = -3.865	112	<0.001
Co-educational Policy			Ddiff = 1.034	2	0.596
All girls' school - mixed	15.245	17.780			
All boys' school - Mixed	11.460	17.109			

All variables except school co-educational policy were entered into a single model. All variables were found to improve the model fit. The curvilinearity of the variables was then evaluated by testing the significance of adding the corresponding orthogonal polynomial (squared and cubed) terms for all continuous variables. However, these were found not to provide a better fit than the corresponding linear variables. Interactions with gender for all Level 1 (student) variables were also examined. Two significant interactions were obtained: one between gender and socio-economic status, and the second between gender and grade level. Hence, these interactions were

entered into the final model, along with the corresponding single variables, gender, student socio-economic status, and student grade level.

Finally, all the student-level variables were evaluated to see whether their effects could be considered constant across schools by the addition of random coefficients for each term, one at a time, using tests of deviance change. Factors with more than two categories (i.e., family structure) had all the random coefficients for the corresponding set of parameter estimates added. No significant improvement was obtained.

Final Model

The final model of mathematical literacy is outlined in Table 6.3. The model includes three school-level variables: school mean socio-economic status, school-level disciplinary climate in mathematics classes, and school size (reference category: large schools – those in the top quarter of schools in the sample based on student enrolment). Student-level variables in the final model include: gender (ref: girl), socio-economic status, grade level (ref: grade 11); country of birth (ref: UK); parent education (ref: not higher education); family structure (ref: two-parent family); and the interactions between gender and socio-economic status, and between gender and grade level. [2]

Table 6.3: *Achievement in Mathematical Literacy: Final Model*

	Parameter	SE	Test Statistic	df	p-value
Intercept	235.1672	23.752381			
Student-Level Variables					
Gender: boy - girl	25.248	9.620			
Socioeconomic status	0.809	0.132			
Year Group: Grade 12 - Grade 11	13.687	3.998			
Country of Birth: Outside UK- UK	-21.643	7.557	t = -2.864	356	0.005
Parents Highest Level of Education: Higher - Other	7.731	3.298	t = 2.344	241	0.02
Family Structure			Ddiff = 13.95187	2	0.0009
Lone parent - Two parent	-10.413	4.019			
Other family type - Two parent	-14.823	6.031			
Gender x Year Group	11.582	5.554	t = 2.085	555	0.037
Gender x Socioeconomic status	-0.415	0.177	t = -2.35	130	0.02
School-Level Variables					
School mean socioeconomic status	5.119	0.444	t = 11.521	110	< .001
Disciplinary climate	48.777	9.042	t = 5.395	110	< .001
School size - Other quartiles - upper quartile	-29.525	7.428	t = -3.975	110	< .001
Variance Components					
Level 2 Variance	29.823		chi-sq = 612.83461	110	< .001
Level 1 Variance	64.16885				

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[2] Where a variable interacts with another variable, the t statistics, degrees of freedom, and significance level for the main effect are not given, as the variable can only be considered in conjunction with its interaction.

The chosen reference categories for factors give an intercept of 235.2. This corresponds to the score of a hypothetical student who is a girl, of average SES, in a two-parent family, in grade 11, born in the UK, with parents who do not have higher education, attending a school that is of average socio-economic status, of average disciplinary climate in mathematics classes, and large in size.

The parameter estimate for each continuous explanatory variable was first multiplied by chosen example values of the variable. Hence, in the case of school disciplinary climate, the chosen values were the means of students in the top, middle and bottom thirds of the distribution of scores for the variable. Table 6.4 provides example values for this variable. The contribution of disciplinary climate to a student scoring at the average score in the bottom third of the distribution has a value of -7, while a student scoring at the average of the top third has a value of +33.

Table 6.4: *Contributions to Fitted Scores on Combined Mathematical Literacy for Example Values of School Disciplinary Climate in Mathematics Classes*

School Disciplinary Climate Group	Example Value	Fitted Value
Low-third	-0.13	-7
Middle-third	0.24	12
Top-third	0.67	33

Table 6.5 provides example values for school-level socio-economic status. For a student with a school SES score at the mean of the lowest third of the distribution, the fitted value is 206 points, while for a student at the mean of the middle group, it is 242, and, for a student at the mean of the highest group, it is 295. The relatively high contributions to fitted values of school-level SES seem to underline the high importance of school-level SES in explaining individual student achievement.

Table 6.5: *Contributions to Fitted Scores on Combined Mathematical Literacy for Example Values of School Socio-economic Status*

School SES Group	Example Value	Fitted Value
Low-third	40.1	205.5
Middle-third	47.4	242.4
Top-third	57.6	295.0

Table 6.6 provides examples of the contributions to fitted scores for the interaction between gender and student SES. Here, a girl scoring at the mean of the lower third of the distribution of student SES scores has a contribution of 24 points, while a boy at the mean of the top-third of SES scores has a contribution of 52 points. Hence, a boy at the mean of the top third of the distribution of student SES scores gets a score that is 28 points higher than a girl at the mean of the bottom third (52.4 – 24.2).

Table 6.6: *Contributions of Fitted Scores on Combined Mathematical Literacy for Example Values of Student Gender by Socio-economic Status*

Socio-economic Status	Gender	
	Girl	Boy
Low	24.2	37.0
Medium	38.4	43.9
High	55.6	52.4

Table 6.7 gives the contributions to fitted scores for the interaction between grade level and student gender. The contribution of zero points for a girl in grade 11 reflects that fact that girls and grade 11 are both reference categories. Compared with a girl in grade 11, a boy in grade 12 scores some 51 points higher.

Table 6.7: *Contributions of Fitted Scores on Combined Mathematical Literacy for Example Values of Student Gender by Grade Level*

Grade Level	Gender	
	Girl	Boy
Grade 11	0.0	25.2
Grade 12	13.7	50.5

Since the contributions of scores are cumulative, readers can estimate the contributions to achievement of a number of variables simultaneously. Thus, for a boy in grade 12, who is at the mean of the top third of the distribution of SES scores, there is a contribution of 102.9 points (50.5 + 52.4), while the contribution for a girl in grade 11 who is at the mean of the bottom third of SES scores is 24.2 points (0 + 24.2).

Explained Variation in Achievement

Using a method to calculate the proportion of variance in achievement at the cluster level provided by Snijders and Bosker (1999), in which the mean enrolment size of schools in the PISA sampling frame (111) was used as a representative value for cluster size, the final model was found to explain 77.3% of the variance at school level, and 40.8% at the student level.

Implications of the Final Model

The final model points to the key role of socio-economic status in explaining achievement on PISA mathematical literacy. Students attending schools with a high average level of socio-economic status are clearly at an advantage relative to students attending schools with lower average levels, even after controlling for a range school and student variables, including school size, student gender, the student's own socio-economic status, family structure, and country of birth.

The data also confirm that girls in Northern Ireland on average perform less well than boys. The interaction between gender and grade level showed that the contribution to the fitted scores of boys in grade 11 (25.2 points) was greater than for girls in grade 12 (13.7). Similarly, girls at the mean of the low SES group do less well than girls at the mean of the medium and high SES groups, and boys at the mean of the low, medium and high SES groups. Given the strong effects of school socio-economic status, it seems reasonable to conclude that low SES girls attending schools with a low average SES level are particularly at risk.

Finally, the contribution to mathematics scores of school-level disciplinary climate in mathematics classes is noteworthy. The model shows that, while controlling for school SES, school size, and a range of student variables, students attending schools with high levels of discipline in mathematics classes (as reported by the students themselves) have a score that is 40 points higher than students attending schools with low disciplinary climate. Hence, this variable is worthy of further exploration in order to seek a better understanding of the nature of disciplinary climate in mathematics classes, as measured by PISA.

7. Summary

This chapter summarises the outcomes of the analyses described in this report. All cross-country comparisons involve Northern Ireland, Scotland and 29 of 30 OECD member countries (the United Kingdom was not included). For aspects of the PISA 2003 results for Northern Ireland not covered in this report, the reader is directed to *Student Achievement in Northern Ireland: Results in Mathematical, Reading and Scientific Literacy among 15-year Olds from the OECD PISA 2003 Study* (Goodard, Ahmed, Hill & Gosden, 2005).

Mathematical Literacy

The mean score of 15-year olds in Northern Ireland (515) on the PISA 2003 combined mathematical literacy scale is significantly higher than the OECD country average of 500. Northern Ireland ranked 13 of 31 countries.

The difference in Northern Ireland between students scoring at the 25th and 75th percentiles is 312 points. This is smaller than the OECD average country difference (328 points), but larger than the difference in some higher-achieving countries such as Finland (274), Korea (302) and the Netherlands (298). It is also greater than for Scotland (279) and the Republic of Ireland (281).

The scores for students in Northern Ireland at the 5th (354 points) and 25th (450) percentiles are significantly higher than the corresponding OECD country average scores (332 and 432 respectively), but scores at the 75th (580) and 95th percentiles (666) are not significantly different. Whereas four countries had scores that were significantly higher than Northern Ireland's at the 5th percentile, just one (Belgium) had a significantly higher score at the 95th percentile.

The mean scores for girls and boys in Northern Ireland were 513 and 517, respectively. The difference, 4 score points in favour of boys, was the smallest among comparison countries, and is not statistically significant.

Girls in three countries – Finland, the Netherlands and Canada – scored significantly higher on combined mathematical literacy than girls in Northern Ireland. Girls in Scotland achieved a mean score that is not significantly different, while girls in the Republic of Ireland achieved a significantly lower mean score. Boys in four countries – Korea, Finland, the Netherlands, and Canada – achieved mean scores that are significantly higher than boys in Northern Ireland. Boys in Scotland and the Republic of Ireland achieved mean scores that are not significantly different.

Cross-curricular Problem Solving

Students in Northern Ireland achieved a mean score on problem solving that was significantly higher than the mean scores of students in 11 countries, not significantly different from the mean scores of students in 12 countries, including the Republic of Ireland, and significantly lower the mean scores of students in 7 countries, including Korea, Finland, Japan and Scotland. Northern Ireland's mean score (508 points) was

not significantly different from the OECD average of 500 points. Northern Ireland ranked 16th of 31 countries on this domain.

The scores of students in Northern Ireland are not significantly different from the OECD country average scores at the 5th, 75th and 95th percentiles, while the score for Northern Ireland at the 25th percentile is significantly higher. Countries that are not significantly different from Northern Ireland at the 5th, 25th, 75th and 95th percentiles include France, the Czech Republic, Germany, Sweden and Austria. The Republic of Ireland has significantly lower scores than Northern Ireland on problem solving at the 75th and 95th percentiles.

The difference between the scores of students at the 25th and 75th percentiles in Northern Ireland is 129 points. Although smaller than the OECD average difference (137), it is greater than the differences for Korea (116), Finland (110), Scotland (117) and the Republic of Ireland (110), indicating a wider spread of scores in problem solving in Northern Ireland than in these comparison countries.

Girls had significantly higher mean scores in problem solving than boys in four countries – Finland, Sweden, Iceland and Norway. In Northern Ireland, the small difference in favour of girls was not statistically significant. The mean score of girls in Northern Ireland was not significantly different from the mean score of girls in Scotland and the Republic of Ireland. Whereas boys in Scotland had a significantly higher mean score than boys in Northern Ireland, the difference between boys in Northern Ireland and in the Republic of Ireland was not statistically different.

Reading Literacy

The mean score for Northern Ireland was 517 scale score points. This is significantly higher than the OECD country average of 494 points. Other countries with mean scores that are significantly higher than the OECD country average include Finland (543, the highest-scoring country), Scotland (516) and the Republic of Ireland (515). Among comparison countries, Northern Ireland ranked 6th of 31 countries on this domain.

Students in Northern Ireland achieve scores in reading literacy that are significantly above the OECD country average score at the 5th, 25th, 75th and 95th percentiles. Other countries with this pattern include Finland, Canada, Australia and Sweden. Although students at the 5th, 25th and 75th percentiles in Scotland, the Republic of Ireland and the Netherlands are above the OECD average at these benchmarks, students at the 95th percentile in these countries achieve scores that are not significantly different from the OECD average.

Hence, in these countries, higher-achieving students do less well than might be expected, based on overall performance on reading literacy.

The difference between the 25th and 75th percentiles in Northern Ireland (133 points) is greater than that found in Finland (105 points) and Korea (106), and somewhat greater than in the Republic of Ireland (117) and Scotland (116). Hence, as in other domains, there is greater variation in the performance of students in reading literacy in Northern Ireland than in these key comparison countries.

Girls in Northern Ireland achieved a mean score of 533 on reading literacy, while boys achieved a mean score of 500. The difference – 33 points, or about one-third of an international standard deviation – is statistically significant, and is close to the OECD average country difference of 34 points. In all participating countries, girls have a significantly higher mean score than boys. The difference in the Republic of Ireland was 29 points, while in Scotland it was 24.

Girls in just one country, Finland, achieved a significantly higher mean score (by 32 score points) than girls in Northern Ireland. Although slightly lower, the mean scores for girls in the Republic of Ireland (530) and Scotland (527) are not significantly different from Northern Ireland (533). Boys in two countries, Korea (525) and Finland (521), achieved significantly higher mean scores than boys in Northern Ireland (500). Countries with mean scores for boys that are not significantly different from Northern Ireland include the Republic of Ireland (501) and Scotland (504).

Scientific Literacy

The mean score for Northern Ireland was 524 scale score points. This is significantly higher than the OECD country average of 500 points. Other countries with mean scores that are significantly higher than the OECD country average include Finland (548), Japan (548), Korea (538), Scotland (514) and the Republic of Ireland (505). Northern Ireland ranked 6th on this domain among 31 comparison countries.

Students in Northern Ireland achieve scores that are above the OECD average at the 25th, 75th and 95th percentiles. The score of students in Northern Ireland at the 5th percentile (345) is not significantly different from the corresponding OECD average (324). One country, Finland, has significantly higher scores than Northern Ireland at the 5th and 25th percentiles, while another country, Japan, has a higher score at the 75th percentile. No country has a significantly higher mean score than Northern Ireland at the 95th percentile.

The difference between scores at the 25th and 75th percentile ranks in Northern Ireland (145 points) is marginally smaller than the OECD country average of 148, and around the same as Sweden (147), the Netherlands (147) and Switzerland (148). On the other hand, Finland (123), the Republic of Ireland (130) and Scotland (140) all have somewhat narrower ranges of achievement between these benchmarks

In Northern Ireland, the mean scores on scientific literacy for boys and girls were identical (524 points), and the difference between them is not statistically significant. Indeed, the difference between girls and boys is not statistically significantly different in 18 other countries, including the Republic of Ireland and Scotland. The OECD average difference between girls and boys is 6 points (in favour of boys), a difference that is statistically significant.

Girls in two countries, Finland (551 points) and Japan (546), have significantly higher mean scores than girls in Northern Ireland (524). Girls in Scotland have a mean score (510) that is not significantly different from that of girls in Northern Ireland, while girls in the Republic (504) have a significantly lower mean score.

Only boys in Finland (545 points) have a significantly higher mean score than boys in Northern Ireland (524). While boys in Japan (550, but with a large standard error) Korea, (546) and New Zealand (529) have scores that are higher than boys in Northern Ireland, differences are not statistically significant. Boys in the Republic of Ireland (506) and Scotland (518) have mean scores that are not significantly different from the mean score of boys in Northern Ireland.

Variables Associated with Mathematical Literacy

A number of variables were associated with performance on the combined PISA mathematical literacy scale. These included student variables (e.g., gender), family (e.g., family size), and school-level variables (e.g., school socioeconomic status).

Girls in Northern Ireland achieved a mean score on combined mathematical literacy that, although 4 points lower than boys, was not significantly different. Another student variable associated with achievement was year group (students in Year 12 outperformed those in Year 11). Although students born in the UK outperformed those born outside the UK, the difference was not statistically significant.

Family characteristics associated with mathematical literacy included socio-economic status (there was an 86 point difference between students in Northern Ireland in the top and bottom SES quartiles), parental education (students of parents with higher education did better than those with upper secondary education, and those with no qualifications), and family type (students in lone-parent families did significantly less well, by about one-third of a standard deviation, than students in families with two parents).

School-level variables associated with achievement included school disciplinary climate in mathematics classes (students attending school with a positive disciplinary climate in mathematics classes did better, on average, than those in schools with a negative disciplinary climate in such classes), school size (students attending the smallest schools did less well in mathematical literacy than those attending larger schools), and school-level socio-economic status (students attending schools with high average SES significantly outperformed those attending schools with a low average SES). While girls in all-girls schools outperformed boys in all-boys schools, the difference was not statistically significant.

A Multi-level Model of Mathematical Literacy

A multi-level model of mathematical literacy in Northern Ireland pointed to the key role of socio-economic status in explaining achievement. Students attending schools with a high average level of socio-economic status performed better relative to students attending schools with lower average levels, even after controlling for a range school and student variables, including school size, student gender, the student's own socio-economic status, family structure, and country of birth.

The data also confirmed that, on average, girls in Northern Ireland performed less well on combined mathematics than boys. An interaction between gender and grade level showed that the contribution to the fitted scores of boys in grade 11 (25.2 points) was greater than for girls in grade 12 (13.7). Similarly, it was shown that girls at the

mean of the low-SES group do less well than girls at the mean of the medium and high SES groups, and boys at the mean of the low, medium and high SES groups. Given the strong effects of school socio-economic status, it can be concluded that low SES-girls attending schools with a low average SES level are particularly at risk of low achievement.

