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THE PERFORMANCE OF IRISH STUDENTS IN READING LITERACY IN THE PROGRAMME FOR INTERNATIONAL STUDENT ASSESSMENT (PISA)

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The results of analyses of the PISA 2000 reading literacy data conducted since publication of the initial national and international reports in December 2001 are reported. In line with its strong overall performance on the assessment, Ireland ranked fourth of 27 OECD countries on comprehension of continuous texts, and sixth on comprehension of non-continuous texts. While female students in Ireland outperformed male students on both continuous and non-continuous texts, the gap was considerably smaller in the case of non-continuous texts. Relative to students in other high-scoring countries, Irish students in general, and male students in particular, reported low engagement in leisure reading. In an analysis of the performance of Irish students in PISA on selected items drawn from the International Adult Literacy Survey (IALS), it was estimated that fewer students would score at Level 1, and more at Level 2, than was the case among Irish adults when IALS was administered in 1994. The results of analyses support policy initiatives designed to address low achievement in reading, especially among boys and students at risk of dropping out of school.

In December 2001, initial international and national reports on the performance of 15-year olds in PISA 2000 were published (OECD, 2001; Shiel, Cosgrove, Sofroniou, & Kelly, 2001). Since then, additional analyses of the international data on reading literacy have been published (Kirsch, de Jong, Lafontaine, McQueen, Mendelovits, & Monseur, 2002). The purpose of this paper is to consider findings arising from these analyses, and to review policy implications outlined in the initial Irish national report in light of these and other analyses.

The paper is divided into four parts. First, the performance of students on two new reading subscales – those dealing with continuous and non-continuous texts – is described. Second, engagement in reading by students in Ireland and in other countries is described, and associations between engagement and reading achievement are examined. Third, the performance of Irish 15-year olds in PISA is considered in terms of their projected performance on the prose literacy scale developed as part of the International Adult Literacy Survey (IALS). Fourth,

both earlier and new policy implications of PISA 2000 for education in Ireland are considered.

PERFORMANCE ON CONTINUOUS AND NON-CONTINUOUS TEXTS

In line with the framework for reading literacy in PISA 2000 (OECD, 1999), texts selected for inclusion in the assessment of reading literacy comprised two broad formats: continuous and non-continuous. Continuous texts are in prose format; they consist of paragraphs made up of complete sentences, and include: narrative (stories, reports, news articles); exposition (essays, definitions, explications, summaries); description (of persons, places, or objects); argumentation/persuasion (comment, scientific argumentation); and injunctive text (instructions, rules, regulations, statutes).

Non-continuous texts (sometimes called documents) may include sentences, but are not in paragraph form. Nevertheless, their layout on the page is considered to be critical to meaning. The texts include charts, tables, maps, forms, and advertisements.

Eighty-nine of the items in the PISA 2000 literacy assessment (63.1%) were based on continuous texts, and 52 (36.9%) on non-continuous texts (Table 1).

Table 1
Continuous and Non-Continuous Texts in the PISA 2000 Assessment of Reading Literacy

Continuous Texts	Non-Continuous Texts
Narrative (18)	Charts/Graphs (16)
Expository (31)	Tables (15)
Descriptive (13)	Diagrams/Schematics (5)
Argumentative/Persuasive (18)	Maps (4)
Injunctive (9)	Forms (8)
	Advertisements (4)

Number of items in brackets

Source: Kirsch et al. (2002), Figures 2.2a and 2.2b.

According to Kirsch et al. (2002), the strengths and weaknesses which students display on the continuous and non-continuous tasks in PISA reading literacy give some indication of the pedagogical and curriculum practices in countries. They argue that, in the past, most attention has been given to instruction in prose literacy and exposition, but that in contexts other than first language instruction, it is important for students to be able to read non-prose texts, such as maps and tables in geography, and graphs and diagrams in science.

They also argue that much of the material that adults read consists of non-continuous texts (e.g., tax forms, public transport timetables, graphs of electricity consumption) and that it is important for students nearing the end of compulsory schooling to be able to read such texts.

Overall Performance on Continuous and Non-Continuous Text Scales

The OECD country average score was set at 500 on both the continuous and non-continuous text scales. The standard deviations are 101 and 109 respectively. Ireland ranked fourth on the continuous text scale, with a mean score (528 points) that is significantly higher than the OECD country mean (Table 2). Just one country, Finland, achieved a significantly higher mean score than Ireland. Eight countries, including Australia, New Zealand, the United Kingdom, and the United States, had mean scores that are not significantly different from the mean score of Ireland. Among the countries with significantly lower mean scores than Ireland are France, Denmark, Italy, and Germany.

Table 2
Country Mean Achievement Scores and Standard Errors on the Reading Literacy Continuous Text Scale

Country	Mean (SE)	Country	Mean (SE)
Finland	544 (2.7)	France	500 (2.8)
Canada	536 (1.6)	Denmark	497 (2.4)
Korea	530 (2.4)	Switzerland	494 (4.3)
Ireland	**528 (3.2)**	Spain	493 (2.6)
New Zealand	526 (2.9)	Italy	491 (2.8)
Australia	526 (3.6)	Czech Republic	489 (2.3)
Japan	524 (5.1)	Germany	484 (2.6)
United Kingdom	521 (2.5)	Greece	483 (5.0)
Sweden	516 (2.2)	Poland	482 (4.4)
Austria	509 (2.5)	Hungary	481 (3.9)
Iceland	509 (1.4)	Portugal	474 (4.5)
Norway	506 (2.8)	Luxembourg	442 (1.7)
United States	504 (7.1)	Mexico	431 (3.2)
Belgium	503 (4.0)	**OECD Average**	**500.0 (0.6)**

Mean achievement significantly higher than Ireland
Mean achievement not significantly different from Ireland
Mean achievement significantly lower than Ireland

Source: Kirsch et al. (2002), Table 4.10.

On the non-continuous text scale, Irish students ranked sixth, with a mean score (530 points) that is also significantly higher than the OECD country mean (Table 3). Again, only Finland achieved a significantly higher mean score. Nine countries have mean scores that do not differ significantly from the Irish mean score, while 16 have mean scores that are significantly lower.

