PIRLS 2005/2006 IN NEW ZEALAND

An overview of national findings from the second cycle of the Progress in International Reading Literacy Study (PIRLS)

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MINISTRY OF EDUCATION
Te Tāhuhu o te Mātauranga

IEA PIRLS 2006

PIRLS 2005/2006 in New Zealand

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Acknowledgements

This report is the second of two reports which describe the findings from the Progress in International Reading Literacy Study (PIRLS) 2005/2006 that were released in November 2007. PIRLS involved a large number of people working together during different phases of the study. Without the efforts from these people, the study would not have been so successful. Special thanks are extended to all the New Zealand students who participated in the study in 2005, and to parents/caregivers, teachers, and school principals involved in the study.

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Contents

Boxes, tables, and figures

Summary

This report is the second of two reports which describe the findings from the IEA's[1] second cycle of the Progress in International Reading Literacy Study (PIRLS) 2005/2006 (or PIRLS-05/06)[2] from a New Zealand perspective. The first report *Reading literacy in New Zealand*,[3] presented an overview of the international findings relevant to New Zealand and was released to coincide with the announcement by the IEA of the PIRLS results in November 2007.[4] The focus of this second report is on national-level results.

PIRLS examines the reading literacy achievement of middle-primary school students every five years, and involves New Zealand's Year 5 students. In 2005/2006 New Zealand and 39 other countries took part in PIRLS; five Canadian provinces also took part as benchmarking participants. Just over 6300 Year 5 students from approximately 240 schools took part in the study. New Zealand, along with 26 other countries, had also taken part in the first study in 2001 (hereafter referred to as PIRLS-01) enabling comparisons to be made across the two cycles.

An overview of Year 5 students' reading literacy achievement[5]

- The mean reading literacy score for New Zealand Year 5 students (532) in 2005/2006 was significantly higher than the international PIRLS scale mean (500).[6]
- The range of reading literacy performance was relatively wide for all ethnic groupings.
- There were both high- and low-achieving students in all ethnic groupings; however, the mean scores for Pākehā/European (552) and Asian (550) students were significantly higher than the mean scores for Māori (483) and Pasifika (479) students.
  - Asian and Pākehā/European girls had the strongest average performance.
  - Māori and Pasifika boys were found to have the weakest average performance.
- Among New Zealand Year 5 students there was a relatively large group who demonstrated that they were good readers as shown by the relatively large proportion reaching the PIRLS higher reading benchmarks. Students from all ethnic groupings were represented at this level.
  - Asian and Pākehā/European girls had the largest proportions reaching the higher benchmarks.
- Relative to other higher-performing countries there was a notable-sized group of New Zealand Year 5 students who did not reach the PIRLS lower international benchmarks.
  - Māori boys, Pasifika boys, Pasifika girls, and Year 5 students in lower decile schools had a greater likelihood of being in this group with weaker reading comprehension skills than other Year 5 students.
- Although Year 5 girls and boys achieved relatively well internationally, New Zealand had one of the largest gender differences in achievement favouring girls to be observed internationally.
  - Significant achievement differences favouring Year 5 girls were observed between girls and boys in the Asian, Māori, and Pākehā/European groups, but not between Pasifika girls and boys.

Any change between 2001 and 2005/2006?

- There was no significant change in New Zealand Year 5 students' mean achievement in reading from 2001 to 2005/2006.
- New Zealand's relative standing compared with the other 2001 trend countries had dropped slightly in 2005/2006.
  - This was largely the effect of the marked increases in the mean scores recorded for Hong Kong Special Administrative Region, the Russian Federation, and Singapore, these being the three countries that had similar performance to New Zealand in 2001.
- There was no significant change in the mean reading literacy achievement of any of the four ethnic groupings from 2001 to 2005/2006.

[1] International Association for the Evaluation of Educational Achievement (IEA).

[2] Internationally this cycle is referred to as PIRLS 2006. In this report it is referred to as PIRLS-05/06 to acknowledge the timing the study was administered in Southern Hemisphere countries.

[3] Chamberlain, 2007b. See the references for details.

[4] Mullis, Martin, Kennedy, & Foy, 2007. See the references for details.

[5] The results reflect the achievement of *all* Year 5 students; achievement by the language of instruction is not examined in this report.

[6] Statistically significant at the 5 percent level. For details, see the Technical Notes at the end of this report.

- There was no significant change in either Year 5 girls' or boys' reading literacy achievement from 2001 to 2005/2006. Moreover, the size of the difference between girls' and boys' average performance also remained unchanged from 2001 to 2005/2006.
- While there were no significant changes in the mean performance in either of the two reading purposes, Year 5 students were found to have a slight but significant advantage on informational reading than on literary reading. The opposite was observed in 2001.
  - This finding was observed for girls, boys, and students in all ethnic groupings.

Students' reading attitudes and home context

- Year 5 students were relatively positive about reading, although they tended to be more reticent with their views in 2005/2006 than in 2001.
- The shifts in student attitudes were significant for Year 5 boys, Māori students, and Pākehā/European girls.
- Boys were more likely than girls to never read for fun outside of school; these boys were most likely to be Māori and Pasifika boys.
- Year 5 students tended to be less confident about their reading ability compared with many of their international counterparts.
  - Moreover, their views were more moderate in 2005/2006 than in 2001.
  - This negative shift between assessment cycles was significant for both Year 5 boys and girls, and Māori, Pākehā/European, and Pasifika students, but not for Asian students.
- Children's early childhood experiences, including the number of years they attended an early childhood facility, were positively related to their reading literacy achievement when in Year 5. The relationship was stronger for boys than it was for girls.
- Year 5 students who regularly spoke the language of the PIRLS assessment generally had higher reading literacy achievement than Year 5 students who sometimes or rarely did; they were also more likely to achieve at or above the PIRLS lower benchmarks.
- Positive values on socio-economic indicators such as household income, financial well being, and the number of books in the home were associated with higher reading literacy achievement.

Schools and school climate

- The urban/rural locality of a school did not appear to be related to students' reading literacy achievement.
- There were high-achieving and low-achieving students in all three school decile-band categories, although the range was greater in lower decile schools than in either mid-range or higher decile schools.
- The average performance of Year 5 students who attended lower decile schools (485) was generally weaker than the average performance of students who attended either mid-range (538) or higher decile (560) schools.
- There was no change from 2001 to 2005/2006 in the achievement of students in any of the school decile band categories.
- Internationally, the average number of hours New Zealand school principals estimated they spent on school-related activities was high. This observation held across the locality of schools and the school decile bands.
- Although the majority of New Zealand principals reported that resource shortages or inadequacies had mostly no impact on reading instruction, principals of both lower and higher decile schools were more likely to report that shortages/inadequacies were impacting on their schools in 2005/2006 than their counterparts in 2001.
- In 2005/2006, principals of lower decile schools tended to be less positive about the climate for learning in their schools and more likely to have concerns about negative student behaviours in their schools than their counterparts in mid-range and higher decile schools.
- The views of Year 5 students in lower decile schools about negative student behaviours to some extent mirrored those of the school principals of these schools.
- A little under one in five New Zealand Year 5 students did not like being at school, about the same as the international average.
  - Year 5 boys were more likely than girls to feel this way about school.
  - Pākehā/European boys were more likely to have this view (nearly 30% of the group) than any other group of Year 5 students.

Section 1:

BACKGROUND

This section presents a brief overview of the background to the second cycle of the Progress in International Reading Literacy Study (PIRLS). It includes details of the countries that took part, the education level of the students involved, and information on the types of reading texts included in the students' reading literacy assessment.

Overview of PIRLS

PIRLS-05/06 was the second in an international 5-yearly cycle[7] of assessments designed to measure trends in reading literacy achievement at the middle primary level (Year 5 students in New Zealand). In addition to providing information on student achievement, it also examines the home, class, and school contexts for reading.

In PIRLS, reading literacy is defined as:

> *The ability to understand and use those written language forms required by society and/or valued by the individual. Young readers can construct meaning from a variety of texts. They read to learn, to participate in communities of readers in school and everyday life, and for enjoyment.* (Mullis, Kennedy, Martin, & Sainsbury, 2006, p.3)

As was the case in PIRLS-01, the framework for PIRLS-05/06 describes three aspects of reading literacy:

- purposes of reading
- processes of comprehension
- reading behaviours and attitudes.

The first two aspects were used to shape the reading assessment in PIRLS-05/06. The aspect relating to reading behaviour and attitudes was addressed in a student questionnaire. In addition, information about the home and school context for reading was gathered through questionnaires for the students' parents, teachers, and school principals, as well as within the student questionnaire.

Countries and education systems involved in the studies

Forty countries and education systems participated in PIRLS-05/06; 26 had also taken part in the first cycle in 2001 (see Table 1.1). Five Canadian provinces, accounting for 88 percent of Canada's population, also took part as benchmark participants; two of these provinces had also taken part in 2001.

Table 1.1: Countries and Canadian provinces participating in PIRLS-05/06

Austria	* Hong Kong SAR†	Luxembourg	* Russian Federation
Belgium (Flemish)	* Hungary	* Macedonia, Rep. of	* Scotland
Belgium (French)	* Iceland	* Moldova, Rep. of	* Singapore
* Bulgaria	Indonesia	* Morocco	* Slovak Republic
Chinese Taipei	* Iran, Islamic Rep. of	* Netherlands, the	* Slovenia
Denmark	* Israel	* New Zealand	South Africa
* England	* Italy	* Norway	Spain
* France	Kuwait	Poland	* Sweden
Georgia	* Latvia	Qatar	Trinidad and Tobago
* Germany	* Lithuania	* Romania	* United States
‡Canadian provinces			
Alberta	Nova Scotia	* Quebec	
British Columbia	* Ontario		

Notes

* These countries and provinces participated in PIRLS-01. Kuwait participated in 2001, but its data are not comparable with 2005/2006.

† The Hong Kong Special Administrative Region.

‡ The Canadian provinces took part in PIRLS-01 and PIRLS -05/06 as benchmarking participants.

[7] At its inception PIRLS was to be on a 4-year cycle with the first cycle administered in 2001. PIRLS then moved from being on a 4- to a 5-year cycle. The majority of countries and all Northern Hemisphere countries administered PIRLS in early 2006, but Southern Hemisphere countries, of which there were only three, administered PIRLS in late 2005, only 4 years after the first cycle. The third cycle, PIRLS-10/11, will be a 5-year cycle for all countries.

New Zealand students and schools involved in PIRLS

In New Zealand, approximately 6,300 Year 5 students from a representative sample of schools which totalled 243 took part in the main survey of PIRLS-05/06 towards the end of 2005. In addition, a group of about 1,320 Year 6[8] students from 40 schools had also taken part in the field trial administered in the first quarter of 2005. Appendix A provides an overview of the sampling design including details of the stratification employed to select a representative sample of schools, and the size of the achieved New Zealand samples: school, teacher, and student samples.

Age and years of schooling

The target class level for PIRLS-05/06 was set to be the fourth year of schooling, (or 'Grade 4'), counting from the first year of ISCED Level 1.[9] Grade 4 was chosen because it is regarded as an important transition point in children's reading development, in that most would have learned to read and be now reading to learn. In New Zealand the fourth year of schooling equates to Year 4. In countries where the average age of the students was *estimated* to be younger than 9.5 years, the class level that represented the fifth year of schooling was chosen. This was the case for New Zealand, England, Scotland, and Trinidad and Tobago, where children start formal schooling at 5 years of age.

To ensure the right New Zealand students were selected, the definition was refined further. Specifically, the definition was Year 5 students, or those students who would enter secondary school (Year 9) in 2009.

Table 1.2 presents a breakdown of the age statistics for New Zealand's Year 5 students in the two PIRLS cycles. For additional information and a discussion of age comparability and achievement, readers should refer to Chamberlain, 2007b.

Table 1.2: Age of New Zealand Year 5 students, 2001 and 2005/2006

Statistics	Age statistics from each PIRLS assessment	
	2001	2005/2006
Mean	10 years, 1 month	10 years
Median	10 years, 1 month	10 years
Range (5th–95th percentiles)	9 years, 6 months – 10 years, 7 months	9 years, 6 months – 10 years, 6 months

School starting age and school entry

The school starting age in most countries is 6 or 7 years. In France and Singapore, for example, the school starting age is 6 years, while in Sweden and Latvia it is 7 years. In England and Scotland it is 5. In New Zealand the compulsory age is 6, but nearly all children start on or soon after their 5th birthday. New Zealand is the only country that has this entry practice; in all other countries students start at specific intake points. For example, in England many children start school at the beginning of the school year (i.e., September) in which they turn 5 years old.

Pre-primary education

Pre-primary education also differs markedly across countries. For example, in Germany most (80%) children go to kindergarten or pre-school from 3 to 5 years of age, but reading instruction does not start formally until they enter school at age 6. In Hungary, children are generally enrolled in kindergarten at 3 years old, with compulsory attendance for 1 year by 5 years of age before they start their formal schooling at 6 years old. Box 1.1 presents examples of the practices used in a selection of countries.

[8] The field trial was undertaken in April/May 2005, this being towards the end of the school year in Northern Hemisphere countries, and was conducted with Grade 4 students. Due to the field trial being administered near the beginning of the school year in Southern Hemisphere countries, trial in these countries involved students in one grade higher than was the case in the main survey. In New Zealand's case this was the Year 6 cohort.

[9] UNESCO's International Standard Classification of Education. Level 1 corresponds to primary education, or the first stage of basic education.

Box 1.1: Pre-primary education practices for selected countries

Selected country	Pre-primary education	Compulsory starting age
Germany	Attendance is voluntary. Most children attend a pre-primary education facility for 3 to 5 years, with no special instruction in reading.	6 years
Hong Kong SAR	Childcare is provided for 2- to 3-year-olds, and kindergarten is attended from 3 to 6 years of age. Formal reading starts at age 6 (Grade 1), but many begin to learn to read in kindergarten.	6 years
Hungary	Pre-primary education is available from ages 3 to 6; it is compulsory for 1 year for children aged 5. This prepares children for entry into formal education. The focus is on skills and competencies	6 years
Netherlands	There is no formal provision under 4 years, although childcare and preschool are available. Kindergarten is part of primary education, which starts at 4 years.	5 years; formal schooling starts at 6 years or the 3rd year
New Zealand	Early childhood education is provided through childcare services, home-based services, kindergartens, kōhanga reo, and play centres, up to school entry. *Te Whāriki*, the early childhood curriculum, identifies five goals that recognise aspects of early literacy skills.	6 years; in practice children start on or near their 5th birthday.
Sweden	The majority of 6-year-olds attend voluntary pre-school or preparatory classes (Grade 0). The goal is to stimulate language development and encourage interest in the written word. Many children (77%) also attend pre-school (nursery or day care) from ages 1 to 5.	Schooling starts at age 7

Source: Kennedy, A.M., Mullis, I. V. S., Martin, M. O., & Trong, K. L., 2007.

Language of assessment

Countries assessed their students according to the language or languages of instruction. Ten countries and the five Canadian provinces assessed in more than one language in order to cover their whole (Grade 4) student population. New Zealand assessed in Māori and English. South Africa (11) and Spain (5) were the only two countries to test in more than two languages. Table A.1 in Appendix A shows these countries (and provinces), with the languages in which their students were assessed.

Assessment format

The reading purposes and comprehension processes were assessed using a total of 10 different passages: five literary passages and five informational passages (outlined in Box 1.2). The passages averaged 760 words in length, with a range of 495 to 872 words. Four of the ten passages and accompanying questions had been retained from PIRLS-01 to enable trends in achievement to be measured.

Box 1.2: Literary texts versus informational texts

Literary texts	Informational texts
The five literary texts were complete short stories or episodes, which were accompanied by supportive illustrations. The stories covered a variety of settings, with each story having two main characters and a plot with one or two central events.	The five informational texts covered a variety of content including scientific, biographical, and procedural material. The texts were structured sequentially or by topic. As well as prose, each text included organisational and presentational features such as diagrams, photographs, and text boxes.

In PIRLS-05/06 students were assigned one of thirteen booklets, each with two passages: one literary text and one informational text; two literary texts; or two informational texts. Each passage was accompanied by a set of questions (about 12), with about half in multiple-choice format and half in constructed-response format. Details of the development and design are described in the *PIRLS 2006 technical report* edited by Martin, Mullis, and Kennedy (2007).

Other sources of information

To assist with the interpretation of the students' assessment data, information was sought from a number of sources using questionnaires. The PIRLS-05/06 framework was used as the basis for developing the questions for the questionnaires. The questionnaires were then given to:

- students and their parents/caregivers
- teachers who taught reading to the students
- principals of the schools the students attended.

A selection of the information collected from these various sources is presented in this report. Information was also sought from each country about its reading curriculum and was reported in Chamberlain 2007b.

To complement the quantitative nature of the approach and presentation of the information collected in PIRLS-05/06, each country (and benchmarking province) contributed an article outlining the policy context for reading in their country. These articles are published in the *PIRLS 2006 encyclopedia* (Kennedy, et al., 2007), available at www.pirls.org.

Technical information

For details on some of the technical aspects pertaining to the reporting of the information in this report, readers are referred to the Technical Notes at the end of this report. A full account of the procedures (e.g., the international sampling design, calculation of countries' sampling weights, assessment item analysis and review, the [IRT] scaling methodology, and estimation of sampling errors)[10] used in PIRLS-05/06 is provided in the *PIRLS 2006 technical report* (Martin, et al., 2007).

[10] See TN 1 to TN 4 in the Technical Notes and Appendix A for an overview of these topics.

Section 2: STUDENT RESULTS

Section 2 examines the reading literacy achievement of New Zealand's Year 5 students from a national perspective. First there is a recap of the results in an international context, followed by a detailed overview of the findings by ethnicity and gender. Comparisons are also made with the achievements of the 2001 year cohort.

Reading literacy achievement in 2005/2006

Figure 2.1 presents the means and distributions for all participating countries. Because PIRLS has been designed to measure trends in achievement over time, the PIRLS reading achievement scale was set in 2001 to have a mean of 500 and a standard deviation of 100, and will remain constant across the assessment cycles. In addition, while some sets of reading texts and associated questions are released after a cycle, others sets are retained to be used across cycles in order to be able to measure trends. The following points are the key results pertaining to New Zealand Year 5 students in an international context in 2005/2006.

- The mean reading score for New Zealand Year 5 students was 532, which was significantly higher[11] than the PIRLS scale mean of 500.
- The mean score for Year 5 students was similar to that of students in three countries – Chinese Taipei, Scotland, and the Slovak Republic – but significantly lower than the mean scores for 17 countries, including England and the United States.
- New Zealand's Year 5 students achieved at the same level in 2005/2006 as their 2001 counterparts.
- Three countries that had a similar performance to New Zealand in 2001 had demonstrated significant improvements in average achievement by 2005/2006. These were Singapore, Hong Kong SAR, and the Russian Federation.[12]

To assist readers with understanding the economic and educational context of participating countries, Figure 2.1 includes the value of each country's Human Development Index provided by the United Nations Development Programme. The index ranges from 0 to 1. Countries with high values on the index have long life expectancy, high levels of participation in education and adult literacy, and a good standard of living as measured by Gross National Product per capita. The majority of countries that scored above the PIRLS scale mean also had index values greater than 0.9 including New Zealand (0.936).

Two of the low-performing countries had the lowest values on the index (approximately 0.64 and 0.653). There were, however, some higher-performing countries with values on the index which ranged from about 0.797 (Russian Federation) to 0.869 (Hungary).

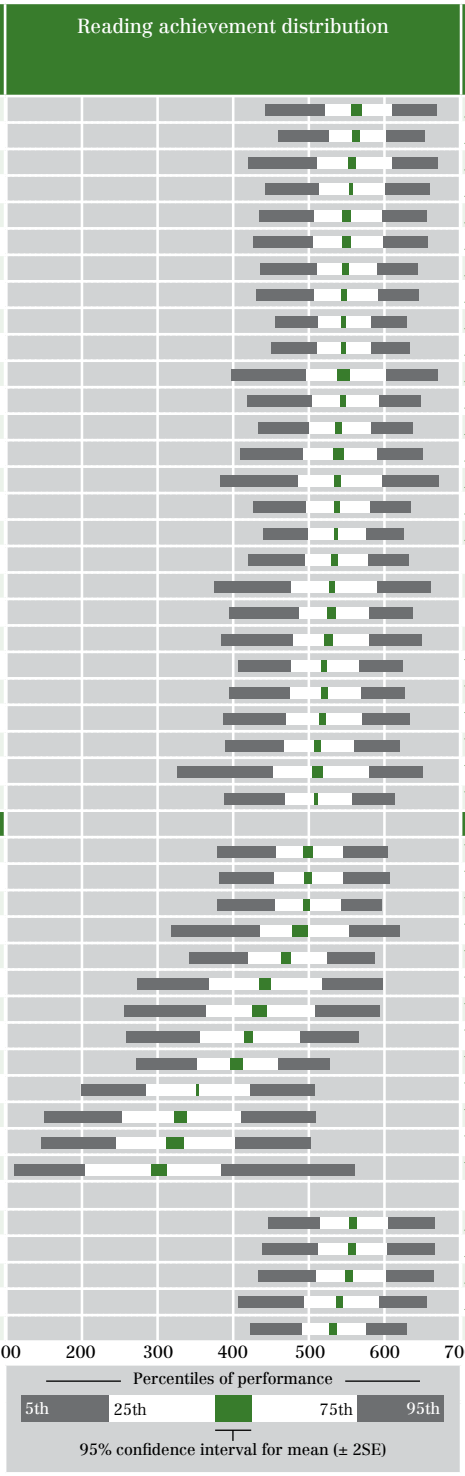
Figure 2.1 also shows the number of years of schooling and the mean age of the students assessed in PIRLS-05/06. Overall, the relationship between the average age of students and countries' mean achievement was variable. In some countries (and provinces), younger students had higher mean achievements than countries with older students, and vice versa. For example, students in some higher-performing countries such as the Russian Federation and Sweden tended to be, on average, older than New Zealand students, while in Hong Kong SAR and Italy it was not the case. Luxembourg students were typically the oldest. Luxembourg made the decision to assess their Grade 5 students (equivalent to New Zealand Year 6) because of concerns about the students' preparedness for taking an assessment in one of the two instructional languages (i.e., French and German), given that it is not their home language (Luxembourgish). Students in three of the Canadian provinces were, on average, slightly younger than many of their international counterparts.

Although the mean age of students in New Zealand, England, Scotland, and Trinidad and Tobago was about 10 years, because of the school starting age of 5 years they had also received at least one more year of schooling than many of their international counterparts, who had started school at age 6 or 7.

[11] As noted in footnote 6, this refers to statistical significance at the 5 percent level.

[12] While New Zealand's average reading literacy achievement did not change, New Zealand's standing relative to the 25 other countries with comparable data from both cycles changed from 11th in 2001 to 14th in 2005/2006. (This excludes the results from two benchmarking Canadian provinces, Ontario and Quebec, which had been combined for reporting in 2001.)

Figure 2.1: Distribution of countries' reading achievement in PIRLS-05/06



Countries	Mean scale score	Years of formal schooling*	Mean age	Human development index**
[2a] Russian Federation	▲ 565 (3.4)	4	10.8	0.797
Hong Kong SAR	▲ 564 (2.4)	4	10.0	0.927
Singapore	▲ 558 (2.9)	4	10.4	0.916
Luxembourg	▲ 557 (1.1)	5	11.4	0.945
Italy	▲ 551 (2.9)	4	9.7	0.940
Hungary	▲ 551 (3.0)	4	10.7	0.869
Sweden	▲ 549 (2.3)	4	10.9	0.951
Germany	▲ 548 (2.2)	4	10.5	0.932
† Netherlands	▲ 547 (1.5)	4	10.3	0.947
†[2a] Belgium (Flemish)	▲ 547 (2.0)	4	10.0	0.945
[2a] Bulgaria	▲ 547 (4.4)	4	10.9	0.816
[2a] Denmark	▲ 546 (2.3)	4	10.9	0.943
Latvia	▲ 541 (2.3)	4	11.0	0.845
†[2a] United States	▲ 540 (3.5)	4	10.1	0.948
England	▲ 539 (2.6)	5	10.3	0.940
Austria	▲ 538 (2.2)	4	10.3	0.944
Lithuania	▲ 537 (1.6)	4	10.7	0.857
Chinese Taipei	● 535 (2.0)	4	10.1	0.910
New Zealand	**532 (2.0)**	**4.5 – 5.5**	**10.0**	**0.936**
Slovak Republic	● 531 (2.8)	4	10.4	0.856
† Scotland	● 527 (2.8)	5	9.9	0.940
France	▼ 522 (2.1)	4	10.0	0.942
Slovenia	▼ 522 (2.1)	3 or 4	9.9	0.910
Poland	▼ 519 (2.4)	4	9.9	0.862
Spain	▼ 513 (2.5)	4	9.9	0.938
[2b] Israel	▼ 512 (3.3)	4	10.1	0.927
Iceland	▼ 511 (1.3)	4	9.8	0.960
PIRLS scale mean	500	–	–	–
Moldova, Rep. of	▼ 500 (3.0)	4	10.9	0.694
Belgium (French)	▼ 500 (2.6)	4	9.9	0.945
‡ Norway	▼ 498 (2.6)	4	9.8	0.965
Romania	▼ 489 (5.0)	4	10.9	0.805
[2a] Georgia	▼ 471 (3.1)	4	10.1	0.743
Macedonia, Rep. of	▼ 442 (4.1)	4	10.6	0.796
Trinidad and Tobago	▼ 436 (4.9)	5	10.1	0.809
Iran, Islamic Rep. of	▼ 421 (3.1)	4	10.2	0.746
Indonesia	▼ 405 (4.1)	4	10.4	0.711
Qatar	▼ 353 (1.1)	4	9.8	0.844
Kuwait	▼ 330 (4.2)	4	9.8	0.871
Morocco	▼ 323 (5.9)	4	10.8	0.640
South Africa	▼ 302 (5.6)	5	11.9	0.653
Canadian provinces				
[2a] Alberta	▲ 560 (2.4)	4	9.9	0.950
[2a] British Columbia	▲ 558 (2.6)	4	9.8	0.950
[2a] Ontario	▲ 555 (2.7)	4	9.8	0.950
Nova Scotia	▲ 542 (2.2)	4	10.0	0.950
Quebec	● 533 (2.8)	4	10.1	0.950

▲ Country mean significantly higher than NZ mean

▼ Country mean significantly lower than NZ mean

Notes

Standard errors appear in parentheses. Because results are rounded, some figures may appear inconsistent. The Canadian provinces took part in PIRLS-05/06 as benchmarking participants.

* Represents years of schooling counting from the first year of ISCED Level 1.

** Taken from United Nations Development Programme's *Human Development Report 2006*, p. 283-286, except for Chinese Taipei taken from Directorate General of Budget, Accounting and Statistics, Executive Yuan, *R.O.C. Statistical Yearbook 2005*. Data for the Belgium (Flemish) and Belgium (French) communities are for the entire country of Belgium. Data for England and Scotland are for the United Kingdom.

† Met guidelines for sample participation rates only after replacement schools were included.

‡ Nearly satisfying guidelines for sample participation rates after replacement schools were included.

[2a] National Defined Population covers less than 95% of National Desired Population.

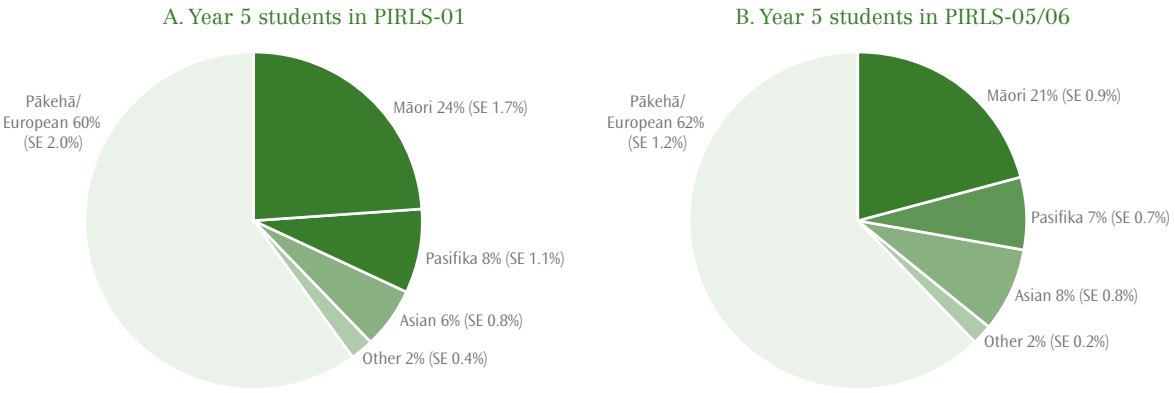
[2b] National Defined Population covers less than 80% of National Desired Population.

Source: IEA Progress in International Reading Literacy Study (PIRLS) 2006. Adapted from Exhibits 1.1 and 1.2 in Mullis, et al., 2007.