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Appendices

Appendix to Chapter 1
Mathematical Literacy – Additional Tables

Table A1.1: *Comparison of Country Scores at the 5th Percentile on Combined Mathematical Literacy with OECD Country Average*

Countries in ascending order of difference from OECD average score at 5th percentile on combined mathematical literacy	5th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from OECD average score?
Mexico	247.11	(5.4)	-85	(5.5)	–
Turkey	269.70	(5.8)	-62	(5.9)	–
Greece	287.58	(5.4)	-44	(5.5)	–
Italy	307.23	(6.4)	-24	(6.5)	–
Portugal	320.91	(6.3)	-11	(6.4)	0
United States	322.96	(4.9)	-9	(5.1)	0
Germany	324.04	(6.1)	-8	(6.2)	0
Belgium	333.77	(6.5)	2	(6.7)	0
Spain	334.97	(5.1)	3	(5.3)	0
Hungary	335.27	(5.6)	4	(5.8)	0
Luxembourg	338.46	(3.9)	7	(4.1)	0
Slovak Republic	342.37	(6.9)	11	(7.0)	0
Poland	343.40	(5.8)	12	(5.9)	0
Norway	343.46	(4.0)	12	(4.2)	0
France	352.36	(6.0)	21	(6.1)	+
Sweden	352.69	(5.3)	21	(5.4)	+
Austria	353.40	(6.6)	22	(6.8)	0
Northern Ireland	354.18	(5.5)	22	(5.7)	+
Czech Republic	357.98	(6.2)	26	(6.4)	+
New Zealand	358.50	(4.1)	27	(4.3)	+
Switzerland	358.67	(4.8)	27	(5.0)	+
Republic of Ireland	360.43	(4.7)	29	(4.9)	+
Denmark	360.74	(4.4)	29	(4.6)	+
Japan	360.91	(8.2)	29	(8.3)	+
Iceland	362.39	(4.0)	31	(4.3)	+
Australia	364.32	(4.4)	33	(4.6)	+
Scotland	380.25	(6.0)	49	(6.1)	+
Netherlands	385.18	(6.9)	53	(7.0)	+
Canada	386.18	(3.0)	54	(3.3)	+
Korea	387.83	(4.6)	56	(4.8)	+
Finland	406.43	(3.8)	75	(4.0)	+
OECD average	331.72	(1.3)			

+ Country score is significantly higher than OECD average score
0 Country score is not significantly different from OECD average score
– Country score is significantly lower than OECD average score

Table A1.2: *Comparison of Country Scores at the 25th Percentile on Combined Mathematical Literacy with OECD Country Average*

Countries in ascending order of difference from OECD average score at 25th percentile on combined mathematical literacy	25th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from OECD average score?
Mexico	326.64	(4.3)	-106	(4.4)	–
Turkey	350.80	(5.3)	-82	(5.3)	–
Greece	382.36	(4.6)	-50	(4.7)	–
Italy	400.47	(4.3)	-32	(4.4)	–
Portugal	405.97	(5.0)	-26	(5.1)	–
United States	417.99	(3.7)	-14	(3.8)	–
Hungary	426.09	(3.0)	-6	(3.2)	0
Spain	426.19	(3.0)	-6	(3.1)	0
Poland	428.20	(3.1)	-4	(3.3)	0
Luxembourg	430.24	(2.2)	-2	(2.3)	0
Germany	432.17	(4.7)	0	(4.8)	0
Norway	432.87	(2.9)	0	(3.0)	0
Slovak Republic	435.55	(4.6)	3	(4.7)	0
Austria	439.37	(4.0)	7	(4.1)	+
Republic of Ireland	444.99	(3.4)	13	(3.5)	+
Sweden	446.08	(3.0)	14	(3.2)	+
France	449.06	(3.7)	17	(3.9)	+
Czech Republic	449.40	(4.5)	17	(4.6)	+
Northern Ireland	450.16	(4.7)	18	(4.8)	+
Denmark	453.17	(3.7)	21	(3.8)	+
Iceland	454.23	(2.8)	22	(3.0)	+
New Zealand	455.23	(2.9)	23	(3.1)	+
Belgium	456.22	(3.4)	24	(3.6)	+
Australia	459.79	(2.7)	27	(2.9)	+
Switzerland	460.76	(3.6)	28	(3.7)	+
Japan	467.19	(5.4)	35	(5.4)	+
Scotland	467.58	(3.4)	35	(3.5)	+
Netherlands	470.95	(5.4)	39	(5.5)	+
Canada	473.94	(2.2)	42	(2.4)	+
Korea	479.26	(3.7)	47	(3.9)	+
Finland	488.24	(2.2)	56	(2.4)	+
OECD average	432.39	(0.9)			

+ Country score is significantly higher than OECD average score
0 Country score is not significantly different from OECD average score
– Country score is significantly lower than OECD average score

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Table A1.3: *Comparison of Country Scores at the 75th Percentile on Combined Mathematical Literacy with OECD Country Average*

Countries in ascending order of difference from OECD average score at 75th percentile on combined mathematical literacy	75th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from OECD average score?
Mexico	443.57	(4.5)	-127	(4.5)	–
Turkey	484.86	(8.5)	-86	(8.6)	–
Greece	507.87	(4.3)	-63	(4.3)	–
Portugal	526.14	(3.5)	-44	(3.6)	–
Italy	530.24	(3.0)	-40	(3.1)	–
Spain	546.44	(3.1)	-24	(3.2)	–
United States	549.70	(3.4)	-21	(3.4)	–
Poland	552.81	(2.9)	-18	(3.0)	–
Hungary	555.88	(3.9)	-15	(4.0)	–
Luxembourg	557.17	(1.9)	-13	(2.0)	–
Norway	559.99	(3.3)	-11	(3.4)	0
Republic of Ireland	561.88	(3.0)	-9	(3.1)	0
Slovak Republic	564.59	(3.8)	-6	(3.8)	0
Austria	571.43	(4.2)	1	(4.2)	0
France	575.25	(3.0)	5	(3.1)	0
Sweden	575.57	(3.2)	5	(3.3)	0
Denmark	578.24	(3.1)	8	(3.2)	0
Germany	578.31	(3.5)	8	(3.5)	0
Iceland	578.44	(1.9)	8	(2.1)	+
Northern Ireland	580.10	(3.5)	10	(3.6)	0
Scotland	582.57	(2.5)	12	(2.6)	+
Czech Republic	584.41	(4.0)	14	(4.0)	+
Australia	591.65	(2.5)	21	(2.6)	+
New Zealand	593.01	(2.2)	22	(2.3)	+
Canada	593.29	(2.1)	23	(2.2)	+
Switzerland	594.98	(4.9)	24	(4.9)	+
Finland	602.63	(2.3)	32	(2.4)	+
Japan	605.09	(4.4)	35	(4.4)	+
Korea	606.14	(4.2)	36	(4.3)	+
Netherlands	608.32	(3.8)	38	(3.9)	+
Belgium	611.17	(2.5)	41	(2.6)	+
OECD average	570.51	(0.7)			

+ Country score is significantly higher than OECD average score
0 Country score is not significantly different from OECD average score
– Country score is significantly lower than OECD average score

Table A1.4: *Comparison of Country Scores at the 95th Percentile on Combined Mathematical Literacy with OECD Country Average*

Countries in ascending order of difference from OECD average score at 95th percentile on combined mathematical literacy	95th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from OECD average score?
Mexico	526.90	(5.6)	-133	(5.7)	–
Greece	597.76	(5.1)	-62	(5.2)	–
Portugal	609.91	(3.7)	-50	(3.8)	–
Turkey	613.58	(22.7)	-47	(22.8)	–
Italy	623.24	(3.7)	-37	(3.9)	–
Spain	626.03	(3.7)	-34	(3.8)	–
United States	637.97	(5.1)	-22	(5.2)	–
Poland	639.93	(3.5)	-20	(3.6)	–
Republic of Ireland	640.97	(3.3)	-19	(3.4)	–
Luxembourg	641.42	(2.7)	-19	(2.9)	–
Hungary	643.79	(4.6)	-16	(4.7)	–
Norway	644.74	(3.9)	-15	(4.0)	–
Slovak Republic	648.45	(4.1)	-12	(4.2)	0
France	656.16	(3.5)	-4	(3.6)	0
Iceland	657.89	(3.8)	-2	(3.9)	0
Austria	658.17	(5.0)	-2	(5.1)	0
Scotland	659.53	4.27	-1	(4.4)	0
Germany	661.68	(3.6)	1	(3.8)	0
Sweden	661.93	(4.8)	2	(4.9)	0
Denmark	661.99	(4.7)	2	(4.8)	0
Northern Ireland	666.41	4.1	6	(4.2)	0
Czech Republic	671.90	(4.9)	12	(5.0)	0
Canada	672.66	(3.4)	12	(3.5)	+
Australia	675.68	(3.5)	15	(3.7)	+
Finland	680.17	(3.1)	20	(3.3)	+
New Zealand	682.30	(2.9)	22	(3.1)	+
Netherlands	683.49	(3.4)	23	(3.6)	+
Switzerland	683.95	(6.8)	24	(6.9)	+
Japan	690.19	(6.6)	30	(6.7)	+
Korea	690.23	(6.8)	30	(6.9)	+
Belgium	693.41	(2.4)	33	(2.6)	+
OECD average	660.20	(1.0)			

+ Country score is significantly higher than OECD average score
0 Country score is not significantly different from OECD average score
– Country score is significantly lower than OECD average score

Table A1.5: *Comparison of Northern Ireland Score at the 5th Percentile on Combined Mathematical Literacy with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 5th percentile on combined mathematical literacy	5th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	247	(5.4)	-107	(7.7)	–
Turkey	270	(5.8)	-84	(8.0)	–
Greece	288	(5.4)	-67	(7.7)	–
Italy	307	(6.4)	-47	(8.4)	–
Portugal	321	(6.3)	-33	(8.3)	–
United States	323	(4.9)	-31	(7.4)	–
Germany	324	(6.1)	-30	(8.2)	–
Belgium	334	(6.5)	-20	(8.5)	0
Spain	335	(5.1)	-19	(7.5)	0
Hungary	335	(5.6)	-19	(7.9)	0
Luxembourg	338	(3.9)	-16	(6.7)	0
Slovak Republic	342	(6.9)	-12	(8.8)	0
Poland	343	(5.8)	-11	(8.0)	0
Norway	343	(4.0)	-11	(6.8)	0
France	352	(6.0)	-2	(8.1)	0
Sweden	353	(5.3)	-1	(7.6)	0
Austria	353	(6.6)	-1	(8.6)	0
Czech Republic	358	(6.2)	4	(8.3)	0
New Zealand	358	(4.1)	4	(6.8)	0
Switzerland	359	(4.8)	4	(7.3)	0
Republic of Ireland	360	(4.7)	6	(7.2)	0
Denmark	361	(4.4)	7	(7.0)	0
Japan	361	(8.2)	7	(9.9)	0
Iceland	362	(4.0)	8	(6.8)	0
Australia	364	(4.4)	10	(7.1)	0
Scotland	380	(6.0)	26	(8.1)	0
Netherlands	385	(6.9)	31	(8.8)	+
Canada	386	(3.0)	32	(6.3)	+
Korea	388	(4.6)	34	(7.2)	+
Finland	406	(3.8)	52	(6.7)	+
Northern Ireland	354	(5.5)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A1.6: *Comparison of Northern Ireland Score at the 25th Percentile on Combined Mathematical Literacy with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 25th percentile on combined mathematical literacy	25th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	327	(4.3)	-124	(6.4)	–
Turkey	351	(5.3)	-99	(7.1)	–
Greece	382	(4.6)	-68	(6.6)	–
Italy	400	(4.3)	-50	(6.4)	–
Portugal	406	(5.0)	-44	(6.8)	–
United States	418	(3.7)	-32	(6.0)	–
Hungary	426	(3.0)	-24	(5.6)	–
Spain	426	(3.0)	-24	(5.6)	–
Poland	428	(3.1)	-22	(5.7)	–
Luxembourg	430	(2.2)	-20	(5.2)	–
Germany	432	(4.7)	-18	(6.6)	0
Norway	433	(2.9)	-17	(5.5)	0
Slovak Republic	436	(4.6)	-15	(6.6)	0
Austria	439	(4.0)	-11	(6.2)	0
Republic of Ireland	445	(3.4)	-5	(5.8)	0
Sweden	446	(3.0)	-4	(5.6)	0
France	449	(3.7)	-1	(6.0)	0
Czech Republic	449	(4.5)	-1	(6.6)	0
Denmark	453	(3.7)	3	(6.0)	0
Iceland	454	(2.8)	4	(5.5)	0
New Zealand	455	(2.9)	5	(5.5)	0
Belgium	456	(3.4)	6	(5.8)	0
Australia	460	(2.7)	10	(5.5)	0
Switzerland	461	(3.6)	11	(5.9)	0
Japan	467	(5.4)	17	(7.1)	0
Scotland	468	(3.4)	17	(5.8)	0
Netherlands	471	(5.4)	21	(7.2)	0
Canada	474	(2.2)	24	(5.2)	+
Korea	479	(3.7)	29	(6.0)	+
Finland	488	(2.2)	38	(5.2)	+
Northern Ireland	450	(4.7)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A1.7: *Comparison of Northern Ireland Score at the 75th Percentile on Combined Mathematical Literacy with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 75th percentile on combined mathematical literacy	75th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	444	(4.5)	-137	(5.7)	–
Turkey	485	(8.5)	-95	(9.2)	–
Greece	508	(4.3)	-72	(5.6)	–
Portugal	526	(3.5)	-54	(5.0)	–
Italy	530	(3.0)	-50	(4.7)	–
Spain	546	(3.1)	-34	(4.7)	–
United States	550	(3.4)	-30	(4.9)	–
Poland	553	(2.9)	-27	(4.6)	–
Hungary	556	(3.9)	-24	(5.3)	–
Luxembourg	557	(1.9)	-23	(4.0)	–
Norway	560	(3.3)	-20	(4.9)	–
Republic of Ireland	562	(3.0)	-18	(4.7)	–
Slovak Republic	565	(3.8)	-16	(5.2)	0
Austria	571	(4.2)	-9	(5.5)	0
France	575	(3.0)	-5	(4.7)	0
Sweden	576	(3.2)	-5	(4.8)	0
Denmark	578	(3.1)	-2	(4.7)	0
Germany	578	(3.5)	-2	(5.0)	0
Iceland	578	(1.9)	-2	(4.0)	0
Scotland	583	(2.5)	2	(4.3)	0
Czech Republic	584	(4.0)	4	(5.3)	0
Australia	592	(2.5)	12	(4.3)	0
New Zealand	593	(2.2)	13	(4.2)	0
Canada	593	(2.1)	13	(4.1)	0
Switzerland	595	(4.9)	15	(6.0)	0
Finland	603	(2.3)	23	(4.2)	+
Japan	605	(4.4)	25	(5.6)	+
Korea	606	(4.2)	26	(5.5)	+
Netherlands	608	(3.8)	28	(5.2)	+
Belgium	611	(2.5)	31	(4.3)	+
Northern Ireland	580	(3.5)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A1.8: *Comparison of Northern Ireland Score at the 95th Percentile on Combined Mathematical Literacy with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 95th percentile on combined mathematical literacy	95th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	527	(5.6)	-140	(7.0)	–
Greece	598	(5.1)	-69	(6.5)	–
Portugal	610	(3.7)	-57	(5.5)	–
Turkey	614	(22.7)	-53	(23.1)	–
Italy	623	(3.7)	-43	(5.5)	–
Spain	626	(3.7)	-40	(5.5)	–
United States	638	(5.1)	-28	(6.6)	–
Poland	640	(3.5)	-26	(5.4)	–
Republic of Ireland	641	(3.3)	-25	(5.2)	–
Luxembourg	641	(2.7)	-25	(4.9)	–
Hungary	644	(4.6)	-23	(6.1)	–
Norway	645	(3.9)	-22	(5.7)	–
Slovak Republic	648	(4.1)	-18	(5.8)	0
France	656	(3.5)	-10	(5.3)	0
Iceland	658	(3.8)	-9	(5.5)	0
Austria	658	(5.0)	-8	(6.4)	0
Scotland	660	4.27	-7	(5.9)	0
Germany	662	(3.6)	-5	(5.5)	0
Sweden	662	(4.8)	-4	(6.3)	0
Denmark	662	(4.7)	-4	(6.2)	0
Czech Republic	672	(4.9)	5	(6.4)	0
Canada	673	(3.4)	6	(5.3)	0
Australia	676	(3.5)	9	(5.4)	0
Finland	680	(3.1)	14	(5.1)	0
New Zealand	682	(2.9)	16	(5.0)	0
Netherlands	683	(3.4)	17	(5.3)	0
Switzerland	684	(6.8)	18	(8.0)	0
Japan	690	(6.6)	24	(7.7)	0
Korea	690	(6.8)	24	(8.0)	0
Belgium	693	(2.4)	27	(4.7)	+
Northern Ireland	666	4.1			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A1.9: *Comparison of Score of Girls at the 5th Percentile on Combined Mathematical Literacy in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 5th percentile on combined mathematical literacy - girls	5th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	243	8.0	-118	(10.3)	–
Turkey	270	7.5	-91	(10.0)	–
Greece	285	7.5	-76	(10.0)	–
Italy	308	6.7	-54	(9.4)	–
Germany	323	8.8	-38	(11.0)	–
United States	327	6.9	-34	(9.5)	–
Portugal	327	6.3	-34	(9.1)	–
Hungary	334	7.9	-27	(10.3)	0
Belgium	336	8.0	-25	(10.3)	0
Luxembourg	337	5.1	-24	(8.3)	0
Spain	337	6.2	-24	(9.1)	0
Slovak Republic	339	7.4	-22	(9.9)	0
Norway	346	5.9	-15	(8.8)	0
Czech Republic	351	10.5	-10	(12.4)	0
Poland	351	5.0	-10	(8.3)	0
Sweden	352	6.0	-9	(8.9)	0
Switzerland	353	7.1	-9	(9.6)	0
Denmark	353	6.6	-8	(9.3)	0
New Zealand	356	7.4	-5	(9.9)	0
France	357	7.2	-5	(9.8)	0
Austria	357	6.1	-4	(9.0)	0
Republic of Ireland	357	6.4	-4	(9.2)	0
Japan	365	9.0	4	(11.2)	0
Australia	368	5.5	6	(8.6)	0
Netherlands	380	9.9	19	(11.9)	0
Iceland	380	5.9	19	(8.8)	0
Scotland	381	6.64	20	(9.3)	0
Korea	383	6.7	22	(9.4)	0
Canada	390	4.3	29	(7.9)	+
Finland	411	5.1	49	(8.3)	+
Northern Ireland	361	6.6			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A1.10: *Comparison of Score of Girls at the 25th Percentile on Combined Mathematical Literacy in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 25th percentile on combined mathematical literacy - girls	25th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	323	5.2	-127	(8.5)	–
Turkey	347	5.7	-103	(8.9)	–
Greece	377	4.7	-73	(8.2)	–
Italy	396	5.6	-54	(8.8)	–
Portugal	404	4.8	-46	(8.3)	–
United States	417	4.6	-33	(8.2)	–
Hungary	423	4.0	-27	(7.9)	–
Spain	425	3.3	-25	(7.5)	–
Luxembourg	425	2.8	-25	(7.3)	–
Slovak Republic	429	4.8	-21	(8.3)	0
Poland	430	3.8	-20	(7.7)	0
Norway	431	4.1	-19	(7.9)	0
Germany	433	5.6	-17	(8.8)	0
Austria	438	4.5	-12	(8.1)	0
Republic of Ireland	438	4.5	-12	(8.1)	0
Sweden	443	4.2	-7	(8.0)	0
Czech Republic	445	6.2	-6	(9.2)	0
Denmark	446	4.3	-4	(8.0)	0
France	448	4.3	-2	(8.0)	0
New Zealand	452	4.7	2	(8.2)	0
Switzerland	455	5.3	5	(8.6)	0
Belgium	458	4.5	8	(8.1)	0
Australia	460	3.4	10	(7.6)	0
Iceland	465	3.3	15	(7.5)	0
Scotland	465	3.72	15	(7.7)	0
Korea	467	6.3	17	(9.3)	0
Netherlands	468	6.2	18	(9.2)	0
Japan	470	6.0	20	(9.0)	0
Canada	475	2.3	25	(7.1)	+
Finland	488	2.5	38	(7.2)	+
Northern Ireland	450	6.8			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A1.11: *Comparison of Score of Girls at the 75th Percentile on Combined Mathematical Literacy in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 75th percentile on combined mathematical literacy - girls	75th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	437	5.3	-138	(7.4)	–
Turkey	474	9.3	-101	(10.7)	–
Greece	495	4.5	-79	(6.8)	–
Portugal	515	3.8	-59	(6.4)	–
Italy	518	3.7	-57	(6.4)	–
Spain	539	3.1	-36	(6.0)	–
United States	544	4.2	-31	(6.6)	–
Luxembourg	545	2.7	-29	(5.8)	–
Poland	546	3.7	-28	(6.3)	–
Hungary	551	4.4	-23	(6.7)	–
Slovak Republic	552	4.3	-22	(6.7)	–
Republic of Ireland	554	4.5	-21	(6.8)	0
Norway	554	4.2	-21	(6.6)	0
Austria	564	5.1	-11	(7.3)	0
France	568	3.5	-7	(6.2)	0
Denmark	569	3.5	-5	(6.2)	0
Germany	570	4.6	-5	(6.9)	0
Sweden	571	4.2	-3	(6.7)	0
Czech Republic	576	4.6	1	(6.9)	0
Scotland	578	3.87	3	(6.4)	0
New Zealand	582	3.2	7	(6.0)	0
Iceland	582	3.2	7	(6.1)	0
Switzerland	585	4.5	10	(6.8)	0
Australia	586	3.2	11	(6.0)	0
Canada	587	2.8	12	(5.8)	0
Korea	590	6.3	15	(8.1)	0
Finland	596	3.3	21	(6.1)	+
Japan	597	4.4	22	(6.7)	+
Belgium	603	3.1	28	(6.0)	+
Netherlands	606	4.0	32	(6.5)	+
Northern Ireland	575	5.1			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A1.12: *Comparison of Score of Girls at the 95th Percentile on Combined Mathematical Literacy in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 95th percentile on combined mathematical literacy - girls	95th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	517	(6.0)	-141	(7.4)	−
Greece	579	(7.2)	-79	(10.2)	−
Turkey	594	(7.8)	-64	(23.8)	−
Portugal	595	(4.9)	-63	(8.8)	−
Italy	604	(3.6)	-55	(8.1)	−
Spain	615	(4.0)	-44	(8.3)	−
Luxembourg	627	(5.1)	-32	(8.9)	−
United States	627	(6.5)	-32	(9.7)	−
Poland	629	(4.8)	-30	(8.7)	−
Republic of Ireland	630	(5.5)	-29	(9.2)	0
Hungary	631	(4.9)	-28	(8.8)	0
Slovak Republic	633	(4.3)	-26	(8.5)	0
Norway	634	(4.8)	-25	(8.8)	0
Austria	645	(5.5)	-13	(9.1)	0
France	646	(5.2)	-12	(8.9)	0
Germany	651	(4.9)	-8	(8.8)	0
Sweden	654	(6.3)	-5	(9.6)	0
Denmark	654	(5.1)	-5	(8.9)	0
Scotland	654	(6.3)	-5	(9.7)	0
Iceland	659	(4.4)	0	(8.5)	0
Czech Republic	659	(5.8)	0	(9.3)	0
Canada	664	(2.7)	5	(7.8)	0
Australia	665	(4.3)	7	(8.5)	0
Switzerland	668	(7.2)	10	(10.2)	0
New Zealand	669	(5.4)	10	(9.1)	0
Finland	670	(4.8)	11	(8.7)	0
Japan	673	(5.3)	15	(9.0)	0
Korea	677	(10.5)	18	(12.8)	0
Netherlands	679	(4.8)	20	(8.7)	0
Belgium	681	(3.7)	22	(8.2)	0
Northern Ireland	659	7.3			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
− Country score is significantly lower than score for N. Ireland