Table 3
Country Mean Achievement Scores and Standard Errors on the Reading Literacy Non-Continuous Text Scale

Country	Mean (SE)	Country	Mean (SE)
Finland	554 (2.7)	Iceland	505 (1.5)
New Zealand	539 (2.9)	Denmark	499 (2.6)
Australia	539 (3.3)	Czech Republic	498 (2.9)
Canada	536 (1.6)	Switzerland	496 (4.4)
United Kingdom	533 (2.4)	Spain	493 (3.0)
Ireland	**530 (3.3)**	Germany	486 (2.4)
Sweden	521 (2.4)	Italy	480 (3.0)
Japan	521 (5.6)	Hungary	479 (4.4)
France	518 (2.7)	Poland	473 (4.8)
Korea	517 (2.5)	Portugal	460 (4.5)
Belgium	516 (3.5)	Greece	456 (4.9)
Norway	508 (2.8)	Luxembourg	441 (1.6)
Austria	507 (2.4)	Mexico	401 (3.7)
United States	506 (7.2)	**OECD Average**	**500.0 (0.7)**

Mean achievement significantly higher than Ireland
Mean achievement not significantly different from Ireland
Mean achievement significantly lower than Ireland

Source: Kirsch et al. (2002), Table 4.10.

While the performance of Irish students was about the same on continuous and non-continuous texts, students in a number of countries performed better on one text type than on the other. For example, French students have a mean score close to the OECD country average on continuous texts, and a score that is significantly higher on non-continuous texts. Similarly, while Korean students have a mean score that is not significantly different from students in Ireland on continuous texts, they achieved a significantly lower score on non-continuous texts.

Performance on Continuous and Non-Continuous Texts, by Proficiency Level

Performance on continuous and non-continuous texts can be considered in terms of the proportions of students who scored at each of five proficiency levels (Levels 1-5) on the two scales, as well as the proportions whose performance could not be placed at any of these levels (i.e., below Level 1). Proficiency levels were developed by applying the same set of cut-points used to identify levels on combined reading literacy in the initial international report on PISA (OECD, 2001). Unlike the earlier scales, however, qualitative descriptions of performance at each proficiency level are not provided for the continuous and non-continuous text scales.

In Ireland, 11.2% of students achieved Level 1 or below on the continuous text scale, and 11.7% on the non-continuous text scale (Table 4). These compare favourably with the OECD country averages of 17.9% and 19.5% for continuous and non-continuous texts respectively. In Finland, the country with the highest mean scores on the two scales, 7.1% of students achieved at Level 1 or below on each scale. In the United Kingdom, a country with mean scores not significantly different from Ireland on the two scales, 14.2% achieved at Level 1 or below on the continuous text scale, and 11.3% on the non-continuous text scale.

Table 4
Percentages of Students Achieving Each Proficiency Level on the Continuous and Non-Continuous Text Scales in Ireland and in OECD Countries

	Ireland		OECD Country Average	
Level	Continuous	Non-Continuous	Continuous	Non-Continuous
Level 5	14.4 (0.9)	17.1 (0.9)	9.8 (0.1)	11.8 (0.2)
Level 4	27.7 (1.0)	26.5 (1.0)	22.3 (0.0)	21.7 (0.2)
Level 3	29.2 (0.9)	26.8 (1.1)	28.5 (0.2)	26.4 (0.2)
Level 2	17.5 (0.8)	18.0 (1.2)	21.5 (0.2)	20.6 (0.2)
Level 1	8.2 (0.8)	8.1 (0.8)	11.9 (0.2)	12.0 (0.2)
Below Level 1	3.0 (0.5)	3.6 (0.5)	6.0 (0.1)	7.5 (0.1)

Below Level 1: less than 335 scale points on the relevant scale; Level 1: 335-407 points; Level 2: 408-480 points; Level 3: 481-552 points; Level 4: 553-626 points; Level 5: above 626 points.

Source: Kirsch et al. (2002), Tables 4.13 and 4.14.

An indication of how scores on the text scales are distributed can be obtained by examining the standard deviations associated with country mean scores, and by considering the performance of students with very high and very low achievement. On the continuous text scale, standard deviations range from 69 for Korea to 115 for Germany (Table 5). Thus, the distribution of reading

literacy scores in Germany is considerably wider than in Korea. The standard deviation of the mean performance of Irish students is 94 – some 7 points below the OECD country average of 101. This is lower than the standard deviations in Australia (104 points), New Zealand (110), and the United Kingdom (104), countries with mean scores that do not differ significantly from the Irish mean score. On the non-continuous scale, standard deviations range from 81 in Korea to 114 in Belgium and Norway. The standard deviation for Ireland (100 points) is again below the OECD country average (109 points).

The average scores of students at the 90th percentile on the continuous text scale range from 545 in Mexico to 661 in New Zealand (Table 5). The score of Irish students at the 90th percentile level is 643, which is some 19 points higher than the OECD country average. Although students in New Zealand (661), Australia (658), Finland (653), and the United Kingdom (651) have higher scores at the 90th percentile, none is statistically significantly higher than the mean score for Ireland. On the non-continuous texts scale, scores at the 90th percentile range from 527 in Mexico to 672 in New Zealand. The score of Irish students at the 90th percentile is 653, which is 19 points higher than the OECD average of 634. Again, while students in five countries – Australia (667), New Zealand (672), Finland (670), Canada (651), and the United Kingdom (659) – have higher scores than Ireland, none is statistically significantly higher.

A somewhat similar pattern presents itself when one examines scores at the 10th percentile on continuous and non-continuous text scales. On the continuous texts scale, scores range from 298 in Luxembourg to 441 in Korea, while on the non-continuous scale, they range from 275 in Mexico to 427 in Finland. In Ireland, students at the 10th percentile achieved a score of 401 on the continuous text scale, and 397 on the non-continuous text scale. These are significantly higher than the corresponding OECD country averages of 366 and 355.

It can also be noted that the differences between the scores for Ireland at the 10th percentile on the continuous and non-continuous scales and the corresponding OECD country average score are 35 points and 42 points respectively. These differences are greater than differences between the corresponding scores at the 90th percentile (19 points on the continuous scale, and 12 on the non-continuous scale). This suggests that the relatively strong overall performance of Irish students on the two scales can, in part, be attributed to the comparatively better performance of low achievers than their counterparts in other countries.