Reading literacy achievement and ethnicity

In New Zealand, five broad ethnic classifications are used to describe students' *ethnicity* in New Zealand: Pākehā/European, Māori, Pasifika, Asian, and Other ethnic groups.[13] Figure 2.2 shows the breakdown of the estimated Year 5 population by ethnicity in the two cycles of PIRLS.[14]

Figure 2.2: Estimated Year 5 student population in each ethnic grouping in PIRLS-01 and PIRLS-05/06 (weighted percentages)*



Notes

Standard errors (SE) appear in parentheses.

Percentages are adjusted for missing responses. Missing ethnicity information was approximately 2 percent in 2001 and 1 percent in 2005.

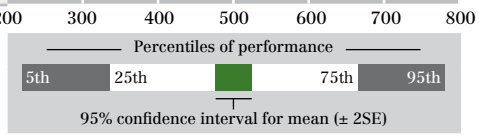
* See TN 1 for a brief description of the weighting used in PIRLS.

Figure 2.3 presents the mean reading literacy score and the distribution of scores for each of New Zealand's ethnic grouping in PIRLS-05/06.[15] The average achievement of Pākehā/European students (552) was about the same as for Asian students (550), with around three-quarters (76%) of students in both groups achieving scores equivalent to or above the PIRLS scale mean of 500.

Māori (483) and Pasifika (479) Year 5 students tended to achieve at about the same level, but somewhat lower than the PIRLS scale mean (500). Less than half of Māori students (46%) and Pasifika students (40%) achieved reading scores equivalent to or above the PIRLS scale mean.

Figure 2.3: Distribution of Year 5 students' reading literacy scores in 2005/2006, by ethnic grouping

Ethnic grouping	Percentage of students	Mean reading literacy score	Distribution of reading literacy scores
Pākehā/European	62 (1.2)	552 (2.4)	
Māori	21 (0.9)	483 (3.6)	
Pasfika	7 (0.7)	479 (6.7)	
Asian	8 (0.8)	550 (5.3)	
Other	2 (0.2)	539 (9.6)	
All New Zealand		532 (2.0)	



Notes

Standard errors appear in parentheses.

The 5th and 95th percentiles for Pasifika and Asian students should be interpreted with some caution due to the relatively small (achieved) sample sizes on which these analyses are based. The distribution of scores for Year 5 students in the 'Other ethnic groups' category is not shown because of the very small proportion (approximately 2%) they form of the overall population.

See Table B.1 in Appendix A for details of the percentiles and standard errors for 2001 and 2005/2006.

[13] *Māori* refers to the indigenous people of New Zealand. *Pasifika* includes people who identify themselves as Cook Islands Māori, Samoan, Tongan, or Niuean. *Asian* includes people who identify as being Chinese, Indian, Korean, or Vietnamese. The *Other* ethnic groups include those from Middle Eastern (e.g., Iraqi,) African (e.g., Somali) or South American (e.g., Chilean) backgrounds. *Pākehā/European* includes people who, for example, identify themselves as of English, Scottish, or Irish heritage, or are of European (such as Dutch or Polish) background.

[14] In 2001 ethnicity data reflect information supplied by schools; in 2005 the data reflect information supplied by schools and students' self-identification. The Ministry of Education data for all domestic Year 5 students in 2005 were Pākehā/European, 58%; Māori, 23%; Pasifika, 9%; Asian, 8%; and Other ethnic groups, 2%. (Source: www.educationcounts.govt.nz)

[15] The results are presented for *all* Year 5 students and do not reflect their language of instruction

Ranges of scores

At 290, the range of scores for New Zealand (i.e., the difference between the 5th and the 95th percentiles) was wider – with the exception of England (290) and Bulgaria (276), which had a similarly large spread – than the range for many other higher-performing countries. By way of comparison, the range for the Netherlands was 174 (see Chamberlain, 2007b; Mullis, et al., 2007 for further details). As well as illustrating the variation in achievement across New Zealand's four main ethnic groupings, Figure 2.3 also highlights the fact that there are high-performing and low-performing students in all ethnic groupings. The range was greater for Māori (290) than for Pākehā/European (266), Pasifika (255), and Asian students (246).

Differences among the ethnic groupings and effect sizes

Both Asian and Pākehā/European students achieved significantly higher reading literacy scores, on average, than Māori and Pasifika students.[16] *Effect sizes* are a useful way of illustrating the magnitude of the achievement difference between two groups of students.[17] In this report, the effect size is calculated as the difference between the means for two groups in question, divided by the pooled standard deviation of the two groups (i.e., Cohen's *d* or the normalised difference between the means). Table B.2 in Appendix B reports the effect sizes for the differences among Pākehā/European, Māori, Pasifika, and Asian students' mean reading literacy scores for the two PIRLS assessments, 2001 and 2005/2006.

For the purposes of this discussion, the effect size is considered large if the value is greater than 0.75, of medium size if the value is equal to 0.35 or higher but less than 0.75, and small if less than 0.35.[18] Essentially, the calculated effect sizes highlight the *large* differences in mean reading literacy achievement as measured by PIRLS among the ethnic groupings in 2005/2006. Of note are the effect sizes for the differences between Pākehā/European and Māori ($d = 0.84$) and between Pākehā/European and Pasifika ($d = 0.92$).

Any change between 2001 and 2005/2006?

Table 2.1 below shows the mean scores for students in each ethnic grouping for the two cycles. The biggest shift was exhibited for Asian students, who on average achieved 11 scale score points higher than their 2001 counterparts. However, neither the average increase in Asian students' reading achievement nor the changes found for the other three main ethnic groups were statistically significant.

Table 2.1: Year 5 students' mean reading literacy scores in 2001 and 2005/2006, by ethnic grouping

Year 5 student group	Mean reading literacy scores for each PIRLS assessment cycle		Change 2001–2005/2006
	2001	2005/2006	
Pākehā/European	552 (3.4)	552 (2.4)	-1 (4.2)
Māori	481 (5.5)	483 (3.6)	+2 (6.6)
Pasifika	481 (7.2)	479 (6.7)	-2 (9.9)
Asian	540 (9.9)	550 (5.3)	+11 (11.2)
Other ethnic groups	~ ~	539 (9.6)	N.C.†

Notes

Standard errors appear in parentheses. Because results are rounded, some figures may appear inconsistent.

Tilde (~) indicates the achieved sample size was too small (N < 50) to calculate the mean. See TN 7 in the Technical Notes for details.

† Not calculated.

[16] The mean scores for Pākehā/European and Asian students were statistically *significantly higher* than the mean scores for Māori and Pasifika students (adjusted for *multiple comparisons*, see TN 5 in the Technical Notes for details.). There was no significant difference between the mean scores for Pākehā/European and Asian students, nor was there a difference between Māori and Pasifika students.

[17] For details on the calculation and interpretation of effect size, see TN 6 in the Technical Notes.

[18] This interpretation of large, medium, and small is a variation of the interpretation commonly used for Cohen's *d* (large = 0.8; medium = 0.5; small = 0.2).

Reading literacy achievement and gender

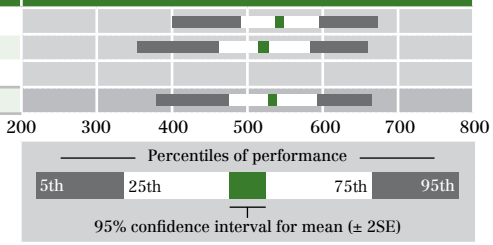
Internationally, both New Zealand Year 5 girls and boys typically achieved above their respective international means. The following points were the highlights for Year 5 students in an international context.

- New Zealand boys (520) scored on average significantly above the international mean for boys (492).
- New Zealand girls (544) scored on average significantly above the international mean for girls (509).
- At 24 scale score points, the average difference between New Zealand girls' and boys' scores was the fifth largest to be observed internationally (an average difference of 17 scale score points).

Figure 2.4 presents the mean reading literacy score and the distribution of scores for New Zealand Year 5 girls and boys separately, along with the (weighted) percentage of girls and boys in the Year 5 population.

Figure 2.4: Distribution of Year 5 students' reading literacy scores in 2005/2006, by gender

Gender	Percentage of students	Mean reading literacy score	Distribution of reading literacy scores
Girls	49 (0.9)	544 (2.2)	
Boys	51 (0.9)	520 (2.9)	
All New Zealand		532 (2.0)	



International mean: girls 509 (0.7)
International mean: boys 492 (0.7)

Notes

Standard errors appear in parentheses.

See Table B.3 in Appendix B for the percentiles and standard errors for 2001 and 2005/2006.

Range of scores

As illustrated in Figure 2.4, the range of scores was greater for Year 5 boys (298) than for Year 5 girls (272). The figure also illustrates the weaker performance of some Year 5 boys when compared to that of girls; 5 percent of Year 5 boys scored below 357 (5th percentile), while the corresponding 5th percentile for Year 5 girls was 40 scale score points higher at 399.

Gender differences

The mean reading literacy score for girls in all but two countries in PIRLS was significantly higher than the mean for boys, with the average difference greatest in Kuwait (67 scale score points) and the smallest (and non-significant) in Luxembourg (3) and Spain (4). As noted in the first part of this section, New Zealand recorded one of the largest differences (24) between girls' and boys' mean achievement.

Again, effect sizes are a useful way to understand the magnitude (size) of the difference between New Zealand girls' and boys' mean achievement. Using the same approach taken to examine differences among the New Zealand ethnic groups (see page 16), an effect size was calculated to look at the size between New Zealand girls' and boys' mean achievement. This was calculated to be $d = 0.28$ in 2005/2006, which indicates that the difference between girls and boys was relatively *small*; this was also the case in 2001 ($d = 0.29$). An examination of the data found that the gender difference was greater among New Zealand's lower reading achievers than its higher reading achievers. For example, the average difference between the achievement of Year 5 girls and boys who scored below the PIRLS scale mean (500) was 18 scale score points, compared with an average difference of just 6, albeit still significant, for those who scored 500 or more.

An examination of the overall New Zealand distribution also illustrates this observation. The proportion of boys who achieved 592 (i.e., the 75th percentile) or a higher score was 22 percent, 6 percentage points lower than the proportion of girls (28%). At the lower end of the performance range, the proportion of Year 5 boys who scored less than 478 (i.e., the 25th percentile) was 30 percent, compared with 20 percent of Year 5 girls. That is, girls were over-represented among higher achievers and boys were over-represented among lower achievers.

Any change between 2001 and 2005/2006?

The mean scores for Year 5 boys and girls for the two PIRLS cycles are reported in Table 2.2, along with the means for girls and boys calculated for the 26 countries taking part in both PIRLS-01 and PIRLS-05/06 (i.e., the 'trend' countries). While there was no significant change in the girls' mean for the 26 trend countries, the boys' mean increased by an average of 5 scale score points; the increase was statistically significant.

Table 2.2: Mean reading literacy scores for New Zealand Year 5 students and the 26 trend countries in 2001 and 2005/2006, by gender

Comparison group	Mean reading literacy scores			
	Girls		Boys	
	2001	2005/2006	2001	2005/2006
New Zealand	542 (4.7)	544 (2.2)	516 (4.2)	520 (2.9)
Trend countries*	525 (0.9)	526 (0.7)	505 (1.1)	510 (0.7) ▲

Notes

Standard errors appear in parentheses.

* Means calculated for the 26 countries participating in both PIRLS-01 and PIRLS-05/06. Includes New Zealand data.

▲ The increase was statistically significant at the 5 percent level.

The gender difference observed in New Zealand remained relatively large when compared with the differences in other countries. The small increases exhibited by New Zealand girls and boys during the period 2001 to 2005 (2 and 4 scale score points higher respectively) were not found to be of statistical significance.

Reading literacy achievement, ethnicity, and gender

Since 'girls' and 'boys' both represent diverse groups of students, their performance in PIRLS is viewed in the context of their ethnic identity.

Pākehā/European (564) and Asian (562) girls, on average, performed well above the international girls' mean of 509. Furthermore, both groups of girls had the greatest proportion (both 82%) of any sub-group scoring 500 (the PIRLS scale mean) or higher.

At 498, the mean score for Māori girls was significantly lower than the international girls' mean (509) but was about the same as the PIRLS scale mean; 52 percent of Māori girls achieved a score at or above this level (500). Pasifika girls (486), on average, achieved scores below the international mean for girls; furthermore, only about two-fifths (42%) of these students achieved scores at or above the PIRLS scale mean (500).

About 70 percent of Pākehā/European boys and Asian boys scored above the PIRLS scale mean of 500; the means for both groups was 540 (c.f. the international boys' mean of 492). At 469, Māori boys' mean score was significantly lower than the international boys' mean; so too was the mean for Pasifika boys (471). About 40 percent of Māori boys and Pasifika boys achieved scores above the PIRLS scale mean of 500.

Gender differences

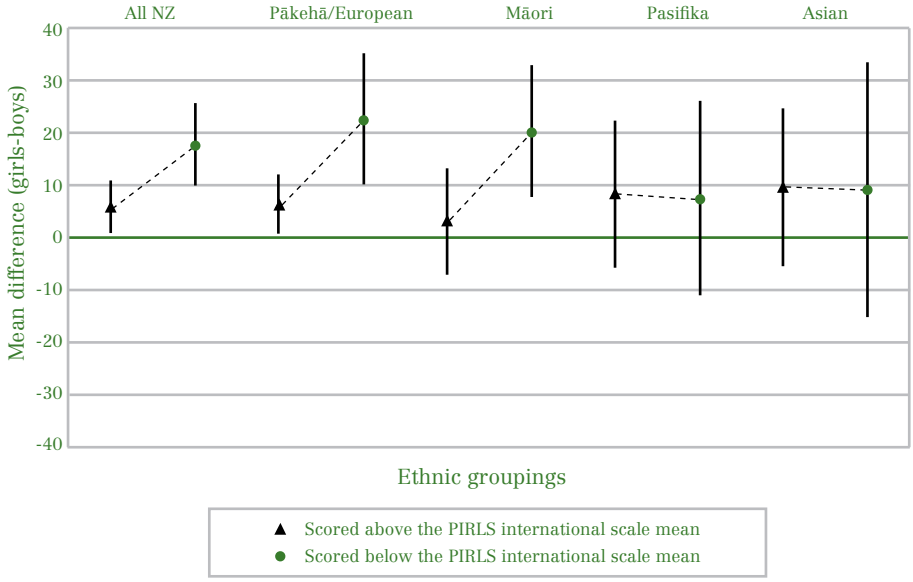
Pākehā/European, Māori, and Asian girls generally achieved significantly higher scores than their respective male counterparts.[19] The one exception was that Pasifika girls typically achieved 15 points higher than Pasifika boys, but the difference between the two groups was not statistically significant.[20]

Were there significant gender differences among those who had 'above average' achievement (scored 500 or higher) and those who had 'below average achievement (scored less than 500) in each of the ethnic groupings? The finding observed for all Year 5 students noted in the previous section held for Pākehā/European students only (see Figure 2.5). That is, although significant gender difference were found among Pākehā/European students who scored above 500 (an average 6 of scale score points), the gender difference was greater for the group who scored below 500 (an average of 23 scale score points).

[19] The differences between means, with standard errors of the differences, were 23 (3.6), 30 (6.1), and 21 (7.8) respectively.

[20] Difference between means, with standard error of the difference, 15 (8.6).

Figure 2.5: Mean differences between Year 5 girls' and boys' reading literacy achievement scores in 2005/2006, by ethnic grouping



Notes

The data points are the *mean differences* between girls' and boys' mean reading literacy achievement in each achievement category (above ▲ and below ● the PIRLS international scale mean). A value close to zero indicates that the difference between girls' and boys' mean achievement is small. The vertical lines extending from a data point shows the 95 percent confidence interval around the difference of the mean (i.e., ± 2 standard errors of the difference).

See Appendix B.4 in Appendix B for the mean differences and standard errors.

For Māori, the average difference (a difference of 20 scale score points) was only significant between girls and boys who scored below 500. Gender differences between students who were in the 'above average' achievers category and who were in the 'below average' category were not found to be significant for the Asian and Pasifika groupings.

Any change between 2001 and 2005/2006?

Tables 2.3 and 2.4 present the mean scores for girls and boys in each ethnic grouping respectively. Pasifika girls in 2005/2006 scored an average of 13 scale score points lower than their 2001 counterparts, while Asian boys scored an average of 14 scale score points higher. These changes were not found to be of statistical significance.

Table 2.3: Year 5 girls' mean reading literacy scores in 2001 and 2005/2006, by ethnic grouping

Ethnic grouping	Year 5 girls' mean reading literacy scores for each PIRLS assessment cycle		Change 2001–2005/2006
	2001	2005/2006	
Pākehā/European	567 (4.7)	564 (2.8)	-4 (5.5)
Māori	495 (7.2)	498 (4.6)	+3 (8.5)
Pasifika	500 (10.1)	486 (6.0)	-13 (11.7)
Asian	560 (13.7)	562 (5.4)	+2 (14.8)
All New Zealand*	542 (4.7)	544 (2.2)	+2 (5.2)

Notes

Standard errors appear in parentheses. Because of rounding, some results may appear inconsistent.

None of the changes were statistically significant at the 5 percent level.

* All girls. In 2001 there were insufficient data to report the mean by gender. In 2005 the girls' mean was 542 (12.1).

Table 2.4: Year 5 boys' mean reading literacy scores in 2001 and 2005/2006, by ethnic grouping

Ethnic grouping	Year 5 boys' mean reading literacy scores for each PIRLS assessment cycle		Change 2001–2005/2006
	2001	2005/2006	
Pākehā/European	539 (4.2)	540 (3.3)	+2 (5.3)
Māori	466 (6.5)	469 (4.7)	+3 (8.0)
Pasifika	465 (10.5)	471 (9.4)	+6 (14.1)
Asian	526 (11.9)	540 (7.3)	+14 (14.0)
All New Zealand*	516 (4.2)	520 (2.9)	+4 (5.1)

Notes

Standard errors appear in parentheses. Because of rounding, some results may appear inconsistent.

None of the changes were statistically significant at the 5 percent level.

* All boys. In 2001 there were insufficient data to report the mean by gender. In 2005, the boy's mean was 536 (14.2).

Section 3:

THE PIRLS INTERNATIONAL BENCHMARKS

Section 3 looks at the performance of Year 5 students in each sub-group in relation to the PIRLS international benchmarks of reading. A benchmark describes the types of comprehension skills and strategies Grade 4 students, or in New Zealand's case Year 5 students, demonstrated when they encountered particular questions in the PIRLS texts.

PIRLS international benchmarks of reading

Four points on the reading achievement scale were identified for use as international benchmarks.[21] These are: the *Advanced International Benchmark*, the *High International Benchmark*, the *Intermediate International Benchmark*, and the *Low International Benchmark*.22 The descriptions for each international benchmark are summarised in Box 3.1. The benchmarks are also cumulative, in that students who demonstrated the skills and strategies at a given benchmark also demonstrated the skills associated with the lower benchmarks. It is worth remembering that the descriptions do not profess to encompass all reading situations 10-year-olds encounter. However, they do reflect the types of PIRLS texts students were asked to read, the types of questions students were able to answer successfully, and, for multiple-mark constructed response questions, the quality of their responses.

Box 3.1: The PIRLS-05/06 international reading benchmarks for Grade 4 (Year 5 equivalent)

625	**Advanced International Benchmark** • When reading literary texts, students could integrate ideas across a text to provide interpretations of a character and provide full text-based support; interpret figurative language; and begin to examine and evaluate story structure. • When reading informational texts, students could distinguish and interpret complex information from different parts of the text, and provide full text-based support; understand the function of organisational features; and integrate information across a text to sequence activities and fully justify preferences.
550	**High International Benchmark** • When reading literary texts, students could locate relevant episodes embedded across the text; make inferences to explain relationships between intentions, actions, events, and feelings, and give text-based support; recognise the use of some textual features; and begin to interpret and integrate events and character actions across the text. • When reading informational texts, students were able to recognise and use a variety of organisational features to navigate through the texts; make inferences based on abstract or embedded information; integrate information across a text; compare and evaluate parts of a text to give a preference and a reason; and had begun to understand textual elements such as simple metaphors and an author's point of view.
475	**Intermediate International Benchmark** • When reading literary texts, students could identify central events, plot sequences, and relevant story details; make straightforward inferences about the attributes, feelings, and motivations of the main characters; and had begun to make connections across parts of the text. • When reading informational texts, students could locate and extract one or two pieces of information; make straightforward inferences from a single part of the text; and use subheadings, text boxes, and illustrations to locate parts of the text.
400	**Low International Benchmark** • When reading literary texts, students demonstrated they could recognise explicitly stated detail; and locate a specified part of the story and make an inference clearly suggested by the text. • When reading informational texts, students demonstrated they could locate and reproduce explicitly stated information, particularly when it was located at the beginning of the text or in a clearly defined section. Students could make a straightforward inference clearly suggested by the text.

Source: IEA Progress in International Reading Literacy Study (PIRLS) 2006. Adapted from Exhibits 2.4, 2.9, 2.14, and 2.19 in Mullis, et al., 2007.

[21] As in 2001, the scale anchoring method was used by the international researchers and a team of reading experts to develop the descriptions of student performance at the four different points. As well as a quantitative component used to identify the questions that discriminated between successive points on the scale, the process used qualitative methods to develop the descriptions of performance. The methodology is described in the *PIRLS 2006 technical report* (Martin, et al., 2007).

[22] It is important to note that these benchmarks are not comparable to the four benchmarks reported for PIRLS-01. For example, the *Advanced International Benchmark* used in 2005/2006 is not equivalent to the *Top 10% Benchmark* used in 2001. In 2001, percentiles (specifically, the 25th, 50th, 75th, and 90th) were used to identify the four benchmark points on the scale. Because there was a strong likelihood that the percentiles would change due to more countries participating, and there being a greater variation in performances as new countries join, four new points were identified. These four points were fixed for this and future cycles, which means that countries can determine with more certainty any changes over time. The four new points have also been used retrospectively to see if there has been any change since 2001.

The following points set out the key results for New Zealand Year 5 students in an international context.

- New Zealand recorded a relatively large proportion (13%) of students reaching the *Advanced International Benchmark*, almost double the international median of 7 percent.
- Forty-five percent of New Zealand students reached the *High International Benchmark*, compared with the international median of 41 percent.
- About three-quarters (76%) of New Zealand students reached the *Intermediate International Benchmark*, the same as the international median.
- Ninety-two percent of New Zealand students reached the *Low International Benchmark*, a little lower than the international median of 94 percent.
- There was no change from 2001 to 2005/2006.

PIRLS benchmarks, gender, and ethnicity

Table 3.1 shows the proportions of Year 5 students who reached the PIRLS international benchmarks, by gender and ethnicity. Year 5 girls, Pākehā/European students, and Asian students were well represented among the higher-performing students, with about half or more students in these groups achieving at or above the *High International Benchmark* (i.e., scored equal to or higher than 550). Māori, but particularly Pasifika students were under-represented among the higher-performing group, with just under one-quarter of Māori students and less than one-fifth of Pasifika achieving at this level. Year 5 boys were also, although to a lesser extent, under-represented, with just two-fifths of students among the higher-performing group. Both Māori and Pasifika students were also less likely than students in the other groups to reach the *Intermediate International Benchmark* (i.e., achieve a score of 475 or higher), with more than two-fifths of students from each group scoring below this level.

Table 3.1: Percentage of students reaching the PIRLS international reading benchmarks in 2005/2006, by gender and ethnic grouping

Year 5 student group	Percentages of students reaching PIRLS international benchmarks			
	Advanced (625)	High (550)	Intermediate (475)	Low (400)
Gender				
Girls	15 (1.0)	49 (1.3)	82 (1.0)	95 (0.5)
Boys	11 (0.8)	40 (1.4)	71 (1.5)	89 (0.9)
Ethnic grouping				
Pākehā/European	17 (1.0)	54 (1.3)	84 (1.0)	96 (0.6)
Māori	4 (0.8)	23 (1.6)	57 (1.9)	82 (1.8)
Pasifika	2 (0.8)	18 (2.7)	54 (3.2)	84 (3.2)
Asian	16 (2.6)	52 (2.9)	84 (2.4)	97 (0.8)
All New Zealand*	13 (0.7)	45 (1.0)	76 (1.0)	92 (0.6)
International median	7	41	76	94

Notes

Standard errors appear in parentheses. Because of rounding some figures may appear inconsistent.

* All Year 5 students, including students in Other ethnic groups.

Any change between 2001 and 2005/2006?

Table B.5 in Appendix B presents the percentages of students who reached the international benchmarks in 2001. Consistent with the overall pattern observed for New Zealand, there were no changes of note for any of the Year 5 student sub-groups.

Lower-achieving students

In recent times there has been commentary about the high proportion of students who 'fail' in New Zealand's education system, with the percentage cited sometimes as high as 20 percent. PIRLS, along with TIMSS[23] and PISA,[24] are often used to support this notion of 'failure', along with the assertion that New Zealand has the widest spread in achievement compared with other countries, enhanced by the so-called 'large tail'. The international studies are not designed to measure failure; they are designed so that countries can look at, among many other variables, strengths and weaknesses of cohorts of students in particular learning areas. Furthermore, the notion of a large tail in achievement does not hold across all learning areas; nor does it hold for every cohort of students (e.g., Chamberlain, 2007a).

PIRLS is designed to be able to discriminate between those students who demonstrate very well-developed comprehension skills for their age and those who have weak comprehension skills. The skills and strategies are tested through texts and stories, which may or may not be familiar in style, format, and length; PIRLS is not a test of reading per se (decoding).

The purpose of the following analysis is to describe the New Zealand group of students who, using the international context, had weaker comprehension skills, or are *lower-achieving* students. These students did not reach the PIRLS *Intermediate International Benchmark* (i.e., scored below 475). Approximately one-quarter of Year 5 students (24%) fell into this category.[25] Some of this group also did not reach the *Low International Benchmark*; 8 percent of Year 5 students scored below 400 overall, while 16 percent scored at least 400 but less than 475.

It should be remembered, though, that New Zealand's Year 5 students were also well represented among the group of readers with very strong reading comprehension skills.

So what does this mean in terms of reading comprehension as measured by PIRLS? When reading *literary texts*, lower-achieving students had difficulty with:

- identifying central events, plot sequences, and relevant story details
- making straightforward inferences about the attributes, feelings, and motivations of the main characters
- making connections across parts of the text.

Some students in this group even had difficulty demonstrating that they could:

- recognise explicitly stated detail
- locate a specified part of the story and make an inference clearly suggested by the text.

When reading *informational* texts, lower-achieving students had difficulty with:

- locating and extracting one or two pieces of information
- making straightforward inferences from a single part of the text
- using subheadings, text boxes, and illustrations to locate parts of the text.

Some of this group of students even had difficulty demonstrating they could:

- locate and reproduce explicitly stated information, even from the beginning of a text or in a clearly defined section
- make a straightforward inference clearly suggested by the text.

So who was in the lower-achieving group? Figures 3.1 through to 3.3 show the composition of the lower-achievers group according to students' gender, ethnicity, and gender and ethnicity.[26] The approach taken to describe the information is firstly to compare the proportion of lower achievers in each sub-group with the overall proportions in the Year 5 population. Are particular sub-groups over-represented among the group of lower achievers? The second approach (Figures 3.4 and 3.5) is to show the proportion of each sub-group that were in the lower-achievers group.

[23] Trends in International Mathematics and Science Study.

[24] Programme for International Student Assessment.

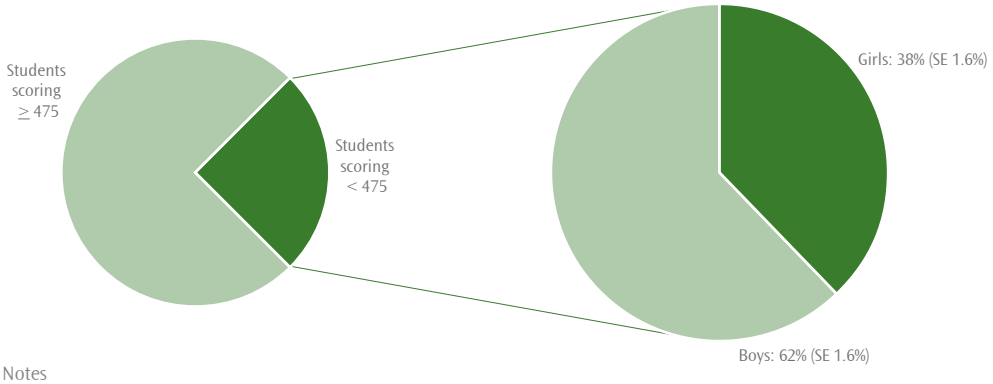
[25] This proportion compares, for example, with 8 percent of Hong Kong students, 13 percent of Ontario's students, 14 percent of Singaporean students, and 22 percent of England's students.

[26] In Section 5, the composition of the Year 5 lower-achievers group is also considered in terms of whether or not they spoke the test language. In Section 6, the composition is considered by the decile (band) of the school the Year 5 students attended in 2005.

Composition of the lower-achievers group

Figure 3.1 shows the composition of the group according to students' gender. While the Year 5 population was estimated to be 51 percent boys and 49 percent girls, most of those in the lower-achievers group were boys (62%).