Table A1.13: *Comparison of Score of Boys at the 5th Percentile on Combined Mathematical Literacy in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 5th percentile on combined mathematical literacy - boys	5th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	252	(5.8)	-95	(11.7)	–
Turkey	269	(9.1)	-78	(13.6)	–
Greece	290	(8.2)	-56	(13.1)	–
Italy	306	(11.7)	-41	(15.5)	0
Portugal	315	(8.0)	-32	(12.9)	0
United States	319	(5.8)	-28	(11.7)	0
Germany	327	(8.4)	-20	(13.2)	0
Belgium	331	(9.2)	-16	(13.7)	0
Poland	335	(7.3)	-12	(12.5)	0
Spain	335	(5.1)	-12	(11.4)	0
Hungary	337	(7.1)	-10	(12.4)	0
Norway	340	(5.7)	-7	(11.7)	0
Luxembourg	341	(5.5)	-6	(11.5)	0
Iceland	347	(6.0)	0	(11.8)	0
Slovak Republic	347	(9.6)	0	(14.0)	0
Austria	348	(7.0)	1	(12.3)	0
France	349	(7.8)	2	(12.8)	0
Sweden	352	(7.6)	5	(12.7)	0
Japan	355	(10.5)	8	(14.6)	0
Australia	361	(5.6)	14	(11.6)	0
New Zealand	361	(5.0)	14	(11.3)	0
Czech Republic	364	(6.1)	17	(11.8)	0
Switzerland	365	(5.9)	18	(11.7)	0
Republic of Ireland	365	(8.1)	18	(13.0)	0
Denmark	368	(5.3)	21	(11.5)	0
Scotland	379	(7.6)	32	(12.7)	0
Canada	383	(3.9)	36	(10.9)	+
Netherlands	391	(8.1)	44	(13.0)	+
Korea	392	(7.1)	45	(12.4)	+
Finland	402	(5.3)	55	(11.4)	+
Northern Ireland	347	(10.1)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A1.14: *Comparison of Score of Boys at the 25th Percentile on Combined Mathematical Literacy in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 25th percentile on combined mathematical literacy - boys	25th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	330	(5.1)	-120	(9.3)	–
Turkey	354	(6.7)	-96	(10.2)	–
Greece	389	(5.9)	-61	(9.7)	–
Italy	405	(6.9)	-45	(10.4)	–
Portugal	408	(6.6)	-42	(10.2)	–
United States	419	(4.1)	-31	(8.8)	–
Spain	426	(3.0)	-24	(8.3)	0
Poland	427	(3.9)	-23	(8.7)	0
Hungary	428	(3.7)	-22	(8.6)	0
Germany	434	(6.6)	-16	(10.2)	0
Norway	434	(3.2)	-16	(8.4)	0
Luxembourg	436	(3.0)	-14	(8.3)	0
Austria	441	(5.4)	-9	(9.5)	0
Slovak Republic	443	(5.4)	-7	(9.4)	0
Iceland	443	(3.9)	-7	(8.7)	0
Sweden	449	(3.6)	-1	(8.6)	0
France	450	(5.8)	0	(9.7)	0
Republic of Ireland	452	(4.4)	2	(8.9)	0
Czech Republic	454	(5.1)	4	(9.3)	0
Belgium	455	(5.6)	5	(9.6)	0
Australia	459	(3.7)	9	(8.6)	0
New Zealand	459	(4.6)	9	(9.0)	0
Denmark	462	(4.3)	12	(8.9)	0
Japan	464	(7.1)	14	(10.5)	0
Switzerland	466	(4.7)	16	(9.0)	0
Scotland	471	(4.8)	21	(9.1)	0
Netherlands	473	(6.7)	23	(10.3)	0
Canada	478	(2.8)	28	(8.2)	+
Korea	489	(6.2)	38	(9.9)	+
Finland	489	(3.1)	39	(8.4)	+
Northern Ireland	450	(7.8)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A1.15: *Comparison of Score of Boys at the 75th Percentile on Combined Mathematical Literacy in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 75th percentile on combined mathematical literacy - boys	75th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	451	(5.6)	-135	(8.3)	–
Turkey	495	(10.2)	-91	(11.9)	–
Greece	521	(5.5)	-64	(8.2)	–
Portugal	538	(4.7)	-47	(7.7)	–
Italy	544	(5.0)	-42	(7.9)	–
Spain	546	(3.1)	-39	(6.9)	–
United States	556	(3.9)	-30	(7.3)	–
Poland	560	(3.2)	-26	(6.9)	–
Hungary	560	(4.1)	-25	(7.4)	–
Norway	567	(4.1)	-19	(7.3)	0
Luxembourg	569	(3.2)	-16	(6.9)	0
Republic of Ireland	570	(3.5)	-15	(7.0)	0
Iceland	575	(3.0)	-11	(6.8)	0
Slovak Republic	575	(5.3)	-10	(8.1)	0
Austria	579	(5.5)	-6	(8.2)	0
Sweden	580	(3.9)	-6	(7.2)	0
France	584	(4.6)	-1	(7.6)	0
Germany	586	(4.4)	0	(7.5)	0
Denmark	586	(4.2)	1	(7.4)	0
Scotland	587	(3.9)	2	(7.2)	0
Czech Republic	596	(6.0)	10	(8.6)	0
Australia	596	(3.6)	11	(7.1)	0
New Zealand	604	(3.6)	18	(7.1)	0
Switzerland	604	(7.6)	19	(9.8)	0
Canada	607	(2.6)	22	(6.6)	+
Finland	610	(3.5)	24	(7.0)	+
Netherlands	611	(5.2)	25	(8.0)	+
Japan	615	(7.3)	30	(9.5)	+
Korea	617	(4.7)	31	(7.7)	+
Belgium	619	(3.3)	33	(7.0)	+
Northern Ireland	585	(6.1)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A1.16: *Comparison of Score of Boys at the 95th Percentile on Combined Mathematical Literacy in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 95th percentile on combined mathematical literacy - boys	95th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Japan	705	(10.2)	32	(12.7)	0
Belgium	703	(3.6)	30	(8.3)	+
Korea	699	(6.8)	26	(10.1)	0
Switzerland	695	(8.1)	22	(11.0)	0
New Zealand	694	(4.4)	21	(8.6)	0
Finland	689	(5.8)	16	(9.4)	0
Netherlands	688	(4.7)	15	(8.8)	0
Australia	685	(5.6)	12	(9.3)	0
Canada	685	(4.2)	12	(8.5)	0
Czech Republic	681	(5.2)	8	(9.1)	0
Germany	672	(5.3)	-2	(9.2)	0
Sweden	669	(6.5)	-4	(9.9)	0
Denmark	669	(5.2)	-4	(9.1)	0
Austria	668	(5.3)	-5	(9.1)	0
France	666	(5.2)	-7	(9.1)	0
Scotland	666	(5.4)	-8	(9.2)	0
Slovak Republic	661	(5.3)	-12	(9.2)	0
Iceland	657	(6.9)	-16	(10.1)	0
Luxembourg	654	(5.6)	-19	(9.3)	0
Norway	653	(5.6)	-20	(9.3)	0
Hungary	653	(5.4)	-21	(9.2)	0
Poland	651	(5.5)	-23	(9.2)	0
Republic of Ireland	650	(4.9)	-23	(8.9)	0
United States	648	(5.7)	-25	(9.4)	0
Italy	640	(4.7)	-33	(8.8)	–
Turkey	628	(27.7)	-45	(28.7)	0
Spain	626	(3.7)	-47	(8.3)	–
Portugal	623	(5.3)	-50	(9.1)	–
Greece	614	(8.1)	-59	(11.0)	–
Mexico	536	(5.6)	-137	(9.3)	–
Northern Ireland	673	(7.4)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Appendix to Chapter 2
Cross-curricular Problem Solving – Additional Tables

Table A2.1: *Comparison of Country Scores at the 5th Percentile on Problem Solving with OECD Country Average*

Countries in ascending order of difference from OECD average score at 5th percentile on problem solving	5th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from OECD average score?
Mexico	227	(5.4)	-102	(5.7)	–
Turkey	257	(7.8)	-71	(8.0)	–
Greece	283	(5.6)	-45	(5.8)	–
Italy	289	(8.7)	-40	(8.9)	–
Portugal	311	(7.9)	-17	(8.1)	0
United States	312	(5.6)	-16	(5.9)	0
Spain	322	(4.8)	-7	(5.1)	0
Norway	322	(5.5)	-6	(5.8)	0
Slovak Republic	337	(7.1)	8	(7.3)	0
Poland	338	(5.6)	10	(5.8)	0
Luxembourg	339	(3.7)	11	(4.1)	0
Belgium	340	(5.0)	12	(5.3)	0
Hungary	343	(5.8)	15	(6.0)	0
Northern Ireland	348	(7.9)	20	(8.1)	0
Germany	351	(5.9)	22	(6.1)	+
Czech Republic	356	(8.6)	28	(8.7)	0
Austria	357	(5.1)	29	(5.4)	+
Iceland	358	(5.5)	30	(5.7)	+
Switzerland	358	(5.7)	30	(6.0)	+
France	358	(6.1)	30	(6.3)	+
Sweden	360	(6.4)	31	(6.6)	+
Japan	362	(8.3)	34	(8.4)	+
Republic of Ireland	364	(4.5)	36	(4.8)	+
Denmark	369	(5.0)	41	(5.3)	+
New Zealand	370	(3.8)	41	(4.1)	+
Australia	371	(4.1)	43	(4.4)	+
Netherlands	372	(5.9)	44	(6.1)	+
Canada	379	(2.4)	50	(2.9)	+
Scotland	381	(6.1)	53	(6.3)	+
Korea	404	(4.6)	76	(4.9)	+
Finland	409	(4.7)	80	(5.0)	+
OECD average	328	(1.7)			

+ Country score is significantly higher than OECD average score
0 Country score is not significantly different from OECD average score
– Country score is significantly lower than OECD average score

Table A2.2: *Comparison of Country Scores at the 25th Percentile on Problem Solving with OECD Country Average*

Countries in ascending order of difference from OECD average score at 25th percentile on problem solving	25th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from OECD average score?
Mexico	317	(5.2)	-114	(5.3)	–
Turkey	343	(5.2)	-88	(5.3)	–
Greece	383	(4.5)	-48	(4.6)	–
Italy	406	(4.7)	-25	(4.8)	–
Portugal	409	(5.7)	-23	(5.8)	–
United States	410	(4.1)	-21	(4.2)	–
Spain	421	(3.6)	-10	(3.7)	0
Norway	424	(3.7)	-7	(3.9)	0
Poland	428	(3.1)	-3	(3.3)	0
Slovak Republic	430	(4.7)	-1	(4.8)	0
Luxembourg	432	(2.4)	1	(2.7)	0
Hungary	436	(3.8)	5	(3.9)	0
Austria	443	(4.1)	12	(4.2)	0
Republic of Ireland	445	(3.1)	14	(3.3)	+
Northern Ireland	446	(3.7)	15	(3.9)	+
Germany	447	(4.8)	16	(4.9)	0
Iceland	450	(2.2)	19	(2.5)	+
Sweden	451	(3.1)	20	(3.2)	+
Czech Republic	454	(4.4)	23	(4.6)	+
Belgium	456	(3.3)	24	(3.5)	+
Netherlands	456	(4.9)	25	(5.0)	+
Denmark	459	(3.1)	27	(3.2)	+
France	459	(3.9)	28	(4.1)	+
Switzerland	461	(3.3)	30	(3.5)	+
Scotland	468	(3.4)	37	(3.5)	+
New Zealand	468	(3.7)	37	(3.8)	+
Australia	469	(2.8)	38	(3.0)	+
Canada	471	(2.5)	40	(2.7)	+
Japan	481	(5.7)	50	(5.8)	+
Korea	494	(3.9)	63	(4.0)	+
Finland	495	(2.5)	63	(2.7)	+
OECD average	431	(1.1)			

+ Country score is significantly higher than OECD average score
0 Country score is not significantly different from OECD average score
– Country score is significantly lower than OECD average score

Table A2.3: *Comparison of Country Scores at the 75th Percentile on Problem Solving with OECD Country Average*