Table 5
Standard Deviations and Percentile Values for Continuous and Non-Continuous Texts, OECD Countries

	Continuous Texts			Non-Continuous Texts		
	Standard Deviation	10th Percentile	90th Percentile	Standard Deviation	10th Percentile	90th Percentile
Australia	104 (1.6)	386 (4.5)	658 (4.8)	104 (1.6)	401 (5.2)	667 (3.8)
Austria	94 (1.5)	384 (4.5)	623 (3.8)	99 (1.5)	376 (3.8)	629 (3.7)
Belgium	108 (3.5)	349 (8.3)	632 (2.5)	114 (2.4)	354 (7.2)	650 (2.7)
Canada	98 (1.1)	407 (3.2)	656 (2.0)	99 (1.1)	407 (3.0)	657 (2.0)
Czech Republic	93 (1.8)	366 (5.4)	604 (3.2)	112 (2.3)	354 (4.7)	635 (4.0)
Denmark	99 (1.9)	364 (5.1)	619 (3.5)	109 (1.8)	356 (4.9)	631 (4.0)
Finland	90 (2.8)	427 (4.6)	653 (2.7)	95 (2.0)	427 (4.8)	670 (3.4)
France	94 (1.8)	370 (5.0)	616 (3.3)	97 (1.8)	389 (5.2)	638 (3.0)
Germany	115 (1.9)	331 (6.8)	624 (3.2)	113 (2.2)	334 (5.5)	623 (3.2)
Greece	99 (2.8)	351 (9.1)	607 (5.0)	103 (2.5)	319 (8.5)	586 (5.0)
Hungary	92 (1.9)	357 (5.3)	596 (4.7)	108 (2.1)	335 (5.7)	615 (5.4)
Iceland	93 (1.2)	384 (3.4)	625 (2.8)	100 (1.4)	372 (3.7)	629 (3.3)
Ireland	**94 (1.7)**	**401 (5.3)**	**643 (3.5)**	**100 (1.8)**	**397 (6.2)**	**653 (3.5)**
Italy	91 (1.5)	371 (6.0)	604 (3.2)	100 (2.8)	348 (5.4)	604 (3.9)
Japan	85 (2.9)	408 (9.8)	627 (4.7)	98 (3.2)	391 (9.5)	639 (5.2)
Korea	69 (1.8)	441 (4.2)	613 (2.8)	81 (1.7)	412 (4.2)	614 (4.9)
Luxembourg	108 (1.3)	298 (4.1)	578 (2.7)	113 (1.5)	289 (4.6)	580 (2.5)
Mexico	86 (1.8)	319 (3.8)	545 (5.0)	97 (2.4)	275 (5.0)	527 (7.2)
New Zealand	110 (1.7)	378 (5.8)	661 (3.7)	110 (1.9)	389 (5.6)	672 (5.7)
Norway	103 (1.6)	364 (5.6)	631 (3.6)	114 (4.7)	356 (5.1)	646 (3.9)
Poland	101 (2.9)	343 (6.6)	606 (6.6)	107 (3.2)	329 (8.2)	607 (6.3)
Portugal	98 (1.8)	341 (6.4)	597 (3.8)	102 (1.8)	322 (6.3)	589 (4.2)
Spain	84 (1.1)	381 (3.7)	596 (2.2)	96 (1.3)	363 (5.5)	613 (3.1)
Sweden	93 (1.2)	390 (4.0)	632 (3.0)	100 (1.3)	386 (4.3)	644 (3.2)
Switzerland	104 (2.0)	352 (6.0)	623 (4.9)	109 (2.0)	350 (6.4)	632 (5.5)
United Kingdom	104 (1.5)	384 (3.5)	651 (3.7)	101 (1.5)	400 (3.9)	659 (4.0)
United States	105 (2.5)	363 (11.2)	637 (6.7)	109 (2.8)	362 (12.2)	641 (7.2)
OECD Average	**101 (0.4)**	**366 (1.2)**	**624 (0.7)**	**109 (0.4)**	**355 (1.2)**	**634 (0.8)**

Source: Kirsch et al. (2002), Tables 4.20 and 4.21.

Gender and Performance on Continuous and Non-Continuous Texts

Female students outperformed male students on the combined reading literacy scale, and on the continuous and non-continuous text scales across OECD countries. The OECD median difference was greatest on the continuous text scale (39.1 points) and smallest on the non-continuous text scale (17.6 points) (Table 6). The largest differences in favour of female students were

found in Finland, the smallest in Korea. In Ireland, the difference in favour of female students on the continuous texts scale is 33.6 points, and the difference on the non-continuous text scale 16.9 points. Hence, the gap between female and male students in Ireland is smaller on non-continuous texts, a pattern also observed in most OECD countries.

Table 6
Differences in Mean Scores Between Female and Male Students on the Combined Reading Literacy Scale, OECD Countries

	Combined Reading Literacy	Continuous Texts	Non-Continuous Texts
Australia	33.6	39.6	21.2
Austria	25.6	33.2	6.8
Belgium	32.8	40.3	19.8
Canada	32.2	39.1	17.6
Czech Republic	37.4	44.1	23.4
Denmark	24.8	32.2	8.2
Finland	51.3	59.5	33.9
France	28.8	35.6	13.6
Germany	34.7	43.5	15.0
Greece	37.0	45.7	20.9
Hungary	31.6	37.4	19.5
Iceland	39.7	45.0	28.1
Ireland	**28.7**	**33.6**	**16.9**
Italy	38.2	44.2	20.1
Japan	29.7	34.2	20.2
Korea	14.2	18.6	5.0
Luxembourg	26.9	38.9	14.2
Mexico	20.3	25.9	9.1
New Zealand	45.8	51.9	34.6
Norway	43.2	52.6	22.7
Poland	36.1	46.5	15.5
Portugal	24.7	31.2	11.5
Spain	24.1	30.3	10.7
Sweden	37.0	44.1	19.2
Switzerland	30.0	39.2	8.8
United Kingdom	25.6	31.2	11.4
United States	28.6	33.4	20.7
OECD Median	**31.6**	**39.1**	**17.6**

Differences are based on the regression of gender on reading literacy performance.

Source: Kirsch et al. (2002), Table 6.2a.