Figure 3.1: Gender composition of the Year 5 lower-achievers group in 2005/2006



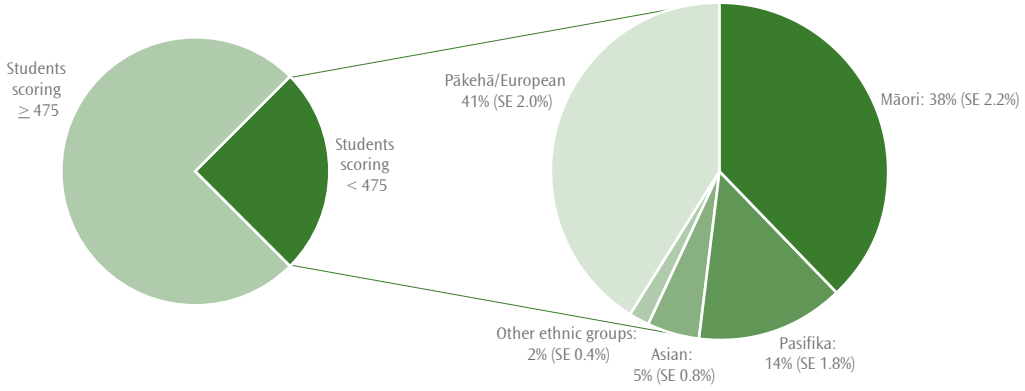
Notes

Standard errors (SE) appear in parentheses.

The proportion of all Year 5 students who reached the PIRLS *Intermediate International Benchmark* was 76 percent (SE 1.0%); the proportion who did not reach this benchmark was 24 percent (SE 1.0%).

Figure 3.2 shows the composition of the lower-achievers group according to their ethnic identity. Although the group comprised mostly Pākehā/European students (41%), 38 percent of the group were Māori students, 1.5 times higher than the estimated proportion of Māori in the Year 5 population (21%).[27] Pasifika students were also over-represented in this group (14% c.f. 7% in the population).

Figure 3.2: Ethnic composition of the Year 5 lower-achievers group in 2005/2006



Notes

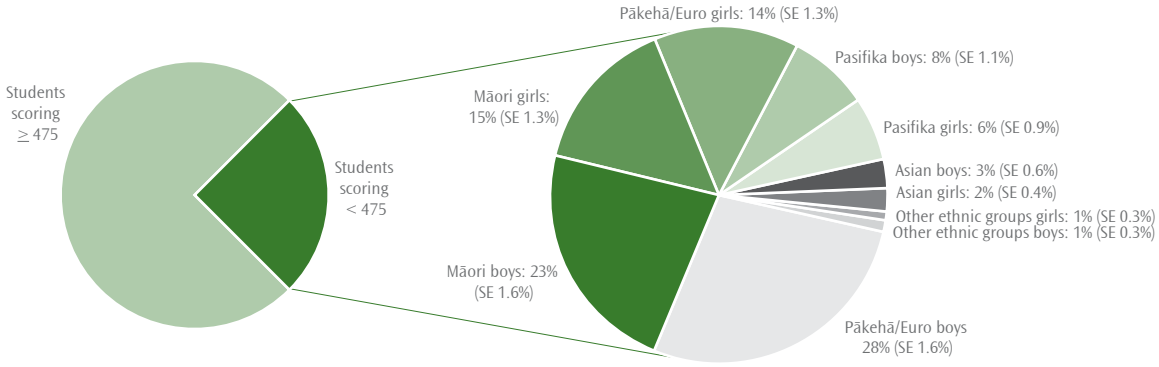
Standard errors (SE) appear in parentheses.

The proportion of all Year 5 students who reached the PIRLS *Intermediate International Benchmark* was 76 percent (SE 1.0%); the proportion who did not reach this benchmark was 24 percent (SE 1.0%).

The interaction between gender and ethnicity was considered by means of data shown in Figure 3.3. The lower-achievers group comprised mostly Pākehā/European boys (28%) and Māori boys (23%). However, in terms of how these data compared with the proportions in the overall population, Māori boys (c.f. 11% in the overall population) and Pasifika boys (c.f. 4%), Pasifika girls (c.f. 3%), and, to a lesser extent, Māori girls (c.f. 10%) were over-represented in the lower-achievers group.

[27] See Section 2 for details of the estimated Year 5 population by ethnicity.

Figure 3.3: Ethnic and gender composition of the Year 5 lower-achievers group in 2005/2006



Notes

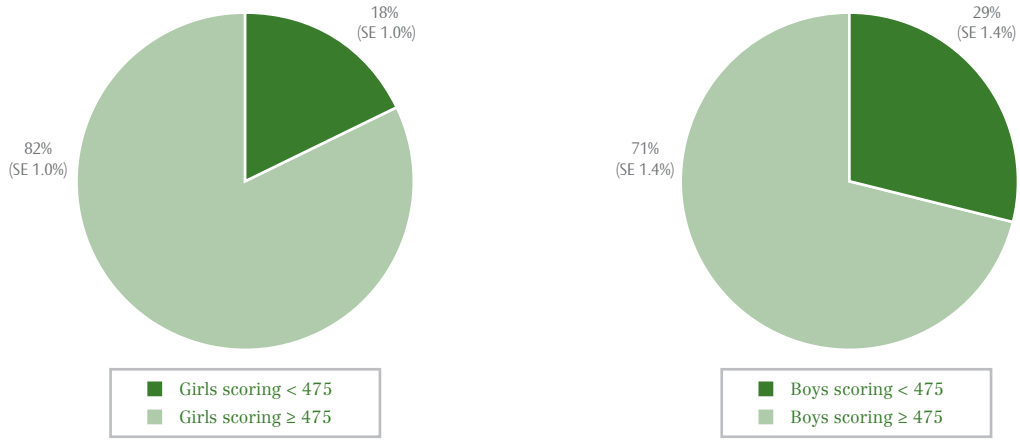
Standard errors (SE) appear in parentheses

The proportion of all Year 5 students who reached the PIRLS *Intermediate International Benchmark* was 76 percent (SE 1.0%); the proportion who did not reach this benchmark was 24 percent (SE 1.0%).

Proportions of sub-groups in the lower-achievers group

The second approach undertaken to describe the characteristics of lower achievers, as measured by PIRLS, was to look at the proportion of a sub-group that fell into a particular achievement category. Figure 3.4 shows the proportions of Year 5 girls and Year 5 boys who scored below 475 (i.e., did not reach the PIRLS *Intermediate International Benchmark*). Just under one-fifth of girls were in the lower-achievers group compared with nearly one-third of boys.

Figure 3.4: Percentage of Year 5 girls and boys who were in the lower-achievers group in 2005/2006



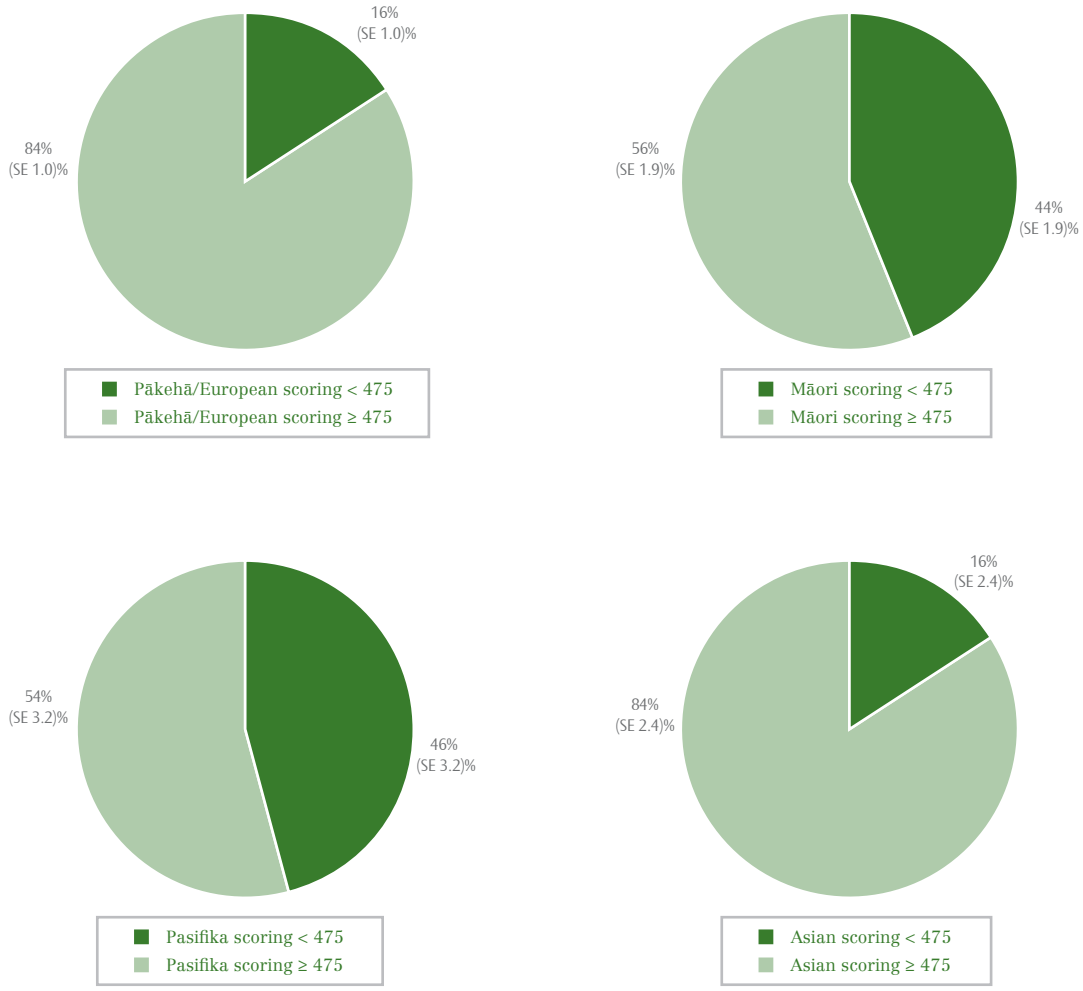
Notes

Standard errors (SE) appear in parentheses.

The proportion of all Year 5 students who reached the PIRLS *Intermediate International Benchmark* was 76 percent (SE 1.0%); the proportion who did not reach this benchmark was 24 percent (SE 1.0%).

Figure 3.5 shows the proportion of students from each ethnic grouping who were in the lower-achieving group. The proportions of Māori and Pasifika students were nearly three-times those of Pākehā/European and Asian in the lower-achieving category.

Figure 3.5: Percentage of Year 5 students from each ethnic grouping who were in the lower-achievers group in 2005/2006



Notes

Standard errors (SE) appear in parentheses.

The proportion of all Year 5 students who reached the PIRLS *Intermediate International Benchmark* was 76 percent (SE 1.0%); the proportion who did not reach this benchmark was 24 percent (SE 1.0%).

When looking at *gender* and *ethnicity* together, about one-fifth of Pākehā/European boys (21%) were by definition lower achievers in reading literacy, about double that for Pākehā/European girls (11%). The proportions for Asian students were about the same as for Pākehā/European students (i.e., Asian boys, 20%; Asian girls, 12%). Of concern, however, are the figures for Māori and Pasifika students, and in particular boys from these two groups. More than one-third of Māori girls (36%) and two-fifths of Pasifika girls (43%) were in the group of lower-achievers. However, by far the highest proportions were those for Māori boys (51%) and Pasifika boys (49%).

Odds ratios

In order to summarise the information presented in the preceding discussion, the *odds* of Year 5 students with particular attributes being in the lower-achievers group were determined. Odds are a way of representing the probability or chance of an *event*.

An odds ratio *(OR)*, a type of effect size, is calculated by dividing the odds of an event (e.g., having a demographic characteristic and being in the lower-achievers group) by the odds of the control event (e.g., not having the demographic characteristic and being in the lower-achievers group). If the *OR* is greater than 1, the *event* is more likely to happen than not; if the *OR* is less than 1, then the chances become less likely, particularly as it approach zero. (See TN 8 in the Technical Notes for further details.) The *ORs* and confidence intervals for each demographic characteristic under scrutiny are reported in Tables B.6A and B.6B in Appendix B.

Of note are the *ORs* for boys, Māori and Pasifika students: they were all greater than 1. That is, the likelihood of being a lower achiever was greater for these students than students who did not share these demographic characteristics. The observations from the analysis can be summarised as follows.

- Year 5 boys had nearly twice the odds of being in the lower-achievers group than Year 5 girls (i.e., 0.42 c.f. 0.23).
- Māori (0.77) and Pasifika (0.86) students had at least three times the odds of being in the lower-achievers group than non-Māori (0.23) and non-Pasifika (0.29) students.
- Māori boys (1.04), followed by Pasifika boys (0.97) and Pasifika girls (0.76), had the highest odds of being in the lower-achievers group compared with all other students.

Section 4:

PURPOSES FOR READING AND PROCESSES OF READING

This section looks at Year 5 students' achievement in the purposes for reading and in the four comprehension processes.

Introduction

The PIRLS assessment framework focused on two overarching purposes that account for most of the reading undertaken by students, both in and out of school: reading for literary experience and reading to acquire and use information. In addition, it describes four major processes of reading comprehension. *Searching for Food*, an example of a PIRLS reading to acquire and use information text, is presented in Appendix C, along with the questions and the specific processes of comprehension that were being assessed.

Purposes for reading

The two main purposes for reading at the middle primary level are described in Box 4.1. PIRLS-05/06 used two numerical scales to look at student achievement in the two purposes for reading: *reading for literary purposes* and *reading for informational purposes*. To enable countries to compare their students' relative performance in each of the purposes for reading, the international mean for each purpose was scaled to 500, the same as for the PIRLS international scale mean.

Box 4.1: The PIRLS-05/06 purposes for reading

Reading for literary experience	Reading to acquire and use information
The reader becomes involved in imagined events, settings, actions, consequences, characters, atmosphere, feelings, and ideas; he or she brings an appreciation of language and knowledge of literary forms to the text. This is often accomplished through reading fiction.	The reader engages with types of texts where she or he can understand how the world is and has been, and why things work as they do. Texts take many forms, but one major distinction is between those organised chronologically and those organised non-chronologically. This area is often associated with information articles and instructional texts.

Source: Mullis, et al., 2006.

The main finding pertaining to New Zealand follows.

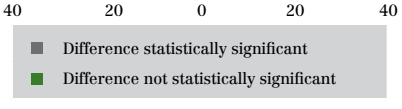
- In 2005/2006 Year 5 students on average achieved slightly (but significantly) higher scores in *reading for informational purposes* (534) than in *reading for literary purposes* (527). The opposite was observed in 2001.

Purposes for reading, gender, and ethnicity

Figure 4.1 presents the mean scores for the two *reading purposes* for New Zealand Year 5 girls and boys and for Year 5 students in each ethnic grouping in 2005/2006. Although not shown in the figure, Pākehā/European girls and Asian girls recorded the highest average achievement on both the *literary reading* scale (560 and 549 respectively) and the *informational reading* scale (562 and 571 respectively) compared with their other Year 5 counterparts.

Figure 4.1: Relative differences in achievement between the two purposes for reading in 2005/2006, by gender and ethnic grouping

Year 5 student group	Reading for literary purposes mean score	Reading for informational purposes mean score	Relative difference: absolute value	Relative difference: Reading for literary purposes mean **higher**	Relative difference: Reading for informational purposes mean **higher**
Gender					
Girls	539 (2.3)	545 (2.2)	6 (1.5)		6
Boys	516 (2.9)	522 (3.0)	6 (1.2)		6
Ethnic grouping					
Asian	539 (5.5)	560 (5.0)	21 (3.6)		21
Pasifika	472 (6.4)	487 (6.5)	15 (4.4)		15
Other ethnic groups	531 (8.8)	541 (10.4)	10 (8.8)		10
Māori	479 (3.5)	486 (3.7)	7 (1.4)		7
Pākehā/European	549 (2.4)	552 (2.6)	3 (0.9)		3
All New Zealand	527 (2.1)	534 (2.2)	6 (0.7)		6



Notes

Standard errors appear in parentheses.

The relative difference is the absolute difference between the means of the *reading for literary purposes* and *reading for informational purposes*.

At 537 and 529, Pākehā/European boys and Asian boys recorded relatively high average scores on the *literary reading* scale; they also typically scored high scores on the *informational reading* scale (541 and 550 respectively).

Māori girls generally scored a little under the international mean for *literary reading* (494 c.f. 500) and just above (502) the international scale mean (500) for *informational reading*. In both *literary* and *informational reading* purposes, the average performance of Pasifika boys (466 and 478) and Māori boys (465 and 471) fell well below the corresponding international scale means. At 478, Pasifika girls also had relatively weak average achievement in *literary reading*; by way of contrast the mean in *informational reading* for this group was 497, just under the PIRLS international scale mean.

Relative performance in the reading purposes

Figure 4.1 also shows the (absolute) difference between the two achievement scales for each group of students in 2005/2006. As noted previously, and contrary to the pattern in 2001, New Zealand students in 2005/2006 tended to have stronger performance on *reading for informational purposes* than *reading for literary purposes*, with the average difference between the two of statistical significance. This pattern was observed for both Year 5 girls and Year 5 boys; it was more marked for both Pasifika and Asian students than it was for Māori and Pākehā/European students.[28]

Gender differences[29]

Consistent with the overall domain of reading, girls from each grouping typically achieved higher scores when *reading for literary purposes* than their respective male counterparts. Internationally, the mean difference was 17 scale score points.

The average achievement differences were somewhat higher for three of the four main ethnic groupings. Māori girls typically scored 29 scale score points higher than Māori boys on the literary texts. The difference between Pākehā/European girls and boys averaged 23 scale points, while for Asian students the difference was 20 scale score points. At 11 scale score points the difference between Pasifika girls and boys was *not* significantly different.

A similar pattern was observed on the *informational reading* scale, although the differences were significant for *all* groupings. The international average difference was 16 scale score points. The average difference was most marked for Māori (30); the average differences were of the same order for the other three groupings: Pākehā/European (22), Asian (20), and Pasifika (19).

Any change between 2001 and 2005/2006?

In order to make comparisons across the two PIRLS cycles, the mean scores for the two reading purposes for 2001 are shown in Tables B.8 and B.9 in Appendix B. There was just a small non-significant decrease (4 scale points) in Year 5 students' mean achievement in *literary reading* between 2001 and 2005/2006 (Table B.8). With two exceptions, decreases were observed for all sub-groups. Year 5 boys' mean performance in *literary reading* was virtually the same in the two cycles, while Asian students in 2005/2006 on average achieved scores 5 scale score points higher than their 2001 counterparts.

By way of contrast, there was a non-significant increase (9 scale score points) in New Zealand's Year 5 students' mean achievement in *informational reading* over the 4-year period (Table B.8). Increases were observed for all sub-groups. Of note were the increases for Year 5 girls (10), and Asian (16) and Māori (9) students.

[28] In 2001, Year 5 girls, Pākehā/European students, and Māori students all on average had significantly stronger performance in *reading for literary purposes* than in *reading for informational purposes*. For boys and Pasifika students there were no differences between the two purposes. Asian students on average had significantly stronger performance in *reading for informational purposes* than in *reading for literary purposes*.

[29] See Table B.7 in Appendix B for details of average differences, along with their standard errors.

Processes of reading comprehension

The processes of reading comprehension are described in Box 4.2. For reporting purposes the four processes were combined into two achievement scales. The first is the *retrieving and inferencing processes* achievement scale, which combines the retrieval and straightforward inferencing processes. The second scale is the *interpreting, integrating, and evaluating processes* scale, which combines the process of interpreting and integrating with the examining and evaluating process.

(Note: because of the features of the different reading texts, the questions assessing the text-based processes were not necessarily 'easier' than the questions assessing the reasoning processes.)

To enable countries to compare their students' relative performance in each of the processes for reading, the international mean for each was scaled to 500.

Box 4.2: The PIRLS-05/06 processes of reading comprehension

Focus on and retrieve explicitly stated information	Readers are required to recognise information or ideas presented in the text, and how that information is related to the information being sought. Specific information to be retrieved is typically located in a single sentence or phrase.
Make straightforward inferences	Readers move beyond the surface of texts to fill in the 'gaps' in meaning. Proficient readers often make these kinds of inferences automatically, even though it is not stated in the text. The focus may be on the meaning of part of the text, or the more global meaning representing the whole text.
Interpreting and integrating ideas and information	Readers need to process the text beyond the phrase or sentence level. Readers attempt to construct a more specific or complete understanding of the text by integrating personal knowledge and experience with meaning that resides in the text. Because of this, meaning that is constructed is likely to vary among readers.
Examine and evaluate content, language, and textual elements	Readers draw on their interpretations and weigh their understanding of texts against their world view – rejecting, accepting, or remaining neutral to the text's representation. Readers need to draw on their knowledge of text genre and structure, as well as their understanding of language conventions. Readers may also reflect on the author's devices for conveying meaning and judge their adequacy, or identify weaknesses in how the text was written.

Source: Mullis, et al., 2006.

The main finding pertaining to New Zealand follows.

- As was the case in 2001, Year 5 students' performance in 2005/2006 was much stronger when answering questions that required them to use *interpreting, integrating, and evaluating* skills (538) rather than questions requiring them to use *retrieval and straightforward inferencing* skills (524).

Processes of reading comprehension, gender, and ethnicity

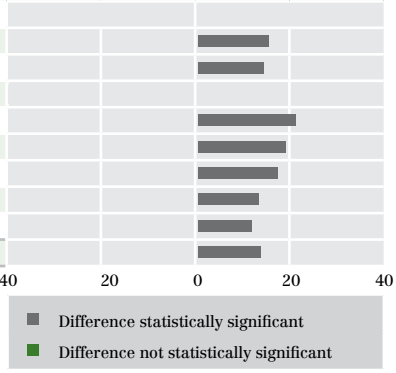
Figure 4.2 presents the mean scores for the two reading processes for Year 5 girls and boys and for Year 5 students in each ethnic grouping. Although not shown, both Pākehā/European girls and Asian girls recorded, on average, high scores when required to demonstrate *retrieving and inferencing* skills (555 and 549 respectively). Pākehā/European boys and Asian boys also recorded on average relatively high average scores (533 and 531).

Māori girls (489) typically achieved scores below the international scale mean for this process (500); the average performance of Pasifika girls (477), Pasifika boys (463), and Māori boys (463) fell well below this level.

On the *interpreting, integrating, and evaluating* scale, Asian girls (569) and Pākehā/European girls (568) recorded the highest average achievement compared with other groups in the Year 5 population on the reading achievement scale. Asian boys and Pākehā/European boys also recorded relatively high scores on average (550 and 545 respectively). While not quite as high, Māori girls (509) tended to score above the international scale mean for this process (500); the average performance of Pasifika girls was just under the international scale mean at 498. The average achievement of both Pasifika boys (483) and Māori boys (477) fell well below the international scale mean on this process.

Figure 4.2: Relative differences in achievement between the two reading comprehension processes in 2005/2006, by gender and ethnic grouping

Year 5 student group	Retrieval and straightforward inferencing mean score	Interpreting, integrating, and evaluating mean score	Relative difference: absolute value
Gender			
Girls	535 (2.4)	550 (2.3)	15 (2.2)
Boys	513 (3.1)	526 (2.9)	14 (0.8)
Ethnic grouping			
Pasifika	470 (6.0)	490 (6.1)	21 (2.8)
Asian	540 (5.1)	559 (5.4)	19 (3.9)
Māori	476 (3.6)	493 (3.7)	17 (1.7)
Other ethnic groups	531 (8.9)	544 (8.6)	13 (4.9)
Pākehā/European	544 (2.7)	556 (2.7)	12 (1.4)
All New Zealand	524 (2.3)	538 (2.2)	14 (1.3)



Notes

Standard errors appear in parentheses.

The relative difference is the absolute difference between the means for the *retrieval and straightforward inferencing* and *interpreting, integrating, and evaluating processes.*

Relative performance in the reading processes

To illustrate the students' relative strength in a process, Figure 4.2 also shows the absolute difference between the two scales. As already noted, New Zealand Year 5 students clearly demonstrated a relatively stronger performance when using reasoning processes (*interpreting, integrating, and evaluating processes*) than when they used text-based processes (*retrieval and interpreting processes*). This pattern was observed for girls and boys and in all four main ethnic groupings, particularly among Pasifika, Asian, and Māori students. These findings are similar to the findings from an exploratory study undertaken and reported by Mullis, Martin, and Foy (2005) on student performance in the mathematics cognitive skills and competencies, as defined by TIMSS. These data also showed New Zealand Year 5 and Year 9 students, and their sub-groups, to have relatively strong performance when they were required to demonstrate their reasoning competencies and skills (Caygill, Sturrock, & Chamberlain, 2007; Chamberlain, 2007a).

Gender differences[30]

Consistent with the overall reading literacy achievement, Year 5 girls from each ethnic grouping typically achieved higher scores than boys when they were required to use *retrieval and inferencing* comprehension skills. Internationally, the average difference was 17 scale score points.

Among New Zealand Year 5 students, the most marked difference – 27 scale score points – was observed between Māori girls and boys. The differences between Pākehā/European girls and boys and Asian girls and boys averaged 22 and 18 scale points respectively. The average difference between Pasifika girls and boys (14) was *not* statistically significant.

When using *interpreting, integrating, and evaluating* processes, gender differences in achievement were observed for *all* groupings, with girls typically achieving higher scores. The international average difference was 15 scale score points. As with the text-based processes, the average difference between Māori girls and boys was the greatest at 31 scale score points. The differences were somewhat less for Pākehā/European (23) and Asian (19) students, while the difference between Pasifika girls and boys (16) was around the international average.

Any change between 2001 and 2005/2006?

For comparative purposes, the mean scores for these two processes for 2001 are shown in Tables B.10 and B.11 in Appendix B. Of note, although not of statistical significance, Asian students were the only group of students to show a positive shift in mean achievement in both comprehension processes.

[30] Refer to Table B.7 for details of the differences between girls' and boys' mean scores and standard errors.

Section 5:

STUDENTS' READING ATTITUDES AND HOME CONTEXT

This section gives an overview of some of the contextual information PIRLS-05/06 sought from students. Information on students' attitudes towards reading, their views of themselves as readers, and the language(s) they spoke at home are examples of the information gathered from the students taking part in the study. Parents/caregivers also provided information about their child's early childhood education experiences as well as indications of their financial well-being and literacy resources in the home.

How is the information presented?

To summarise the information concisely, students' and parents'/caregivers' responses to sets of questions were often combined to form indices. These indices are more comprehensive (describing a general concept or activity) and more informative than the individual results for component questions. To help interpret each index, students are placed, according to their or their parents'/caregivers' responses, into one of three categories: high, medium, or low. The high level of each index corresponds to positive conditions or good educational practice and high reading achievement.

Despite a lower response rate from parents/caregivers in 2006/2006 than in 2001, the information does provide a good indication of Year 5 students' early literacy experiences and their home context at the time PIRLS was administered in 2005. However, comparisons with 2001 are limited to the reports of students rather than those of the parents/caregivers.[31]

Students' attitudes towards reading

Children who enjoy and value reading are likely to read more frequently and read a wider range of material than those who get little pleasure from reading. In turn, they are enhancing both their comprehension skills and learning experiences.

In order to gauge how positive students are in their attitudes towards reading, students were asked about their views on reading for enjoyment and their appreciation of books. Students were asked to indicate on a 4-point scale (agree a lot through to disagree a lot) the extent to which they agreed with the following statements related to reading:

- I read only if I have to
- I like talking about books with other people
- I would be happy if someone gave me a book as a present
- I think reading is boring
- I enjoy reading.

The Students' Attitudes Towards Reading (SATR) Index was then used to summarise students' responses to the five statements by averaging their combined responses.[32] Students were assigned to three levels on the SATR Index. Students who had positive attitudes towards reading (i.e., responded positively) were placed at the high level of the index. Students who had negative attitudes towards reading (i.e., students who responded negatively) were placed at the low level of the index. The remainder were assigned to the medium level of the index. The international findings pertaining to New Zealand were as follows.

- Year 5 students were relatively positive towards reading, with 48 percent in the high level (about the same as the international mean of 49%) and just 7 percent in the low level (also similar to the international mean of 8%).
- The difference between the mean reading literacy scores for those Year 5 students at the high level of the index and those at the low level was about 70 scale score points.
- The students' views tended to be more moderate in 2005/2006 than in 2001. A significant increase (4 percentage points) at the medium level of the index was accompanied by (non-significant) decreases at both the high (3 percentage points) and low (1 percentage point) levels of the SATR Index.

Reading attitudes and gender

Figure 5.1 shows the proportion of New Zealand Year 5 girls and boys at each level of the SATR Index. Year 5 girls tended to express more positive views about reading than Year 5 boys: 58 percent of girls were at the high level of the SATR Index compared with just 39 percent of boys. The opposite was observed at both the medium level (38% girls and 51% boys) and low level (4% and 10%).

The relationship with reading literacy achievement was somewhat stronger for Year 5 boys than it was for was for Year 5 girls, with boys at the high level of the index scoring an average of 69 scale score points higher than those Year 5 boys at the low level. The average difference between Year 5 girls at each of the two levels was 59.