Countries in ascending order of difference from OECD average score at 75th percentile on problem solving	75th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from OECD average score?
Mexico	451	(5.1)	-119	(5.1)	–
Turkey	467	(7.7)	-104	(7.7)	–
Greece	517	(4.6)	-54	(4.7)	–
Portugal	534	(3.6)	-37	(3.7)	–
Italy	540	(3.0)	-31	(3.1)	–
Spain	547	(3.2)	-24	(3.3)	–
Poland	548	(3.0)	-23	(3.1)	–
United States	548	(3.3)	-23	(3.4)	–
Republic of Ireland	555	(2.7)	-16	(2.9)	–
Slovak Republic	558	(3.6)	-13	(3.7)	–
Luxembourg	558	(2.2)	-13	(2.3)	–
Norway	559	(3.3)	-12	(3.4)	–
Iceland	564	(2.0)	-7	(2.2)	0
Hungary	567	(3.9)	-4	(4.0)	0
Austria	569	(4.0)	-1	(4.1)	0
Sweden	571	(3.1)	0	(3.2)	0
Northern Ireland	575	(3.4)	4	(3.5)	0
Denmark	578	(2.8)	8	(2.9)	0
Czech Republic	582	(3.6)	11	(3.7)	0
Germany	583	(4.3)	12	(4.4)	0
Scotland	585	(2.6)	14	(2.7)	+
France	586	(3.1)	15	(3.2)	+
Netherlands	587	(3.6)	16	(3.7)	+
Switzerland	587	(3.9)	16	(4.0)	+
Canada	591	(1.9)	20	(2.1)	+
Australia	594	(2.1)	23	(2.3)	+
New Zealand	601	(2.4)	30	(2.5)	+
Belgium	602	(2.6)	31	(2.7)	+
Finland	604	(2.3)	33	(2.4)	+
Korea	610	(3.5)	39	(3.6)	+
Japan	621	(4.2)	50	(4.3)	+
OECD average	571	(0.9)			

+ Country score is significantly higher than OECD average score
0 Country score is not significantly different from OECD average score
– Country score is significantly lower than OECD average score

Table A2.4: *Comparison of Country Scores at the 95th Percentile on Problem Solving with OECD Country Average*

Countries in ascending order of difference from OECD average score at 95th percentile on problem solving	95th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from OECD average score?
Mexico	542	(6.5)	-114	(6.5)	–
Turkey	577	(18.6)	-79	(18.6)	–
Greece	607	(5.6)	-48	(5.7)	–
Portugal	614	(3.5)	-41	(3.6)	–
Republic of Ireland	625	(3.2)	-31	(3.3)	–
Italy	627	(3.6)	-28	(3.6)	–
Spain	629	(3.3)	-26	(3.4)	–
Poland	632	(4.5)	-24	(4.6)	–
Iceland	634	(3.6)	-21	(3.7)	–
United States	635	(4.2)	-21	(4.3)	–
Slovak Republic	638	(4.2)	-17	(4.2)	–
Luxembourg	640	(3.4)	-16	(3.5)	–
Norway	645	(4.4)	-10	(4.5)	0
Sweden	647	(3.6)	-8	(3.7)	0
Austria	651	(4.6)	-5	(4.7)	0
Hungary	653	(5.4)	-2	(5.4)	0
Denmark	655	(3.7)	-1	(3.8)	0
Northern Ireland	656	(4.8)	0	(4.9)	0
Germany	658	(3.2)	3	(3.3)	0
Scotland	661	(2.9)	5	(3.0)	0
Netherlands	662	(3.7)	7	(3.8)	0
France	662	(4.5)	7	(4.6)	0
Czech Republic	663	(4.0)	8	(4.1)	0
Switzerland	666	(5.2)	11	(5.2)	0
Canada	669	(2.4)	13	(2.5)	+
Australia	672	(3.4)	16	(3.5)	+
Finland	677	(3.6)	21	(3.7)	+
Belgium	681	(2.0)	25	(2.2)	+
New Zealand	682	(2.8)	27	(2.9)	+
Korea	686	(5.5)	30	(5.6)	+
Japan	705	(6.0)	50	(6.1)	+
OECD average	656	(0.8)			

+ Country score is significantly higher than OECD average score
0 Country score is not significantly different from OECD average score
– Country score is significantly lower than OECD average score

Table A2.5: *Comparison of Northern Ireland Score at the 5th Percentile on Problem Solving with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 5th percentile on problem solving	5th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	227	(5.4)	-121	(9.6)	–
Turkey	257	(7.8)	-91	(11.1)	–
Greece	283	(5.6)	-65	(9.7)	–
Italy	289	(8.7)	-59	(11.8)	–
Portugal	311	(7.9)	-37	(11.2)	–
United States	312	(5.6)	-36	(9.7)	–
Spain	322	(4.8)	-26	(9.2)	0
Norway	322	(5.5)	-26	(9.6)	0
Slovak Republic	337	(7.1)	-11	(10.6)	0
Poland	338	(5.6)	-10	(9.7)	0
Luxembourg	339	(3.7)	-9	(8.7)	0
Belgium	340	(5.0)	-8	(9.3)	0
Hungary	343	(5.8)	-5	(9.8)	0
Germany	351	(5.9)	3	(9.9)	0
Czech Republic	356	(8.6)	9	(11.6)	0
Austria	357	(5.1)	9	(9.4)	0
Iceland	358	(5.5)	10	(9.6)	0
Switzerland	358	(5.7)	10	(9.8)	0
France	358	(6.1)	10	(10.0)	0
Sweden	360	(6.4)	12	(10.2)	0
Japan	362	(8.3)	14	(11.4)	0
Republic of Ireland	364	(4.5)	16	(9.1)	0
Denmark	369	(5.0)	21	(9.4)	0
New Zealand	370	(3.8)	22	(8.7)	0
Australia	371	(4.1)	23	(8.9)	0
Netherlands	372	(5.9)	24	(9.9)	0
Canada	379	(2.4)	31	(8.3)	+
Scotland	381	(6.1)	34	(10.0)	+
Korea	404	(4.6)	56	(9.2)	+
Finland	409	(4.7)	61	(9.2)	+
Northern Ireland	348	(7.9)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A2.6: *Comparison of Northern Ireland Score at the 25th Percentile on Problem Solving with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 25th percentile on problem solving	25th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	317	(5.2)	-128	(6.4)	–
Turkey	343	(5.2)	-103	(6.4)	–
Greece	383	(4.5)	-63	(5.9)	–
Italy	406	(4.7)	-40	(6.0)	–
Portugal	409	(5.7)	-37	(6.8)	–
United States of America	410	(4.1)	-36	(5.5)	–
Spain	421	(3.6)	-25	(5.2)	–
Norway	424	(3.7)	-21	(5.3)	–
Poland	428	(3.1)	-17	(4.9)	–
Slovak Republic	430	(4.7)	-16	(6.0)	0
Luxembourg	432	(2.4)	-14	(4.5)	0
Hungary	436	(3.8)	-9	(5.3)	0
Austria	443	(4.1)	-3	(5.5)	0
Republic of Ireland	445	(3.1)	-1	(4.9)	0
Germany	447	(4.8)	1	(6.1)	0
Iceland	450	(2.2)	4	(4.4)	0
Sweden	451	(3.1)	6	(4.8)	0
Czech Republic	454	(4.4)	8	(5.8)	0
Belgium	456	(3.3)	10	(5.0)	0
Netherlands	456	(4.9)	10	(6.2)	0
Denmark	459	(3.1)	13	(4.8)	0
France	459	(3.9)	13	(5.4)	0
Switzerland	461	(3.3)	16	(5.0)	0
Scotland	468	(3.4)	22	(5.0)	+
New Zealand	468	(3.7)	22	(5.2)	+
Australia	469	(2.8)	24	(4.7)	+
Canada	471	(2.5)	25	(4.5)	+
Japan	481	(5.7)	36	(6.8)	+
Korea	494	(3.9)	48	(5.4)	+
Finland	495	(2.5)	49	(4.5)	+
Northern Ireland	446	(3.7)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A2.7: *Comparison of Northern Ireland Score at the 75th Percentile on Problem Solving with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 75th percentile on problem solving	75th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	451	(5.1)	-123	(6.1)	–
Turkey	467	(7.7)	-108	(8.4)	–
Greece	517	(4.6)	-58	(5.7)	–
Portugal	534	(3.6)	-41	(5.0)	–
Italy	540	(3.0)	-35	(4.5)	–
Spain	547	(3.2)	-28	(4.7)	–
Poland	548	(3.0)	-27	(4.5)	–
United States of America	548	(3.3)	-27	(4.7)	–
Republic of Ireland	555	(2.7)	-20	(4.4)	–
Slovak Republic	558	(3.6)	-17	(4.9)	–
Luxembourg	558	(2.2)	-17	(4.0)	–
Norway	559	(3.3)	-16	(4.7)	–
Iceland	564	(2.0)	-11	(4.0)	0
Hungary	567	(3.9)	-8	(5.2)	0
Austria	569	(4.0)	-5	(5.2)	0
Sweden	571	(3.1)	-4	(4.6)	0
Denmark	578	(2.8)	4	(4.4)	0
Czech Republic	582	(3.6)	7	(4.9)	0
Germany	583	(4.3)	8	(5.5)	0
Scotland	585	(2.6)	10	(4.3)	0
France	586	(3.1)	11	(4.6)	0
Netherlands	587	(3.6)	12	(4.9)	0
Switzerland	587	(3.9)	12	(5.1)	0
Canada	591	(1.9)	16	(3.9)	+
Australia	594	(2.1)	19	(4.0)	+
New Zealand	601	(2.4)	26	(4.2)	+
Belgium	602	(2.6)	27	(4.3)	+
Finland	604	(2.3)	29	(4.1)	+
Korea	610	(3.5)	35	(4.9)	+
Japan	621	(4.2)	46	(5.4)	+
Northern Ireland	575	(3.4)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A2.8: *Comparison of Northern Ireland Score at the 95th Percentile on Problem Solving with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 95th percentile on problem solving	95th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Japan	705	(6.0)	50	(7.7)	+
Korea	686	(5.5)	30	(7.3)	+
New Zealand	682	(2.8)	27	(5.6)	+
Belgium	681	(2.0)	25	(5.2)	+
Finland	677	(3.6)	21	(6.0)	+
Australia	672	(3.4)	16	(5.9)	0
Canada	669	(2.4)	13	(5.4)	0
Switzerland	666	(5.2)	11	(7.1)	0
Czech Republic	663	(4.0)	8	(6.3)	0
France	662	(4.5)	7	(6.6)	0
Netherlands	662	(3.7)	7	(6.1)	0
Scotland	661	(2.9)	5	(5.6)	0
Germany	658	(3.2)	3	(5.8)	0
Denmark	655	(3.7)	-1	(6.1)	0
Hungary	653	(5.4)	-2	(7.2)	0
Austria	651	(4.6)	-5	(6.7)	0
Sweden	647	(3.6)	-8	(6.0)	0
Norway	645	(4.4)	-10	(6.5)	0
Luxembourg	640	(3.4)	-16	(5.9)	0
Slovak Republic	638	(4.2)	-17	(6.4)	0
United States of America	635	(4.2)	-21	(6.4)	–
Iceland	634	(3.6)	-21	(6.0)	–
Poland	632	(4.5)	-24	(6.6)	–
Spain	629	(3.3)	-26	(5.8)	–
Italy	627	(3.6)	-28	(6.0)	–
Republic of Ireland	625	(3.2)	-31	(5.8)	–
Portugal	614	(3.5)	-41	(6.0)	–
Greece	607	(5.6)	-48	(7.4)	–
Turkey	577	(18.6)	-79	(19.2)	–
Mexico	542	(6.5)	-114	(8.1)	–
Northern Ireland	656	(4.8)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A2.9: *Comparison of Score of Girls at the 5th Percentile on Problem Solving in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 5th percentile on problem solving - girls	5th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	224	(9.0)	-137	(11.7)	–
Turkey	271	(6.0)	-90	(9.5)	–
Greece	290	(5.7)	-71	(9.4)	–
Italy	306	(8.5)	-55	(11.3)	–
United States	318	(6.7)	-44	(10.0)	–
Portugal	321	(7.5)	-41	(10.6)	–
Spain	334	(6.1)	-27	(9.6)	0
Norway	336	(8.8)	-25	(11.5)	0
Slovak Republic	337	(7.8)	-24	(10.7)	0
Luxembourg	343	(5.4)	-19	(9.2)	0
Hungary	346	(8.1)	-15	(11.0)	0
Belgium	350	(9.3)	-12	(11.9)	0
Poland	351	(6.4)	-11	(9.8)	0
Germany	355	(6.0)	-7	(9.5)	0
Czech Republic	355	(10.3)	-6	(12.7)	0
Switzerland	362	(7.2)	0	(10.3)	0
France	366	(8.2)	5	(11.0)	0
Republic of Ireland	367	(5.9)	5	(9.5)	0
Austria	367	(6.0)	5	(9.5)	0
Sweden	367	(6.5)	6	(9.8)	0
Netherlands	368	(8.6)	7	(11.4)	0
Denmark	369	(7.1)	7	(10.2)	0
Japan	374	(9.9)	12	(12.4)	0
New Zealand	377	(5.0)	15	(9.0)	0
Australia	382	(6.3)	21	(9.7)	0
Canada	389	(4.0)	28	(8.4)	+
Scotland	390	(6.8)	28	(10.0)	0
Iceland	391	(7.4)	30	(10.5)	0
Korea	407	(6.9)	45	(10.1)	+
Finland	425	(5.4)	64	(9.2)	+
Northern Ireland	361	(7.4)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A2.10: *Comparison of Score of Girls at the 25th Percentile on Problem Solving in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 25th percentile on problem solving - girls	25th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	316	(5.5)	-136	(7.7)	–
Turkey	346	(5.7)	-106	(7.8)	–
Greece	386	(5.0)	-66	(7.3)	–
United States	412	(5.0)	-40	(7.4)	–
Italy	412	(5.3)	-40	(7.6)	–
Portugal	413	(5.5)	-39	(7.7)	–
Spain	427	(3.1)	-25	(6.2)	–
Slovak Republic	429	(5.0)	-23	(7.4)	0
Norway	430	(5.5)	-22	(7.7)	0
Poland	432	(3.4)	-20	(6.4)	0
Luxembourg	435	(3.6)	-17	(6.5)	0
Hungary	440	(4.5)	-12	(7.0)	0
Republic of Ireland	445	(3.8)	-7	(6.6)	0
Austria	448	(4.7)	-4	(7.2)	0
Czech Republic	453	(6.7)	1	(8.6)	0
Germany	454	(5.6)	2	(7.8)	0
Netherlands	455	(5.9)	3	(8.0)	0
Denmark	458	(4.4)	6	(7.0)	0
Sweden	458	(3.4)	6	(6.4)	0
Belgium	461	(4.5)	9	(7.0)	0
France	462	(3.9)	10	(6.6)	0
Switzerland	465	(4.8)	13	(7.3)	0
Iceland	469	(2.9)	17	(6.2)	0
New Zealand	473	(4.7)	21	(7.2)	0
Scotland	473	(3.9)	21	(6.7)	0
Australia	476	(3.2)	24	(6.3)	+
Canada	478	(2.6)	26	(6.0)	+
Japan	487	(5.7)	35	(7.9)	+
Korea	490	(5.3)	39	(7.5)	+
Finland	502	(2.7)	50	(6.0)	+
Northern Ireland	452	(5.4)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A2.11: *Comparison of Score of Girls at the 75th Percentile on Problem Solving in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 75th percentile on problem solving - girls	75th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	449	(5.5)	-127	(7.1)	–
Turkey	460	(7.8)	-116	(9.0)	–
Greece	512	(4.9)	-64	(6.7)	–
Portugal	529	(3.6)	-48	(5.8)	–
Italy	536	(3.5)	-40	(5.7)	–
Poland	543	(3.5)	-33	(5.7)	–
United States	545	(4.7)	-31	(6.6)	–
Spain	547	(4.0)	-29	(6.1)	–
Slovak Republic	552	(4.1)	-24	(6.1)	–
Luxembourg	553	(3.7)	-23	(5.9)	–
Republic of Ireland	555	(4.3)	-21	(6.2)	–
Norway	561	(4.0)	-15	(6.1)	0
Austria	567	(4.9)	-9	(6.6)	0
Hungary	568	(4.7)	-8	(6.6)	0
Sweden	574	(4.4)	-2	(6.3)	0
Iceland	575	(3.5)	-1	(5.8)	0
Denmark	575	(3.6)	-1	(5.8)	0
Czech Republic	577	(4.5)	1	(6.4)	0
France	583	(3.8)	7	(5.9)	0
Scotland	584	(3.9)	8	(6.0)	0
Germany	584	(4.8)	8	(6.6)	0
Netherlands	585	(4.3)	9	(6.3)	0
Switzerland	586	(4.2)	10	(6.2)	0
Canada	590	(2.2)	13	(5.0)	0
Australia	594	(2.6)	18	(5.2)	+
New Zealand	599	(3.7)	23	(5.8)	+
Belgium	599	(3.1)	23	(5.5)	+
Korea	603	(5.0)	27	(6.7)	+
Finland	605	(3.1)	29	(5.5)	+
Japan	618	(3.6)	42	(5.8)	+
Northern Ireland	576	(4.5)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A2.12: *Comparison of Score of Girls at the 95th Percentile on Problem Solving in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 95th percentile on problem solving - girls	95th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	535	(7.9)	-123	(10.3)	–
Turkey	564	(19.1)	-94	(20.2)	–
Greece	598	(6.3)	-60	(9.0)	–
Portugal	606	(6.6)	-52	(9.3)	–
Italy	618	(4.1)	-40	(7.7)	–
Republic of Ireland	621	(5.3)	-37	(8.4)	–
Poland	625	(5.7)	-33	(8.6)	–
Spain	626	(5.2)	-32	(8.3)	–
Slovak Republic	629	(4.5)	-29	(7.9)	–
United States	631	(6.1)	-27	(8.9)	0
Luxembourg	632	(5.0)	-26	(8.2)	0
Iceland	642	(5.8)	-16	(8.7)	0
Norway	644	(6.0)	-14	(8.9)	0
Austria	646	(6.2)	-12	(9.0)	0
Sweden	649	(4.7)	-9	(8.0)	0
Hungary	650	(6.2)	-8	(9.0)	0
Denmark	651	(5.4)	-7	(8.5)	0
Germany	656	(4.4)	-2	(7.9)	0
Netherlands	656	(3.9)	-2	(7.6)	0
Czech Republic	656	(5.1)	-2	(8.3)	0
France	658	(5.0)	0	(8.2)	0
Scotland	659	(4.8)	1	(8.1)	0
Switzerland	664	(5.1)	6	(8.3)	0
Canada	667	(3.6)	9	(7.4)	0
Australia	668	(3.6)	10	(7.5)	0
Finland	674	(4.7)	16	(8.1)	0
Belgium	676	(3.4)	18	(7.4)	0
New Zealand	678	(5.0)	20	(8.2)	0
Korea	679	(8.6)	21	(10.8)	0
Japan	698	(4.9)	40	(8.2)	+
Northern Ireland	658	(6.5)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A2.13: *Comparison of Score of Boys at the 5th Percentile on Problem Solving in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 5th percentile on problem solving - boys	5th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	229	(8.1)	-103	(14.5)	–
Turkey	246	(11.6)	-86	(16.7)	–
Italy	271	(12.2)	-61	(17.1)	–
Greece	276	(8.0)	-56	(14.4)	–
Portugal	301	(9.4)	-31	(15.2)	0
Norway	309	(6.8)	-23	(13.8)	0
United States	318	(6.7)	-14	(13.7)	0
Spain	322	(4.8)	-10	(12.9)	0
Poland	324	(8.3)	-8	(14.5)	0
Belgium	334	(6.1)	2	(13.4)	0
Luxembourg	335	(5.3)	3	(13.1)	0
Slovak Republic	336	(7.6)	4	(14.2)	0
Iceland	338	(5.5)	6	(13.2)	0
Hungary	340	(6.6)	8	(13.7)	0
Germany	348	(7.2)	16	(14.0)	0
Austria	349	(6.6)	17	(13.7)	0
France	351	(10.8)	19	(16.1)	0
Japan	351	(10.1)	19	(15.6)	0
Sweden	354	(7.0)	22	(13.9)	0
Switzerland	355	(6.9)	23	(13.8)	0
Czech Republic	359	(8.6)	27	(14.7)	0
Australia	362	(4.8)	30	(12.9)	0
Republic of Ireland	362	(6.6)	30	(13.7)	0
New Zealand	364	(6.0)	32	(13.4)	0
Denmark	369	(5.8)	37	(13.3)	0
Canada	371	(3.2)	39	(12.4)	0
Scotland	374	(7.7)	42	(14.2)	0
Netherlands	378	(7.4)	46	(14.1)	0
Finland	396	(6.8)	64	(13.8)	+
Korea	403	(7.0)	71	(13.9)	+
Northern Ireland	332	(12.0)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