ENGAGEMENT OF 15-YEAR OLDS IN READING

In the literature on reading, there is considerable interest in links between engagement in reading and reading achievement. Stanovich (1986) referred to a 'Mathew effect' as he described a circular association between reading practices and achievement: better readers tend to read more because they are motivated to read, which in turn leads to improved vocabulary and skills. Meanwhile, the gap between good readers (who read more) and poor readers (who read relatively little) increases over time. Guthrie and Wigfield (2000) take the point further when they note that

> As students become engaged readers, they provide themselves with self-generated learning opportunities that are equivalent to several years of education. Engagement in reading may substantially compensate for low family income and poor educational background. (p. 204)

In this section, the engagement in reading of students in Ireland and in other OECD countries is described, and a claim in the thematic report on reading literacy that engagement could compensate for differences in students' socioeconomic status is considered.

Measures of Student Engagement in Reading

A number of items on the PISA Student Questionnaire were designed to assess students' engagement in reading, including the following:

Diversity of reading: a variable based on the frequency with which students reported reading six types of text (magazines, comics, fiction books, non-fiction books, e-mails and web pages, and newspapers) for pleasure;

Frequency of leisure reading: a variable based on the frequency with which students engaged in leisure reading on a daily basis;

Attitude to reading: a variable based on students' level of agreement with statements such as: 'I read only if I have to', 'Reading is one of my favourite hobbies', 'I like talking about books with other people', and 'I cannot sit still and read for more than a few minutes'.[1]

In the Irish national report on PISA , these variables were looked at separately as they related to reading achievement, and were also included as candidate

1 The variable, 'attitude to reading' is a composite variable that was scaled using Item Response Modelling (Weighted Likelihood Estimation) to have an international mean of 0, and a standard deviation of 1. Following scaling, it represented a continuous variable.

variables in a multi-level model of achievement (Shiel et al., 2001). A correlation of 0.43 ($p<.001$) was reported between Irish students' attitude to reading and their achievement on the PISA combined reading literacy scale. Correlations between diversity of reading and combined reading literacy and between frequency of leisure reading and combined reading literacy are 0.25 ($p<.001$) and 0.26 ($p<.001$) respectively. When entered as variables in an exploratory multi-level model of performance on the PISA combined reading literacy scale, attitude to reading and frequency of reading were found to contribute to the explanation of students' reading literacy scores, while diversity of reading was not, when such variables as school- and student-level SES had been controlled for.[2] Diversity of reading was dropped from the model at an early stage in its development, as its effect seemed to be accounted for by other variables.

In this section, relationships between engagement in reading (the composite variable based on diversity of reading, frequency of reading, and attitude towards reading)[3] and reading achievement are considered in light of comparative data presented in the thematic report on PISA reading literacy.

Differences in Engagement Between Countries

Table 7 shows the mean scores for Ireland and for 26 other OECD countries on the composite engagement in reading variable, as well as differences between male and female students. The OECD average was set at 0.00 and the standard deviation at 1.0. Thus, a negative score indicates low engagement in reading relative to the OECD average. Ireland's score on the engagement measure was –0.20. Other countries with low average levels of engagement include Belgium (–0.28), Germany (–0.26), and Spain (–0.23), all countries with significantly lower mean scores than Ireland on combined reading literacy. In contrast, Finland, the country with the highest mean score on engagement (0.46), also has the highest reading score.

Across OECD countries, female students achieved a significantly higher average engagement score (0.19) than male students (–0.19), indicating that, relative to male students, they are more likely to report reading a more diverse

2 When both attitude to reading and frequency of leisure reading were entered into the model together, the parameter for 'more than 60 minutes per day' changed from positive to negative.

3 The engagement in reading variable was also constructed using Item Response Theory methodology.

Table 7
Mean Scores on Engagement in Reading for All Students (Total), by Gender, OECD Countries

	Total	Female	Male	F-M Difference
Australia	–0.04 (0.03)	0.11	–0.18	0.28
Austria	–0.08 (0.03)	0.17	–0.35	0.52
Belgium	–0.28 (0.03)	–0.07	–0.48	0.41
Canada	0.01 (0.01)	0.24	–0.23	0.47
Czech Republic	0.02 (0.02)	0.29	–0.29	0.57
Denmark	0.26 (0.02)	0.50	0.02	0.48
Finland	0.46 (0.02)	0.82	0.08	0.74
France	–0.18 (0.02)	–0.03	–0.33	0.30
Germany	–0.26 (0.02)	0.01	–0.53	0.55
Greece	–0.09 (0.02)	0.00	–-0.17	0.17
Hungary	0.03 (0.02)	0.21	–0.15	0.36
Iceland	0.27 (0.01)	0.46	0.08	0.39
Ireland	**–0.20 (0.02)**	**0.03**	**–0.43**	**0.46**
Italy	-0.08 (0.02)	0.10	–0.27	0.37
Japan	0.20 (0.03)	0.28	0.11	0.17
Korea	0.21 (0.21)	0.23	0.19	0.04
Luxembourg	–0.19 (0.02)	0.01	–0.39	0.40
Mexico	0.07 (0.01)	0.17	–0.03	0.20
New Zealand	0.05 (0.02)	0.20	–0.09	0.29
Norway	0.09 (0.02)	0.35	–0.16	0.51
Poland	–0.10 (0.02)	0.09	–0.28	0.36
Portugal	0.13 (0.02)	0.36	–0.11	0.47
Spain	–0.23 (0.02)	–0.09	–0.38	0.29
Sweden	0.14 (0,02)	0.37	–0.08	0.45
Switzerland	0.00 (0.01)	0.31	–0.31	0.62
United Kingdom	–0.10 (0.02)	0.03	–0.24	0.26
United States	–0.14 (0.03)	0.04	–0.32	0.36
OECD Average	**0.00**	**0.19**	**–0.19**	**0.38**

Source: Kirsch et al. (2002), Table 5.8.

range of materials, read more frequently for leisure, and hold a more positive attitude to reading. The mean engagement score for Irish male students is –.43. Only Germany (–0.53) and Belgium (–0.48) have lower levels of engagement among male students. The largest differences between females and males on engagement are in Finland (0.74, or three quarters of a standard deviation), Switzerland (0.62), the Czech Republic (0.57), Germany (0.55), and Norway

(0.51). The difference for Ireland (0.46) is somewhat greater than the OECD country average (0.38).