[31] Although more than 4,000 parents/caregivers responded to the Home Questionnaire, at 64 percent the *response rate* from New Zealand parents/caregivers in PIRLS-05/06 was less than in PIRLS-01 (84%). In the international report, comparisons have been made for New Zealand with information reported for 2001. In most cases there were no changes in the proportions at each level of the various parent-related indices over the 4-year period.

[32] Disagree a lot = 1, disagree a little = 2, agree a little = 3, and agree a lot = 4. Responses for negative statements were reverse coded. Responses for each student were combined and averaged. High level on the index is where the average was greater than 3 through to 4. Medium level indicates an average of 2 through to 3. Low level indicates an average of 1 to less than 2.

Figure 5.1: Year 5 students at each level of the Students' Attitudes Towards Reading (SATR) Index in 2005/2006, by gender

Notes

The mean reading literacy scores for Year 5 students at each level of the SATR Index in 2005/2006 were:

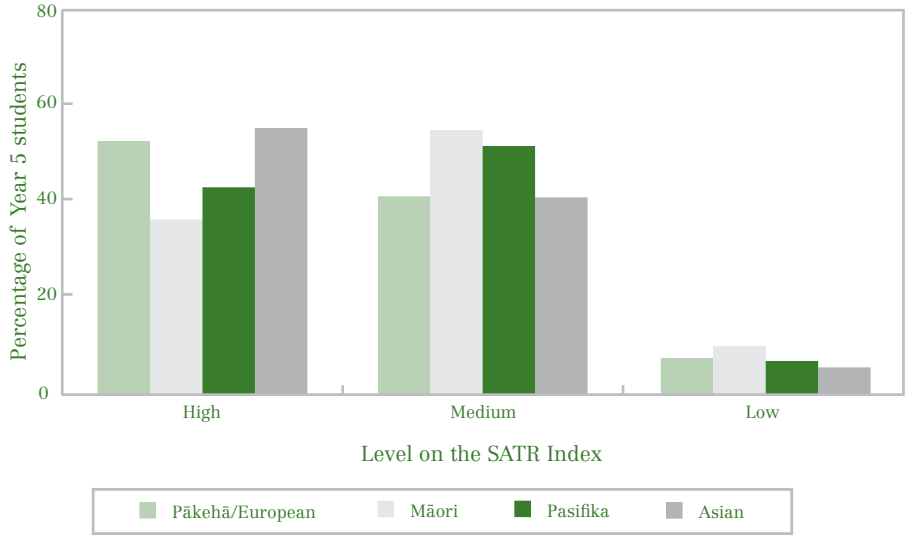
Girls: High 569 (2.5), Medium 514 (3.0), and Low 510 (5.8).

Boys: High 554 (3.9), Medium 503 (3.7), and Low 486 (6.0).

Reading attitudes and ethnicity

Figure 5.2 shows the proportion of Year 5 students from each main ethnic grouping at each level of the SATR Index in 2005/2006. Pākehā/European and Asian students tended to be more positive towards reading than Pasifika and Māori students.

Figure 5.2: Year 5 students at each level of the Students' Attitudes Towards Reading (SATR) Index in 2005/2006, by ethnic grouping



Notes

The mean reading literacy scores for Year 5 students at each level of the SATR Index in 2005/2006 were:

Pākehā/European: High 579 (2.5), Medium 528 (3.5), and Low 503 (5.5).

Māori: High 510 (5.2), Medium 470 (5.0), and Low 479 (11.1).

Pasifika: High 505 (6.7), and Medium 461 (9.0). There were too few observations to report achievement at the Low level).

Asian: High 575 (6.1), and Medium 525 (6.9). There were too few observations to report achievement at the Low level.

Māori students (9%) were also more likely to hold negative views about reading (i.e., at the low level of the SATR Index) than students from the other ethnic groupings.

Interestingly, the relationship between reading literacy achievement and students' attitudes about reading, as measured by the SATR Index, was stronger for Pākehā/European than for Māori students. The difference between the mean achievement of Pākehā/European students at the high level of the SATR Index and those at the low level was 75 scale score points, compared with a difference of 30 scale score points for Māori students.[33]

Looking at gender and ethnicity together, it was apparent that the gender pattern shown in Figure 5.1 was also evident within each ethnic grouping. That is, girls in each ethnic grouping were more likely to be at the high level of the SATR Index than their male counterparts.

Any change between 2001 and 2005/2006?

The change apparent for New Zealand from 2001 to 2005/2006 was largely due to the changes for Year 5 boys. That is, Year 5 boys in 2005/2006 tended to hold more moderate views than their 2001 male counterparts. A significant 5 percentage point increase in the proportion of boys at the medium level (46% to 51%) was accompanied by non-significant decreases from 2001 to 2005/2006 at the high and low levels of the index. There were no corresponding changes for Year 5 girls over the period.

Māori students tended to hold more moderate views in 2005/2006 than in 2001, recording a significant decrease of 8 percentage points in the proportion at the high level of the SATR Index (from 44% in 2001 to 36% in 2005/2006), along with a corresponding significant 9 percentage point increase at the medium level (45% to 54%).

At 8 percentage points, the decrease at the high level of the index was greater for Māori boys than it was for Māori girls (6). However, when the changes for girls and boys were considered separately they were not found to be statistically significant.

Pākehā/European students' views also tended to be less positive in 2005/2006, although the shifts between the two levels of the index (high to medium) were not found to be of statistical significance. However, looking at the shifts for Pākehā/European girls and boys separately, the decrease in the proportion at the high level of the index was largely due to a significant decrease observed for girls (6 percentage points, c.f. a 3-point decrease for boys).

Asian students were generally more positive (44% to 55%), with the increase from 2001 to 2005/2006 in the proportion of students at the high level statistically significant.[34] There were no changes of note found for Pasifika students.

Reading for fun

As children are developing their reading skills, the time they spend on reading in relation to other leisure activities becomes important. Reading as a leisure activity can not only give children enjoyment but it can also provide opportunities to reinforce their literacy skills (Mullis, et al., 2006).

Just over two-fifths (42%) of New Zealand Year 5 students reported they read for fun outside of school every day or almost every day, compared with the international average of 40 percent. About one-quarter of Year 5 students (24%) read once or twice a week, with the remainder (34%) reporting that they rarely or never read for fun. The corresponding international averages were 28 percent and 32 percent. Across countries and within most countries there was a positive association between the frequency of reading for fun and the average reading achievement.

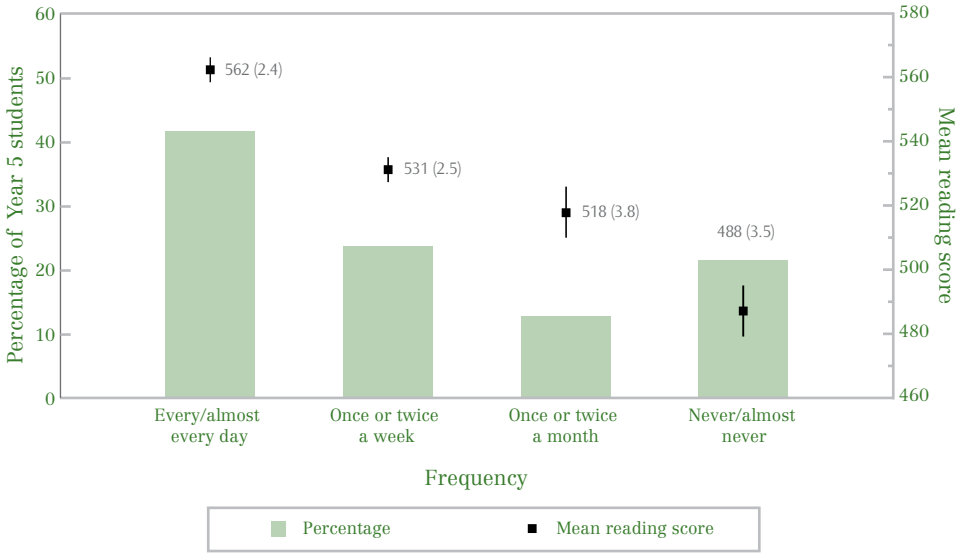
When the group of Year 5 students (34%) who rarely or never read for fun were considered separately, the majority (61%) reported that they *never* read for enjoyment; this equated to 21 percent of all Year 5 students. This percentage of non-readers was marginally higher than the international average (19%) and notably higher than some higher-achieving countries such as Germany (14%) and the Canadian provinces (10-16%). It was, however, lower than the percentage of non-readers in the United States (31%), Scotland (30%), and England (28%).

[33] There were too few observations (N < 50) to calculate the means for Asian and Pasifika students at the low level of the SATR Index.

[34] The numbers were too small in 2001 to examine these changes by gender.

Figure 5.3 shows Year 5 students' reports of how often they read for fun out of school regardless of their reading material, and the relationship with their reading literacy achievement. Not surprisingly, the students who read for fun on a regular basis tended to have higher achievement than those who never or almost never read for fun.

Figure 5.3: Year 5 students' reports of reading for fun and their reading literacy scores in 2005/2006



Notes

The bars represent the percentage of Year 5 students in each time.

The data points are the mean reading scores for Year 5 students in each response category. Standard errors appear in parentheses. The vertical lines extending from the data point show the 95 percent confidence interval around the mean (i.e., ± 2 standard errors).

Table 5.1 shows Year 5 students' reports of how often they read for fun out of school, for girls and boys separately and for each ethnic grouping.

Table 5.1: Year 5 students' reports on reading for fun in 2005/2006, by gender and ethnic grouping

Year 5 student group	Students' reports of reading for fun outside of school (%)			
	Every day or almost every day	Once or twice a week	Once or twice a month	Never or almost never
Gender				
Girls	49 (1.2)	25 (1.0)	11 (0.7)	15 (1.0)
Boys	35 (1.3)	23 (0.8)	16 (0.8)	27 (1.0)
Ethnic grouping				
Pākehā/European	45 (1.4)	23 (0.9)	13 (0.6)	19 (1.0)
Māori	34 (1.9)	24 (1.3)	15 (1.4)	28 (1.9)
Pasifika	38 (2.3)	23 (2.1)	14 (2.0)	25 (2.5)
Asian	46 (2.4)	25 (2.1)	14 (1.4)	15 (1.8)
All New Zealand*	42 (1.1)	24 (0.7)	13 (0.5)	21 (0.8)

Notes

Adjusted percentages are reported. Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

* All Year 5 students, including students in Other ethnic groups.

As shown in Table 5.1, about half of Year 5 girls reported they read for fun daily (or almost daily). Although not shown in the table, Asian and Pākehā/European girls (both 53%) tended to be in this category. Although not quite as high as their other female counterparts, about two-fifths of Pasifika girls (42%) and Māori girls (40%) read for fun daily.

Never reading for fun was more frequently reported by Year 5 boys than Year 5 girls; relatively high proportions of Māori and Pasifika also fell into this category. In particular, about one-third of Māori boys and Pasifika boys (both 32%) reported they never read for fun, compared with Pākehā/European boys (25%) and Asian boys (20%).

As noted, reading for fun was associated with achievement. This held for boys, girls, and all ethnic groupings: those students who reported reading for fun at least weekly had significantly higher reading achievement than students who never or rarely read for fun.

The reports about reading for fun by Year 5 students in 2005 were essentially the same as those for their 2001 counterparts.

Students' reading self-concept

"Motivation is affected by the learner's self-concept and sense of self-efficacy" (Ministry of Education, 2006, p. 22). As well as holding positive views about reading, children who are self-assured of their reading ability are likely to read more often and more varied materials.

The Students' Reading Self-Concept (SRSC) Index was developed to investigate students' perceptions of their ability in reading, using their responses to four statements on how well they thought they read. Students were asked to indicate on a 4-point scale (agree a lot through to disagree a lot) their level of agreement to the following statements:

- Reading is very easy for me
- I do not read as well as other students in my class
- When I am reading by myself I understand almost everything I read
- I read more slowly than other students in my class.

Students' responses to the four statements were combined and averaged to construct the SRSC Index.[35] Students with a high self-concept in reading (i.e., they responded positively) were placed at the high level of the SRSC Index; those students with a low self-concept in reading (i.e., responded negatively) were placed at the low level of the index. The remainder were assigned to the medium level of the index.

The key results for New Zealand in an international context were as follows.

- The percentage of Year 5 students (36%) who had a high self-concept was below the international mean (49%), and was the fourth-lowest (equal) percentage internationally.[36]
- The average reading literacy achievement (574) of Year 5 students who viewed themselves very positively was significantly higher than the average for students who held more modest views (513), which in turn was much higher than for students who viewed themselves as weak readers (459).
- New Zealand was one of six countries (another being the United States) that recorded a significant *decrease* from 2001 to 2005/2006 in the proportion of students with high self-concept in reading. Accompanying the decrease was a significant increase at the medium level of the index.

Self-concept and gender

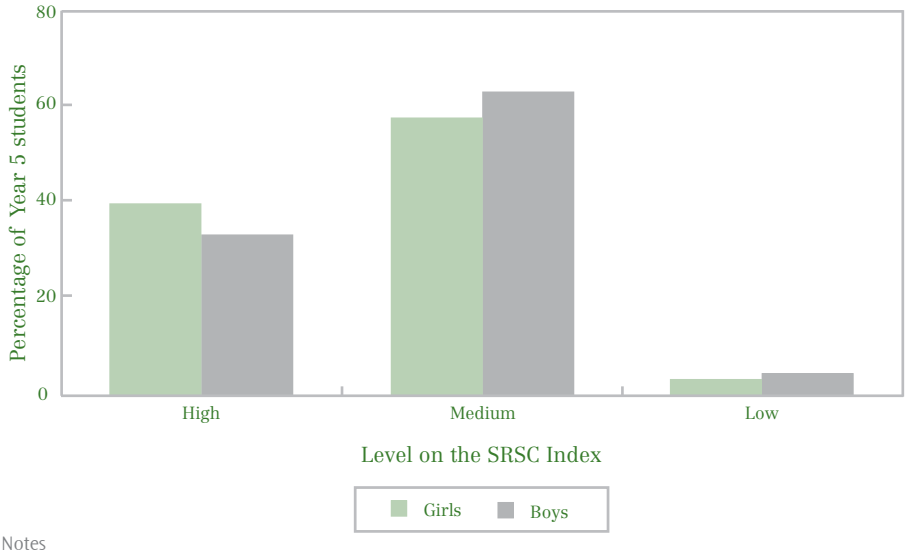
Figure 5.4 shows the percentages of New Zealand's Year 5 girls and boys at each level of the SRSC Index. Consistent with the overall pattern reported for New Zealand, relatively low proportions of both girls and boys perceived themselves as good readers (i.e., 40% and 33% respectively at the high level of the index). Both tended to hold moderate views, boys (63%) more so than girls (58%). Interestingly, Year 5 boys (4%) and girls were (3%) were equally likely to report a low self-concept in reading.

The relationship with achievement (i.e., the difference between the mean achievement of students at the high level of the SRSC Index and those at the low level) was more evident for boys (118) than it was for girls (106).

[35] Disagree a lot = 1, disagree a little = 2, agree a little = 3, agree a lot = 4. Responses for negative statements were reverse coded. High level on the index is where the average was greater than 3 through to 4. Medium level indicates an average of 2 through to 3. Low level indicates an average of 1 to less than 2.

[36] The proportions of New Zealand Year 5 students at the medium and low levels were 60 percent (c.f. 48% internationally) and 4 percent (c.f. 3%) respectively.

Figure 5.4: Year 5 students at each level of the Students' Reading Self-Concept (SRSC) Index in 2005/2006, by gender



Notes

The mean reading literacy scores for Year 5 students at each level of the SRSC Index in 2005/2006 were:

Girls: High 581 (2.6), Medium 524 (2.7), and Low 475 (11.6).

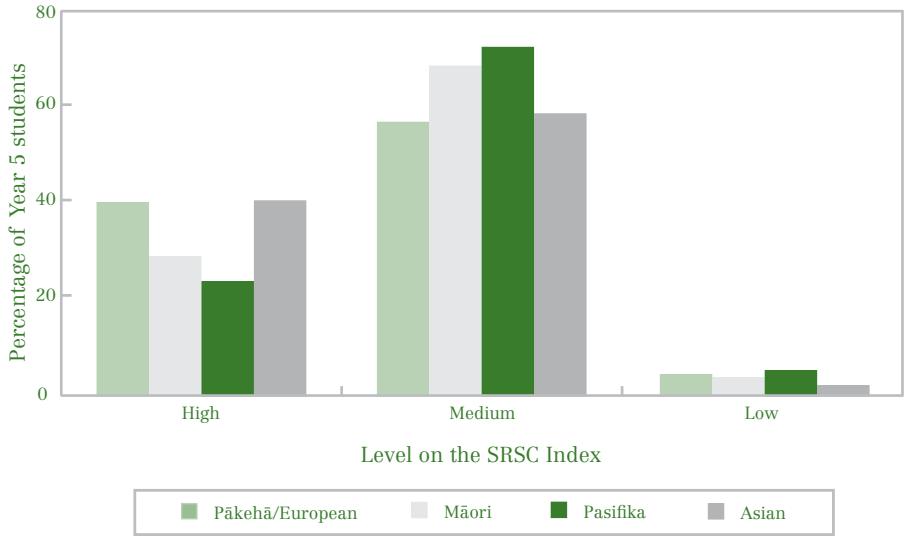
Boys: High 566 (3.2), Medium 503 (3.6), and Low 448 (8.2).

Self-concept and ethnicity

Figure 5.5 shows the percentages of Year 5 girls and boys in each ethnic grouping at each level of the SRSC Index. Proportionately more Pākehā/European and Asian students (both 40%) were found to have a high self-concept of their reading ability than Māori (29%) and Pasifika students (23%). At just 1 percent, Asian students were less likely than students in the other ethnic groupings to have a low self-concept of their reading ability than their counterparts.

The gender pattern observed in Figure 5.4 was also apparent within the ethnic groupings. That is, girls from each ethnic grouping tended to have a high self-concept in reading, with boys from each grouping having more moderate views.

Figure 5.5: Year 5 students at each level of the Students' Reading Self-Concept (SRSC) Index in 2005/2006, by ethnic grouping



Notes

The mean reading literacy scores for Year 5 students at each level of the SRSC Index in 2005/2006 were:

Pākehā/European: High 589 (2.7), Medium 533 (2.9), and Low 468 (5.8).

Māori: High 523 (5.3), Medium 472 (4.5), and Low 433 (12.6).

Pasifika: High 517 (11.0) and Medium 470 (6.1). There were too few observations to report achievement at the Low level.

Asian: High 579 (6.1) Medium and 533 (6.9). There were too few observations to report achievement at the Low level.

While there was a positive relationship between higher self-concept and achievement was observed for all ethnic groupings, the relationship was less marked (or *steep*) for Māori students than it was for Pākehā/European students. That is, the difference between Pākehā/European students' mean achievement at the high and low levels was 122 scale score points compared with a difference of 90 observed for Māori students.[37]

Any change between 2001 and 2005/2006?

Both Year 5 girls and boys in 2005/2006 tended to be less confident about their reading ability, as measured by the SRSC Index, than their 2001 counterparts. A significant 9 percentage point decrease in the proportion of both boys and girls at the high level was accompanied by a significant increase at the medium level from 2001 to 2005/2006.

Students in all ethnic groupings in 2005/2006 were also less likely to be at the high level of the SRSC Index than their 2001 counterparts. The decreases in the proportions at the high level were significant for Māori, Pasifika, and Pākehā/European students; the decrease for Asian students was not significant. (Note: the increase in the proportions at the medium level were significant for Māori and Pākehā/European but not for Pasifika students.)

As well as looking at the changes on the entire index, it is also interesting to examine the changes in responses to the individual statements that comprise the index. These data are shown in Table 5.2.

Table 5.2: Students' level of agreement to statements on self-concept in reading in 2001 and 2005/2006

Self-concept statement	Level of agreement (%) and year of assessment							
	Agree a lot		Agree a little		Disagree a little		Disagree a lot	
	2001	2005/2006	2001	2005/2006	2001	2005/2006	2001	2005/2006
Reading is easy for me	49 (1.0)	45 (0.8) ▼	41 (1.0)	44 (0.8) ▲	7 (0.6)	9 (0.4)	3 (0.8)	3 (0.3)
I do not read as well as other students in my class	19 (0.9)	20 (0.7)	33 (1.0)	36 (0.8) ▲	22 (1.0)	22 (0.7)	26 (0.9)	21 (0.7) ▼
When I am reading by myself, I understand almost everything I read	56 (1.1)	51 (0.8) ▼	31 (1.1)	36 (0.7) ▲	9 (0.6)	10 (0.5)	4 (0.4)	3 (0.3)
I read more slowly than other children in my class	N.A.	18 (0.6)	N.A.	30 (0.6)	N.A.	27 (0.7)	N.A.	25 (0.7)

Notes

Adjusted percentages have been reported. Standard errors appear in parentheses.

N.A. Statement was not included in PIRLS 2001.

▲ = the percentage is significantly higher.

▼ = the percentage is significantly lower.

Year 5 students in 2005/2006 were generally more reticent with their views on the statements about the ease of reading and independent reading. Year 5 students in 2005/2006 were also more likely than their 2001 counterparts to view their reading ability a little more negatively when they compared themselves with their peers.

Starting early makes a difference

To provide information about students' early literacy activities, parents/caregivers were asked to indicate how frequently (on a 3-point scale – 'often', 'sometimes', 'never or almost never') they or someone else in the home engaged in six literacy-related activities with their child before the child began primary school:

- read books
- tell stories
- sing songs
- play with the alphabet
- play with word games
- read aloud signs and labels.

[37] There were too few observations (N < 50) to look at the mean scores for Asian and Pasifika at the low level of the SRSC Index.

The Early Home Literacy Activities (EHLA) Index summarises parents' responses.[38] Students were assigned to the high level of the index if their parents reported engaging in the six activities 'often', whereas students at the low level had parents who for the most part reported they 'never or almost never' did so.[39]

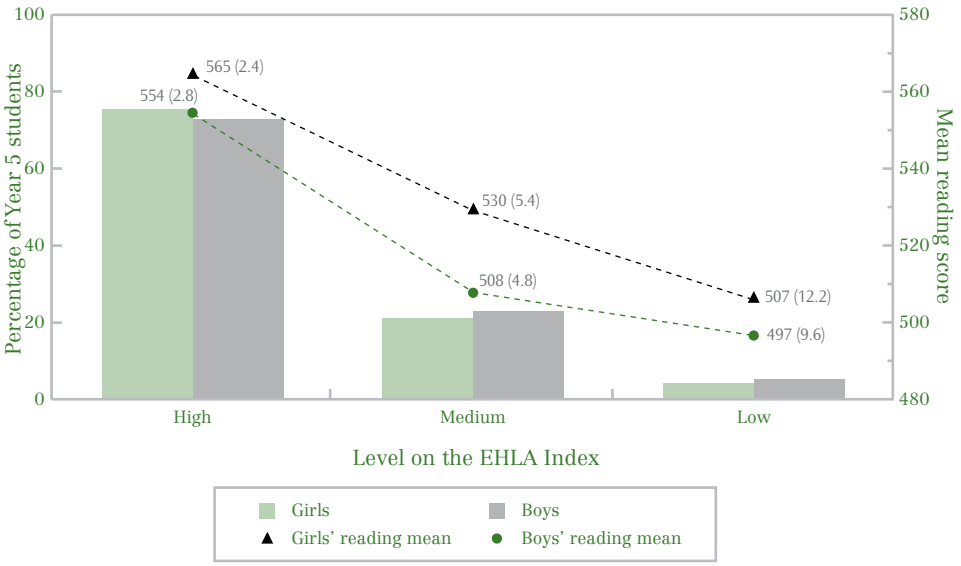
Based on the responses of parents/caregivers, internationally the following points can be made.

- New Zealand Year 5 students in 2005/2006 were found to have had one of the highest levels of engagement in early literacy activities, with nearly three-quarters (74%) at the high level of the EHLA Index. Just over one-fifth (22%) were at the medium level, and just under one-twentieth (4%) were at the low level.[40]
- Internationally, there was a positive relationship between engaging in early literacy activities and students' reading literacy achievement. New Zealand Year 5 students whose parents/caregivers reported that they had frequently exposed their child to early literacy activities as a pre-schooler on average achieved significantly higher reading scores than those who had not (560 compared with 501).

Figure 5.6 shows the proportions of New Zealand's Year 5 boys and girls who were, based on their parents' reports, at each level of the index. There was very little difference in the proportions of girls and boys at each level of the index. The difference in reading literacy achievement between those students who had high exposure and those who had low exposure was about the same for both girls and boys (about 58 scale score points).

Interestingly, however, at both the high and medium levels there were still significant differences between girls' and boys' reading literacy achievement, although there was no difference between the two groups who had little exposure to early literacy activities.

Figure 5.6: Year 5 students at each level of the Early Home Literacy Activities (EHLA) Index and reading literacy scores in 2005/2006, by gender



Notes

The bars represent the percentage of Year 5 students at each level of the EHLA Index. The high level of the EHLA Index denotes high exposure to early literacy activities, whereas the low level of the index denotes a low exposure to the activities.

The data points are the mean reading literacy scores for the students at each level of the EHLA Index. Standard errors appear in parentheses.

Pākehā/European students were the most likely to have engaged in these activities (80%), while Asian students were the least likely (52%).[41] Based on the responses received from parents/caregivers, the difference in reading literacy achievement was observed across all ethnic groupings.

[38] Although approximately 4,000 questionnaires were completed and returned by New Zealand parents/caregivers in 2005 (c.f. approx. 2,100 in 2001), the overall response rate (unweighted) was actually lower at 64 percent (c.f. 84%).

[39] The average for each parent was computed across the six activities: 1 = never or almost never, 2 = sometimes, and 3 = often. A high level indicates an average of greater than 2.33 through 3, a medium level indicates an average score of 1.67 through 2.33, and a low level indicates an average of 1 to less than 1.67.

[40] Only the Russian Federation, Scotland, and the Canadian province Nova Scotia had higher proportions at the high level.

[41] The response rates were lower for parents/caregivers of Māori and Pasifika students (49% and 48% respectively) than for Pākehā/European students (72%) and Asian students and Other ethnic groups (both 67%). Therefore, this information should be interpreted with some caution. However, it is worth noting that in 2001 this finding was also observed.

Pre-primary education

The importance of quality pre-primary education in preparing children for primary school is well documented. In most PIRLS countries pre-primary education is voluntary, although participation rates are high. In some PIRLS countries pre-primary education is compulsory and is usually one or two years in duration, typically from about 4 years of age. These countries are Hungary, Israel, Latvia, Luxembourg, Poland, and Romania. Two Canadian provinces – British Columbia and Nova Scotia – also reported compulsory pre-primary education.

Internationally, there was a strong relationship with achievement: the mean reading literacy achievement of students who had 2 or more years of pre-primary education was about 50 scale score points higher than that of students who had not attended a facility.

In New Zealand, the majority of Year 5 students had attended an early childhood education facility prior to their starting school (96%), including 5 percent of students who had spent only up to 1 year. The 9 percent of students who either had 1 year or less (522) or who had not attended (532) tended to achieve lower scores than those who had attended for at least two years (about 550).

Of note is the 28 to 30 scale point difference between the mean reading scores for Year 5 boys who had attended (542) an early childhood facility and those Year 5 boys who either had not attended (512) or who had relatively little (516) early childhood education experience.

By way of contrast, for Year 5 girls the difference was only evident between those who had attended a facility and those girls who had little (1 year or less) early childhood education (558 c.f. 528); the 5 percent of Year 5 girls who had *no* early childhood education experience generally scored nearly as well (548) as those who had attended.

Parents' reports indicate that the majority of Pākehā/European students had attended some form of early childhood facility (93%) for more than 1 year. The corresponding figures for Māori and Pasifika students were both 85 percent; a smaller proportion was observed for Asian students at 82 percent.

Born in New Zealand

In *Reading literacy in New Zealand* students' reports of whether or not their parents were born in New Zealand was presented. Based on their reports, a relatively high proportion (20%) of New Zealand students' parents were born in another country compared with many other countries but was lower than, for example, the proportions reported for the Canadian provinces Ontario (37%) and British Columbia (33%). No significant differences in the mean reading literacy achievement was found between those Year 5 students whose parents who were born in New Zealand and Year 5 students whose parents born in another country.

Students were also asked whether or not they were born in another country. It is important to note, however, that the question as to the age of students' arrival in New Zealand was not asked. At 14 percent, the proportion of Year 5 students who reported they were born in a country other than New Zealand was relatively high compared to the comparable proportions observed for other countries. Only three other countries had higher proportions: Latvia (26%), Hong Kong and Qatar (both 18%). Table 5.3 shows the mean reading literacy scores for students by their *immigrant* status, and by their ethnicity.