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Table A2.14: *Comparison of Score of Boys at the 25th Percentile on Problem Solving in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 25th percentile on problem solving - boys	25th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	319	(6.3)	-119	(9.7)	–
Turkey	340	(6.9)	-97	(10.0)	–
Greece	380	(5.4)	-58	(9.1)	–
Italy	398	(7.5)	-39	(10.4)	–
Portugal	402	(8.2)	-36	(11.0)	–
United States	412	(5.0)	-26	(8.9)	0
Norway	418	(3.9)	-19	(8.3)	0
Spain	421	(3.5)	-17	(8.1)	0
Poland	425	(3.9)	-13	(8.3)	0
Luxembourg	429	(4.0)	-9	(8.3)	0
Iceland	431	(3.9)	-7	(8.3)	0
Slovak Republic	431	(5.3)	-7	(9.0)	0
Hungary	433	(4.8)	-4	(8.7)	0
Austria	437	(4.9)	-1	(8.8)	0
Germany	441	(5.3)	3	(9.0)	0
Republic of Ireland	445	(4.5)	7	(8.6)	0
Sweden	445	(3.9)	8	(8.3)	0
Belgium	449	(5.0)	11	(8.8)	0
Czech Republic	454	(5.1)	16	(8.9)	0
France	455	(5.8)	17	(9.3)	0
Netherlands	457	(5.7)	19	(9.3)	0
Switzerland	458	(4.5)	21	(8.6)	0
Denmark	459	(5.3)	21	(9.0)	0
Scotland	462	(4.9)	24	(8.8)	0
New Zealand	462	(5.0)	25	(8.8)	0
Australia	462	(3.7)	25	(8.2)	0
Canada	470	(3.2)	32	(7.9)	+
Japan	474	(7.6)	36	(10.5)	+
Finland	486	(3.7)	48	(8.2)	+
Korea	496	(5.3)	58	(9.0)	+
Northern Ireland	438	(7.3)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A2.15: *Comparison of Score of Boys at the 75th Percentile on Problem Solving in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 75th percentile on problem solving - boys	75th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	455	(6.5)	-118	(8.0)	–
Turkey	472	(9.0)	-102	(10.2)	–
Greece	522	(6.3)	-52	(7.8)	–
Portugal	541	(5.1)	-32	(6.9)	–
Italy	544	(4.5)	-29	(6.5)	–
United States	545	(4.7)	-29	(6.7)	–
Spain	547	(3.2)	-26	(5.7)	–
Poland	551	(3.6)	-22	(5.9)	–
Iceland	553	(3.0)	-20	(5.6)	–
Republic of Ireland	557	(3.6)	-17	(6.0)	0
Norway	557	(3.8)	-17	(6.1)	0
Luxembourg	563	(4.4)	-10	(6.5)	0
Slovak Republic	564	(4.4)	-10	(6.5)	0
Hungary	565	(4.9)	-8	(6.8)	0
Sweden	568	(3.6)	-6	(5.9)	0
Austria	572	(5.5)	-2	(7.2)	0
Denmark	581	(3.6)	8	(5.9)	0
Germany	583	(4.8)	9	(6.8)	0
Scotland	585	(3.6)	12	(5.9)	0
Switzerland	588	(5.5)	14	(7.2)	0
Czech Republic	588	(4.8)	14	(6.7)	0
Netherlands	588	(4.3)	15	(6.4)	0
France	589	(4.1)	15	(6.2)	0
Australia	594	(3.0)	20	(5.6)	+
Canada	600	(2.5)	26	(5.4)	+
New Zealand	603	(3.4)	29	(5.8)	+
Finland	603	(3.0)	29	(5.6)	+
Belgium	604	(3.6)	31	(5.9)	+
Korea	615	(3.8)	41	(6.1)	+
Japan	625	(6.8)	51	(8.3)	+
Northern Ireland	574	(4.7)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A2.16: *Comparison of Score of Boys at the 95th Percentile on Problem Solving in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 95th percentile on problem solving - boys	95th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	548	(7.4)	-104	(10.4)	–
Turkey	585	(22.8)	-67	(24.0)	–
Greece	618	(7.4)	-34	(10.5)	–
Portugal	623	(4.7)	-29	(8.7)	–
Iceland	626	(5.2)	-26	(9.0)	0
Ireland	628	(4.9)	-24	(8.8)	0
Spain	629	(3.3)	-23	(8.1)	0
United States	631	(6.1)	-21	(9.6)	0
Italy	637	(4.0)	-15	(8.4)	0
Poland	638	(6.0)	-14	(9.5)	0
Sweden	644	(5.4)	-8	(9.1)	0
Slovak Republic	646	(4.9)	-6	(8.8)	0
Luxembourg	646	(4.2)	-6	(8.5)	0
Norway	649	(5.7)	-3	(9.3)	0
Hungary	655	(5.5)	3	(9.2)	0
Austria	656	(6.5)	4	(9.8)	0
Denmark	658	(4.9)	6	(8.8)	0
Germany	661	(3.6)	9	(8.2)	0
Scotland	662	(5.0)	10	(8.9)	0
Netherlands	667	(5.9)	15	(9.4)	0
Switzerland	668	(7.5)	16	(10.5)	0
France	668	(6.2)	16	(9.6)	0
Czech Republic	669	(5.6)	17	(9.2)	0
Australia	675	(4.1)	23	(8.4)	0
Canada	676	(3.4)	24	(8.1)	0
Finland	680	(5.0)	28	(8.9)	0
New Zealand	685	(3.5)	33	(8.1)	+
Belgium	685	(3.3)	33	(8.1)	+
Korea	691	(6.1)	39	(9.5)	+
Japan	713	(10.5)	61	(12.9)	+
Northern Ireland	652	(7.4)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Appendix to Chapter 3
Reading Literacy – Additional Tables

Table A3.1: *Comparison of Country Scores at the 5th Percentile on Reading with OECD Country Average Score*

Countries in ascending order of difference from OECD average score at 5th percentile on reading literacy	5th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from OECD average score?
Mexico	238	(6.1)	-80	(6.3)	–
Greece	288	(6.2)	-30	(6.3)	–
Turkey	291	(6.1)	-27	(6.3)	–
Germany	295	(6.0)	-23	(6.1)	–
Italy	295	(8.6)	-23	(8.7)	0
Luxembourg	302	(3.8)	-16	(4.1)	0
Belgium	302	(8.4)	-16	(8.5)	0
Slovak Republic	310	(5.7)	-8	(5.8)	0
Japan	310	(7.3)	-7	(7.5)	0
Portugal	311	(6.6)	-7	(6.8)	0
Spain	313	(5.8)	-5	(5.9)	0
Austria	313	(7.5)	-4	(7.6)	0
Iceland	316	(6.4)	-1	(6.5)	0
United States	319	(6.6)	1	(6.7)	0
Czech Republic	320	(9.5)	3	(9.6)	0
France	320	(7.7)	3	(7.9)	0
Norway	321	(6.1)	4	(6.2)	0
Hungary	324	(6.0)	6	(6.1)	0
Switzerland	330	(5.8)	13	(6.0)	0
Poland	330	(6.3)	13	(6.4)	0
New Zealand	338	(6.2)	20	(6.4)	0
Denmark	338	(6.6)	20	(6.7)	0
Northern Ireland	348	(7.2)	30	(7.4)	+
Sweden	349	(6.0)	31	(6.2)	+
Australia	352	(4.8)	34	(5.0)	+
Republic of Ireland	364	(7.3)	46	(7.5)	+
Scotland	365	(7.2)	48	(7.3)	+
Netherlands	369	(6.4)	51	(6.6)	+
Canada	373	(3.1)	55	(3.4)	+
Korea	393	(6.0)	76	(6.2)	+
Finland	400	(4.8)	82	(5.0)	+
OECD average	318	(1.4)			

+ Country score is significantly higher than OECD average score
0 Country score is not significantly different from OECD average score
– Country score is significantly lower than OECD average score

Table A3.2: *Comparison of Country Scores at the 25th Percentile on Reading with OECD Country Average Score*

Countries in ascending order of difference from OECD average score at 25th percentile on reading literacy	25th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from OECD average score?
Mexico	335	(4.9)	-95	(5.0)	–
Turkey	377	(5.7)	-53	(5.8)	–
Greece	406	(5.2)	-24	(5.3)	–
Slovak Republic	408	(4.6)	-22	(4.7)	–
Italy	411	(4.4)	-19	(4.5)	–
Luxembourg	416	(2.8)	-14	(2.9)	–
Portugal	418	(5.2)	-12	(5.3)	0
Germany	419	(5.6)	-12	(5.7)	0
Spain	421	(3.4)	-10	(3.5)	0
Hungary	422	(3.3)	-8	(3.4)	0
Austria	423	(4.9)	-7	(5.0)	0
Czech Republic	428	(4.7)	-2	(4.8)	0
United States	429	(4.1)	-1	(4.3)	0
Iceland	431	(2.3)	1	(2.5)	0
Japan	431	(5.4)	1	(5.4)	0
Norway	434	(3.8)	4	(4.0)	0
France	436	(4.0)	6	(4.1)	0
Poland	436	(3.6)	6	(3.7)	0
Denmark	438	(4.0)	8	(4.1)	0
Switzerland	439	(4.5)	8	(4.6)	0
Belgium	441	(3.7)	11	(3.8)	0
New Zealand	453	(3.5)	23	(3.7)	+
Northern Ireland	453	(4.5)	23	(4.6)	+
Sweden	453	(3.4)	23	(3.5)	+
Netherlands	454	(4.5)	24	(4.6)	+
Republic of Ireland	460	(3.8)	30	(3.9)	+
Scotland	461	(3.5)	31	(3.7)	+
Australia	464	(3.0)	34	(3.2)	+
Canada	472	(2.3)	42	(2.5)	+
Korea	484	(4.1)	54	(4.2)	+
Finland	494	(2.4)	64	(2.6)	+
OECD average	430	(1.0)			

+ Country score is significantly higher than OECD average score
0 Country score is not significantly different from OECD average score
– Country score is significantly lower than OECD average score

Table A3.3: *Comparison of Country Scores at the 75th Percentile on Reading with OECD Country Average Score*

Countries in ascending order of difference from OECD average score at 75th percentile on reading literacy	75th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from OECD average score?
Mexico	467	(4.3)	-99	(4.4)	–
Turkey	500	(6.6)	-65	(6.6)	–
Slovak Republic	535	(3.2)	-30	(3.2)	–
Portugal	544	(3.5)	-22	(3.5)	–
Greece	546	(4.4)	-19	(4.4)	–
Hungary	546	(3.3)	-19	(3.3)	–
Italy	547	(2.5)	-18	(2.6)	–
Spain	548	(2.8)	-17	(2.9)	–
Luxembourg	551	(1.9)	-14	(2.0)	–
Denmark	553	(3.0)	-12	(3.0)	–
Czech Republic	555	(4.0)	-10	(4.0)	0
Iceland	560	(2.2)	-5	(2.3)	0
Poland	563	(3.1)	-3	(3.1)	0
Austria	565	(4.2)	0	(4.2)	0
Switzerland	565	(3.7)	0	(3.7)	0
France	565	(2.8)	0	(2.9)	0
United States	568	(3.6)	3	(3.6)	0
Norway	571	(3.6)	5	(3.6)	0
Germany	572	(3.4)	6	(3.4)	0
Japan	574	(3.7)	9	(3.7)	0
Netherlands	576	(3.2)	11	(3.3)	+
Scotland	577	(3.2)	11	(3.3)	+
Republic of Ireland	577	(2.8)	12	(2.8)	+
Sweden	582	(2.9)	16	(3.0)	+
Northern Ireland	586	(4.3)	21	(4.4)	+
Belgium	587	(2.1)	22	(2.2)	+
Canada	590	(2.1)	24	(2.1)	+
Korea	590	(2.8)	25	(2.9)	+
Australia	594	(2.5)	28	(2.6)	+
New Zealand	596	(2.8)	31	(2.9)	+
Finland	599	(1.7)	33	(1.8)	+
OECD average	565	(0.6)			

+ Country score is significantly higher than OECD average score
0 Country score is not significantly different from OECD average score
– Country score is significantly lower than OECD average score

Table A3.4: *Comparison of Country Scores at the 95th Percentile on Reading with OECD Country Average Score*

Countries in ascending order of difference from OECD average score at 95th percentile on reading literacy	95th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from OECD average score?
Mexico	552	(5.5)	-94	(5.6)	−
Turkey	608	(19.4)	-38	(19.4)	−
Slovak Republic	613	(3.5)	-33	(3.5)	−
Portugal	617	(3.9)	-30	(4.0)	−
Hungary	625	(5.0)	-21	(5.0)	−
Spain	625	(3.1)	-21	(3.2)	−
Denmark	627	(3.9)	-19	(4.0)	−
Italy	627	(2.6)	-19	(2.7)	−
Luxembourg	627	(2.7)	-19	(2.8)	−
Greece	631	(5.4)	-15	(5.4)	0
Czech Republic	636	(4.0)	-10	(4.1)	0
Iceland	640	(3.6)	-7	(3.7)	0
France	641	(3.3)	-6	(3.4)	0
Switzerland	643	(5.0)	-3	(5.1)	0
Netherlands	645	(4.2)	-1	(4.2)	0
Poland	645	(4.4)	-1	(4.5)	0
Austria	646	(4.7)	0	(4.8)	0
Scotland	646	(3.9)	0	(3.9)	0
Republic of Ireland	647	(3.3)	1	(3.4)	0
United States	651	(4.5)	5	(4.6)	0
Germany	652	(3.9)	6	(3.9)	0
Japan	652	(4.7)	6	(4.8)	0
Norway	656	(3.9)	10	(4.0)	0
Korea	660	(5.0)	13	(5.1)	0
Sweden	660	(3.6)	14	(3.7)	+
Belgium	662	(3.5)	16	(3.5)	+
Canada	663	(2.5)	17	(2.6)	+
Finland	666	(2.5)	20	(2.6)	+
Northern Ireland	667	(4.0)	21	(4.1)	+
Australia	673	(3.1)	27	(3.2)	+
New Zealand	682	(3.4)	36	(3.5)	+
OECD average	646	(0.7)			

+ Country score is significantly higher than OECD average score
0 Country score is not significantly different from OECD average score
− Country score is significantly lower than OECD average score