In addressing the question of whether engagement in reading can compensate for differences in social background, Kirsch et al. (2002) divided students across all OECD countries according to whether they fell into the top 25%, the middle 50%, or the bottom 25% on the distributions of engagement and socioeconomic status[4] (Table 8), and then compared expected and observed percentages of students in each of the nine cells. For example, the observed percentage of low-SES students with low engagement in reading (7.60%) is marginally higher than the expected percentage (6.25%). On the other hand, the observed percentage of low-SES students with high engagement in reading (4.85%) is marginally lower than the expected percentage (6.25%).

Table 8
Expected and Observed Percentages of Students at Three Levels of Reading Engagement, and Associated Mean Combined Reading Literacy Scores, by Socioeconomic Status, OECD Countries

	Low Engagement			Medium Engagement			High Engagement		
	% Exp	% Obs	Mean	%Exp	%Obs	Mean	%Exp	%Obs	Mean
Low SES	6.25	7.60	423	12.50	12.56	467	6.25	4.85	540
Med. SES	12.25	12.90	463	25.00	25.14	506	12.25	11.96	548
High SES	6.25	4.50	491	12.50	12.30	540	6.25	8.19	583

Exp – Expected percentage of cases; Obs – Observed percentage of cases; Mean: Mean score on combined reading literacy scale.

Source: Kirsch et al. (2002), Figure 5.8 and Table 5.9.

Table 8 also gives the mean combined reading literacy scores for students in each cell. The mean score of students with low SES but high engagement in reading (540) is considerably greater than the mean score of students with high SES but low engagement in reading (491). Thus, there is some evidence that students with low SES may compensate through high engagement in reading

4 The PISA measure of socioeconomic status was obtained by first categorizing each student's parents' occupations according to the International Standard Classification of Occupation (ISCO), and transforming the highest value for each student (i.e., mother or father) on to the International Socioeconomic Index (ISEI) (see Ganzeboom & Treiman, 1996) to achieve a continuous measure of SES that can be interpreted as a weighted average of educational requirements and mean incomes associated with occupations.

(though this association would need to be investigated further within individual countries, preferably in the context of a longitudinal study). It is also relevant to observe that the mean reading score of students with high SES but low engagement (491) is greater than the mean reading scores of students with low engagement and medium (463) or low (423) SES. Hence, it seems that high SES acts as a cushion for students with relatively low levels of engagement in reading, in comparison with their medium- and low-SES counterparts.

Correlations between engagement in reading and combined reading literacy range from a low of .24 in Mexico to a high of .48 in Finland, with an OECD median of .38. Ireland's correlation of .39 is close to the OECD country median, and is about the same as the correlation (.42) between attitude to reading (one of the components of engagement) and combined reading literacy for Irish students that was reported earlier.

There are a number of issues to consider in interpreting the data on student engagement in reading. First, there may be cultural differences in the ways in which students in different countries respond to items about diversity of reading or attitude to reading. Second, the items upon which the engagement in reading variable was based mainly refer to students' leisure-time reading, and do not address potential effects of required reading (e.g., reading assigned as homework) in mediating the relationship between SES and achievement. It might be hypothesized that Irish students, for example, engage in considerable amounts of 'required' reading in the context of completing classroom assignments, doing homework, and preparing for examinations, and that such reading was not reflected in their PISA engagement in reading scores. Third, it would be necessary to examine the association between engagement in reading and combined reading literacy while taking into account other variables measured in PISA (such as the number of books in the home). As indicated earlier, some work of this nature was carried out in the context of developing an exploratory multi-level model of reading literacy (Shiel et al., 2001). Fourth, since the engagement in reading variable is a complex composite measure, combining motivation, frequency, and attitude, it is difficult to draw direct implications for practice.

One could hypothesize that if students' attitudes to reading (and particularly boys' attitudes) could be enhanced, their engagement in reading and, perhaps, their reading achievement would increase. However, a model of engagement through classroom practice developed by Guthrie and Davis (in press), which aims at motivating struggling readers in fifth and sixth grades, draws attention to the need to develop both cognitive and non-cognitive aspects of reading. According to Guthrie and Davis, the development of motivation through the

provision of interesting texts, the development of autonomy, and the provision of opportunities for collaboration with peers on literacy activities must be supported by direct instruction in reading skills and strategies that can require substantial amounts of time. Kirsch et al. (2002) make the point that cognitive strategy instruction may be relatively ineffective in isolation from a rich content domain.

PERFORMANCE OF 15-YEAR OLDS ON THE PISA AND IALS SCALES

Between 1994 and 1998, 24 countries/regions, including Ireland, participated in the International Adult Literacy Survey (IALS), a major survey of the literacy skills of adults.[5] On the IALS prose literacy scale, Irish adults (16-65 years) achieved a mean score of 265.7, and ranked 14th of 22 countries/regions for which data were published (OECD/Statistics Canada, 2000). They performed significantly less well than adults in 10 countries/regions, better than adults in five, and about the same as adults in six.

Performance on the IALS prose literacy scale was also reported in terms of proficiency levels. Almost one-quarter (22.6%) of Irish adults scored at Level 1 (the lowest level on the scale), 30.0% scored at Level 2, 34.1% at Level 3, and 13.5% at Levels 4/5 (combined) (Morgan, Hickey, & Kellaghan, 1997; OECD/Statistics Canada, 2000). The situation among Irish 16-24-year olds in the study was marginally better with 15.9% achieving at Level 1, 28.5% at Level 2, 40.3% at Level 3, and 15.2% at Levels 4/5. According to the OECD, Level 3 or higher is necessary to meet the literacy challenges of adult life (OECD/Statistics Canada, 2000). Applying this criterion to the Irish data, over one half of Irish adults (16-65 years) could be considered to have inadequate literacy levels.

PISA allows us to compare the performance of adults in IALS with the performance of 15-year olds in PISA since PISA included some items that had been administered in IALS, making it possible to estimate the scores of 15-year olds in PISA on the IALS prose literacy scale.

5 Belgium (Flemish), Belgium (French), Switzerland (French), Switzerland (German), and Switzerland (Italian) were treated as separate regions (populations). Two non-OECD countries, Chile and Slovenia, participated. The performance of respondents in these countries was taken into account in computing country average scores. Results for France and Northern Ireland were not published.