Table 5.3: Year 5 students' mean reading literacy scores in 2005/2006, by New Zealand-born and ethnic grouping

Year 5 student group	Born in NZ		Born in another country		Difference in mean achievement (NZ born – Not NZ born
	Percentage of Year 5 students	Mean score	Percentage of Year 5 students	Mean score	
Pākehā/European	90 (0.6)	551 (2.4)	10 (0.6)	574 (5.4)	-23 (5.5)*
Māori	95 (0.8)	487 (3.9)	5 (0.8)	480 (16.5)	+7 (16.5)
Pasifika	79 (2.6)	482 (6.8)	21 (2.6)	474 (12.1)	+8 (12.0)
Asian	45 (2.5)	551 (7.5)	55 (2.5)	551 (5.9)	0 (7.6)
Other ethnic groups	31 (4.7)	~ ~	69 (4.7)	534 (11.8)	N.C.†
All New Zealand	86 (0.8)	532 (2.2)	14 (0.8)	546 (3.5)	-14 (3.4)*

Notes

Standard errors appear in parentheses. Because results are rounded, some figures may appear inconsistent.

Tilde (~) indicates the achieved sample size was too small (N < 50) to calculate the mean. See TN 7 in Technical Notes for details.

* Difference between mean scores was statistically significant at 5 percent level.

† Not calculated.

The mean achievement of Year 5 students who reported they were born in another country achieved, on average, 14 scale score points higher than those students who were born in New Zealand. Interestingly, when students' reports of being born in New Zealand were examined by ethnicity, the difference in achievement was found to be largely due to the significantly higher average achievement of Pākehā/European students who were not born in New Zealand. It is also worth noting, that for each of the other ethnic groupings there was no significant difference between the mean reading literacy achievement of students born in New Zealand and those born in another country.

Home language

In PIRLS-05/06 students and parents were asked about the frequency of speaking the language in which the assessment was administered (i.e., the language of instruction).[42] Note that the question format was different from the format used in PIRLS-01, and therefore it was not possible to make any direct comparisons with the information reported for PIRLS-05/06.

New Zealand students were tested in either English or Māori.[43] According to PIRLS-05/06, just under three-quarters of New Zealand Year 5 students (73%) reported they 'always' spoke the test language (English or Māori) in the home,[44] with just over one-quarter (26%) reporting they 'sometimes spoke the *test* language and sometimes spoke another language'. Just 1 percent of Year 5 students reported 'never' speaking the test language at home. New Zealand parents' reports were fairly consistent with students' reports, with both parents/caregivers of more than three-quarters of students (78%) reporting they mostly communicated with their child in the test language.

Countries where at least 80 percent of students reported always speaking the language of the test at home were Georgia (85%), Poland (85%), Macedonia (83%), Denmark (81%), the Russian Federation (82%), Romania (81%), Norway (80%), and Scotland (80%). Countries where 40 percent or less of students spoke the language of the test at home included Indonesia (38%), Chinese Taipei (36%), Kuwait (26%), Singapore (21%), and Luxembourg (3%).

Speaking the test language at home and achievement

As already noted, the question used in PIRLS-05/06 differed from that used in PIRLS-01. However, the relationship with the test language and speaking it at home is fairly consistent across the two studies, with both showing that students who frequently spoke the test language at home typically achieved at a much higher level than those students who rarely did. In 2005/2006 New Zealand's Year 5 students reporting they 'always' spoke the test language, on average, achieved a significant 23 scale score points higher than those who only 'sometimes' spoke the test language (542 compared with 519).[45] (Note: this difference is relatively small [effect size or Cohen's $d = 0.29$] compared with size of the average differences across the ethnic groupings reported in Section 2). Table B.12 in Appendix B reports the mean reading literacy achievement for those students who were assessed in English for the two home language categories: always spoke English in the home and sometimes/never spoke English. As already noted students assessed in Māori formed just 1.7 percent of the achieved (weighted) sample. Moreover there were insufficient numbers of students assessed in te reo Māori in each of the home language categories to be able to report their achievement separately (See TN 7 in Technical Notes for details).

Speaking the test language at home and lower achievers

In Section 3 the lower-achievers group was defined as the group of students who did not reach the *Intermediate International Benchmark*, or scored less than 475. Figure 5.7 shows the composition of the lower-performing group according to whether students reported always speaking the language of the PIRLS assessment (English or te reo Māori) at home.

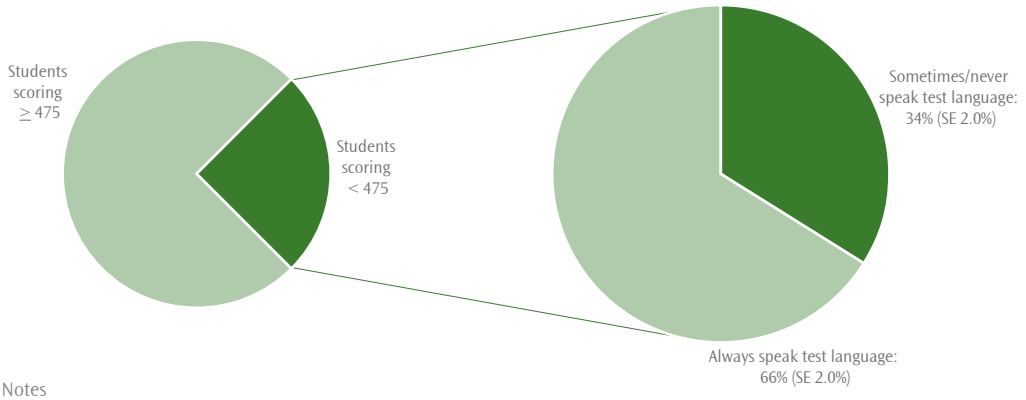
[42] According to international criteria for excluding students from the PIRLS assessment, students with *limited proficiency* in the test language could be excluded from the assessment. Typically these were students who had received only 1 or 2 years' instruction in the language of the test. New Zealand's exclusion rate in 2005/2006 was higher than in 2001 largely due to the exclusions based on the language criterion. See Table A.3 in Appendix A.

[43] Testing in te reo Māori was conducted in schools and classes where students received 81 to 100 percent of their instruction in te reo (i.e., Level 1 immersion).

[44] This compared with Scotland (80%), England (76%), the United States (72%), and Singapore (21%), and the international mean of 66%.

[45] There were proportionally too few New Zealand students never speaking the test language to report their achievement. This was also the case in many other countries. The mean for the combined categories of 'sometimes' and 'never' was 518. Examples of countries with a difference higher than the one observed in New Zealand included Belgium (Flemish) (29), and Germany (28); countries with a lower difference included the Netherlands (20), England (14), and the United States (13).

Figure 5.7: Composition of the Year 5 lower-achievers group in 2005/2006 by their reports of speaking the language of the PIRLS assessment at home



Notes

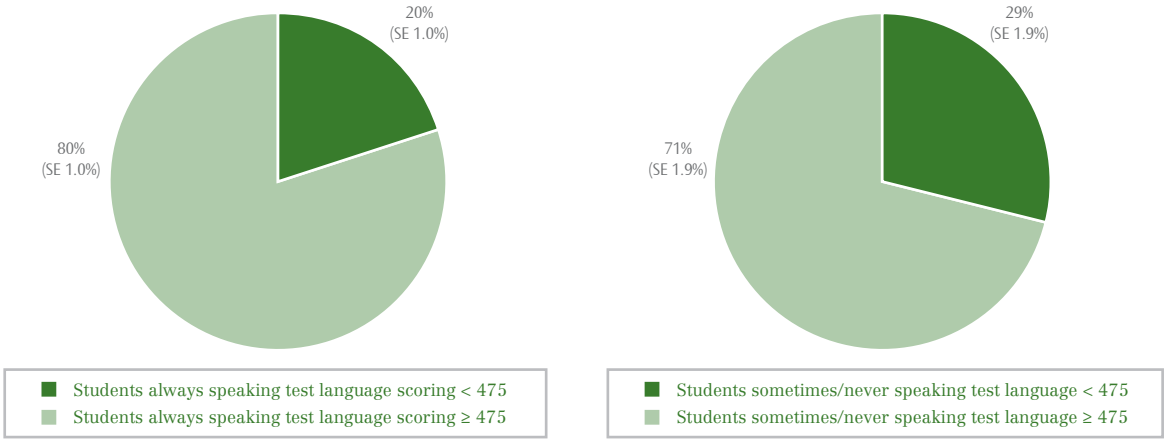
Standard errors (SE) appear in parentheses.

The proportion of all Year 5 students who reached the PIRLS *Intermediate International Benchmark* was 76 percent (SE 1.0%); the proportion who did not reach this benchmark was 24 percent (SE 1.0%).

After combining students in the 'sometimes' speak the test language (26%) and 'never' speak it categories (1%), non-speakers of the test language were somewhat over-represented in the lower-achievers group, with about one-third of these Year 5 students (34%) scoring below 475.[46]

Figure 5.8 shows the proportions of students in each home language category that fell into the lower-achieving category. The proportion of students who sometimes/never spoke the test language at home and who were in the lower-achievers group was about 9 percentage points higher than the proportion observed for the group who always spoke the test language at home.

Figure 5.8: Percentage of Year 5 students who spoke the language of the PIRLS assessment at home and were in the lower-achievers group in 2005/2006



Notes

Standard errors (SE) appear in parentheses.

The proportion of all Year 5 students who reached the PIRLS *Intermediate International Benchmark* was 76 percent (SE 1.0%); the proportion who did not reach this benchmark was 24 percent (SE 1.0%).

Odds ratio

Summing up the information above, the odds of a Year 5 student who rarely spoke the test language at home being in the lower-achievers group was 60 percent higher than the odds of a Year 5 student who always spoke the test language at home (i.e., 0.40 c.f. 0.25).

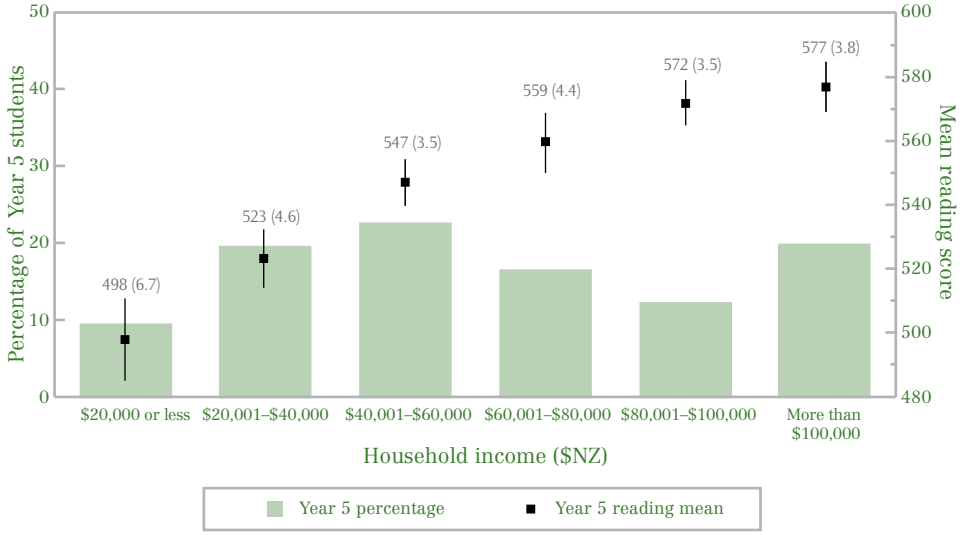
[46] Another way to view this information is to look at the composition according to home language status *and* the language in which students were assessed. However, due to the very small sample of students assessed in Māori (< 2%), the responses from students in two home-language categories (always and sometimes/rarely) were not analysed separately by test language.

Socio-economic background

A family's socio-economic status is likely to have an impact on its children's access to educational resources that can be acquired out of school, on their extra-curricular experiences, and on their educational outcomes. In PIRLS, socio-economic information is sought from both parents/caregivers and students. The information sought from parents/caregivers in 2005/2006 included details about household income, financial wellbeing, and parents' highest level of education.

Figure 5.9 summarises one of two key socio-economic indicators, household income, collected from the parents of Year 5 students. The figure shows clearly the relationship between household income and student achievement.

Figure 5.9: Household income and Year 5 students' reading literacy achievement in 2005/2006



Notes

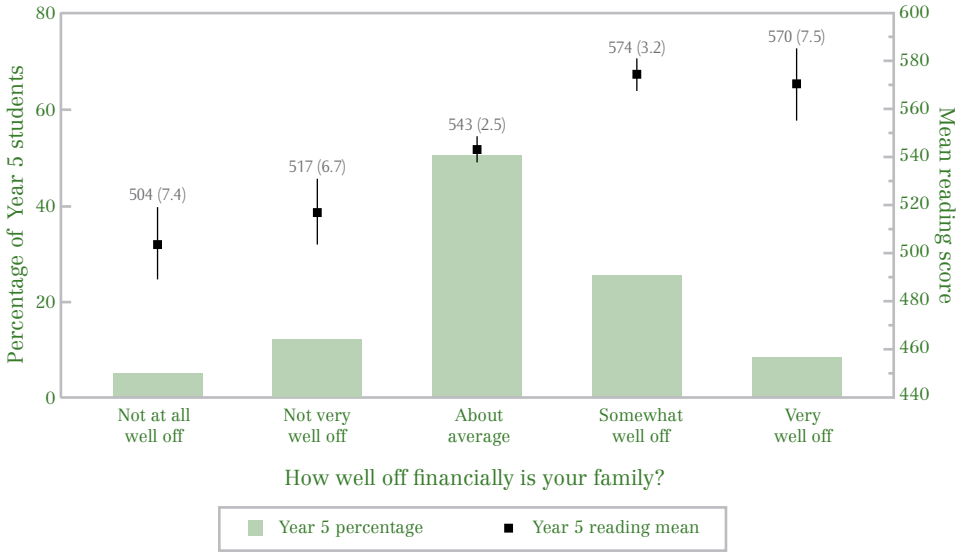
Each bar represents the percentage of students whose parents/caregivers indicated their household income falls within a particular band. The mean reading literacy scores are shown for each group of students in each income band. The vertical lines extending from the data point show the 95 percent confidence interval around the mean (i.e., ± 2 standard errors).

The overall response rate to the questionnaire was 64 percent and therefore may not be representative of all parents/caregivers of Year 5 students.

Figure B.1 in Appendix B also summarises the parents' reports on household income information by students' ethnicity. Although within all ethnic groupings there is a linear relationship between household income and achievement, there are still observable differences in students' achievement across groupings. That is, income on its own does not appear to account for all the differences among students of different ethnic backgrounds. For example, Asian students in households with relatively low income appear to achieve at a higher level than Pākehā/European students in households at the same lower income level, who in turn achieve at a higher level than Māori students in households at the same income level. One possible explanation for this is household size. This information was not collected in PIRLS-05/06, but in 2001 this data was available and went some way towards explaining some of the difference (Caygill & Chamberlain, 2004).

Parents/caregivers were also asked to compare their financial circumstances ('financial well-being') with other families. Figure 5.10 summarises this, the second of the two key socio-economic indicators. Again, there is a strong relationship between parents' ratings of financial well-being and children's reading achievement.

Figure 5.10: Parents'/caregivers' ratings of household financial well-being and Year 5 students' reading literacy scores in 2005/2006



Notes

Each bar represents the percentage of students whose parents/caregivers rated their household's financial well-being. The data points are the mean reading literacy scores for each group of Year 5 students in each well-being category. The vertical lines extending from the data point show the 95 percent confidence interval around the mean (i.e., ± 2 standard errors).

The overall response rate to the questionnaire was 64 percent and therefore may not be representative of all parents/caregivers of Year 5 students.

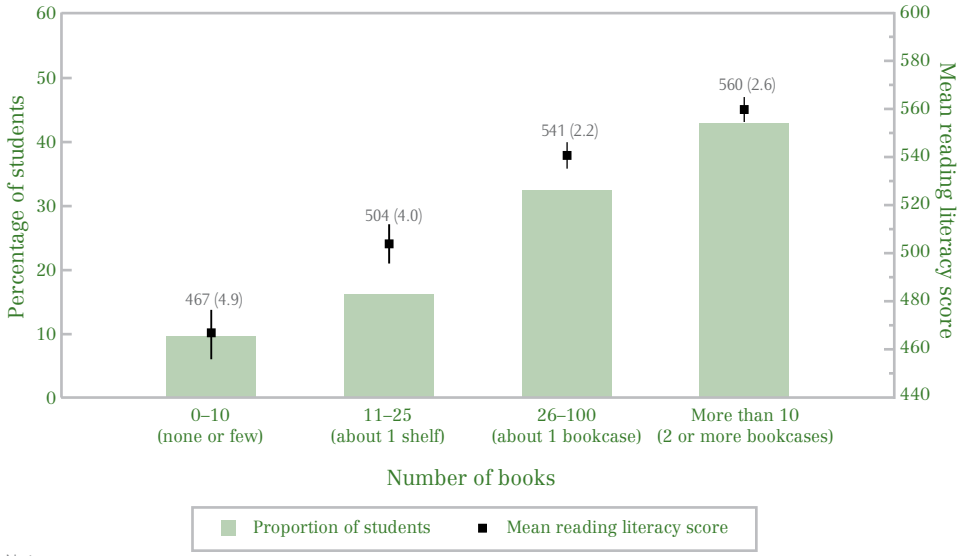
Both sets of financial data complement home education resources information, which was summarised and reported as the Home Education Resources (HER) Index, described in *Reading literacy in New Zealand* (Chamberlain, 2007b).

The HER Index combined parents' and students' responses to questions on the number of books, the presence of educational aids, and whether or not at least one parent had completed a university education. The relationship between New Zealand students' reading literacy achievement and the level on the index was positive, with the average achievement of the 18 percent of students at the high level of the index (i.e., high access) 50 scale score points *higher* than the 80 percent of students at the medium level of the index (591 c.f. 541). There were too few Year 5 students (1%) at the low level of the index to calculate the mean for this group. (The corresponding international means for each level were 563, 503, and 426.) Because the index is constructed to summarise information, it is worth examining some of the individual components separately.

Students' reports of books in the home

'Books in the home', used in many of the large-scale student assessment studies, has been found to be a reliable proxy of students' family socio-economic status. Using numbers and illustrations of bookcases, students in PIRLS were asked to estimate the number of books in their home. Figure 5.11 summarises Year 5 students' estimates. Not surprisingly, there is a strong positive relationship between the number of books and reading literacy achievement.

Figure 5.11: Year 5 students' reports on the number of books in their homes and their reading literacy scores in 2005/2006



Notes

Each bar represents the percentage of Year 5 students reporting particular book ownership.

The data points are the mean reading literacy scores for the students in each books-in-the-home category. The vertical lines extending from the data point show the 95 percent confidence interval around the mean (i.e., ± 2 standard errors).

The relationship between books in the home and achievement was weakest for Pasifika students, and to some extent Māori students, than it was for Pākehā/European and Asian students as Figure B.2 with Table B.13 in Appendix B illustrate.

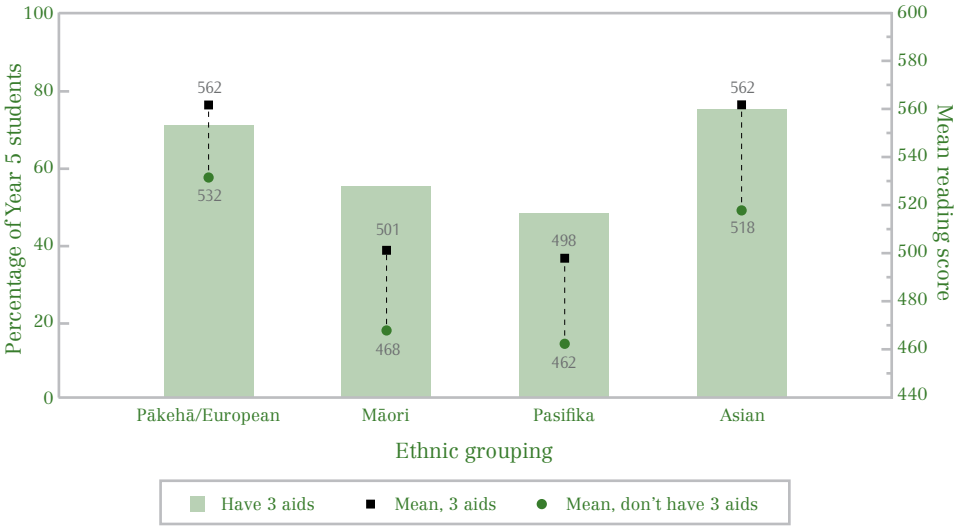
Students' reports of three educational aids

Three other indicators of socio-economic/educational wellbeing were combined in order to examine the relationship further. Students were asked if they had access to three educational aids: a computer, a study desk or table, and whether or not they had their own books. Two-thirds of Year 5 students reported having all three aids. Moreover, the average achievement of this group was a significant 42 scale score points higher than the group who reported fewer or none of the aids (548 c.f. 506).

At this point it is also worth considering this information in the context of being in the lower-achievers group. That is, what were the *odds* of Year 5 students who did not have the three educational aids being in the lower-achievers group (i.e., did not reach the *Intermediate International Benchmark* as they scored less than 475)? Just over one-third of Year 5 students (35%) who did not have three aids scored below 475; the odds were 0.54. Furthermore, the odds of a Year 5 student who did not have all three aids being in the lower-achievers group was 2.6 times higher than the odds of a Year 5 student who had all three aids being in the lower-achievers group (i.e., 0.21).

Figure 5.12 summarises the educational aids data for students in each of the four main ethnic groupings. The average achievement of Year 5 students who had access to all three aids in each grouping was clearly higher than that of their counterparts who did not. The average difference in achievement was greatest for Asian students (44 scale score points). The corresponding differences for students in the other groups were: Pasifika, 35, Māori, 33, and Pākehā/European, 29. In all cases the differences were statistically significant.

Figure 5.12: Year 5 students' reports of three educational aids in the home and their reading literacy scores in 2005/2006, by ethnic grouping



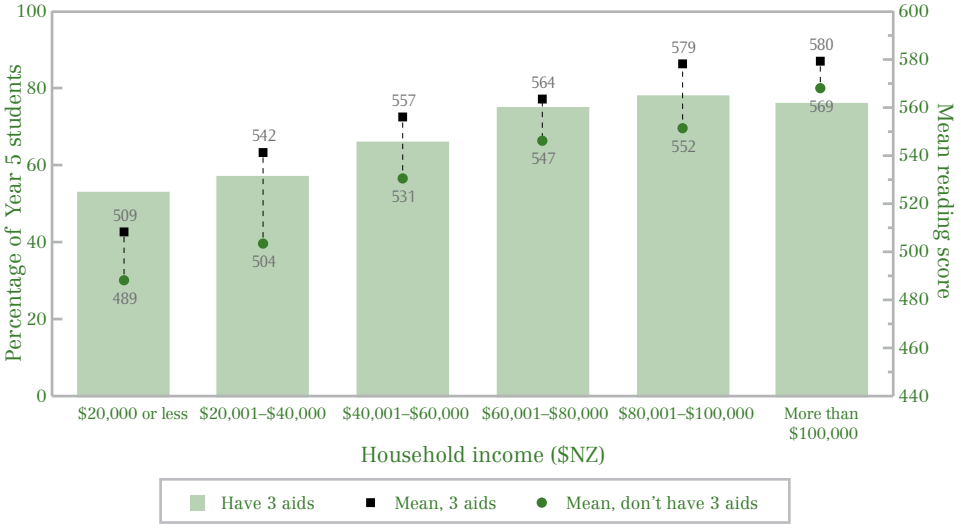
Notes

The bars represent the percentages of Year 5 students in each ethnic grouping who reported they had three educational aids and those who had fewer than three or none.

The ■ data points are the mean reading literacy achievement for Year 5 students in each ethnic grouping who had all three educational aids. The ● data points are the mean scores for counterparts who had fewer or none of the aids.

Looking at the educational aids data along with household income is also revealing. Bearing in mind that the parent/caregiver data do have some limitations due to the non-response rate, Figure 5.13 illustrates the positive relationship between household income and students having the three aids: as income increases, the probability of having three educational aids increases.

Figure 5.13: Year 5 students' reports of three educational aids and their reading literacy scores in 2005/2006, by household income



Notes

The bars represent the percentages of students who reported they had three educational aids according to their family household income.

The ■ data points are the mean reading literacy scores for students who reported having all three aids in each income band. The ● data points are the mean literacy scores for students who had fewer or none of the aids in each income band.

Furthermore, in every income band Year 5 students who had access to all three educational aids generally had higher reading achievement than their counterparts who did not have the three aids.

In summing up, all economic measures (income, financial well-being,) and educational resources (books in the home and educational aids) clearly have a positive relationship with Year 5 student achievement. However, while all these single measures appear to provide some insight into differences in reading achievement *within* ethnic groupings, they do not account for all the differences *between* groupings.

Section 6:

SCHOOLS AND SCHOOL CLIMATE

Although the home and classroom both play an important role in developing children's literacy, there are features of schools as institutions which offer challenges for those responsible for their governance and leadership. This section presents an overview on the characteristics of New Zealand schools, including a cursory examination of some of the school climate information collected in PIRLS-05/06.

Background

New Zealand has a national policy for what is expected of children in terms of their reading acquisition, but schools are responsible for interpreting the policy and sometimes establishing their own policies for reading. Differences in school characteristics such as location and size, as well as the socio-economic background and home language of students attending the school, may require schools to make variations in how a school is organised and how the curriculum is delivered. As well as the school 'demographics', creating a positive learning environment is also important for children's learning. A school's climate can be enhanced by how all the participants feel – the principal, teachers, parents, and students.[47]

Reading literacy achievement and school location[48]

There were no significant differences between Year 5 students' mean reading achievement among the three locations of schools: urban (536), suburban (527), and rural (535). On average internationally, it was found that children attending urban or suburban schools generally achieved at a moderately higher level than those who attended schools located in rural areas. This finding was consistent with PIRLS 2001 (Caygill & Chamberlain, 2004).

Reading literacy achievement and school size[49]

The 37 percent of Year 5 students who attended larger schools (an enrolment size of more than 400 students) achieved on average significantly higher scores (543) than the 27 percent of Year 5 students who attended smaller (less than 200 students) and the 36 percent in medium-sized (200 to 400 students) schools. There was no difference between the mean achievement of Year 5 students attending smaller (519) and medium-sized (529) schools. (Also see page 54 for discussion on school size and decile.)

Reading literacy achievement and school decile[50]

Internationally, principals across countries were asked to estimate the proportion of their student body that came from economically disadvantaged backgrounds. Based on their reports, New Zealand Year 5 students who attended schools where few schoolmates were from economically disadvantaged homes generally achieved at a higher level, with the difference between their average achievement and those attending schools where most came from disadvantaged backgrounds one of the highest among higher-performing countries (Chamberlain, 2007b; Mullis, et al., 2007).

A national-level variable of interest both to schools and to education policy makers, and which measures similar attributes of schools to that noted above, is the *decile*. Schools are ranked into 10 percent groupings, or deciles. The Ministry of Education then allocates funding to state and state-integrated schools based on their decile. Decile 1 schools are the 10 percent of schools with the *highest* proportion of students from socio-economically disadvantaged communities, while decile 10 schools are the 10 percent of schools with students from the *lowest* level of socio-economically disadvantaged communities. A school's decile does not indicate the overall socio-economic mix of the school.

In PIRLS-05/06, Year 5 students from higher decile state/state integrated schools (8 through 10) generally achieved significantly higher reading literacy scores than those attending medium decile state/state integrated (4 through 7) or lower decile (1 through 3) state/state integrated schools. See Figure 6.1 for details. Note that although 2 percent of students in PIRLS attended independent schools, the actual number of schools from which they were sampled was too small to be able to report their mean (less than 10 schools). See TN 7 in the Technical Notes for details.

[47] For an overview of the class setting in which Year 5 students were learning and how their teachers typically approached the teaching of reading, readers should refer to *Reading literacy in New Zealand* (Chamberlain, 2007b).

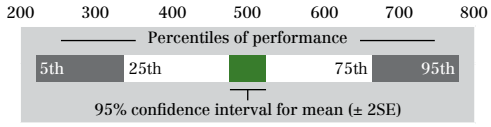
[48] Based on the responses from New Zealand school principals, 41 percent of Year 5 students attended schools in an urban location, 39 percent attended suburban schools, and 21 percent attended schools in rural settings.

[49] Twenty-seven percent of Year 5 students in PIRLS were in smaller schools, 36 percent were in medium-sized schools, and 37 percent were in larger schools. (See Appendix A for details of how schools were sampled.)

[50] Deciles are used to provide funding to state and state-integrated schools, with schools with a lower decile being funded at a higher level than those with a higher decile. ***Some*** independent schools have requested that the Ministry of Education calculate their decile. However, for the purpose of this analysis, independent schools have been grouped separately, and so the decile bands reflect the deciles of state and state-integrated schools only.

Figure 6.1: Distribution of Year 5 students' mean reading literacy scores in 2005/2006, by school decile band*

School decile band	Percentage of students	Mean reading literacy score	Distribution of reading literacy scores
Low: 1–3	28 (1.1)	485 (4.9)	
Medium: 4–7	34 (1.5)	538 (3.7)	
High: 8–10	36 (1.4)	560 (2.9)	
Independent	2 (1.0)	~ ~	
All New Zealand		532 (2.0)	



Notes

Standard errors appear in parentheses.