Table A3.5: *Comparison of Northern Ireland Score at the 5th Percentile on Reading with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 5th percentile on reading literacy	5th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	238	(6.1)	-110	(9.5)	–
Greece	288	(6.2)	-60	(9.5)	–
Turkey	291	(6.1)	-57	(9.5)	–
Germany	295	(6.0)	-53	(9.4)	–
Italy	295	(8.6)	-53	(11.2)	–
Luxembourg	302	(3.8)	-46	(8.2)	–
Belgium	302	(8.4)	-46	(11.1)	–
Slovak Republic	310	(5.7)	-38	(9.2)	–
Japan	310	(7.3)	-38	(10.3)	–
Portugal	311	(6.6)	-37	(9.8)	–
Spain	313	(5.8)	-35	(9.2)	–
Austria	313	(7.5)	-35	(10.4)	–
Iceland	316	(6.4)	-32	(9.6)	–
United States	319	(6.6)	-29	(9.8)	0
Czech Republic	320	(9.5)	-28	(11.9)	0
France	320	(7.7)	-28	(10.6)	0
Norway	321	(6.1)	-27	(9.4)	0
Hungary	324	(6.0)	-24	(9.4)	0
Switzerland	330	(5.8)	-18	(9.3)	0
Poland	330	(6.3)	-17	(9.6)	0
New Zealand	338	(6.2)	-10	(9.5)	0
Denmark	338	(6.6)	-10	(9.8)	0
Sweden	349	(6.0)	1	(9.4)	0
Australia	352	(4.8)	4	(8.7)	0
Republic of Ireland	364	(7.3)	16	(10.3)	0
Scotland	365	(7.2)	17	(10.2)	0
Netherlands	369	(6.4)	21	(9.7)	0
Canada	373	(3.1)	25	(7.9)	0
Korea	393	(6.0)	45	(9.4)	+
Finland	400	(4.8)	52	(8.7)	+
Northern Ireland	348	(7.2)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A3.6: *Comparison of Northern Ireland Score at the 25th Percentile on Reading with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 25th percentile on reading literacy	25th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	335	(4.9)	-118	(6.7)	–
Turkey	377	(5.7)	-76	(7.2)	–
Greece	406	(5.2)	-47	(6.8)	–
Slovak Republic	408	(4.6)	-45	(6.4)	–
Italy	411	(4.4)	-42	(6.3)	–
Luxembourg	416	(2.8)	-37	(5.3)	–
Portugal	418	(5.2)	-36	(6.8)	–
Germany	419	(5.6)	-35	(7.2)	–
Spain	421	(3.4)	-33	(5.6)	–
Hungary	422	(3.3)	-31	(5.5)	–
Austria	423	(4.9)	-30	(6.6)	–
Czech Republic	428	(4.7)	-25	(6.5)	–
United States	429	(4.1)	-24	(6.1)	–
Iceland	431	(2.3)	-22	(5.0)	–
Japan	431	(5.4)	-22	(7.0)	0
Norway	434	(3.8)	-19	(5.9)	0
France	436	(4.0)	-17	(6.0)	0
Poland	436	(3.6)	-17	(5.7)	0
Denmark	438	(4.0)	-15	(6.0)	0
Switzerland	439	(4.5)	-15	(6.3)	0
Belgium	441	(3.7)	-12	(5.8)	0
New Zealand	453	(3.5)	0	(5.7)	0
Sweden	453	(3.4)	0	(5.6)	0
Netherlands	454	(4.5)	1	(6.4)	+
Republic of Ireland	460	(3.8)	7	(5.9)	+
Scotland	461	(3.5)	8	(5.7)	+
Australia	464	(3.0)	11	(5.4)	+
Canada	472	(2.3)	19	(5.0)	+
Korea	484	(4.1)	31	(6.0)	+
Finland	494	(2.4)	41	(5.1)	+
Northern Ireland	453	(4.5)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A3.7: *Comparison of Northern Ireland Score at the 75th Percentile on Reading with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 75th percentile on reading literacy	75th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	467	(4.3)	-120	(6.1)	−
Turkey	500	(6.6)	-86	(7.9)	−
Slovak Republic	535	(3.2)	-51	(5.4)	−
Portugal	544	(3.5)	-43	(5.5)	−
Greece	546	(4.4)	-40	(6.2)	−
Hungary	546	(3.3)	-40	(5.4)	−
Italy	547	(2.5)	-39	(5.0)	−
Spain	548	(2.8)	-38	(5.1)	−
Luxembourg	551	(1.9)	-35	(4.7)	−
Denmark	553	(3.0)	-33	(5.2)	−
Czech Republic	555	(4.0)	-31	(5.9)	−
Iceland	560	(2.2)	-26	(4.9)	−
Poland	563	(3.1)	-24	(5.3)	−
Austria	565	(4.2)	-21	(6.0)	−
Switzerland	565	(3.7)	-21	(5.7)	−
France	565	(2.8)	-21	(5.2)	−
United States	568	(3.6)	-18	(5.6)	−
Norway	571	(3.6)	-16	(5.6)	0
Germany	572	(3.4)	-15	(5.5)	0
Japan	574	(3.7)	-12	(5.7)	0
Netherlands	576	(3.2)	-10	(5.4)	0
Scotland	577	(3.2)	-10	(5.4)	0
Republic of Ireland	577	(2.8)	-9	(5.1)	0
Sweden	582	(2.9)	-5	(5.2)	0
Belgium	587	(2.1)	1	(4.8)	0
Canada	590	(2.1)	3	(4.8)	0
Korea	590	(2.8)	4	(5.2)	0
Australia	594	(2.5)	7	(5.0)	0
New Zealand	596	(2.8)	10	(5.2)	0
Finland	599	(1.7)	12	(4.6)	0
Northern Ireland	586	(4.3)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
− Country score is significantly lower than score for N. Ireland

Table A3.8: *Comparison of Northern Ireland Score at the 95th Percentile on Reading with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 95th percentile on reading literacy	95th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	552	(5.5)	-115	(6.8)	–
Turkey	608	(19.4)	-59	(19.8)	–
Slovak Republic	613	(3.5)	-54	(5.3)	–
Portugal	617	(3.9)	-51	(5.6)	–
Hungary	625	(5.0)	-42	(6.4)	–
Spain	625	(3.1)	-42	(5.0)	–
Denmark	627	(3.9)	-40	(5.6)	–
Italy	627	(2.6)	-40	(4.7)	–
Luxembourg	627	(2.7)	-40	(4.8)	–
Greece	631	(5.4)	-36	(6.7)	–
Czech Republic	636	(4.0)	-31	(5.6)	–
Iceland	640	(3.6)	-28	(5.4)	–
France	641	(3.3)	-27	(5.2)	–
Switzerland	643	(5.0)	-24	(6.4)	–
Netherlands	645	(4.2)	-22	(5.8)	–
Poland	645	(4.4)	-22	(5.9)	–
Austria	646	(4.7)	-21	(6.2)	–
Scotland	646	(3.9)	-21	(5.5)	–
Republic of Ireland	647	(3.3)	-20	(5.2)	–
United States	651	(4.5)	-16	(6.0)	0
Germany	652	(3.9)	-15	(5.5)	0
Japan	652	(4.7)	-15	(6.2)	0
Norway	656	(3.9)	-11	(5.6)	0
Korea	660	(5.0)	-8	(6.4)	0
Sweden	660	(3.6)	-7	(5.4)	0
Belgium	662	(3.5)	-5	(5.3)	0
Canada	663	(2.5)	-4	(4.7)	0
Finland	666	(2.5)	-1	(4.7)	0
Australia	673	(3.1)	6	(5.0)	0
New Zealand	682	(3.4)	15	(5.3)	0
Northern Ireland	667	(4.0)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A3.9: *Comparison of Score of Girls at the 5th Percentile on Reading Literacy in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 5th percentile on reading literacy - girls	5th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	250	(8.7)	-127	(12.2)	−
Greece	323	(7.5)	-54	(11.4)	−
Germany	323	(7.6)	-54	(11.5)	−
Turkey	324	(7.1)	-54	(11.1)	−
Luxembourg	329	(7.1)	-48	(11.1)	−
Slovak Republic	330	(9.2)	-47	(12.6)	−
Japan	334	(9.3)	-44	(12.6)	−
Italy	334	(7.7)	-43	(11.6)	−
Belgium	335	(9.7)	-42	(13.0)	0
Czech Republic	336	(15.8)	-41	(18.0)	0
United States	344	(8.1)	-34	(11.8)	0
Portugal	345	(9.1)	-32	(12.5)	0
Spain	347	(7.5)	-31	(11.4)	0
Hungary	347	(7.8)	-30	(11.6)	0
Austria	353	(8.7)	-25	(12.2)	0
France	357	(8.7)	-21	(12.2)	0
Denmark	357	(8.8)	-20	(12.3)	0
Switzerland	361	(6.7)	-17	(10.9)	0
New Zealand	362	(8.2)	-15	(11.9)	0
Norway	364	(7.7)	-13	(11.5)	0
Poland	372	(8.2)	-6	(11.9)	0
Iceland	374	(6.7)	-4	(10.9)	0
Sweden	378	(8.0)	0	(11.7)	0
Netherlands	383	(8.7)	6	(12.2)	0
Republic of Ireland	385	(10.0)	8	(13.2)	0
Scotland	387	(7.0)	10	(11.1)	0
Australia	389	(5.9)	11	(10.4)	0
Canada	402	(4.7)	25	(9.8)	0
Korea	412	(8.0)	35	(11.8)	0
Finland	439	(4.7)	61	(9.8)	+
Northern Ireland	377	(8.6)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
− Country score is significantly lower than score for N. Ireland

Table A3.10: *Comparison of Score of Girls at the 25th Percentile on Reading Literacy in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 25th percentile on reading literacy - girls	25th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	349	(6.1)	-123	(9.6)	–
Turkey	401	(5.9)	-72	(9.4)	–
Slovak Republic	428	(5.2)	-45	(9.0)	–
Greece	431	(4.4)	-41	(8.6)	–
Italy	436	(5.7)	-37	(9.3)	–
Luxembourg	437	(3.5)	-36	(8.2)	–
Portugal	442	(5.4)	-31	(9.1)	–
Hungary	442	(4.3)	-30	(8.5)	–
Spain	444	(4.0)	-28	(8.3)	–
Japan	446	(6.7)	-27	(9.9)	0
Czech Republic	448	(6.1)	-25	(9.6)	0
United States	448	(4.6)	-24	(8.7)	0
Germany	449	(6.8)	-23	(10.0)	0
Denmark	452	(3.8)	-20	(8.3)	0
Austria	454	(6.0)	-19	(9.5)	0
France	457	(4.8)	-16	(8.8)	0
Poland	458	(4.3)	-14	(8.5)	0
Switzerland	460	(5.0)	-12	(8.9)	0
Norway	465	(4.3)	-8	(8.5)	0
Iceland	465	(3.9)	-7	(8.3)	0
Belgium	465	(5.3)	-7	(9.1)	0
Netherlands	466	(5.1)	-6	(8.9)	0
New Zealand	470	(5.4)	-3	(9.1)	0
Scotland	473	(5.3)	1	(9.0)	0
Sweden	475	(3.9)	2	(8.3)	0
Republic of Ireland	477	(5.4)	5	(9.1)	0
Australia	489	(3.8)	16	(8.3)	0
Canada	493	(2.8)	20	(7.9)	0
Korea	499	(4.9)	26	(8.8)	0
Finland	520	(2.4)	47	(7.7)	+
Northern Ireland	473	(7.3)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A3.11: *Comparison of Score of Girls at the 75th Percentile on Reading Literacy in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 75th percentile on reading literacy - girls	75th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	474	(4.7)	-123	(7.4)	–
Turkey	513	(7.6)	-83	(9.5)	–
Slovak Republic	549	(3.7)	-48	(6.8)	–
Portugal	554	(4.1)	-42	(7.0)	–
Greece	556	(5.1)	-40	(7.7)	–
Hungary	559	(4.5)	-38	(7.3)	–
Italy	559	(3.1)	-38	(6.5)	–
Spain	561	(2.9)	-35	(6.4)	–
Luxembourg	562	(2.8)	-35	(6.3)	–
Denmark	563	(3.7)	-34	(6.8)	–
Czech Republic	569	(4.0)	-28	(7.0)	–
Poland	577	(3.3)	-19	(6.6)	0
France	578	(3.6)	-19	(6.8)	0
Switzerland	579	(3.8)	-17	(6.9)	0
United States	580	(3.9)	-17	(6.9)	0
Japan	580	(3.6)	-17	(6.8)	0
Austria	581	(5.0)	-15	(7.6)	0
Iceland	582	(3.2)	-15	(6.6)	0
Netherlands	585	(3.6)	-12	(6.8)	0
Scotland	586	(4.7)	-11	(7.4)	0
Germany	587	(4.0)	-10	(7.0)	0
Norway	590	(3.8)	-7	(6.9)	0
Republic of Ireland	590	(4.0)	-7	(7.0)	0
Sweden	597	(3.9)	0	(6.9)	0
Belgium	599	(3.1)	3	(6.5)	0
Korea	600	(4.8)	3	(7.5)	0
Canada	603	(2.0)	6	(6.1)	0
New Zealand	607	(4.6)	10	(7.4)	0
Australia	608	(2.7)	11	(6.3)	0
Finland	616	(2.7)	19	(6.3)	0
Northern Ireland	597	(5.7)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A3.12: *Comparison of Score of Girls at the 95th Percentile on Reading Literacy in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 95th percentile on reading literacy - girls	95th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	556	(6.4)	-118	(8.8)	–
Turkey	615	(18.7)	-60	(19.6)	–
Portugal	623	(6.8)	-52	(9.2)	–
Slovak Republic	625	(4.1)	-50	(7.3)	–
Denmark	634	(5.2)	-41	(8.0)	–
Spain	635	(3.8)	-40	(7.2)	–
Luxembourg	636	(3.9)	-39	(7.2)	–
Italy	636	(2.8)	-39	(6.7)	–
Hungary	636	(5.9)	-39	(8.5)	–
Greece	638	(6.8)	-37	(9.2)	–
Czech Republic	647	(5.0)	-28	(7.9)	–
Netherlands	651	(4.2)	-24	(7.4)	0
France	651	(5.8)	-23	(8.4)	0
Japan	654	(5.2)	-20	(8.0)	0
Scotland	655	(5.4)	-20	(8.1)	0
Iceland	655	(4.5)	-20	(7.6)	0
Switzerland	656	(5.9)	-19	(8.5)	0
Poland	656	(5.6)	-19	(8.3)	0
Republic of Ireland	657	(4.4)	-18	(7.5)	0
Austria	658	(5.6)	-17	(8.3)	0
United States	661	(5.4)	-14	(8.2)	0
Germany	661	(4.9)	-13	(7.8)	0
Norway	669	(4.9)	-5	(7.8)	0
Korea	670	(7.3)	-5	(9.5)	0
Sweden	672	(4.4)	-3	(7.5)	0
Belgium	672	(3.0)	-2	(6.8)	0
Canada	673	(3.2)	-2	(6.9)	0
Finland	678	(3.5)	3	(7.0)	0
Australia	683	(3.8)	8	(7.2)	0
New Zealand	688	(6.3)	14	(8.8)	0
Northern Ireland	675	(6.1)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A3.13: *Comparison of Score of Boys at the 5th Percentile on Reading Literacy in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 5th percentile on reading literacy - boys	5th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	228	(7.2)	-90	(18.6)	–
Greece	263	(9.1)	-55	(19.4)	0
Italy	270	(11.2)	-49	(20.5)	0
Turkey	271	(8.4)	-47	(19.1)	0
Germany	275	(10.5)	-43	(20.1)	0
Belgium	278	(9.8)	-41	(19.8)	0
Luxembourg	280	(7.0)	-39	(18.5)	0
Iceland	286	(7.7)	-33	(18.8)	0
Austria	289	(8.4)	-30	(19.1)	0
Portugal	290	(7.4)	-28	(18.7)	0
Norway	291	(6.9)	-27	(18.5)	0
Japan	292	(9.8)	-26	(19.8)	0
France	294	(9.9)	-24	(19.8)	0
Slovak Republic	296	(7.3)	-23	(18.7)	0
United States	299	(7.1)	-19	(18.6)	0
Poland	302	(9.0)	-17	(19.4)	0
Czech Republic	306	(12.0)	-12	(21.0)	0
Hungary	307	(9.8)	-12	(19.7)	0
Spain	313	(5.8)	-6	(18.1)	0
Switzerland	313	(6.9)	-6	(18.5)	0
New Zealand	322	(6.1)	3	(18.2)	0
Denmark	324	(8.4)	6	(19.1)	0
Australia	329	(5.6)	10	(18.1)	0
Sweden	331	(9.7)	13	(19.7)	0
Scotland	346	(8.8)	28	(19.3)	0
Canada	351	(4.4)	32	(17.7)	0
Republic of Ireland	351	(8.8)	33	(19.3)	0
Netherlands	359	(9.0)	41	(19.4)	0
Finland	378	(5.5)	59	(18.0)	+
Korea	380	(7.2)	62	(18.6)	+
Northern Ireland	318	(17.2)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A3.14: *Comparison of Score of Boys at the 25th Percentile on Reading Literacy in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 25th percentile on reading literacy - boys	25th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	322	(6.5)	-112	(9.9)	–
Turkey	358	(6.7)	-76	(10.0)	–
Greece	380	(6.4)	-55	(9.8)	–
Italy	387	(7.7)	-48	(10.7)	–
Slovak Republic	390	(4.9)	-44	(8.9)	–
Portugal	392	(7.1)	-43	(10.2)	–
Germany	395	(6.8)	-40	(10.0)	–
Austria	395	(6.7)	-40	(10.0)	–
Luxembourg	396	(5.1)	-39	(9.0)	–
Iceland	401	(4.5)	-34	(8.7)	–
Hungary	406	(5.0)	-29	(8.9)	–
Norway	408	(5.1)	-27	(9.0)	0
United States	410	(4.7)	-25	(8.8)	0
Czech Republic	412	(5.5)	-23	(9.2)	0
France	413	(6.2)	-22	(9.7)	0
Poland	413	(5.8)	-21	(9.4)	0
Japan	414	(7.3)	-21	(10.4)	0
Belgium	419	(6.7)	-16	(10.0)	0
Switzerland	420	(5.5)	-15	(9.2)	0
Spain	421	(3.4)	-14	(8.1)	0
Denmark	422	(5.4)	-12	(9.1)	0
Sweden	433	(4.0)	-1	(8.4)	0
New Zealand	438	(4.0)	3	(8.4)	0
Australia	442	(3.8)	7	(8.3)	0
Netherlands	442	(6.5)	8	(9.9)	0
Republic of Ireland	445	(5.0)	10	(8.9)	0
Scotland	448	(5.1)	14	(9.0)	0
Canada	454	(2.9)	20	(7.9)	0
Finland	470	(3.3)	35	(8.1)	+
Korea	475	(5.8)	40	(9.4)	+
Northern Ireland	435	(7.4)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A3.15: *Comparison of Score of Boys at the 75th Percentile on Reading Literacy in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 75th percentile on reading literacy - boys	75th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	457	(5.4)	-116	(7.2)	–
Turkey	488	(8.4)	-86	(9.6)	–
Slovak Republic	521	(4.3)	-53	(6.4)	–
Portugal	529	(4.6)	-44	(6.6)	–
Italy	531	(4.7)	-42	(6.7)	–
Greece	532	(5.5)	-41	(7.3)	–
Hungary	534	(4.2)	-40	(6.4)	–
Iceland	534	(3.0)	-39	(5.7)	–
Czech Republic	540	(4.5)	-33	(6.6)	–
Luxembourg	540	(3.8)	-33	(6.1)	–
Denmark	541	(4.2)	-32	(6.4)	–
Austria	544	(5.0)	-29	(6.9)	–
Poland	546	(3.6)	-27	(6.0)	–
Switzerland	548	(5.6)	-25	(7.4)	–
Spain	548	(2.8)	-25	(5.5)	–
Norway	548	(3.8)	-25	(6.1)	–
France	548	(3.5)	-25	(5.9)	–
Germany	552	(4.6)	-21	(6.6)	0
United States	554	(4.2)	-20	(6.4)	0
Republic of Ireland	562	(4.0)	-11	(6.2)	0
Sweden	563	(4.1)	-10	(6.3)	0
Scotland	566	(4.8)	-7	(6.7)	0
Japan	566	(6.7)	-7	(8.3)	0
Netherlands	567	(4.2)	-6	(6.4)	0
Belgium	574	(3.5)	1	(5.9)	0
Australia	577	(3.4)	4	(5.9)	0
Finland	578	(2.8)	5	(5.5)	0
Canada	579	(2.5)	6	(5.4)	0
Korea	583	(3.1)	10	(5.7)	0
New Zealand	584	(3.5)	11	(5.9)	0
Northern Ireland	573	(4.8)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A3.16: *Comparison of Score of Boys at the 95th Percentile on Reading Literacy in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 95th percentile on reading literacy - boys	95th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	544	(6.9)	-113	(9.6)	–
Slovak Republic	599	(4.9)	-58	(8.2)	–
Turkey	600	(22.0)	-57	(23.0)	–
Portugal	608	(4.5)	-49	(8.0)	–
Hungary	612	(5.9)	-45	(8.9)	–
Iceland	615	(5.4)	-42	(8.5)	–
Italy	615	(3.8)	-42	(7.7)	–
Denmark	616	(5.6)	-41	(8.7)	–
Luxembourg	617	(5.1)	-40	(8.4)	–
Greece	621	(7.3)	-36	(9.8)	–
Czech Republic	622	(6.3)	-35	(9.1)	–
France	623	(5.4)	-34	(8.5)	–
Spain	625	(3.1)	-32	(7.3)	–
Austria	628	(5.6)	-29	(8.7)	–
Switzerland	629	(7.6)	-28	(10.1)	0
Poland	631	(5.0)	-26	(8.3)	0
Republic of Ireland	633	(4.4)	-24	(8.0)	0
Scotland	635	(4.9)	-22	(8.2)	0
Norway	637	(6.8)	-20	(9.5)	0
Netherlands	637	(5.2)	-20	(8.4)	0
Germany	639	(6.6)	-18	(9.4)	0
United States	640	(4.8)	-17	(8.2)	0
Sweden	643	(5.0)	-14	(8.3)	0
Finland	646	(4.4)	-11	(8.0)	0
Belgium	650	(2.9)	-8	(7.2)	0
Korea	650	(5.3)	-7	(8.5)	0
Japan	650	(7.8)	-7	(10.2)	0
Canada	655	(2.9)	-2	(7.2)	0
Australia	659	(4.8)	2	(8.2)	0
New Zealand	673	(4.9)	16	(8.2)	0