Estimated Performance of 15-Year Olds in PISA on the IALS Prose Scale

Following the implementation of statistical procedures by the Educational Testing Service in the US (see Kirsch et al., 2002; Yamamoto, 2002), the mean score of Irish 15-year olds on the IALS Prose Literacy Scale was estimated to be 281.2. Of 27 OECD countries, just four achieved higher mean scores than Ireland – Finland (301.9), Japan (287.7), Korea (285.1), and Canada (285.6) (Table 9). Australia (281.3) and New Zealand (279.7) were among a group of countries with mean scores similar to Ireland's.

Table 9

Estimated Mean Scores (and Standard Errors) of 15-Year Olds in OECD Countries in PISA 2000 on the IALS Prose Literacy Scale, and Mean Scores of Adults in OECD Countries on the IALS Prose Literacy Scale

Country	Estimated Mean Score on Prose Literacy 15-Year Olds (2000)	Mean Score on Prose Literacy Adults 16-65 years (1994-98)
Australia	281.3 (1.2)	274.2 (1.0)
Austria	262.1 (0.9)	
Belgium (Flanders)	277.7 (1.1)	271.8 (3.9)
Canada	285.6 (0.5)	278.8 (3.2)
Czech Republic	268.0 (0.8)	269.4 (0.8)
Denmark	266.1 (0.7)	275.0 (0.7)
Finland	301.9 (0.7)	288.6 (0.7)
France	272.5 (1.0)	
Germany	264.1 (1.0)	275.9 (1.0)
Greece	267.7 (2.0)	
Hungary	267.1 (1.5)	242.4 (1.1)
Iceland	276.3 (0.6)	
Ireland	**281.2 (1.1)**	**265.7 (3.3)**
Italy	271.1 (1.0)	
Japan	287.7 (1.3)	
Korea	285.1 (0.7)	
Luxembourg	243.7 (0.5)	
Mexico	248.4 (1.1)	
New Zealand	279.9 (1.0)	275.2 (1.3)
Norway	266.2 (0.9)	288.5 (1.0)
Poland	268.1 (1.3)	229.5 (1.1)
Portugal	258.5 (1.5)	222.6 (3.7)
Spain	270.1 (0.8)	
Sweden	269.6 (0.7)	301.3 (0.8)
Switzerland	273.3 (1.4)	*
United Kingdom	275.2 (0.9)	266.7 (1.8)
United States	272.5 (2.1)	273.7 (1.6)
PISA Country Average	**267.8 (0.4)**	

*Switzerland (French): 264.8 (1.7); Switzerland (German): 263.3 (1.4); Switzerland (Italian): 264.3 (2.2)

Sources: Kirsch et al. (2002), Table 8.5; OECD/Statistics Canada (2000), Table 2.1.

Table 10

Percentages of PISA 15-Year Olds, Young Adults (16-25 Years), and All Adults (16-65 years) in Ireland Scoring at Various Levels on the IALS Prose Literacy Scale

IALS Level	PISA 15-year olds - 2000	IALS Adults (16-25 years) - 1994	IALS Adults (16-65 years) - 1994
4/5	13.0	15.2	13.5
3	43.0	40.3	34.1
2	35.4	28.5	30.0
1	8.6	15.9	22.6

Sources: Kirsch et al. (2000), Table 8.5; OECD/Statistics Canada (2000), Table 2.2; Morgan et al. (1997), Tables 2.1 to 2.5.

Table 11

Estimated Percentages of PISA Students (Aged 15 Years) Scoring at Various Levels on the IALS Prose Literacy Scale, by Country (2000)

	Percent of PISA Students (Age 15 Years) – 2000			
	Level 1	Level 2	Level 3	Levels 4/5
Australia	9.3	35.3	41.4	13.9
Austria	19.8	41.4	33.0	5.8
Belgium	11.7	33.0	44.4	10.9
Canada	5.4	33.9	47.0	13.7
Czech Rep.	15.3	41.4	36.6	6.9
Denmark	15.5	43.0	35.5	5.9
Finland	4.2	22.8	43.3	29.7
France	12.5	40.3	38.1	9.0
Germany	20.6	37.8	32.7	8.9
Greece	18.7	36.5	34.3	10.4
Hungary	15.7	41.5	36.5	6.3
Iceland	12.2	36.8	38.8	12.2
Ireland	**8.6**	**35.4**	**43.0**	**13.0**
Italy	13.2	40.0	38.8	8.0
Japan	3.2	31.5	54.0	11.2
Korea	2.5	33.7	56.3	7.4
Luxembourg	33.2	42.9	21.4	2.5
Mexico	28.1	46.9	22.9	2.0
New Zealand	10.2	34.9	41.6	13.3
Norway	16.8	41.0	35.5	6.8
Poland	16.5	39.9	35.1	8.5
Portugal	20.2	45.1	31.7	2.9
Spain	9.2	45.7	42.3	2.8
Sweden	11.7	43.3	39.8	5.2
Switzerland	12.8	38.9	38.4	9.8
United Kingdom	10.9	39.3	40.0	9.8
United State	11.1	41.8	39.7	7.5
PISA Average*	**15.2**	**41.7**	**36.3**	**6.9**

*Average of countries participating in PISA.

Source: Kirsch et al. (2002), Table 8.5.

The somewhat stronger performance of Irish 15-year olds in 2000 compared to 16- to 25-year olds in 1994 is also apparent in the distribution of scores across the lower IALS proficiency levels (Table 10). Whereas almost 16% of 16- to 25-year olds in 1994 achieved at the lowest level (Level 1) on the IALS prose literacy scale, just 8.6% of 15-year olds in 2000 were estimated to be at this level. In contrast, the percentage of 15-year olds in 2000 estimated to be at Level 2 (35.4%) is greater than the percentage of 16- to 25-year olds at Level 2 in 1994 (28.5%). The percentages of 15-year olds and 16- to 25-year olds at Level 3 and Levels 4/5 are fairly similar in the two assessments.

The percentage of 15-year old PISA students at Level 1 on the IALS scale (8.6%) is lower in Ireland than in most other countries. Only Korea (2.5%), Japan (3.2%), Finland (4.2%) and Canada (5.4%) have lower percentages than Ireland at Level 1 (Table 11). The average across countries participating in PISA is 15.2 percent. Finland (29.7%) has significantly more students at Levels 4/5 than Ireland (13.0%), while Australia (13.9%) and Canada (13.7%) have marginally more.