Tilde (~) indicates that there was insufficient data to report achievement. Although the (weighted) percentage of students in independent schools in PIRLS was 2 percent, the number of schools from which they were sampled was too small (less than 10 schools) to be able to report their mean. See TN 7 in the Technical Notes for details.

See Table B.14 for the 2001 means and Table B.15 for details of the percentiles and standard errors for 2001 and 2005/2006.

* State and state-integrated schools only.

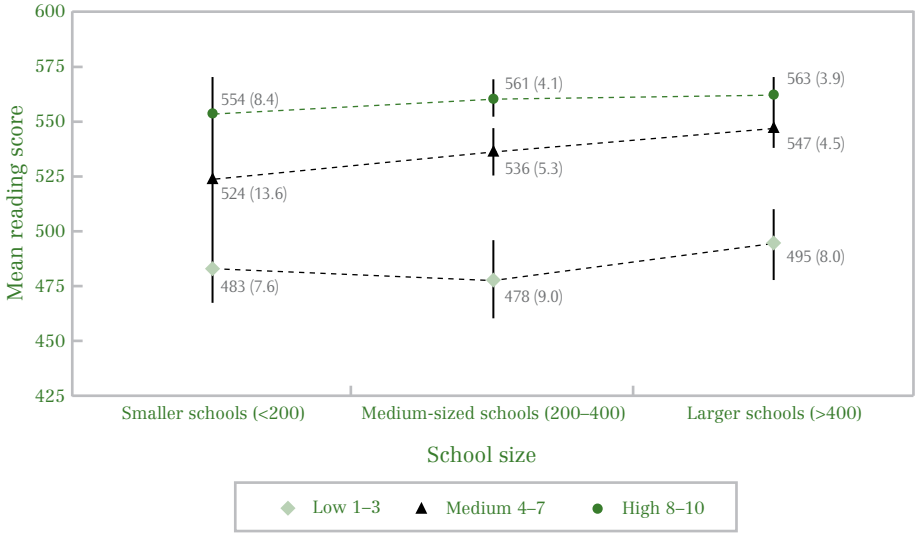
Range of scores

As well as there being a considerable range in reading literacy achievement scores across all decile bands in 2005/2006, Figure 6.1 also shows that there are high-performing and low-performing students in all three decile band categories. However, the range was larger for Year 5 students in the 1 to 3 band schools (292) compared to those in the 4 to 7 and 8 to 10 bands (266 and 250 respectively).

School decile and enrolment size

It was reported on page 53 that, on average, students attending larger schools had higher reading literacy achievement than students attending smaller schools. As Figure 6.2 shows, this relationship is clearly an artifact of the decile of the school. That is, students in lower decile schools tended to have lower achievement regardless of the size of the school they attended. Similarly, students in higher decile schools tended to have higher achievement regardless of the enrolment size of the school.

Figure 6.2: Year 5 students' mean reading literacy scores in 2005/2006, by size of school and school decile band*



Notes

The ◆ data points are the mean reading scores for the Year 5 students in lower decile schools by school enrolment size. The ▲ data points are the mean scores for the Year 5 students in the mid-range decile schools by school enrolment size, and the ● data points are the mean scores for Year 5 students in higher decile schools by school enrolment size. Standard errors appear in parentheses.

The vertical lines extending from the data points show the 95 percent confidence interval around the mean (i.e., ± 2 standard errors).

* State and state-integrated schools only.

School decile and the PIRLS international benchmarks

Table 6.1 reports the percentages of Year 5 students reaching the PIRLS international reading benchmarks, by the decile of the schools they attended.

Table 6.1: Percentage of students reaching PIRLS international reading benchmarks in 2005/2006, by school decile band*

School decile band	Percentage of Year 5 students reaching PIRLS international benchmark			
	Advanced (625)	High (550)	Intermediate (475)	Low (400)
Low: 1–3	5 (0.9)	24 (2.2)	57 (2.4)	82 (1.6)
Medium: 4–7	13 (1.1)	46 (2.1)	79 (1.8)	95 (0.8)
High: 8–10	19 (1.3)	58 (1.6)	87 (1.2)	97 (0.5)
All New Zealand†	13 (0.7)	45 (1.0)	76 (1.0)	92 (0.6)

Notes

Standard errors appear in parentheses.

See Table B.16 in Appendix B for 2001 data.

* State and state-integrated schools only.

† All students, including 2 percent of students in the independent schools.

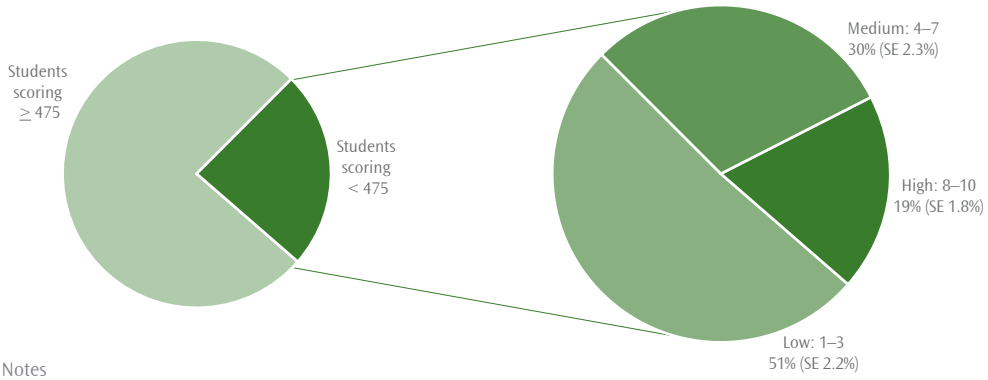
Proportionately few students in lower decile schools reached each benchmark compared with their counterparts in mid-range and higher decile schools. While not quite as striking, a similar pattern was observed when comparing the proportions of students from mid-range and higher decile schools.

School decile and lower achievers

In Section 3, *lower achievers* were defined as students who did not reach the PIRLS *Intermediate International Benchmark* (i.e., scored below 475). About one-quarter (24%) of Year 5 students fell into this category. As well as looking at the student characteristics of this group, it is also important to consider the (socio-) economic character of the schools lower achievers attended.

Figure 6.3 shows the composition of the lower-achievers group according to the decile band of the schools the Year 5 students attended. The lower-achievers group comprised about one-half students from lower decile schools (51%), nearly double their proportion in the Year 5 population (28%). In sharp contrast, just under one-fifth of students from higher decile schools (19%) were in this lower-achievers group and yet they comprised 36 percent of the Year 5 population.

Figure 6.3: Composition of the Year 5 lower-achievers group in 2005/2006, by school decile band*



Notes

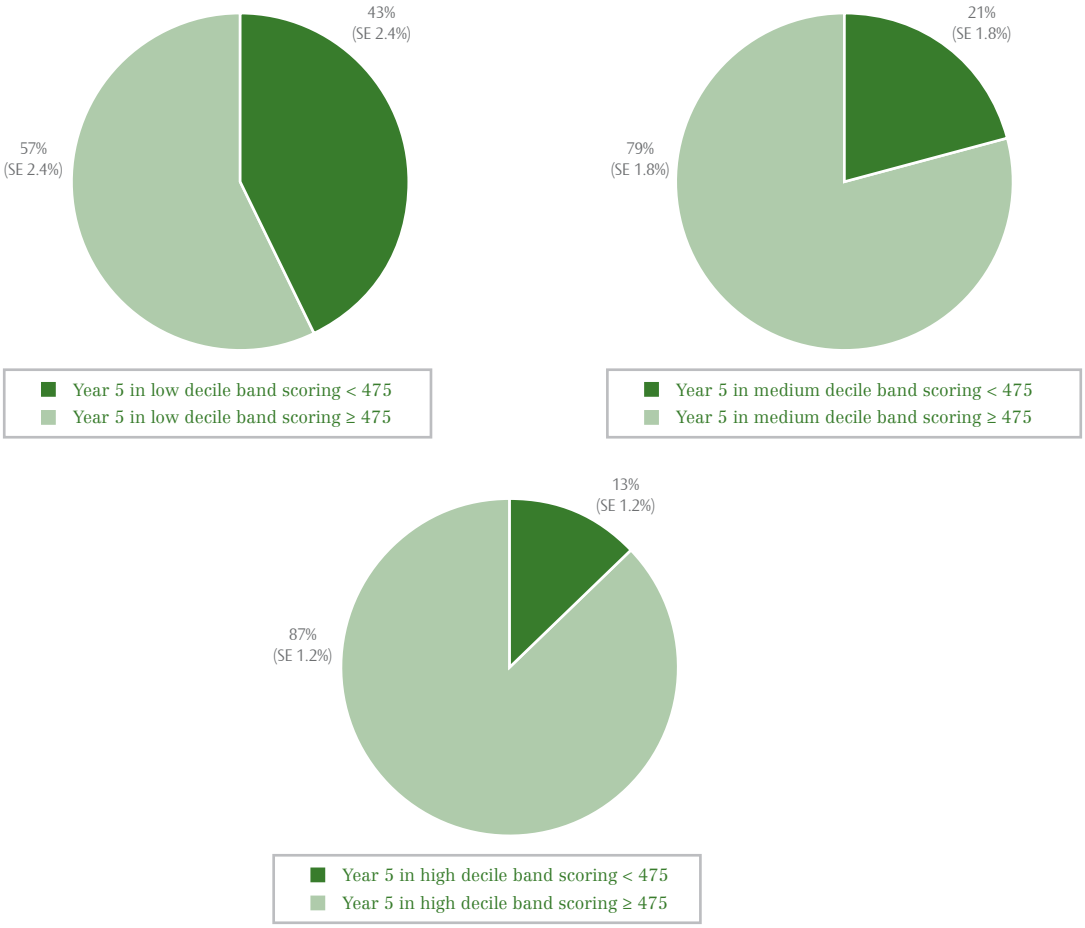
Standard errors (SE) appear in parentheses.

The proportion of all Year 5 students who reached the PIRLS *Intermediate International Benchmark* was 76 percent (SE 1.0%); the proportion who did not reach this benchmark was 24 percent (SE 1.0%).

* State and state-integrated schools only.

The second approach used here is to look at the proportion of students in each school decile band that fell into this lower-achievers group. Figure 6.4 shows the proportions of students attending lower, mid-range, and higher decile schools who were in the lower-achievers group.

Figure 6.4: Percentage of Year 5 students in each school decile band* who were in the lower-achievers group in 2005/2006



Notes

Standard errors (SE) appear in parentheses.

The proportion of all Year 5 students who reached the PIRLS *Intermediate International Benchmark* was 76 percent (SE 1.0%); the proportion who did not reach this benchmark was 24 percent (SE 1.0%).

* State and state-integrated schools only.

Odds ratios

Summing up the information noted above for school decile, the odds ratios *(ORs)* for Year 5 students attending mid-range and higher decile schools being in the lower-achievers group were both less than 1, indicating relatively low probabilities for the students in these schools being lower achievers. Of note is the *OR* – 3.81 – for lower decile schools. That is, the odds of a Year 5 student attending a lower decile school and being in the lower-achievers group was about 3.8 times higher than the odds of a Year 5 student who attended a mid-range or higher decile school (i.e., a non-lower decile school, 0.77 c.f. 0.20). See Table B.6A in Appendix B for details.

Any change between 2001 and 2005/2006?

Details of the means, percentiles, and benchmarks for the 2001 Year 5 cohort in each decile band are reported in Tables B.14 through to B.16 in Appendix B. Consistent with the overall pattern observed for New Zealand, and for any of the Year 5 student sub-populations, there were *no* changes that were of statistical significance. Of interest here were decreases, albeit very small, in the proportions reaching the higher benchmarks in 2005/2006 than was the case in 2001, observed particularly among the band of higher decile schools. However, to reiterate, these decreases were not significant.

Role of the school principal

New Zealand principals reported a similar use of their time in 2005/2006 as their counterparts in England and Scotland, but they were typically spending more hours, about 57 per week, doing these activities than their international counterparts. Table 6.2 presents the data for New Zealand school principals according to the location of their schools and school decile.

Table 6.2: Principals' estimates of their time spent on various school-related activities in 2005/2006, by location and school decile band*

School category	Mean hours per week spent on the activities	Percentage of time						
		Developing curriculum and pedagogy for the school	Managing staff / staff development	Administrative duties (e.g., hiring, budgeting)	Parent and community relations	Teaching	Interacting with individual students	Other
Location								
Urban	58 (1.5)	15 (1.1)	17 (1.1)	32 (2.0)	14 (0.9)	4 (0.6)	11 (0.6)	6 (1.0)
Suburban	57 (1.1)	15 (1.0)	18 (0.8)	34 (1.8)	12 (0.5)	5 (0.8)	11 (0.7)	5 (0.7)
Rural	57 (1.3)	15 (1.5)	13 (1.2)	27 (2.5)	10 (0.9)	21 (3.5)	10 (0.9)	4 (0.8)
Decile								
Low:1–3	54 (1.4)	17 (1.1)	17 (1.1)	32 (2.1)	13 (0.8)	6 (1.1)	12 (0.7)	4 (0.7)
Medium: 4–7	59 (1.3)	15 (1.1)	17 (1.1)	31 (1.2)	13 (0.8)	8 (1.6)	12 (0.8)	5 (0.7)
High: 8–10	57 (0.9)	15 (1.3)	16 (1.1)	33 (2.3)	12 (0.6)	9 (1.7)	9 (0.6)	6 (1.1)
Independent	*73 (9.1)*	*9 (1.2)*	*13 (4.8)*	*32 (19.0)*	*12 (5.0)*	*18 (14.6)*	*9 (1.2)*	*6 (7.3)*
All New Zealand	57 (0.7)	15 (0.7)	17 (0.6)	32 (1.2)	12 (0.4)	8 (0.8)	11 (0.4)	5 (0.5)

Notes

Standard errors appear in parentheses.

The information reported for independent schools is shown only for illustrative purposes and should be regarded as indicative only. These data are drawn from the responses of the principals of fewer than 10 schools. The standard errors show the level of uncertainty.

* State and state-integrated schools only.

In general, principals tended to spend about the same amount of time on the tasks regardless of the school locality and their school's decile. Not surprisingly, exceptions were mainly observed for rural school principals, where the percentage of time spent managing staff, performing administrative duties, and teaching differed from their counterparts in suburban and urban localities. Rural schools were more often than not smaller schools (60%), and school principals of these schools would most likely have a teaching role as well as the leadership role.

Availability of school resources

The Availability of School Resources (ASR) Index was developed internationally to measure the extent to which shortages or inadequacies of school resources affect schools' capacity to provide instruction.[51] In 2005/2006 the majority of New Zealand Year 5 students (86%) attended schools where school principals reported that resource shortages or inadequacy of resources had little or no effect on schools' capacity to provide reading instruction (i.e., were at the high level of the index).[52] Thirteen percent of Year 5 students were at the medium level of the index, with just 2 percent at the low level.

Although very small, proportionately more principals of smaller schools and of lower decile schools reported that shortages or inadequacies affected their schools' capacity to provide instruction (i.e., at the low level) than principals of medium- or larger-sized schools and higher decile schools (4% of students in both cases.)

[51] The school resources covered by this index were: qualified teaching staff; teachers with a specialisation in reading; second-language teachers; instructional materials; supplies (such as paper and pencils); school buildings and grounds; heating/cooling and lighting systems; instructional space (such as classrooms); special equipment for physically disabled students; computers for instructional purposes; computer software for instructional purposes; computer support staff; library books; and audio-visual resources.

[52] A 4-point scale was used for each category: 1 = not at all, 2 = a little, 3 = some, and 4 = a lot. Responses for the activities were averaged for each principal. Students were assigned to the high level when the average was (1–<2); to the medium level when the average was (2–<3); and to the low level when the average was (3–4).

Any change between 2001 and 2005/2006?

There was a small but significant increase (of 2 percentage points) in the proportion of Year 5 students at the *low* level of the Availability of School Resources Index between 2001 and 2005/2006. In 2001, all school principals indicated that shortages or inadequacies did not affect their schools' capacity to provide instruction (i.e., it was estimated that there were no students at the low level of the index.) Although just a small change, in 2005/2006 principals' from some schools indicated that shortages or inadequacies in resources did affect their schools' capacity to provide instruction, with about 2 percent of Year 5 students reportedly in schools where this was the case. Accompanying this change was a small non-significant decrease (3 percentage points) in the proportion at the medium level of the ASR Index for the same period. There was no change in the proportion of students recorded at the high level of the index.

The changes were largely a reflection of the views of principals of lower decile schools becoming more polarised. Accompanying a 9 percentage point increase in the proportion of lower decile schools' students at the high level of the ASR Index, there was a corresponding increase (4 percentage points) at the low level of the index. Similar changes were observed in the data for higher decile schools; no changes were observed for mid-range decile schools.

School climate

Internationally, New Zealand principals were among the most positive in their views on the climate for learning in their schools. The Principals' Perceptions of School Climate (PPSC) Index summarised principals' characterisation of teachers' job satisfaction; teachers' expectations for student achievement; parental support for student achievement; students' regard for school property; students' regard for others' welfare; and students' desire to do well. Students were assigned to the high level of the PPSC Index if their principal typically responded 'high' or 'very high' and to the low level if their principal typically responded 'low' or 'very low'. The remainder were assigned to the medium level.[53]

Principals of mid-range and higher decile schools were generally more positive than their counterparts at lower decile schools, with more than three-quarters of students from each group of schools (78% and 83% respectively) at the high level of the index. By way of contrast, less than half of Year 5 students (46%) were in lower decile schools where their principals held positive views. A similar pattern was exhibited when looking at the size of schools: the principals of smaller schools tended to be less positive than their counterparts in larger schools.

The average achievement of Year 5 students in schools where principals were very positive about their school climate tended to be about 30 scale score points higher than that of their counterparts whose principals held less favourable views (541 compared with 512 for the high and medium levels respectively; there were too few observations to report the achievement at the low level).

Students' view of school life

Students were asked for their views on school. Specifically, they were asked the extent to which they agreed with the following:

- I like being at school
- I think that teachers in my school care about me
- Students in my school show respect to each other
- Students in my school care about each other.

Across countries the relationship between levels of agreement with these statements and achievement varied, and so they were not summarised into an index. However, students' responses on their own do provide some important indication of what they feel about aspects of their school life as Year 5 students.

Internationally, middle primary school students were very positive about their teachers, with 89 percent of students on average agreeing a lot or agreeing a little that their teachers cared about them. Also, internationally most students liked being at school (84%). Students' level of agreement with the statement 'students in my school care about each other' and 'students in my school show respect to each other' did, however, vary across countries (also see Chamberlain, 2007b).

[53] The 5-point scale is: 1 = very low; 2 = low; 3 = medium; 4 = high; and 5 = very high. Responses to the activities were averaged for each principal. Students were assigned to the high level when the average was greater than 3.67 through 5; the medium level when the average was 2.33 through to 3.67; and the low level when the average was 1 to less than 2.33.

The percentage of New Zealand Year 5 students who agreed a lot or a little with each statement is reported in Table 6.3.

Table 6.3: Percentage of Year 5 students reporting their agreement with statements about aspects of school life in 2005/2006, by gender and ethnic grouping

Year 5 student group	Percentage of students agreeing a lot or a little to the statement			
	I like being at school	I think that teachers in my school care about me	Students in my school show respect to each other	Students in my school care about each other
Gender				
Girls	89 (0.7)	93 (0.7)	82 (1.0)	83 (0.9)
Boys	76 (1.0)	86 (0.9)	77 (1.0)	77 (1.1)
Ethnic grouping				
Pākehā/European	79 (1.0)	90 (0.7)	80 (1.0)	81 (1.1)
Māori	86 (1.2)	88 (1.1)	77 (1.6)	77 (1.5)
Pasifika	89 (2.2)	89 (1.9)	80 (3.1)	77 (3.1)
Asian	90 (1.6)	90 (1.6)	83 (2.2)	84 (1.8)
All New Zealand*	83 (0.7)	89 (0.6)	80 (0.8)	81 (0.8)

Note

Adjusted percentages are reported. Standard errors appear in parentheses.

* All Year 5 students, including students in Other ethnic groups.

About one in four Year 5 boys (24%) did not agree with the statement 'I like being at school' compared with about one in ten girls (11%). Pākehā/European boys (28%) were more likely to disagree with the statement than students from any other group boys (c.f. 19% of Māori boys, 15% of Pasifika boys, and 14% of Asian boys).

'Students in my school care about each other' also attracted some differing views. More than one in five Pākehā/European boys (21%), Māori girls and boys (21% and 24% respectively), Pasifika girls and boys (22% and 24% respectively) and, to a lesser extent, Asian boys (19%) did not endorse this statement. By way of contrast, Pākehā/European girls (17% did not agree) and Asian girls (12%) were more likely to agree with the statement. A similar pattern was observed with the statement 'Students in my school show respect to each other'.

In New Zealand, the relationship between Year 5 students' views on aspects of school and achievement is worth noting. Generally, the relationship was curvilinear. Year 5 students who were very positive (i.e., agreed a lot) tended to achieve about 15-20 scale score points *lower* than students who were more reticent with their views (agree a little or disagree a little). The group of Year 5 students who expressed very negative views (i.e., disagreed a lot), albeit proportionally few, generally had typically much lower achievement (an average of 50 scale score points lower) than students in the other categories.

School safety

Two indices were developed internationally to measure school safety: one based on the ratings of principals on a series of statements and one based on the views of students on a different series of statements.

Principals' perceptions

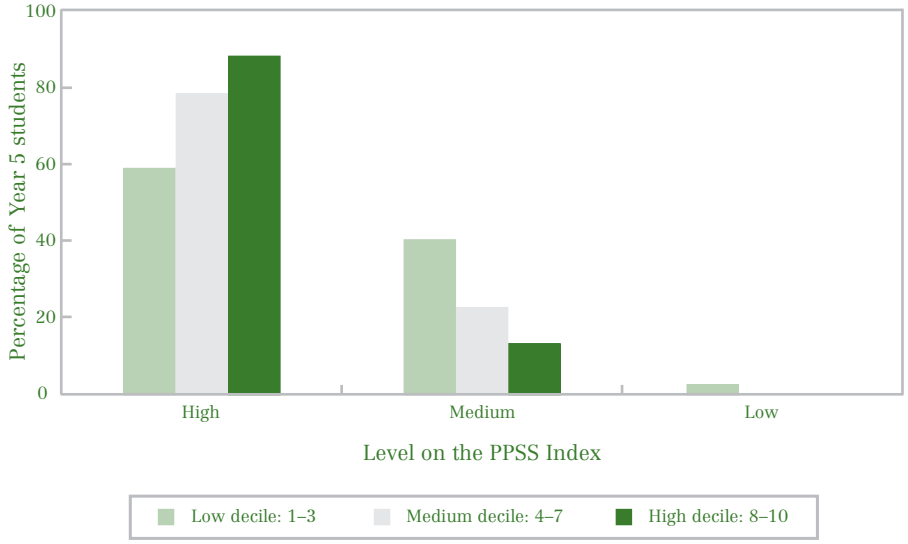
Information on principals' responses to the severity of seven student behaviours was summarised in the Principals' Perceptions of School Safety (PPSS) Index. These behaviours included classroom disturbances, cheating, profanity, vandalism, theft, intimidation or verbal abuse among students, and physical conflict among students. Although cross-national comparisons are difficult because of differing perceptions of what constitutes a serious problem, the seriousness of the student behaviours in most countries was generally low, with on average only 7 percent of students at the low level of the index (i.e., serious problem).

In New Zealand, the percentage at the low level of the PPSS Index was just 1 percent. More than three-quarters of Year 5 students (77%) were in schools where their principals generally viewed the behaviours as not a problem (i.e., at the high level) compared with 60 percent internationally; the remainder of Year 5 students (23%) were at the medium level (compared with 32% internationally).

School size and school location did not appear to affect the views of New Zealand's principals. However, as Figure 6.5 illustrates, principals of lower decile schools were more likely to express some concerns about the behaviours in their schools than their counterparts in mid-range and higher decile schools. About 40 percent of Year 5 students in lower decile schools were at the medium level of the Principals' Perceptions of School Safety Index compared with 22 percent of students from mid-range decile schools and 12 percent of students from higher decile schools. Principals of higher (88%) and mid-range (78%) decile schools on the other hand were more likely to view the negative behaviours as not being a problem (i.e., at the high level of the PPSS Index) than the principals of lower decile schools (58%).

The relationship between students' reading literacy achievement and principals' views on the severity of negative behaviours was relatively strong internationally, particularly between the high and low levels of the PPSS Index (61 scale score points). In New Zealand's case there were too few students (1%) at the low level to reliably estimate their achievement. However, the average achievement difference between Year 5 students at the high and medium levels of 34 scale points was higher than the international average difference of 8 scale score points found for these two corresponding levels (i.e., 503 compared with 495).

Figure 6.5: Principals' Perception of School Safety (PPSS) Index in 2005/2006, by school decile band*



Notes

The mean reading literacy scores for Year 5 students at each level of the PPSS Index in 2005/2006 were:

Low decile 1–3: High 495 (5.2) and Medium 479 (9.3).

Medium decile 4–7: High 543 (3.9) and Medium 522 (8.4).

High decile 8–10: High 561 (3.2) and Medium 551 (5.4).

There were too few students to report achievement at the Low level of the index.

Although not reflected in this graph, independent school principals were very positive with their ratings and therefore all students from independent schools were assigned to the high level of the index. There were too few schools to report their achievement.

* State and state-integrated schools.

Student Safety in School (SSS) Index

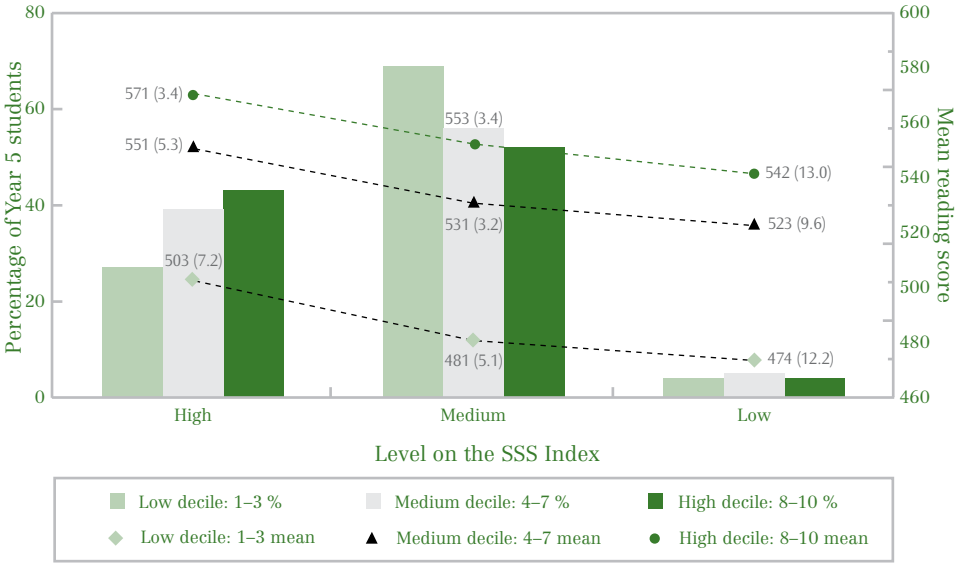
Students' responses to the statement 'I feel safe at school' and to the statements on whether or not they had something stolen, been bullied or been injured by another student during the month prior to the PIRLS assessment were combined into the Student Safety in School (SSS) Index. The percentage of Year 5 students who reported feeling safe and had no incidents happening to them (i.e., at the high level of the index) was 37 percent, while 4 percent indicated they did not feel safe and had experienced two or more negative behaviours (i.e., the low level of the index). The remainder, 58 percent, typically gave a combination of responses (i.e., at the medium level).[54]

[54] On average internationally, 47 percent of students felt very safe and reported no incidents happening to them (i.e., at the high level of the SSS Index); 3 percent reported not feeling safe and had two or more incidents happen to them (and their classmates) (i.e., at the low level of the index). The remaining 50 percent typically gave a combination of responses (i.e., the medium level).

In terms of achievement, Year 5 students at the high level of the index (i.e., who reported feeling safe and had not experienced any incidents) achieved an average of about 28 scale score points higher than their counterparts at the medium level (551 c.f. 523), and about 35 scale points higher than those students at the low level (516).

The size of the schools of Year 5 students did not appear to be related to whether or not they had experienced negative behaviours, with the proportions of students at each level of the SSS Index about the same in smaller, medium-sized, and larger schools, as for New Zealand overall. Students' reports did, however, appear to be related to the decile of the school they attended (see Figure 6.6), which to some extent is consistent with the views of their principals.

Figure 6.6: Year 5 students at each level of the Student Safety in School (SSS) Index and reading literacy achievement in 2005/2006, by school decile band*



Notes

Each set of bars represents the percentage of Year 5 students at each level of the SSS Index by school decile band. The high level of the SSS Index denotes students who feel very safe and reported no negative incidents, whereas the low level denotes students who do not feel safe and experienced two or more incidents.

The data points are the mean reading literacy scores for the students at each level of the SSS Index, by school decile band (* state and state-integrated schools). Standard errors appear in parentheses.