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Appendix to Chapter 4
 Scientific Literacy – Additional Tables

Table A4.1: *Comparison of Country Scores at the 5th Percentile on Scientific Literacy with OECD Country Average Score*

Countries in ascending order of difference from OECD average score at 5th percentile on scientific literacy	5th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from OECD average score?
Mexico	264	(5.1)	-60	(5.3)	–
Turkey	295	(5.0)	-29	(5.1)	–
Italy	303	(7.3)	-21	(7.4)	–
Denmark	306	(6.4)	-18	(6.5)	–
Germany	307	(7.1)	-17	(7.3)	–
Luxembourg	309	(4.2)	-15	(4.4)	–
Portugal	310	(5.9)	-14	(6.1)	0
Norway	312	(5.3)	-12	(5.4)	0
Greece	315	(5.8)	-9	(5.9)	0
Spain	318	(5.8)	-6	(5.9)	0
Belgium	320	(6.1)	-4	(6.3)	0
France	321	(6.7)	-3	(6.9)	0
United States	322	(5.4)	-2	(5.6)	0
Austria	327	(6.6)	3	(6.7)	0
Sweden	327	(6.5)	4	(6.6)	0
Switzerland	328	(5.8)	4	(6.0)	0
Iceland	331	(5.9)	7	(6.0)	0
Slovak Republic	331	(7.0)	8	(7.1)	0
Poland	333	(5.3)	9	(5.4)	0
Hungary	340	(5.9)	16	(6.0)	0
Northern Ireland	345	(7.8)	22	(7.9)	0
New Zealand	347	(3.9)	24	(4.1)	+
Scotland	348	(6.6)	24	(6.7)	+
Republic of Ireland	348	(6.1)	24	(6.3)	+
Australia	351	(4.2)	27	(4.3)	+
Canada	352	(3.9)	28	(4.1)	+
Czech Republic	356	(5.8)	33	(5.9)	+
Japan	357	(7.0)	33	(7.1)	+
Netherlands	363	(6.6)	39	(6.7)	+
Korea	365	(6.3)	41	(6.4)	+
Finland	393	(3.5)	69	(3.7)	+
OECD average	324	(1.2)			

+ Country score is significantly higher than OECD average score
0 Country score is not significantly different from OECD average score
– Country score is significantly lower than OECD average score

Table A4.2:   *Comparison of Country Scores at the 25th Percentile on Scientific Literacy with OECD Country Average Score*

Countries in ascending order of difference from OECD average score at 25th percentile on scientific literacy	25th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from OECD average score?
Mexico	347	(3.5)	-80	(3.6)	−
Turkey	367	(4.9)	-60	(5.0)	−
Portugal	405	(5.0)	-22	(5.1)	−
Denmark	407	(3.9)	-20	(4.0)	−
Greece	412	(4.5)	-15	(4.6)	−
Luxembourg	413	(2.9)	-14	(3.0)	−
Norway	414	(4.0)	-13	(4.1)	0
Italy	415	(4.9)	-12	(5.0)	0
United States	420	(3.8)	-7	(3.9)	0
Spain	421	(3.4)	-6	(3.6)	0
Austria	423	(4.1)	-4	(4.3)	0
Poland	426	(4.3)	-1	(4.4)	0
Germany	427	(5.8)	0	(5.9)	0
Slovak Republic	428	(4.6)	1	(4.7)	0
Iceland	432	(2.8)	5	(3.0)	0
Sweden	435	(3.5)	8	(3.6)	0
France	435	(4.4)	8	(4.5)	0
Belgium	436	(3.8)	9	(3.9)	0
Hungary	437	(3.1)	10	(3.2)	0
Switzerland	440	(4.5)	14	(4.6)	0
Republic of Ireland	442	(3.7)	15	(3.8)	+
Scotland	445	(4.2)	18	(4.3)	+
New Zealand	448	(3.9)	21	(4.1)	+
Netherlands	451	(5.3)	24	(5.4)	+
Northern Ireland	452	(4.3)	25	(4.5)	+
Canada	452	(2.7)	25	(2.8)	+
Czech Republic	453	(4.2)	26	(4.4)	+
Australia	457	(3.1)	30	(3.3)	+
Korea	473	(4.8)	46	(4.9)	+
Japan	475	(6.1)	48	(6.2)	+
Finland	488	(2.8)	61	(3.0)	+
OECD average	427	(1.0)			

+ Country score is significantly higher than OECD average score
0 Country score is not significantly different from OECD average score
− Country score is significantly lower than OECD average score

Table A4.3: *Comparison of Country Scores at the 75th Percentile on Scientific Literacy with OECD Country Average Score*

Countries in ascending order of difference from OECD average score at 75th percentile on scientific literacy	75th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from OECD average score?
Mexico	462	(4.2)	-112	(4.3)	−
Turkey	492	(8.4)	-83	(8.4)	−
Portugal	533	(3.4)	-41	(3.5)	−
Denmark	547	(3.6)	-28	(3.7)	−
Greece	552	(4.0)	-22	(4.1)	−
Luxembourg	556	(2.4)	-18	(2.6)	−
Spain	557	(3.1)	-18	(3.2)	−
Norway	557	(3.8)	-17	(3.9)	−
Austria	561	(4.0)	-13	(4.1)	−
Iceland	562	(2.7)	-13	(2.8)	−
Italy	563	(2.8)	-12	(2.9)	−
United States	564	(3.3)	-10	(3.4)	0
Slovak Republic	566	(3.6)	-9	(3.7)	0
Poland	570	(3.5)	-5	(3.6)	0
Republic of Ireland	572	(3.0)	-3	(3.1)	0
Hungary	572	(3.9)	-2	(3.9)	0
Sweden	581	(4.0)	7	(4.0)	0
Germany	584	(4.0)	9	(4.0)	0
Scotland	585	(3.3)	10	(3.4)	0
Canada	588	(2.4)	14	(2.6)	+
Switzerland	588	(4.6)	14	(4.7)	+
Belgium	588	(2.4)	14	(2.5)	+
France	591	(3.4)	17	(3.5)	+
Czech Republic	594	(3.9)	20	(4.0)	+
New Zealand	596	(3.3)	21	(3.4)	+
Australia	596	(2.7)	22	(2.8)	+
Northern Ireland	598	(4.8)	23	(4.9)	+
Netherlands	599	(4.0)	24	(4.1)	+
Korea	609	(4.3)	34	(4.3)	+
Finland	611	(2.2)	37	(2.4)	+
Japan	624	(4.2)	50	(4.3)	+
OECD average	575	(0.8)			

+ Country score is significantly higher than OECD average score
0 Country score is not significantly different from OECD average score
− Country score is significantly lower than OECD average score

Table A4.4: *Comparison of Country Scores at the 95th Percentile on Scientific Literacy with OECD Country Average Score*

Countries in ascending order of difference from OECD average score at 95th percentile on scientific literacy	95th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from OECD average score?
Mexico	551	(6.8)	-117	(6.8)	–
Turkey	609	(20.0)	-59	(20.0)	–
Portugal	618	(4.5)	-49	(4.6)	–
Denmark	638	(4.4)	-30	(4.5)	–
Greece	643	(4.9)	-24	(5.0)	–
Spain	644	(3.8)	-23	(3.9)	–
Austria	644	(4.4)	-23	(4.5)	–
Luxembourg	645	(2.9)	-22	(3.1)	–
Iceland	647	(3.6)	-21	(3.7)	–
Norway	651	(6.1)	-16	(6.1)	–
Republic of Ireland	652	(3.4)	-15	(3.6)	–
United States	654	(3.5)	-13	(3.7)	–
Italy	656	(3.9)	-12	(4.1)	0
Slovak Republic	657	(3.9)	-11	(4.0)	0
Hungary	658	(4.6)	-10	(4.7)	0
Poland	666	(6.3)	-1	(6.4)	0
Belgium	668	(2.6)	1	(2.8)	0
Germany	672	(3.5)	4	(3.7)	0
Sweden	673	(4.8)	6	(4.9)	0
Scotland	675	(3.8)	8	(4.0)	0
Canada	676	(2.9)	8	(3.1)	0
France	682	(4.5)	14	(4.7)	0
Netherlands	682	(4.3)	15	(4.4)	+
Switzerland	683	(6.8)	16	(6.9)	0
Australia	686	(3.7)	18	(3.9)	+
Czech Republic	686	(4.5)	19	(4.6)	+
New Zealand	687	(3.2)	19	(3.4)	+
Northern Ireland	689	(4.7)	22	(4.8)	+
Finland	691	(3.5)	23	(3.7)	+
Korea	695	(5.8)	28	(5.9)	+
Japan	715	(7.9)	48	(8.0)	+
OECD average	668	(1.0)			

+ Country score is significantly higher than OECD average score
0 Country score is not significantly different from OECD average score
– Country score is significantly lower than OECD average score

Table A4.5: *Comparison of Northern Ireland Score at the 5th Percentile with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 5th percentile on scientific literacy	5th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	264	(5.1)	-82	(9.3)	–
Turkey	295	(5.0)	-51	(9.3)	–
Italy	303	(7.3)	-43	(10.7)	–
Denmark	306	(6.4)	-40	(10.1)	–
Germany	307	(7.1)	-39	(10.6)	–
Luxembourg	309	(4.2)	-36	(8.9)	–
Portugal	310	(5.9)	-36	(9.8)	–
Norway	312	(5.3)	-34	(9.4)	–
Greece	315	(5.8)	-31	(9.7)	0
Spain	318	(5.8)	-28	(9.7)	0
Belgium	320	(6.1)	-26	(9.9)	0
France	321	(6.7)	-25	(10.3)	0
United States	322	(5.4)	-24	(9.5)	0
Austria	327	(6.6)	-18	(10.2)	0
Sweden	327	(6.5)	-18	(10.2)	0
Switzerland	328	(5.8)	-18	(9.8)	0
Iceland	331	(5.9)	-14	(9.8)	0
Slovak Republic	331	(7.0)	-14	(10.5)	0
Poland	333	(5.3)	-12	(9.4)	0
Hungary	340	(5.9)	-6	(9.8)	0
New Zealand	347	(3.9)	2	(8.8)	0
Scotland	348	(6.6)	2	(10.2)	0
Republic of Ireland	348	(6.1)	2	(9.9)	0
Australia	351	(4.2)	6	(8.9)	0
Canada	352	(3.9)	6	(8.7)	0
Czech Republic	356	(5.8)	11	(9.7)	0
Japan	357	(7.0)	11	(10.5)	0
Netherlands	363	(6.6)	17	(10.3)	0
Korea	365	(6.3)	19	(10.0)	0
Finland	393	(3.5)	47	(8.6)	+
Northern Ireland	345	(7.8)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A4.6: *Comparison of Northern Ireland Score at the 25th Percentile on Scientific Literacy with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 25th percentile on scientific literacy	25th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	347	(3.5)	-105	(5.6)	−
Turkey	367	(4.9)	-85	(6.5)	−
Portugal	405	(5.0)	-48	(6.6)	−
Denmark	407	(3.9)	-45	(5.8)	−
Greece	412	(4.5)	-40	(6.3)	−
Luxembourg	413	(2.9)	-39	(5.2)	−
Norway	414	(4.0)	-38	(5.9)	−
Italy	415	(4.9)	-38	(6.6)	−
United States	420	(3.8)	-32	(5.8)	−
Spain	421	(3.4)	-32	(5.5)	−
Austria	423	(4.1)	-29	(6.0)	−
Poland	426	(4.3)	-26	(6.1)	−
Germany	427	(5.8)	-26	(7.3)	−
Slovak Republic	428	(4.6)	-25	(6.3)	−
Iceland	432	(2.8)	-20	(5.2)	−
Sweden	435	(3.5)	-18	(5.6)	0
France	435	(4.4)	-17	(6.2)	0
Belgium	436	(3.8)	-16	(5.8)	0
Hungary	437	(3.1)	-15	(5.3)	0
Switzerland	440	(4.5)	-12	(6.2)	0
Republic of Ireland	442	(3.7)	-10	(5.7)	0
Scotland	445	(4.2)	-7	(6.1)	0
New Zealand	448	(3.9)	-4	(5.9)	0
Netherlands	451	(5.3)	-1	(6.9)	0
Canada	452	(2.7)	0	(5.1)	0
Czech Republic	453	(4.2)	1	(6.1)	0
Australia	457	(3.1)	5	(5.4)	0
Korea	473	(4.8)	20	(6.4)	0
Japan	475	(6.1)	23	(7.5)	0
Finland	488	(2.8)	36	(5.2)	+
Northern Ireland	452	(4.3)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
− Country score is significantly lower than score for N. Ireland