Gender Differences on the IALS Prose Scale

When the performance of 15-year olds in PISA 2000 was estimated on the IALS scale, it was observed that Irish male students were more strongly represented at the lower proficiency levels (Levels 1 and 2), while female students were more strongly represented at the higher levels (Level 3 and Levels 4/5) (Table 12). The mean score of Irish female students was 288.9, while that of males was 273.9. The 15-point difference is about one-third of a standard deviation. Across countries participating in PISA, the mean score for female 15-year olds in PISA on the IALS scale was 274.7, while that of males was 260.9. The size of the difference, 13.8 points in favour of females, is marginally smaller than the difference between male and female students in Ireland. In 1994, the difference between Irish males and females aged 16 to 25 years was 11 points, which is slightly smaller than for 15-year olds in 2000.

Table 12

Estimated Percentages of Male and Female Students (Aged 15) Scoring at Various Levels on the IALS Prose Scale (2000), Ireland and Pisa Countries

	Ireland		PISA Countries	
	Male 15-year olds	Female 15-year olds	Male 15-year olds	Female 15-year olds
Level 1	11.1	5.9	19.3	10.9
Level 2	40.6	30.1	44.0	39.3
Level 3	39.3	46.9	32.1	40.7
Levels 4/5	9.0	17.2	4.6	9.1

Source: Kirsch et al. (2002), Tables 8.6 and 8.7.

PISA 2000 READING LITERACY AND POLICY DEVELOPMENT AT NATIONAL LEVEL

In the initial national report on PISA, a number of broad policy implications relating to reading literacy were proposed. Implications in relation to the following issues were identified: addressing low achievement in reading literacy; choice of Foundation and Ordinary level Junior Certificate English courses/examinations; gender differences in reading literacy; reading literacy in different types of school (secondary, community/comprehensive, and vocational); reading literacy in designated disadvantaged schools; and student dropout risk and reading literacy. Each issue is now reviewed.

Addressing Low Achievement in Literacy

At first glance, the performance of Irish students on the PISA assessment of reading literacy appears quite strong. As noted above, just 11.2% of students scored at or below Level 1 on the continuous text scale, while 11.7% did so on the non-continuous text scale. The corresponding OECD country average percentages are 17.9% and 19.5% respectively. It was also noted that the distribution of achievement in Ireland is somewhat narrower than in many other countries. The standard deviation for Irish students on the continuous text scale (94) is well below the OECD country average of 101, and lower than the standard deviations of countries with mean scores on this scale that are not significantly different from Ireland's.

Unlike IALS, where Level 3 had been identified as a minimum level of literacy needed for effective functioning in society, PISA does not identify a particular level on its scales as being essential for effective functioning after compulsory schooling. Nevertheless, it is clear that students scoring at or below Level 1 on the PISA combined reading literacy scale, or on its subscales, are likely to be at a considerable disadvantage in their future education and in their lives. Moreover, because overall levels of literacy (as measured by PISA) are relatively high in Ireland, those with low achievement may be at an even greater disadvantage than their counterparts in countries with lower average levels. It seems important, therefore, to redouble efforts to address low levels of achievement in literacy among students in both primary and post-primary schools. Recent initiatives such as the establishment of broad targets for literacy as part of the National Anti-Poverty Strategy (2002) and the development of an English language component in the Junior Certificate School Programme (JCSP) are steps in the right direction. However, literacy targets need to be more specific if they are to be useful to policy makers and practitioners (Kellaghan, 2002), and should be established at school level as well as at national level.

Selection of Foundation and Ordinary Level English Courses/Examinations

Although the percentage of students taking Foundation level English in the Junior Certificate examination increased in 2002 (4.56%, up from 3.87% in 2001), it is clear that this level still attracts only the very weakest students (see Cosgrove, 2002 for a more detailed discussion of this issue). Indeed, in 2000, the year in which PISA was administered, the percentage taking Foundation level English (3.86%) was quite close to the percentage achieving below Level 1 on the PISA non-continuous text scale (3.6%).

While the majority of students in PISA who sat Foundation level English in either 1999 or 2000 achieved at or below Level 1 on PISA, it is significant that 28% of PISA students who also took Ordinary level in those years also achieved scores at or below Level 1 (Cosgrove, 2002). This suggests an overlap in competence of students taking the Ordinary and Foundation levels, and points to a need to review the purposes and focus of Foundation level English, and the basis on which students make choices about levels. One might hypothesize, for example, that many of the stronger students at Foundation level could be encouraged to take Ordinary level English. Certainly, it would appear that their chances of succeeding are good, as just 257 out of 19,811 candidates achieved a failing grade in the 2002 Junior Certificate examination.

Understanding and Addressing Gender Differences in Reading Literacy

It was indicated in the national report on PISA that the difference in mean scores on combined reading literacy between Irish male and female students (28.7 points, or just over one quarter of a standard deviation) was close to the OECD country average difference (Shiel et al, 2001). However, it was also noted that, in the model of performance on combined reading literacy presented in the same report, gender could not be interpreted independently of its interaction with the number of books in a student's home (a proxy for home educational resources), and that additional research would be needed to unpack the observed interaction.

The finding that male students in Ireland and in other OECD countries were substantially less engaged in reading than female students leads to the hypothesis that programmes designed to enhance engagement might also contribute to a narrowing of the gender gap in achievement. However, longitudinal and/or experimental research would be needed to test such a hypothesis.

The finding that differences between female and male students were substantially smaller for non-continuous text than for continuous text in Ireland, as well as in most OECD countries, suggests that efforts to increase the engagement in reading of male students should focus on encouraging them to

become more involved in reading of continuous text, including fiction and non-fiction. Furthermore, early intervention is indicated since gender differences emerge at a relatively early age (see Elley, 1992; Elley, 1994).

In considering strategies to address gender differences, it might be noted that low achievement in reading literacy is not confined to male students. Indeed, 8.3% of Irish female students (compared with 13.5% of Irish male students) achieved at or below Level 1 on the PISA combined reading literacy scale. Hence, there is also a need to address low achievement among some female students.