More than half of Year 5 students in schools in each of the decile bands were likely to have experienced at least one negative behaviour (i.e., at the medium level of the SSS Index) with students in lower decile schools more likely to report this (70% of students) than their counterparts in mid-range (56%) or higher (52%) decile schools. A sense of *not* feeling safe, as measured by the index (i.e., low level of the index), was felt by the same proportion of students regardless of the decile band (about 5%).

Consistent with the overall pattern for New Zealand, and illustrated in Figure 6.6, there was a positive relationship between the level on the School Safety Index and mean reading achievement for students attending schools in each decile band.

Looking at the demographic characteristics of the students at each level of the index, proportionately fewer Year 5 boys than Year 5 girls were at the high level of the index (35% c.f. 40%), while the converse was observed at the low level (6% c.f. 3%). Proportionately fewer Māori (29%) and Pasifika (27%) students than Asian (41%) and Pākehā/European (40%) students reported feeling safe at school and having not experienced any incidents of negative behaviours, with higher proportions of Māori and Pasifika students (both at 66%) than Asian (58%) and Pākehā/European students (55%) at the medium level of the SSS Index. There were no differences among the proportions of students from the four main groupings at the low level (4–5% each). This information is consistent with the findings from other international studies (e.g., Chamberlain, 2001)

Section 7: Overview

The discussion in this section pulls together findings from other research – international and national – to allow readers to reflect and understand the context of the findings from PIRLS 2005/2006.

New Zealand's Year 5 students, on average, demonstrated that they had relatively strong reading comprehension skills and strategies as measured by the Progress in International Reading Literacy Study (2005/2006). Furthermore, a significant proportion of Year 5 students used skills and strategies that placed them among the best readers internationally. The performance of these higher-achieving students was also consistent with that of their 2001 counterparts, while the performance of students with weaker reading skills in 2005 was also found to be the same as that of their weaker 2001 counterparts. The data also show that the average achievement differences between girls and boys remained unchanged. Of continuing concern are the differences in achievement among the ethnic groupings, with the performance of each group in 2005 essentially the same as that of their respective 2001 cohort.

As well as the cognitive outcomes from PIRLS, the study also provides invaluable insight into Year 5 students' attitudes to reading, their ratings of themselves as readers, their opinions about aspects of school life, including whether or not they liked being at school and felt safe school there. Furthermore, all these factors were found to have a strong, positive association with students' reading literacy achievement. The findings on students' beliefs and attitudes do highlight however that among New Zealand 10 year olds there is a notable size group who do not consider reading a part of their repertoire of recreational activities. Also, for a significant minority school was not a place they liked been at nor was it perceived as safe place to be.

Both PIRLS studies have highlighted the large range in the *reading* performance of New Zealand's Year 5 students. A similar wide range of performance was found for England in 2001 and again in 2005/2006. Whetton and Twist (2003) conjectured as to why the 'English-speaking' countries in PIRLS-01 exhibited relatively large ranges of achievement. As well as looking at curricula and pedagogical practice, and the availability of specialist support, Whetton and Twist also considered the complexity of the English language in relation to students who have lower reading ability. With a very similar pattern of performance exhibited again among the English-speaking countries in 2005/2006 (Twist, Schagen, & Hodgson, 2007), further work is being undertaken by England's PIRLS researchers to look at patterns of achievement across the different language groupings in PIRLS.

Results from this second cycle of PIRLS again highlight the importance of the relationship between the home and reading literacy achievement, with the time spent on early literacy activities and the positive role that parents/caregivers can play in promoting reading being examples of such factors. It is also revealing to see how important these factors are in New Zealand when viewed in an international context.

Using PIRLS 2001 data, Martin, Mullis, and Gonzalez (2004), for example, identified factors associated with *effective* homes in terms of literacy development by middle primary school. The factors they identified discriminated between higher-achieving students and lower-achieving students. Parents/caregivers reading to their children on a frequent basis was one such factor. In several countries, including New Zealand, the practice is common. However, in New Zealand's case, while the parents/caregivers of the majority of New Zealand's higher-achieving students (90%) reported they had read to their child, a little over one-half of the parents/caregivers of New Zealand's lower-achieving students (55%) reported this practice; the difference of 35 percentage points was one of the highest internationally (c.f. the international average of 22%). Parents'/caregivers' attitudes to reading was another factor which discriminated between New Zealand's higher and lower achievers. In every country, significantly higher proportions of higher-achieving students than lower-achieving students had parents/caregivers who held positive views about reading. However, New Zealand had the largest the difference (39%).

A strong early foundation in literacy through parents/caregivers actively engaging in early literacy activities with their child, and later their child participating in early childhood education, is also a key precursor of later success at middle primary school as measured by PIRLS. Recently, Tunmer, Chapman, and Prochnow (2006) explored the connections between New Zealand students having 'literate cultural capital' at school entry, a set of reading-related factors that have been strongly influenced by early literacy activities undertaken in the home, their family socio-economic circumstances, and their reading outcomes later in school. Their longitudinal study found that children from low-income households had considerably less literate cultural capital than students from higher-income households. Furthermore, literate cultural capital at school entry was a strong explanatory variable for reading achievement when students were in Year 7.

Socio-economic factors and their relationship with student reading literacy achievement cannot be ignored. The findings described in this report emphasise the achievement differences among Year 5 students who have access to different educational resources in the home as well as households with different incomes. The disparity that exists between households that are relatively well-off and those households that are less well-off is illustrated further at the school level. According to the PIRLS socio-economic measures, New Zealand schools where the student body is predominately from economically disadvantaged backgrounds had on average markedly lower achievement than those where there was little economic disadvantage. This finding was confirmed using the school's decile indicator, a New Zealand measure of socio-economic disadvantage. Schools with higher levels of socio-economic disadvantage were also more likely to be faced with other challenges, such as dealing with negative student behaviours, than were schools with lower levels of socio-economic disadvantage.

Interestingly, the data revealed that not all differences in achievement among the ethnic groupings were accounted for solely by differences in the socio-economic circumstances of the households in which students reside. Moreover, the information in this report on individual socio-economic measures such as household income and books in the home does suggest a need for a finer, aggregated measure of socio-economic circumstances; such a measure could include, for example, parents'/caregivers' occupation and their highest level of education. Such a measure could be used in conjunction with other variables to better explain the relationships with achievement for students from the different ethnic groupings. It is worth noting that Nash (2004) offers insight into the effect of socio-economic circumstances and ethnicity and its relationship with student achievement in New Zealand.

As well as being a research study, PIRLS plays an important monitoring function and is used in conjunction with information collected from the National Education Monitoring Project (NEMP). NEMP assesses the achievement of students in reading every four years, with reading comprehension assessed in 2000 and again in 2004. According to Crooks and Flockton (2005), the cohort of Year 4 students assessed in 2004 achieved at the same level on the trend reading tasks as their 2000 Year 4 counterparts. NEMP also provides information on students' attitudes to reading, the findings of which are consistent with those found for PIRLS. Interestingly, Year 4 students in 2000 were mostly Year 5 students in 2001, and Year 4 students in 2004 were Year 5 students in 2005, making them the same cohort as that assessed in PIRLS. This shows there was no change in reading achievement in the same cohorts as measured by the two very different assessments.

In early 1999, the Literacy Taskforce's report was released to advise the then Government on how to achieve its goal that "By 2005, every child turning nine will be able to read, write, and do maths for success. "(Ministry of Education, 1999). Recommendations made by the Literacy Taskforce subsequently informed the work of the *Literacy and Numeracy Strategy*. The strategy essentially has provided an alignment and consistency for a range of policies, programmes, and projects, which have been designed and implemented in English-medium settings and which have aimed to improve literacy achievement outcomes. However, most of the initiatives have been implemented after 2001, the year in which the first cycle of PIRLS was administered. For example, the Literacy Professional Development Project (LPDP), a successful programme which has involved close to 300 schools, only started in 2004 (McDowall, Cameron, Dingle, Gilmore & MacGibbon, 2007). It is therefore unlikely that the positive outcomes of this relatively small-scale activity would have been reflected in a large-scale assessment like PIRLS.

A number of other countries taking part in PIRLS have had some major structural and curricular changes. Four examples are described in Appendix D, and they highlight the scale and number of years needed for improvements to appear in system-level data such as PIRLS. The IEA, the organisation with overall responsibility for PIRLS, has also recently published a book containing articles from 13 countries on the impact of PIRLS 2001. In putting the book together, impact was defined "as the study's influence on public and published opinion, on education policy, on teaching and curriculum development, and on educational research." (Schwippert & Goy, 2007, p. 265)

Since PIRLS was administered in New Zealand in late 2005, a number of other important policy initiatives have been released, which provide a mandate for making change. Specifically in relation to reading literacy in English-medium settings is the (draft) tool *Literacy Learning Progressions*, a resource which explicitly sets out the "literacy expertise that students need in order to meet the demands of the curriculum" (Ministry of Education, 2007a, p.3). More recently, the Māori-medium literacy strategy *Te Reo Matatini* was released in order to align existing literacy-related initiatives, as well those related specifically to Māori-medium education (Ministry of Education, 2007b).

Ka Hikitia – Managing for Success, the Māori education strategy for 2008–2012 (Ministry of Education, 2008), sets out goals and specific actions in order to "improve education outcomes for and with Māori" (p. 5). Strengthening the participation of whānau in Māori children's learning and improving teaching and the learning of literacy for Māori children in their first years of school are two of six stated goals. Examples of actions include the extension of the LPDP into schools with a higher proportion of Māori students, and developing an equivalent literacy programme for and with Māori-medium settings (Ministry of Education, 2008, p. 31).

Improving the literacy foundations of Pasifika children, and is identified as a key stated goal in the *Pasifika Education Plan 2006–2010* (Ministry of Education, 2007c). Furthermore, "positive shifts in performance as measured by national and international assessments (PISA, PIRLS, TIMSS, and NEMP) by 2010"[55] (p.16) is one of the targets to be able to measure the success of the work related to improved student outcomes in education.

Finally, the third cycle of PIRLS is scheduled to be administered in New Zealand and other Southern Hemisphere countries in late 2010, and in early 2011 in Northern Hemisphere countries. Although the international data will not be available until the end of 2012, some preliminary (national) data will become available during the first half of 2012, which should provide some indication of the progress made since 2005 in shifting student achievement in reading literacy.

[55] The current plan is a large scale map which set outs the targets for 2010-2011. The map has the year 2011. However, an attachment which sets out some revisions to the current plan has the target year as 2010. The document sited here is the monitoring report which also outlines the targets for the period.

APPENDIX A: TEST LANGUAGE AND SAMPLING

Languages of assessment

Many participating countries administered tests in more than one language in order to cover their whole (Grade 4) student population (see Table A.1).

Table A.1: Countries assessing in more than one language in PIRLS-05/06

Country	Number of languages used in PIRLS	Languages
Israel	2	Hebrew, Arabic
Latvia	2	Latvian, Russian
Macedonia, Rep. of	2	Macedonian, Albanian
Moldova, Rep. of	2	Romanian, Russian
New Zealand	2	English, Māori
Norway	2	Bokmaal, Nynorsk
Romania	2	Romanian, Hungarian
Slovak Republic	2	Slovak, Hungarian
Spain	5	Castilian, Catalonian, Galician, Basque, Valencian
South Africa	11	Afrikaans, English, isiZulu isiXhosa, Sepedi, Sesotho, Seswana, isiNdebele, Siswati, Tshivenda, Xitsonga
Canadian provinces	2	English, French

Note

See Appendix A.3 in Mullis et al., 2007 for details of the other countries' test languages.

Sample design and size

The sample design for New Zealand was organised around the following criteria.

Selecting schools

There was explicit stratification by language, as follows.

- *Stratum 1* – schools where more than 80% of instruction was delivered in Māori. Schools were sampled with equal probabilities.
- *Stratum 2* – schools where there was at least one class where more than the language of instruction was in Māori. Schools were sampled with equal probabilities.
- *Stratum 3* – schools where the main language was English. There was also implicit stratification (or sorting) to ensure a representative sample according to decile band (high, medium, low) and urbanisation (urban, rural) in this stratum. Small schools (where the measure of size, MOS, was less than 16 Year 5 students) were sampled with equal probabilities; otherwise schools were selected with probability proportional to the Year 5 count.

Selecting classes/groups

One class or group of Year 5 students was sampled in Stratum 1. Two classes (one where instruction was delivered in English and the other where instruction was in Māori) were sampled from Stratum 2. If the MOS was large for the English-medium class, then two classes were selected randomly. In Stratum 3, if the MOS was 60 or more then two classes/groups were randomly sampled; otherwise, one class/group was randomly sampled.

Tables A.2A and A.2B present details of the original and achieved New Zealand sample sizes in PIRLS-05/06. Achieved samples were then weighted to represent the *student* population from which they were drawn. That is, the Year 5 student sample was weighted to reflect the population of New Zealand Year 5 students. It also means that even though 50 schools were sampled to cover Māori-medium Level 1 education, the sampling weights adjust the numbers to reflect the overall population. See the Technical Notes for further elaboration. Alternatively, see Joncas (2007) in the *PIRLS 2006 technical report* referenced at the end of this report. Details of other countries' sample designs and achieved samples are also described in this report.

Table A.2A: A summary of New Zealand's achieved school and student samples at Year 5 in IRLS-05/06

Stratum	New Zealand Year 5		
	Number of schools in original sample (N)	Total number of **schools** in achieved sample (N)	Total number of **students** in achieved sample (N)
Māori-medium schools (immersion 81–100%)	25	19	174
Schools with Māori-medium units/classes	25	25	565
All other schools	200	199	5,517
Total	250	243	6,256

Table A.2B: A summary of New Zealand's achieved parent, teacher, and school principal samples in PIRLS-05/06

Respondents in the achieved sample	Number of sampled respondents (N)	Number of respondents (N)	Achieved response rate (%)
Teachers of Year 5 students	514	502	98
Principals of the schools	243	236	97
Parents of students	6,256	4,014	64

Exclusions

Countries were able to exclude students from the assessment according to very strict internationally defined criteria. Most importantly, exclusions had to be kept to a minimum (i.e., preferably less than 5%). Exclusions could take place at the school level (i.e., a whole school could be excluded) or within schools. As is the practice in all international assessments in which New Zealand has been involved (e.g., TIMSS and PISA), schools/students were excluded according to the following international criteria.

School-level exclusions

These were done on the basis of:

1. schools being in a small, remote geographical region (in New Zealand this included the Correspondence School)
2. the removal of a language group, possibly due to political, organisational, or operational reasons
3. schools that were special education schools.

Within-school exclusions

Those eligible for exclusion were:

1. functionally disabled students
2. educable mentally disabled students (although it should be noted that students were not to be excluded solely because of poor academic performance or normal discipline problems)
3. students with limited proficiency in the test language - typically, a student who had received less than 1 or 2 years of instruction in the language of the test could be excluded
4. other – in New Zealand this category was for foreign-fee paying students.

New Zealand's final exclusion rates in PIRLS-05/06 are shown in Table A.3, along with the rates for PIRLS-01.

Table A.3: A summary of New Zealand's exclusions in PIRLS-01 and PIRLS-05/06

Reason for exclusion	Percentage of students in each PIRLS assessment cycle	
	2001	2005/2006
Students excluded at the school level	1.6	1.4
Students excluded within schools	1.7	3.9
Overall exclusion rate	3.2	5.3

APPENDIX B: REFERENCE TABLES AND FIGURES

Table B.1: Standard deviations and percentiles for Year 5 students in 2001 and 2005/2006, by ethnic grouping

Ethnic grouping	Year	Standard deviation	Percentiles				
			5th	25th	50th	75th	95th
Pākehā/European	2001	86 (2.3)	398 (3.5)	502 (8.6)	560 (2.9)	611 (2.8)	681 (3.6)
	2005/2006	80 (1.6)	408 (5.5)	503 (3.9)	558 (2.0)	606 (2.3)	674 (6.9)
Māori	2001	92 (3.8)	327 (18.9)	416 (4.4)	486 (6.7)	547 (10.3)	628 (9.1)
	2005/2006	88 (1.9)	328 (9.2)	425 (6.6)	489 (4.5)	545 (4.1)	617 (5.5)
Pasifika	2001	82 (5.3)	339 (28.1)	422 (32.5)	490 (4.5)	540 (6.7)	603 (24.2)
	2005/2006	77 (4.8)	345 (22.4)	428 (5.9)	482 (5.1)	532 (7.5)	599 (7.3)
Asian	2001	88 (10.5)	386 (97.1)	488 (14.1)	551 (8.9)	598 (7.6)	661 (7.8)
	2005/2006	76 (2.7)	420 (5.1)	502 (9.2)	554 (6.6)	603 (14.3)	666 (23.0)
All New Zealand*	2001	93 (1.9)	360 (4.7)	472 (5.9)	537 (3.6)	593 (4.5)	668 (5.1)
	2005/06	87 (1.3)	374 (3.0)	478 (2.5)	539 (2.2)	592 (2.1)	664 (4.0)

Notes

Standard errors are in parentheses.

The 2001 data for Asian and Pasifika students (in grey text) should be interpreted with caution due to the high level of uncertainty/variability, as indicated by the size of the standard errors.

* All Year 5 students, including students in Other ethnic groups.

Table B.2: Mean effect sizes in the reading literacy scores for Year 5 students in 2001 and 2005/2006, by ethnic grouping

Reference group	Comparison group							
	Boys		Māori		Pasifika		Asian	
	2001	2005/06	2001	2005/06	2001	2005/06	2001	2005/06
Girls	0.287	0.278	–	–	–	–	–	–
Pākehā/European	–	–	0.804	0.837	0.838	0.919	0.149	0.018
Māori	–	–	–	–	0.009	0.056	-0.635	-0.788
Pasifika	–	–	–	–	–	–	-0.701	-0.937

Notes

$d < 0.35$: difference between means is *small*

$0.35 \leq d \leq 0.75$: difference between means is of *medium* size

$d > 0.75$: difference between means is *large*

An effect size of +1.0 indicates that the average score for the *comparison* group is one standard deviation below the reference group; if it is -1.0 then the *reference* group average score is one standard deviation below the *comparison* group.

Table B.3: Standard deviations and percentiles for Year 5 students in 2001 and 2005/2006, by gender

Gender	Year	Standard deviation	Percentiles				
			5th	25th	50th	75th	95th
Girls	2001	90 (2.4)	379 (15.2)	487 (7.7)	550 (4.9)	604 (7.7)	679 (6.5)
	2005/2006	81 (1.5)	399 (6.8)	494 (4.3)	549 (2.0)	599 (1.5)	671 (7.0)
Boys	2001	95 (2.6)	345 (13.3)	454 (6.6)	527 (5.3)	583 (7.7)	657 (3.6)
	2005/2006	90 (1.8)	357 (3.9)	462 (4.5)	528 (3.8)	584 (2.0)	655 (4.9)
All New Zealand	2001	93 (1.9)	360 (4.7)	472 (5.9)	537 (3.6)	593 (4.5)	668 (5.1)
	2005/2006	87 (1.3)	374 (3.0)	478 (2.5)	539 (2.2)	592 (2.1)	664 (4.0)

Note

Standard errors appear in parentheses.

Table B.4: Mean differences between Year 5 girls' and boys' reading literacy scores in 2005/2006, by ethnic grouping

Ethnic grouping	Mean difference between girls and boys achievement	
	Above the international scale mean	Below the international scale mean
Pākehā/European	6 (2.9)	23 (6.4)
Māori	3 (5.1)	20 (6.3)
Pasifika	8 (7.1)	8 (9.4)
Asian	10 (7.6)	9 (12.2)
All New Zealand*	6 (2.5)	18 (4.0)

Notes

Standard errors appear in parentheses.

* All Year 5 students, including students in Other ethnic groups.

Table B.5: Percentage of students reaching the PIRLS international reading benchmarks in 2001, by gender and ethnic grouping

Year 5 student group	Percentages of students reaching PIRLS international benchmarks			
	Advanced (625)	High (550)	Intermediate (475)	Low (400)
Girls	17 (1.2)	50 (2.3)	79 (1.8)	93 (1.1)
Boys	11 (1.4)	40 (1.9)	69 (1.7)	87 (1.5)
Pākehā/European	19 (1.5)	55 (1.9)	83 (1.4)	95 (0.7)
Māori	6 (1.3)	24 (2.7)	55 (2.7)	80 (2.6)
Pasifika	2 (1.6)	21 (3.8)	57 (4.3)	80 (3.7)
Asian	15 (3.6)	50 (5.7)	78 (4.6)	95 (2.8)
All New Zealand*	14 (1.2)	45 (1.6)	74 (1.4)	90 (1.0)

Notes

Standard errors appear in parentheses.

* All Year 5 students, including students in Other ethnic groups.

Table B.6A: Odds ratio for the Year 5 lower-achievers group in 2005/2006

Variable: demographic/home/school	Odds ratio	Confidence interval	Significance
Sex = boys	1.84	(1.56, 2.17)	$p < 0.000$
Ethnic = Māori	3.32	(2.71, 4.06)	$p < 0.000$
Ethnic = Pasifika	3.00	(2.31, 3.90)	$p < 0.000$
Ethnic = Asian	0.58	(0.4, 0.85)	$p < 0.006$
Ethnic = Pākehā/European	0.32	(0.26, 0.39)	$p < 0.000$
Test language spoken at home = Sometimes/rarely	1.62	(1.31, 1.99)	$p < 0.000$
Ed aids = not all	2.63	(2.27, 3.03)	$p < 0.000$
Decile = Low	3.81	(2.95, 4.92)	$p < 0.000$
Decile = Medium	0.76	(0.59, 0.96)	$p < 0.023$
Decile = High	0.32	(0.25, 0.41)	$p < 0.000$

Note

The odds ratio was significant when $p \leq 0.05$.

Table B.6B: Odds ratios for the Year 5 lower-achievers group in 2005/2006, by gender and ethnic grouping

Year 5 student group	Odds ratio	Confidence interval	Significance
Māori boys	3.95	(3.12, 5.0)	$p < 0.000$
Pasifika boys	3.23	(2.35, 4.45)	$p < 0.000$
Pasifika girls	2.49	(1.86, 3.35)	$p < 0.006$
Māori girls	1.89	(1.48, 2.43)	$p < 0.000$
Pākehā/European boys	0.79	(0.65, 0.96)	$p < 0.0206$
Asian boys	0.77	(0.49, 1.24)	$p < 0.279$†
Asian girls	0.41	(0.22, 0.75)	$p < 0.0048$
Pākehā/European girls	0.28	(0.28, 0.35)	$p < 0.000$

Notes

The odds ratio was significant when $p \leq 0.05$.

† Not significant

Table B.7: Absolute mean differences between Year 5 girls' and boys' achievement in the purposes for reading and the processes of comprehension in 2005/2006, by ethnic grouping

Ethnic grouping	Overall reading	Purposes for reading		Processes of comprehension	
		Reading for literary experience	Reading for information	Retrieving and straightforward inferencing	Interpreting, integrating, and evaluating
Pākehā/European	23 (3.6)	23 (3.6)	22 (3.4)	22 (3.8)	23 (3.5)
Māori	30 (6.1)	29 (5.6)	30 (5.5)	27 (5.9)	31 (5.3)
Pasifika	15 (8.6)†	11 (8.6)†	19 (8.6)	14 (8.7)†	16 (8.0)
Asian	21 (7.8)	20 (8.0)	20 (7.3)	18 (7.2)	19 (7.2)
All New Zealand*	24 (3.1)	23 (3.1)	23 (2.9)	22 (3.1)	24 (2.8)

Notes

Interpretation: Pākehā/European girls scored an average of 23 scale points higher than their male counterparts on the *interpreting, integrating, and evaluating process*. Pasifika girls scored an average of 19 scale score points higher than their male counterparts on *informational reading*. Standard errors of the differences appear in parentheses.

† Not statistically significant.

* All Year 5 students, including students in Other ethnic groups.

Table B.8: Year 5 students' mean scores for *reading for literary purposes* in 2001 and 2005/2006, by gender and ethnic grouping

Year 5 student group	Mean scores for reading for literary purposes		Change from 2001 to 2005/2006
	2001	2005/2006	
Girls	546 (4.7)	539 (2.3)	-7 (5.2)
Boys	517 (4.6)	516 (2.9)	-1 (5.4)
Pākehā/European	555 (3.6)	549 (2.4)	-6 (4.3)
Māori	485 (6.1)	479 (3.5)	-6 (7.1)
Pasifika	482 (7.7)	472 (6.4)	-10 (10.0)
Asian	534 (9.8)	539 (5.5)	+5 (11.2)
All New Zealand*	531 (3.9)	527 (2.1)	-4 (4.4)

Notes

Standard errors appear in parentheses. Because results are rounded some figures may appear inconsistent.

None of the changes between 2001 and 2005/2006 were statistically significant.

Year 5 students' performance in 2005 was significantly better on *informational reading* than on *literary reading*. In 2001 Year 5 students' performance was significantly better on *literary reading* than on *informational reading*.

* All Year 5 students, including students in Other ethnic groups. The mean for Other ethnic groups in 2005 was 531 (8.8). The grouping was too small to report achievement in 2001.

Table B.9: Year 5 students' mean scores for *reading for informational purposes* in 2001 and 2005/2006, by gender and ethnic grouping

Year 5 student group	Mean scores for reading for informational purposes		Change from 2001 to 2005/2006
	2001	2005/2006	
Girls	536 (4.5)	545 (2.2)	+10 (5.0)
Boys	514 (4.4)	522 (3.0)	+8 (5.3)
Pākehā/European	548 (3.7)	552 (2.6)	+4 (4.5)
Māori	477 (5.4)	486 (3.7)	+9 (6.5)
Pasifika	485 (9.0)	487 (6.5)	+2 (11.1)
Asian	544 (9.3)	560 (5.0)	+16 (13.6)
All New Zealand*	525 (3.8)	534 (2.2)	+9 (4.4)

Notes

Standard errors appear in parentheses. Because results are rounded some figures may appear inconsistent.

None of the changes between 2001 and 2005/2006 were statistically significant.

Year 5 students' performance in 2005 was significantly better on *informational reading* than on *literary reading*. In 2001 Year 5 students' performance was significantly better on *literary reading* than on *informational reading*.

* All Year 5 students, including students in Other ethnic groups. The mean for Other ethnic groups in 2005 was 541 (10.4). The grouping was too small to report achievement in 2001.

Table B.10: Year 5 students' mean scores for the *retrieving and straightforward inferencing* processes in 2001 and 2005/2006, by gender and ethnic grouping

Year 5 student group	Mean scores for retrieving and straightforward inferencing		Change from 2001 to 2005/2006
	2001	2005/2006	
Girls	534 (5.0)	535 (2.4)	+1 (5.6)
Boys	510 (4.4)	513 (3.1)	+3 (5.3)
Pākehā/European	543 (4.1)	544 (2.7)	0 (4.9)
Māori	479 (5.9)	475 (3.6)	-4 (6.9)
Pasifika	472 (8.9)	470 (6.0)	-3 (10.7)
Asian	534 (12.7)	540 (5.1)	+6 (13.7)
All New Zealand*	522 (3.7)	524 (2.3)	+2 (4.3)

Notes

Standard errors appear in parentheses. Because results are rounded some figures may appear inconsistent.

The differences between 2001 and 2005/2006 were not statistically significant.

As was the case in 2001, Year 5 students' performance in 2005 was relatively better on *interpreting, integrating and evaluating processes* than on *retrieving and making straightforward inferences*.

* All Year 5 students, including students in Other ethnic groups. The mean for Other ethnic groups in 2005 was 531 (8.8). The grouping was too small to report achievement in 2001.

Table B.11: Year 5 students' mean achievement scores for *interpreting, integrating, and evaluating processes* in 2001 and 2005/2006, by gender and ethnic grouping

Year 5 student group	Mean scores for interpreting, integrating, and evaluating		Change from 2001 to 2005/2006
	2001	2005/2006	
Girls	550 (4.6)	550 (2.3)	0 (5.1)
Boys	521 (4.4)	526 (2.9)	+5 (5.3)
Pākehā/European	558 (3.9)	556 (2.7)	-2 (4.7)
Māori	487 (5.5)	493 (3.7)	+6 (7.3)
Pasifika	493 (8.3)	490 (6.1)	-3 (10.3)
Asian	545 (8.8)	559 (5.4)	+14 (10.3)
All New Zealand*	535 (3.8)	538 (2.2)	+3 (4.4)

Notes

Standard errors appear in parentheses. Because results are rounded some figures may appear inconsistent.

The differences between 2001 and 2005/2006 were not statistically significant.

As was the case in 2001, Year 5 students' performance in 2005 was relatively better on *interpreting, integrating, and evaluating* processes than on *retrieving and making straightforward inferences.*

* All Year 5 students, including students in Other ethnic groups. The mean for Other ethnic groups in 2005 was 544 (8.6). The grouping was too small to report achievement in 2001.