Table A4.7: *Comparison of Northern Ireland Score at the 75th Percentile on Reading with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 75th percentile on scientific literacy	75th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	462	(4.2)	-135	(6.4)	–
Turkey	492	(8.4)	-106	(9.7)	–
Portugal	533	(3.4)	-65	(5.9)	–
Denmark	547	(3.6)	-51	(6.0)	–
Greece	552	(4.0)	-46	(6.3)	–
Luxembourg	556	(2.4)	-41	(5.4)	–
Spain	557	(3.1)	-41	(5.7)	–
Norway	557	(3.8)	-41	(6.2)	–
Austria	561	(4.0)	-37	(6.3)	–
Iceland	562	(2.7)	-36	(5.5)	–
Italy	563	(2.8)	-35	(5.6)	–
United States	564	(3.3)	-34	(5.9)	–
Slovak Republic	566	(3.6)	-32	(6.0)	–
Poland	570	(3.5)	-28	(6.0)	–
Republic of Ireland	572	(3.0)	-26	(5.7)	–
Hungary	572	(3.9)	-26	(6.2)	–
Sweden	581	(4.0)	-17	(6.3)	0
Germany	584	(4.0)	-14	(6.3)	0
Scotland	585	(3.3)	-13	(5.9)	0
Canada	588	(2.4)	-9	(5.4)	0
Switzerland	588	(4.6)	-9	(6.7)	0
Belgium	588	(2.4)	-9	(5.4)	0
France	591	(3.4)	-6	(5.9)	0
Czech Republic	594	(3.9)	-3	(6.2)	0
New Zealand	596	(3.3)	-2	(5.9)	0
Australia	596	(2.7)	-1	(5.5)	0
Netherlands	599	(4.0)	1	(6.3)	0
Korea	609	(4.3)	11	(6.4)	0
Finland	611	(2.2)	13	(5.3)	0
Japan	624	(4.2)	27	(6.4)	+
Northern Ireland	598	(4.8)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A4.8: *Comparison of Northern Ireland Score at the 95th Percentile on Scientific Literacy with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 95th percentile on scientific literacy	95th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	551	(6.8)	-139	(8.2)	–
Turkey	609	(20.0)	-81	(20.5)	–
Portugal	618	(4.5)	-71	(6.5)	–
Denmark	638	(4.4)	-52	(6.4)	–
Greece	643	(4.9)	-46	(6.8)	–
Spain	644	(3.8)	-45	(6.1)	–
Austria	644	(4.4)	-45	(6.5)	–
Luxembourg	645	(2.9)	-44	(5.5)	–
Iceland	647	(3.6)	-43	(5.9)	–
Norway	651	(6.1)	-38	(7.7)	–
Republic of Ireland	652	(3.4)	-37	(5.8)	–
United States	654	(3.5)	-35	(5.9)	–
Italy	656	(3.9)	-34	(6.2)	–
Slovak Republic	657	(3.9)	-33	(6.1)	–
Hungary	658	(4.6)	-32	(6.6)	–
Poland	666	(6.3)	-23	(7.9)	0
Belgium	668	(2.6)	-21	(5.4)	–
Germany	672	(3.5)	-18	(5.9)	0
Sweden	673	(4.8)	-16	(6.7)	0
Scotland	675	(3.8)	-14	(6.1)	0
Canada	676	(2.9)	-14	(5.6)	0
France	682	(4.5)	-8	(6.6)	0
Netherlands	682	(4.3)	-7	(6.4)	0
Switzerland	683	(6.8)	-6	(8.3)	0
Australia	686	(3.7)	-4	(6.0)	0
Czech Republic	686	(4.5)	-3	(6.6)	0
New Zealand	687	(3.2)	-3	(5.7)	0
Finland	691	(3.5)	1	(5.9)	0
Korea	695	(5.8)	6	(7.5)	0
Japan	715	(7.9)	26	(9.2)	0
Northern Ireland	689	(4.7)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A4.9: *Comparison of Score of Girls at the 5th Percentile on Scientific Literacy in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 5th percentile on scientific literacy - girls	5th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	263	(7.8)	-90	(12.6)	−
Turkey	297	(6.1)	-56	(11.6)	−
Denmark	300	(7.5)	-53	(12.4)	−
Germany	306	(8.0)	-47	(12.7)	−
Luxembourg	311	(7.0)	-42	(12.1)	−
Italy	313	(5.7)	-40	(11.4)	−
Greece	314	(6.4)	-39	(11.8)	−
Portugal	315	(6.7)	-38	(11.9)	0
Norway	319	(5.5)	-34	(11.3)	0
Slovak Republic	324	(10.1)	-29	(14.1)	0
Spain	325	(7.6)	-28	(12.5)	0
United States	325	(6.0)	-28	(11.6)	0
Belgium	326	(7.2)	-27	(12.2)	0
Sweden	326	(7.3)	-27	(12.3)	0
Switzerland	328	(6.8)	-25	(12.0)	0
France	331	(7.4)	-22	(12.3)	0
Poland	336	(5.6)	-17	(11.3)	0
Austria	339	(9.0)	-14	(13.3)	0
Scotland	344	(9.6)	-9	(13.8)	0
New Zealand	345	(7.0)	-8	(12.1)	0
Hungary	347	(8.7)	-6	(13.2)	0
Iceland	348	(5.5)	-5	(11.3)	0
Republic of Ireland	348	(8.5)	-5	(13.0)	0
Czech Republic	354	(8.1)	1	(12.8)	0
Canada	355	(4.7)	2	(10.9)	0
Netherlands	360	(7.1)	7	(12.1)	0
Australia	360	(5.1)	7	(11.1)	0
Korea	364	(9.2)	11	(13.5)	0
Japan	366	(10.7)	13	(14.6)	0
Finland	404	(5.2)	51	(11.2)	+
Northern Ireland	353	(9.9)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
− Country score is significantly lower than score for N. Ireland

Table A4.10: *Comparison of Score of Girls at the 25th Percentile on Scientific Literacy in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 25th percentile on scientific literacy - girls	25th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	345	(4.6)	-110	(8.4)	–
Turkey	368	(5.9)	-87	(9.1)	–
Denmark	401	(4.7)	-54	(8.4)	–
Portugal	406	(5.2)	-49	(8.7)	–
Greece	409	(4.6)	-46	(8.3)	–
Luxembourg	411	(3.9)	-45	(8.0)	–
Italy	415	(6.3)	-40	(9.4)	–
Norway	416	(4.5)	-39	(8.3)	–
United States	419	(4.5)	-36	(8.3)	–
Spain	421	(3.4)	-34	(7.7)	–
Slovak Republic	424	(5.0)	-31	(8.6)	–
Poland	426	(4.8)	-30	(8.5)	–
Austria	428	(5.1)	-27	(8.6)	0
Germany	430	(6.1)	-26	(9.3)	0
Sweden	432	(4.9)	-23	(8.5)	0
France	437	(4.6)	-18	(8.4)	0
Switzerland	437	(5.5)	-18	(8.9)	0
Iceland	439	(3.7)	-16	(7.9)	0
Hungary	440	(4.4)	-16	(8.3)	0
Belgium	440	(5.7)	-15	(9.0)	0
Republic of Ireland	442	(5.0)	-13	(8.6)	0
New Zealand	442	(5.1)	-13	(8.6)	0
Scotland	443	(5.6)	-12	(9.0)	0
Netherlands	450	(6.3)	-5	(9.4)	0
Czech Republic	450	(5.4)	-5	(8.8)	0
Canada	453	(3.2)	-3	(7.7)	0
Australia	462	(4.1)	6	(8.1)	0
Korea	462	(7.6)	7	(10.3)	0
Japan	478	(6.6)	23	(9.6)	0
Finland	495	(3.6)	39	(7.8)	+
Northern Ireland	455	(7.0)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A4.11: *Comparison of Score of Girls at the 75th Percentile on Scientific Literacy in Northern Ireland, with Country Scores*

Countries in ascending order of difference from N. Ireland score at 75th percentile on scientific literacy - girls	75th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	456	(4.9)	-138	(8.6)	–
Turkey	490	(9.3)	-103	(11.7)	–
Portugal	526	(4.1)	-68	(8.2)	–
Denmark	537	(4.0)	-57	(8.1)	–
Greece	544	(5.2)	-50	(8.8)	–
Luxembourg	547	(3.4)	-46	(7.9)	–
Spain	552	(3.4)	-41	(7.9)	–
Norway	553	(4.4)	-41	(8.3)	–
Italy	555	(4.0)	-38	(8.1)	–
Slovak Republic	556	(5.0)	-38	(8.7)	–
Austria	558	(5.5)	-35	(9.0)	–
United States	560	(4.4)	-33	(8.3)	–
Iceland	563	(3.6)	-30	(8.0)	–
Poland	564	(4.2)	-29	(8.2)	–
Hungary	569	(4.0)	-24	(8.2)	0
Republic of Ireland	570	(4.7)	-23	(8.5)	0
Germany	578	(5.2)	-16	(8.8)	0
Sweden	578	(5.8)	-15	(9.2)	0
Scotland	580	(5.0)	-13	(8.7)	0
Switzerland	581	(4.8)	-12	(8.6)	0
Canada	583	(2.5)	-10	(7.5)	0
Belgium	584	(2.9)	-9	(7.6)	0
New Zealand	585	(4.0)	-8	(8.1)	0
France	589	(4.0)	-5	(8.2)	0
Czech Republic	592	(4.4)	-2	(8.3)	0
Australia	592	(3.4)	-1	(7.9)	0
Netherlands	595	(4.2)	2	(8.3)	0
Korea	596	(6.4)	3	(9.5)	0
Finland	610	(2.7)	17	(7.6)	0
Japan	618	(4.0)	25	(8.1)	0
Northern Ireland	593	(7.1)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A4.12: *Comparison of Score of Girls at the 95th Percentile on Scientific Literacy in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 95th percentile on scientific literacy - girls	95th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	541	(7.2)	-145	(9.9)	–
Turkey	600	(17.3)	-86	(18.6)	–
Portugal	608	(5.8)	-78	(9.0)	–
Greece	629	(5.5)	-56	(8.8)	–
Luxembourg	630	(4.7)	-56	(8.3)	–
Denmark	630	(6.3)	-56	(9.3)	–
Spain	637	(5.9)	-48	(9.0)	–
Austria	638	(6.1)	-48	(9.2)	–
Italy	644	(3.5)	-41	(7.7)	–
Norway	645	(5.7)	-41	(8.9)	–
Slovak Republic	645	(5.0)	-40	(8.5)	–
United States	646	(5.9)	-40	(9.0)	–
Iceland	648	(5.7)	-38	(8.9)	–
Republic of Ireland	648	(4.8)	-38	(8.4)	–
Hungary	652	(7.0)	-33	(9.8)	–
Poland	656	(6.9)	-30	(9.7)	0
Belgium	662	(3.0)	-24	(7.5)	0
Germany	662	(5.3)	-23	(8.7)	0
Scotland	667	(7.4)	-19	(10.1)	0
Canada	667	(3.4)	-18	(7.6)	0
Sweden	668	(6.5)	-18	(9.4)	0
New Zealand	672	(6.5)	-13	(9.5)	0
Switzerland	673	(6.9)	-13	(9.7)	0
Netherlands	675	(5.2)	-11	(8.6)	0
France	678	(5.4)	-8	(8.7)	0
Australia	678	(4.5)	-7	(8.2)	0
Czech Republic	681	(5.3)	-4	(8.6)	0
Korea	682	(9.0)	-4	(11.3)	0
Finland	688	(4.3)	3	(8.1)	0
Japan	703	(6.2)	17	(9.3)	0
Northern Ireland	686	(6.8)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland

Table A4.13: *Comparison of Score of Boys at the 5th Percentile on Scientific Literacy in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 5th percentile on scientific literacy - boys	5th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	264	(6.5)	-73	(14.3)	–
Italy	290	(11.9)	-48	(17.5)	0
Turkey	292	(7.2)	-45	(14.7)	0
Norway	303	(9.6)	-34	(16.0)	0
Portugal	304	(8.1)	-33	(15.2)	0
Luxembourg	307	(6.4)	-30	(14.3)	0
Germany	309	(11.1)	-28	(16.9)	0
France	311	(10.2)	-26	(16.3)	0
Denmark	314	(9.4)	-23	(15.9)	0
Belgium	314	(9.5)	-23	(15.9)	0
Greece	314	(8.3)	-23	(15.3)	0
Spain	318	(5.8)	-19	(14.0)	0
United States	318	(9.1)	-19	(15.7)	0
Austria	318	(6.2)	-19	(14.2)	0
Iceland	318	(7.8)	-19	(15.0)	0
Sweden	329	(9.3)	-8	(15.8)	0
Switzerland	329	(7.9)	-8	(15.0)	0
Poland	331	(6.5)	-6	(14.4)	0
Hungary	333	(6.2)	-4	(14.2)	0
Slovak Republic	337	(6.9)	0	(14.5)	0
Australia	344	(6.3)	7	(14.3)	0
Republic of Ireland	347	(8.0)	10	(15.1)	0
New Zealand	349	(4.6)	12	(13.6)	0
Canada	349	(4.7)	12	(13.6)	0
Japan	350	(7.6)	13	(14.9)	0
Scotland	350	(7.1)	13	(14.6)	0
Czech Republic	358	(7.7)	21	(14.9)	0
Korea	365	(8.9)	28	(15.6)	0
Netherlands	366	(10.4)	29	(16.5)	0
Finland	383	(6.0)	46	(14.1)	0
Northern Ireland	337	(12.8)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
− Country score is significantly lower than score for N. Ireland

Table A4.14: *Comparison of Score of Boys at the 25th Percentile on Scientific Literacy in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 25th percentile on scientific literacy - boys	25th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	349	(4.4)	-101	(8.9)	−
Turkey	366	(6.2)	-84	(10.0)	−
Portugal	404	(6.1)	-46	(9.9)	−
Norway	412	(5.4)	-38	(9.4)	−
Italy	414	(8.1)	-36	(11.2)	−
Luxembourg	415	(4.3)	-35	(8.9)	−
Greece	415	(6.3)	-35	(10.0)	−
Denmark	416	(5.4)	-34	(9.4)	−
Austria	418	(6.3)	-32	(10.0)	−
Spain	421	(3.4)	-29	(8.5)	−
United States	421	(5.3)	-29	(9.4)	0
Iceland	424	(4.3)	-26	(8.9)	0
Germany	425	(7.2)	-25	(10.6)	0
Poland	426	(5.5)	-23	(9.5)	0
Slovak Republic	431	(5.4)	-19	(9.5)	0
Belgium	432	(5.5)	-18	(9.5)	0
France	433	(6.9)	-17	(10.4)	0
Hungary	435	(3.8)	-15	(8.6)	0
Sweden	436	(4.3)	-13	(8.9)	0
Republic of Ireland	441	(5.1)	-8	(9.3)	0
Switzerland	444	(5.3)	-6	(9.4)	0
Scotland	446	(6.0)	-4	(9.8)	0
Netherlands	452	(6.1)	3	(9.9)	0
Australia	453	(3.5)	3	(8.5)	0
New Zealand	453	(4.8)	3	(9.1)	0
Czech Republic	456	(5.2)	6	(9.3)	0
Canada	459	(2.7)	9	(8.2)	0
Japan	471	(7.1)	22	(10.5)	0
Korea	481	(7.2)	31	(10.6)	0
Finland	482	(3.5)	33	(8.5)	+
Northern Ireland	450	(7.8)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
− Country score is significantly lower than score for N. Ireland

Table A4.15: *Comparison of Score of Boys at the 75th Percentile on Scientific Literacy in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 75th percentile on scientific literacy - boys	75th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	470	(5.2)	-132	(8.8)	−
Turkey	493	(9.1)	-109	(11.6)	−
Portugal	542	(4.3)	-60	(8.3)	−
Spain	557	(3.1)	-45	(7.8)	−
Denmark	557	(4.4)	-44	(8.4)	−
Iceland	559	(4.3)	-42	(8.3)	−
Norway	561	(3.8)	-41	(8.1)	−
Greece	562	(5.6)	-39	(9.1)	−
Austria	564	(5.4)	-37	(9.0)	−
Luxembourg	567	(3.5)	-35	(8.0)	−
United States	568	(4.2)	-34	(8.3)	−
Italy	571	(4.3)	-31	(8.3)	−
Republic of Ireland	574	(3.4)	-27	(7.9)	−
Slovak Republic	575	(4.4)	-27	(8.4)	0
Hungary	575	(5.3)	-27	(8.9)	0
Poland	576	(4.1)	-25	(8.3)	0
Sweden	584	(3.6)	-18	(8.0)	0
Scotland	589	(4.7)	-12	(8.5)	0
Germany	590	(4.5)	-12	(8.4)	0
Belgium	593	(4.0)	-9	(8.2)	0
France	596	(4.1)	-6	(8.2)	0
Switzerland	596	(7.1)	-6	(10.1)	0
Czech Republic	598	(5.0)	-4	(8.7)	0
Australia	600	(3.6)	-1	(8.0)	0
Canada	601	(3.4)	-1	(7.9)	0
Netherlands	602	(5.9)	1	(9.2)	0
New Zealand	607	(4.6)	5	(8.5)	0
Finland	612	(3.6)	10	(8.0)	0
Korea	617	(4.5)	16	(8.5)	0
Japan	632	(7.7)	30	(10.5)	0
Northern Ireland	602	(7.1)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
− Country score is significantly lower than score for N. Ireland

Table A4.16: *Comparison of Score of Boys at the 95th Percentile on Scientific Literacy in Northern Ireland, with Corresponding Country Scores*

Countries in ascending order of difference from N. Ireland score at 95th percentile on scientific literacy - boys	95th Percentile	S.E.	Difference (Advantage to Country)	S.E. Diff	Significantly Different from N. Ireland score?
Mexico	560	(7.5)	-134	(11.9)	–
Turkey	615	(23.3)	-79	(25.0)	–
Portugal	628	(5.1)	-66	(10.5)	–
Spain	644	(3.8)	-50	(9.9)	–
Denmark	645	(5.7)	-49	(10.8)	–
Iceland	646	(5.4)	-48	(10.6)	–
Austria	650	(6.2)	-44	(11.1)	–
Greece	654	(5.7)	-40	(10.8)	–
Republic of Ireland	657	(4.9)	-38	(10.4)	–
Luxembourg	657	(3.7)	-38	(9.9)	–
Norway	659	(7.7)	-36	(12.0)	0
Hungary	661	(6.9)	-33	(11.5)	0
United States	662	(6.2)	-33	(11.1)	0
Italy	665	(5.2)	-30	(10.6)	0
Slovak Republic	665	(4.7)	-29	(10.3)	0
Belgium	674	(3.5)	-20	(9.8)	0
Poland	677	(5.9)	-18	(10.9)	0
Sweden	679	(5.7)	-15	(10.8)	0
Germany	680	(6.6)	-14	(11.3)	0
Scotland	681	(7.1)	-13	(11.6)	0
Netherlands	687	(6.1)	-7	(11.0)	0
France	688	(7.3)	-7	(11.8)	0
Canada	689	(3.9)	-5	(10.0)	0
Switzerland	691	(7.0)	-4	(11.5)	0
Czech Republic	692	(7.0)	-3	(11.5)	0
Australia	692	(5.0)	-2	(10.5)	0
Finland	693	(5.4)	-1	(10.6)	0
New Zealand	698	(5.2)	4	(10.6)	0
Korea	704	(6.1)	9	(11.0)	0
Japan	726	(10.6)	31	(14.1)	0
Northern Ireland	695	(9.2)			

+ Country score is significantly higher than score for N. Ireland
0 Country score is not significantly different from score for N. Ireland
– Country score is significantly lower than score for N. Ireland