School Type and Reading Literacy

While the percentage of variation in PISA combined reading literacy achievement that is attributable to differences between schools is relatively low in Ireland in comparison with the OECD country average (17.8% vs. 34.7%; OECD, 2001), it is clear that there are large differences in achievement between school types. In the model of performance on PISA reading literacy presented in Shiel et al. (2001), students in vocational schools had a predicted score that was 22.4 points lower than the score of students in community/comprehensive schools, after controlling for other relevant variables such as student- and school-level socioeconomic status. In contrast, students in secondary schools had a predicted score that was just 1.8 points higher than that of students in community/comprehensive schools. Hence, concerns persist about the performance of students in vocational schools and, by implication, the selection of post-primary schools by students, and the selection of students by schools.

School Designated Disadvantaged Status and Reading Literacy

The model of performance on reading literacy presented in Shiel et al. (2001) showed that the contribution of attending a designated disadvantaged school to the achievement of a student on the PISA combined reading literacy scale was –22.4 (about one quarter of a standard deviation). While initiatives designed to alleviate disadvantage, such as the Disadvantaged Areas Scheme and the Home-School Community Liaison Scheme (HSCL) might be expected to have some effect on the literacy performance of students over time, it is unclear how strong these effects are or how they operate. At a minimum, there is a need for carefully designed studies in designated disadvantaged schools at both primary and post-primary levels that point to ways in which literacy levels can be fostered and improved at different stages in students' development. Where programmes such as the Junior Certificate School Programme are offered in designated disadvantaged schools, their effects on pupils' reading literacy levels should be carefully studied.

Dropout Risk and Reading Literacy

Perhaps one of the most striking findings arising from the national report on PISA is the poor performance on the PISA combined reading literacy scale of students at risk of dropping out of school before the completion of senior cycle. The model of performance on combined reading literacy in the initial national report indicated a contribution of –54.3 points (over one-half of a standard deviation) to the scores of such students. Furthermore, the model indicated that the effect of dropout risk on reading literacy varied across schools, with the effect being greater in some schools than in others.

Students deemed to be at risk of dropping out of school were those who indicated on the PISA Student Questionnaire that they did not intend to complete a programme leading to the Leaving Certificate examination, and expressed agreement with at least one of eight statements that were negatively associated with completing post-primary schooling (e.g., 'I don't like school', 'My teachers think I should leave school'). In all, 13.7% of students were identified as being at risk. While it cannot be claimed that these students were at risk of dropping out because of their poor reading literacy levels, it might be hypothesized that low achievement in reading literacy is likely to influence students in deciding whether or not to leave school early.

In this context, it is encouraging to observe that earlier initiatives such as the 8-15-Year Old Early School Leaver Initiative and the Staying-in-School Retention Initiative at second level are being amalgamated into a new scheme called the School Completion Programme (see Department of Education and Science, n.d.). The scheme entails targeting individual young people of school age, both in and out of school, and arranging supports to address inequalities in educational access, participation, and outcomes. It includes provision of in-school, after-school, out-of-school, and holiday-time support. It is likely that the effectiveness of such a programme would be greatly enhanced if it could focus on the development and maintenance of literacy skills among those at risk of dropping out of school by, for example, liaising with existing services such as learning support, and ensuring that any reading gains that are made are maintained over time.

CONCLUSION

New findings in relation to the performance of Irish students on the PISA 2000 assessment of reading literacy were presented in this paper. Policy implications discussed in the national report on PISA (Shiel et al, 2001) were also reviewed. Irish students were found to perform at about the same level on scales for continuous and non-continuous texts as they did on the overall

(combined) measure of PISA reading literacy. Irish students achieved the fourth highest mean score on the continuous text scale, and the sixth highest score on non-continuous text scale. Only Finland achieved significantly higher mean scores than Ireland. While Irish female students did better than male students on the continuous text scale, and also outperformed male students on the non-continuous text scale, the gender difference was less pronounced on the latter. It can be concluded that gender differences in reading are more likely to be associated with performance on items based on continuous texts (including fiction and non-fiction) than on items based on non-continuous texts.

Irish students performed poorly relative to their counterparts in other OECD countries on a measure of engagement in reading that was based on the frequency with which students read different types of text for enjoyment, the frequency with which they engaged in leisure reading, and their attitudes to reading. While recognizing the potential difficulties of making cross-country comparisons based on self-reports of reading practices, and the fact that reading done as part of classroom assignments and homework was not included in the PISA measure of reading engagement, the relatively low mean score of Irish students (particularly males) is a matter of concern.

Some evidence was provided in the thematic report on PISA reading literacy that differences in socioeconomic status could be mediated by high levels of engagement in reading. This is consistent with the finding, presented in the Irish national report, that, even when socioeconomic status at the school and student levels, and a range of other variables, were included in a multi-level model of performance on reading literacy, attitude to reading contributed significantly to students' achievement. The challenge that faces educators is how to enhance students' attitudes, and improve their levels of engagement, in the context of intervention programmes that also attend to the development of cognitive strategies for reading. A related issue is the extent to which enhanced engagement might serve to reduce differences in reading achievement between male and female students.

Discrepancies between the findings of different international studies of educational achievement are not new and can arise for a variety of reasons (see O'Leary, Kellaghan, Madaus, & Beaton, 2000). Particular caution needs to be exercised in interpreting the comparison reported in this paper between the performance of Irish 15-year olds in PISA and Irish adults in the International Adult Literacy Study. Nevertheless, the finding that relatively fewer 15-year olds in 2000 were estimated to have scored at Level 1 on the IALS prose literacy scale than 16- to 25-year olds in 1994 is encouraging.

While the strong overall performance of Irish students on reading literacy in PISA 2000 might lead one to conclude that all students were doing well, this is clearly not the case. Differences in performance between high and low achievers, between students in designated disadvantaged schools and non-designated schools, between male and female students, between those attending vocational schools and other school types, and between those at risk of dropping out of school and those not at risk, are evident. Clearly, some of these differences are not unrelated. Thus, policy initiatives in one area (for example, those designed to address educational disadvantage) might be expected to have knock-on effects in other areas (for example, addressing low achievement in literacy, addressing the literacy needs of students at risk of dropping out of school before completion of senior cycle). While some new policy initiatives have been devised since the publication of the initial reports on PISA 2000 (for example, the School Completion Programme), it is clear that the range of initiatives that are now available need to be co-ordinated in a systematic manner to focus more strongly on the development of language and literacy skills at both primary and post-primary levels.

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