Table B.12: Mean reading literacy scores for Year 5 students who were assessed in English in 2005/06, by frequency with which they spoke English in the home

Year 5 ethnic grouping	Year 5 students always speak English in the home		Year 5 students sometimes/never speak English in the home		Difference in mean achievement (English spoken–English rarely spoken)
	Percentage of Year 5 students	Mean score	Percentage of Year 5 students	Mean score	
Pākehā/European	87 (0.7)	555 (2.3)	13 (0.7)	549 (5.3)	+6 (5.0)
Māori	67 (1.7)	498 (5.2)	33 (1.7)	494 (5.2)	+4 (7.2)
Pasifika	41 (8.6)	489 (8.6)	59 (2.8)	480 (5.6)	+9 (9.0)
Asian	25 (2.4)	557 (10.0)	75 (2.4)	549 (5.4)	+8 (9.9)
All New Zealand†	74 (1.0)	543 (2.1)	26 (1.0)	524 (3.0)	+19 (3.3) *

Notes

Standard errors appear in parentheses. Because results are rounded, some figures may appear inconsistent.

† All Year 5 students assessed in English.

* Difference between means statistically significant at the 5 percent level.

Table B.13: Year 5 students' reports of the number of books in the home in 2005/2006, by ethnic grouping

Ethnic grouping	Percentage of Year 5 students			
	0–10 (none or few)	11–25 (about 1 shelf)	26–100 (about 1 bookcase)	More than 100 (2 or more bookcases)
Pākehā/European	5 (0.4)	11 (0.7)	33 (1.1)	51 (1.3)
Māori	15 (1.1)	22 (1.5)	31 (1.6)	31 (1.7)
Pasifika	25 (2.6)	26 (2.3)	27 (2.6)	22 (2.6)
Asian	15 (2.1)	25 (2.1)	30 (2.2)	30 (2.6)

Note

Also see Figure B.2 for an illustration of the relationship with reading achievement.

Table B.14: Mean reading literacy scores for Year 5 students in 2001, by school decile band*

School decile band	Percentage of Year 5 students	Mean reading literacy score
Low: 1–3	32 (1.9)	483 (4.7)
Medium: 4–7	35 (1.9)	537 (6.0)
High: 8–10	31 (1.7)	564 (5.5)
Independent schools	2 (0.2)	~ ~
All New Zealand		529 (3.6)

Notes

Standard errors appear in parentheses.

Tilde (~): insufficient data to report achievement for the 2 percent of students attending independent schools.

* State and state-integrated schools only. The information for high decile schools differs slightly from that reported by Caygill and Chamberlain (2004). For this table, the data for the very small sample of independent schools which had deciles assigned to them were omitted from the calculations.

Table B.15: Standard deviations and percentiles for Year 5 students in 2001 and 2005/2006, by school decile band*

School decile band	Year of PIRLS assessment	Standard deviation	Percentiles				
			5th	25th	50th	75th	95th
Low: 1–3	2001	91 (3.1)	*324 (11.5)*	419 (7.2)	490 (5.4)	548 (5.3)	624 (6.5)
	2005/2006	89 (2.0)	332 (7.3)	425 (6.7)	490 (5.1)	547 (5.4)	*624 (12.7)*
Medium: 4–7	2001	88 (3.4)	*380 (16.9)*	483 (6.6)	545 (8.3)	597 (8.2)	*670 (13.7)*
	2005/2006	81 (2.0)	400 (5.2)	486 (4.1)	542 (3.3)	592 (4.2)	666 (6.4)
High: 8–10	2001	81 (3.4)	414 (7.4)	518 (6.4)	569 (4.9)	618 (4.6)	*688 (11.2)*
	2005/2006	75 (1.9)	425 (7.7)	515 (3.4)	565 (3.6)	611 (2.0)	675 (2.9)
All New Zealand†	2001	93 (1.9)	360 (4.7)	472 (5.9)	537 (3.6)	593 (4.5)	668 (5.1)
	2005/2006	87 (1.3)	374 (3.0)	478 (2.5)	539 (2.2)	592 (2.1)	664 (4.0)

Notes

Standard errors appear in parentheses. Due to the large variability, as indicated by the standard errors, the percentiles in italics should be noted with caution.

* State and state-integrated schools only.

† Includes students in independent schools.

Table B.16: Percentage of Year 5 students reaching PIRLS international reading benchmarks in 2001, by school decile band*

School decile band	Percentage of Year 5 students reaching PIRLS international benchmark			
	Advanced (625)	High (550)	Intermediate (475)	Low (400)
Low: 1–3	5 (1.2)	25 (2.1)	56 (2.2)	80 (2.4)
Medium: 4–7	15 (2.2)	48 (2.8)	77 (2.4)	93 (1.3)
High: 8–10	22 (2.0)	60 (2.9)	87 (1.9)	96 (1.0)
All New Zealand†	14 (1.2)	45 (1.6)	74 (1.4)	90 (1.0)

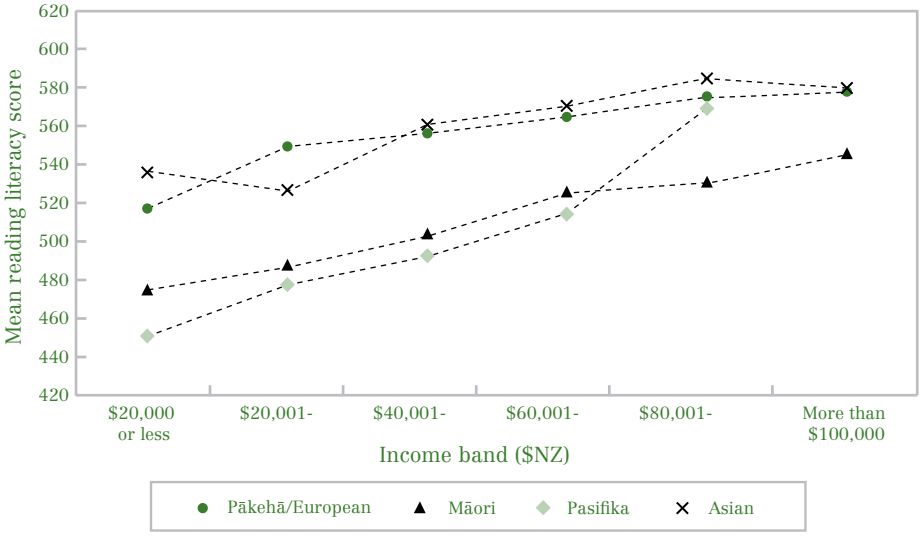
Notes

Standard errors appear in parentheses.

* State and state-integrated schools only.

† Includes students in independent schools

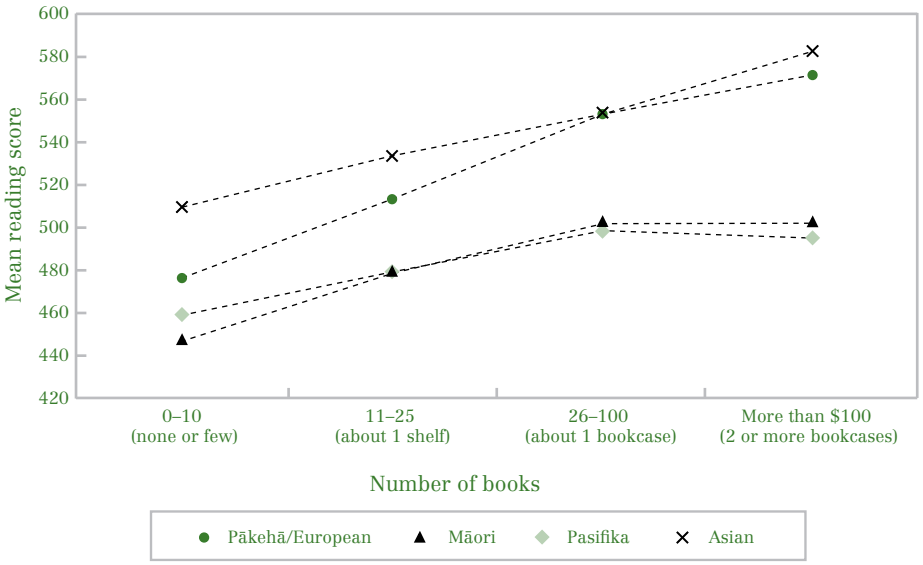
Figure B.1: Relationship between Year 5 students' reading literacy achievement and parents' reports of household income in 2005/2006, by ethnic grouping



Note

The cell size for Pasifika students was too small in the category 'more than $100,000' to include their reading achievement.

Figure B.2: Relationship between Year 5 students' reports on the number of books in the home and their reading literacy achievement, by ethnic grouping



APPENDIX C: SAMPLE PASSAGE AND QUESTIONS

'SEARCHING FOR FOOD'

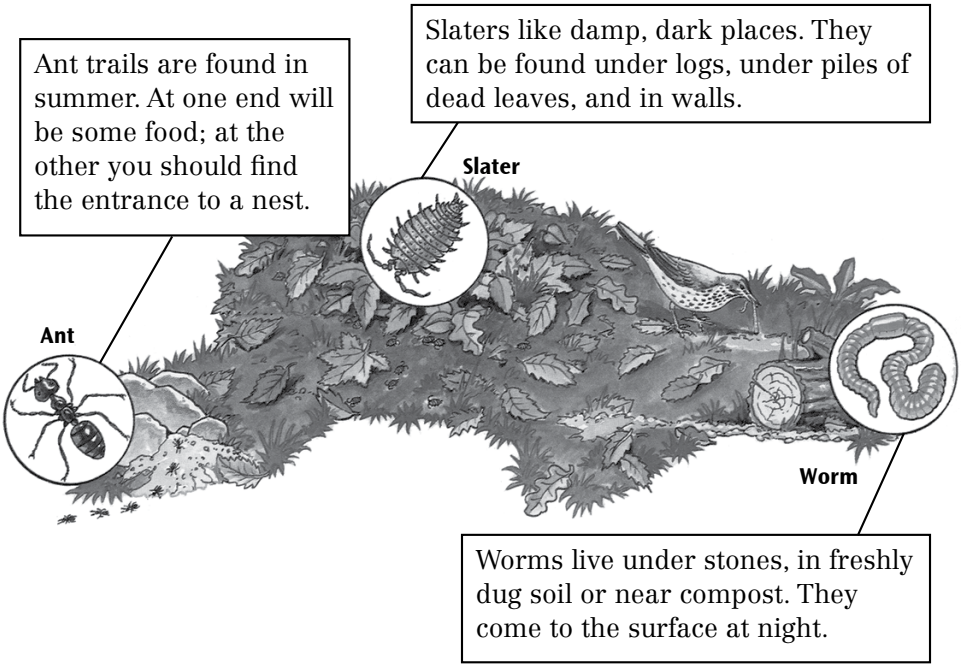
The passage *Searching for Food* is an example of one of five informational texts use in PIRLS-05/06 (© IEA, Amsterdam). Each question is presented along with details of the key comprehension process assessed and the percentage of Year 5 students who answered correctly. The graphics in the assessment were presented in colour.

Searching for Food

Here are three projects about the things small creatures eat and the ways they search for food. First you need to find actual ants, slaters, and worms. Treat them carefully and make sure you put them back where you found them after you have finished studying them.

- Follow an Ant Trail
- Study of Slaters
- Make a Wormery

Where to find ants, slaters, and worms



Follow an Ant Trail

Ants live together in nests. When an ant finds some food it makes a trail for others to follow. To do this experiment you will need to find an ants' nest. You will also need the following materials: a sheet of paper, a small piece of apple, a handful of soil.

1. Put the piece of apple on the sheet of paper and lay the paper close to an ants' nest. Wait for some ants to find the apple. They should all follow the same trail.
2. Move the apple. Do the ants go straight to it?
3. Now sprinkle soil on the paper to cover the trail. The ants should scurry around for a while. Do they make a new trail?

What happens?

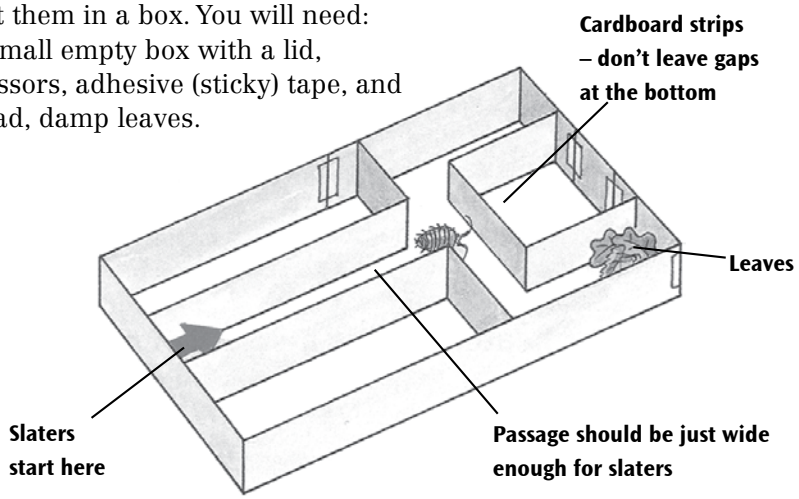
Even after the food has moved, the ants still follow the old trail until a new one is laid.

Why?

Once an ant has found some food, it produces special chemicals that leave a scent trail. Other ants from the nest use their antennae, or feelers, to sense this scent.

Study of Slaters

Slaters have sensitive antennae. Make this box, then collect six slaters in a container. Watch how they find their way when you put them in a box. You will need: a small empty box with a lid, scissors, adhesive (sticky) tape, and dead, damp leaves.



1. Use the lid to make three long strips for making the passages in the picture.

2. Let your slaters walk along the passage one at a time. When they reach the end of the passage, some will turn left and some will turn right.

3. Put damp leaves in the right hand side of the box. Now let the slaters walk through the box again. Which way do they go?

What happens?

The slaters will turn to the right towards the food.

Why?

The slaters can sense the food with their antennae. They use them to find the leaves.

Make a Wormery

Worms are hard to study because they don't like the light. As soon as they sense it, they wriggle away, trying to find a dark place again. To see how worms live and feed, make a wormery like the one shown here. Then find two or three worms to put in it. It is important to remember not to pull on the worms or you may hurt them. They are covered with bristles that grip the soil tightly.

You will need

- **Shoe box**
- **Adhesive (sticky) tape**
- **Pen**
- **Scissors**
- **Large plastic bottle**
- **1 mug of sand**
- **3 mugs of damp, crumbly soil**
- **Small cubes of onion and potato**

1. Tape one side of the shoe box lid to the box, so it opens like a door. Poke holes in the top of the box with the pen to let air and light into the wormery.

2. Cut the top off the bottle. Then fill it with loosely packed layers of soil and sand. Scatter potato and onion on the surface.

3. Gently drop in your worms, then stand the bottle in the box and close the door. Leave it outside in a cool, dry place for four days.

4. After four days, go back and look at the bottle. What is different about the sand and soil?

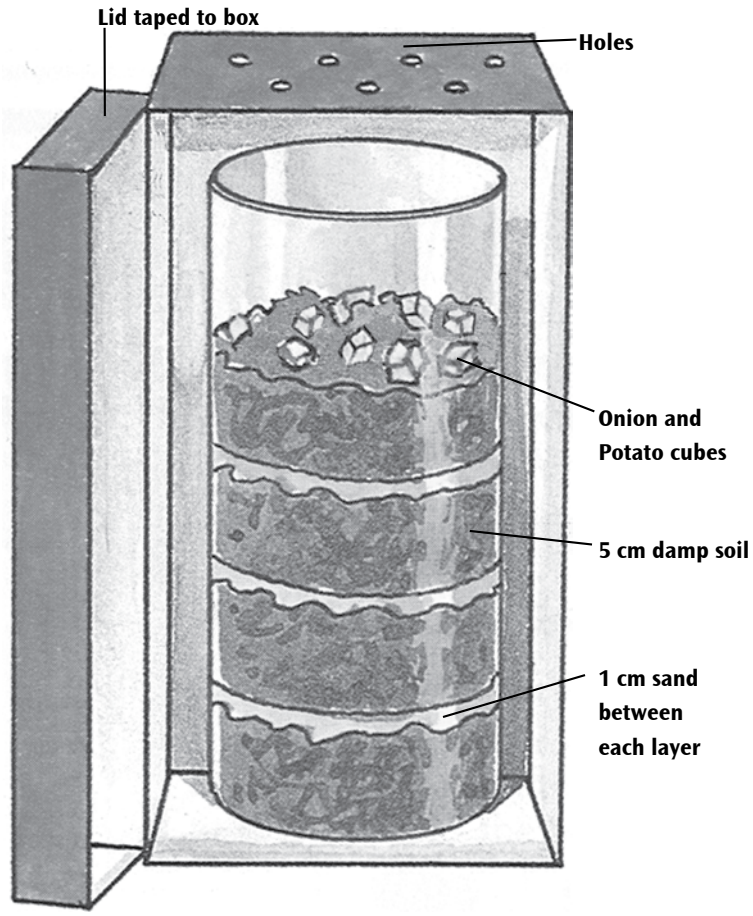
Don't forget: when you've finished with this project, put the worms back where you found them.

What happens?

After four days, the layers of sand and soil will have been mixed together.

Why?

The worms mix the sand and soil coming to the surface to eat the food and then tunnelling underground to get away from the light.



From *Animal watching* in the *Usborne Big Book of Experiments* published in 1996 by Usborne Publishing Ltd., London. An effort has been made to obtain copyright permission.

Questions: Searching for Food

1. What is the main purpose of the article?

   A to describe different projects you can do
   B to give information about ant trails
   C to show what small creatures look like
   D to explain what worms eat

Percentage correct	
NZ	International average
71	57
Examine and evaluate content, language and text features	

2. What is one thing you should do to take care of the creatures?

   A search for them under rocks and stones
   B find out all about them
   C collect as many as you can
   D put them back where you found them

Percentage correct	
NZ	International average
81	66
Focus and retrieve explicitly stated information	

Questions 3 to 5 are about the Ant Project

3. Why do you put the apple by the ants' nest?

(A) to block the ants' trail

(B) so the ants will make a trail

(C) to confuse the ants

(D) so the ants will scurry around

Percentage correct	
NZ	International average
84	73
Make straightforward inferences	

4. Once an ant finds some food, how do the other ants from the nest find it too?

(A) They watch the first ant and follow it.

(B) They run around until they find the food.

(C) They sense the scent left by the first ant.

(D) They smell the food on the piece of paper.

Percentage correct	
NZ	International average
64	60
Focus and retrieve explicitly stated information	

5. Why do the ants scurry around after you've sprinkled the soil?

(1) The ant's is trying to make a new trail.

Percentage correct	
NZ	International average
53	53
Interpret and integrate ideas and information	

Questions 6 to 9 are about the Slaters Project

6. How do slaters find the food?

A They walk down the passage.

B They sense food with their antennae.

C They follow the scent trail.

D They see the food in the dark.

Percentage correct	
NZ	International average
83	78
Focus and retrieve explicitly stated information	

7. Look at the picture for the Study of Slaters. How does the picture help you to know what to do in the experiment?

2 It helps me because I know what my exsperament is suposst to look like when its complete. It also helps me because if the picture wasn't there I wouldn't know if i'm saposst to bend the cardboard to the left or the right.

Percentage correct		
Score points	NZ	International average
1 mark	10	11
2 marks	40	21
Examine and evaluate content, language and text features		

8. Why do you need to let your slaters walk along the passage before putting the leaves in the box?

A To see if they can learn the maze.

B To see what they do when there is no food.

C To see if the box is put together correctly.

D To see which ones turn which way.

Data not available. Item dropped from final analysis

9. In Step 3 of the slaters project, what do you think will happen if you move the damp leaves to the left corner of the box?

1 They will go over to the right then the left.

Percentage correct	
NZ	International average
57	55
Interpret and integrate ideas and information	

10. What is similar in the way ants and slaters find their food?

1 They have both got antennae to smell the food.

Percentage correct	
NZ	International average
65	51
Interpret and integrate ideas and information	

Questions 11 to 13 are about the Wormery Project

11. Number the steps in the order you would follow to make a wormery. The first one has been done for you.

Percentage correct	
NZ	International average
36	29
Make straightforward inferences	

5 put the bottle in the shoebox

1 poke holes in the top of the shoebox

4 drop in the worms

3 add potato and onion

2 fill the bottle with soil and sand

12. Explain why it is important to put layers of soil and sand in the bottle

Percentage correct	
NZ	International average
24	26
Interpret and integrate ideas and information	

1 It's important to put sand and soil in the wormery because the worms would need a place to get away from the light and because you get to see how the sand and soil mix up.

13. Explain why putting the onion and potato on the surface of the soil is important to the wormery project.

2 So they will burrow up to the food and down to avoid the light to mix the sand and soil.

Percentage correct	
NZ	International average
65	51
Interpret and integrate ideas and information	

Score points collapsed into 1 mark item during analysis phase.

14. Each project has What happens and Why in a separate box. What is the purpose of these boxes?

A to explain the steps of the project

B to explain what you need for the project

C to explain what to do when you have finished

D to explain what you have seen

Percentage correct	
NZ	International average
49	43
Examine and evaluate content, language and text features	

15. Which of the three projects did you find the most interesting? Use information from the text to explain your answer.

2 I found the wormery because you can see what happens underground.

Percentage correct		
Score points	NZ	International average
1 mark	7	13
2 marks	42	30
Examine and evaluate content, language and text features		

APPENDIX D: COUNTRIES SHOWING IMPROVEMENTS FROM 2001 TO 2005/2006

Eight countries recorded significant increases in their students' mean reading literacy achievement, and the average performance of students in three of these countries – the Russian Federation, Hong Kong SAR, and Singapore – had been about the same as New Zealand in 2001. These three countries recorded the largest increases between the two cycles. Slovenia also recorded a relatively large increase in mean achievement.

Because of the sizeable shifts in achievement for these four countries, it is worth examining the context (structural and curricular) in which the changes occurred. The detail for this is described in both the *PIRLS 2001* and *PIRLS 2006 encyclopedias*. However, the information in Box D.1 encapsulates some of the details of the changes for these systems.

Box D.1: Context for changes in achievement in four countries in PIRLS-05/06

Russian Federation	Hong Kong SAR	Singapore	Slovenia
Structural: Primary education increased from 3 years to 4 years, with children to start at 6 years (rather than at age 7). In practice, children are still starting at 7. In 2001 about half of the Russian PIRLS cohort was still in the 3-year school system; by 2006 it had been completed. Average age increased over the cycle from 10.3 to 10.8 years. *Curriculum:* Since 1998 there has been a major shift to 'literary reading' as part of philology (reading and writing in Russian). Compulsory content for the course includes techniques of reading; exposure to the world of books, including classic, modern, and foreign children's books, etc; and different genres of reading. This has been accompanied by increased usage of informational-type texts in other curriculum areas such as history and mathematics.	*Curriculum:* Reforms in 2000 established clear reading goals for schools, including extensive work to promote children's reading comprehension skills in both Chinese and English. Schools were given the authority to adjust their curriculum and schedule to meet the literary needs of students. Teachers were encouraged to extend the range of teaching materials used in lessons. Another initiative was 'Reading Mothers', who were trained to work in schools to help students when reading stories. PIRLS-01 results raised further concerns about whether or not Hong Kong was meeting the literacy needs of its students. Special workshops were held for primary and pre-school teachers and parents about reading.	*Curriculum:* A new syllabus was being implemented in 2001, when PIRLS was first administered, with implementation completed up to Grade 3. A wider range of instructional materials was used than previously. Learning outcomes were specified at 2-year intervals for English-language learning (including reading). This has given teachers more explicit information about the teaching of language at different schooling levels. The syllabus is under review again, with a focus on teaching approaches for diverse students and assessment practices.	*Structural:* Primary education increased from 8 years to 9 years, with children now starting at 6 years (rather than at age 7). This change has been implemented gradually since 1999. In 2001 children in their 3rd year of schooling were tested in PIRLS. By 2006 about half had 4 years of schooling, so the average age is still about the same. The main purpose for changing the number of years in school was to improve literacy.

Note: Russian Federation students were assessed in Russian, Hong Kong SAR students in Modern Standard Chinese, Singaporean students in English, and Slovenian students in Slovenian.

Source: *PIRLS 2001 encyclopedia* (Mullis, Martin, Kennedy, & Flaherty, 2002) and PIRLS 2006 encyclopedia (Kennedy, et al., 2007).

TECHNICAL NOTES AND REFERENCES

Technical Notes

These technical notes provide a very brief outline of some of the key methodology used in PIRLS-05/06. For more detailed information readers are advised to go to the *PIRLS 2006 technical report* edited by Martin, Mullis, and Kennedy (2007) and available on the PIRLS web site (www.pirls.org). The PIRLS 2006 User Guide that is included with the international database also provides a comprehensive overview of the technical aspects of the study. (See Foy & Kennedy, 2008 for details.)

TN1 Weighting

The sampling design required schools to be sampled with probability proportional to size (PPS), and for classrooms to be sampled with equal probabilities. In addition, many countries, including New Zealand, used stratification to improve the precision of their sampling. Weighting was applied to all countries' data to ensure proper survey estimates and to adjust for the fact that the sampling design resulted in differential probabilities of selection for each student within the population. The weighting took into account school-, class-, and student-level information so that the overall sampling weight was a product of the school, class, and student weights.

TN2 Scaling

PIRLS makes use of a multiple-matrix sampling whereby students answer subsets of items from a larger pool of test items. Psychometric scaling techniques based on Item Response Theory (IRT) enable population estimates to be generated even though students do not respond to all the same achievement items.

Three Item Response Theory models are used, corresponding to the three types of assessment questions. For multiple-choice questions a three-parameter logistic model is used, which characterises the item in terms of difficulty, discrimination, and the possibility of guessing. For dichotomous open-response questions, a two-parameter logistic model is used (the possibility of guessing is discounted). For polytomous questions (extended response items with 0, 1, 2, and 3 as possible scores), a generalised partial-credit model was used, which factors in the different scores available to respondents.

The Item Response Theory scaling applied in PIRLS-05/06 uses the plausible value methodology to produce estimates of student proficiency in reading.

TN3 Summary statistics

The IRT scaling procedures generate five imputed scores or plausible values for each student. The differences between the five values, which tend to be very small, reflect the degree of uncertainty in the imputation process. To obtain the best estimate of a statistic, the computation is carried out on each of the five plausible values, and the results are then averaged. The national mean for a country, for example, was calculated as the mean of the weighted means of the plausible values. The international achievement means reported for a background index were calculated by first computing the national mean for each plausible value for each country and then calculating the mean across the countries. The five estimates resulting from this were then averaged to derive the international means presented in this report and in the international PIRLS.

TN4 Standard errors

The standard error is a measure of variability due to sampling when estimating a statistic. It provides a measure for determining the discrepancy between, for example, a sample mean and the true population mean. Ninety-five percent of sample means will lie within approximately plus or minus two (or more accurately 1.96) standard errors of the population mean. The standard error is used for determining confidence intervals.

For example, in 2005/2006 the Year 5 student mean for reading was 532 and the standard error of this statistic was 2.0. Therefore, we can say with 95 percent confidence, that the true mean was between 528 and 536 (i.e., 532 $\pm$ 2 x 2.0).

Because of the complexity of the design of PIRLS (a complex survey design for the school sampling and a multiple-matrix design for questionnaire allocation), the calculation of standard errors is not as straightforward as it is for a study that uses simple random sampling and one assessment tool. The standard errors included in this report, which usually appear in brackets after the statistic, incorporate both the sampling variance (the uncertainty due to generalising from the sample to the population) and the imputation variance (the uncertainty due to inferring each student's proficiency from their performance on a subset of the items).

The Jackknife Repeated Replication (JRR) technique is used to estimate the sampling variance. This technique constructs a number of pseudo-replicates of the sample and compares each of the pseudo-replicated samples with that of the original sample. As noted, each student's proficiency is estimated by calculating five plausible values. The variability among these plausible values is used as a measure of the imputation variance. Custom-written SAS programs were used to compute the standard error, incorporating each of the variance components for each statistic.

Significance tests-comparisons of means

In this report all the comparisons that have been made were tested for statistical significance using the ***t*** statistic, with the alpha (α) level set at 0.05. The alpha level refers to the probability that a difference exists when in actuality it does not; the probability of making an incorrect inference is 5 percent.

To compare the means of two groups of students that have not been sampled independently of each other (e.g., the means for Year 5 boys and girls), the formula to generate the test statistics computed in this report was:

(1) $$t = \frac{\bar{X}_1 - \bar{X}_2}{se_{diff}}$$

where se_{diff} is computed by combining the JRR and imputation variances. This involves computing the average difference between the two correlated samples (e.g., girls and boys in the same classes/schools) once for each of 75 replicate samples (error due to sampling) and five more times for each of the plausible values (imputation error). Custom-written SAS programs were used to compute the standard error of the mean difference between the two groups. The resulting value, ***t***, is compared to the critical value of 1.96, this being the critical value for a two-tailed test at the alpha 0.05 level of significance (95 percent confidence).

If the means for two groups that were sampled independently are being compared (e.g., boys' achievement across two assessments), then the standard error of the difference is calculated as the square root of the sum of the squared standard errors of each mean:

(2) $$se_{diff} = \sqrt{se_1^2 + se_2^2}$$

Note that in all calculations, unrounded figures are used in these tests, which may account for some results appearing to be inconsistent.

TN5 Multiple comparisons of means

When making a comparison between two means, the value of *t* must be at least equal to the critical value 1.96 for $\alpha \leq 0.05$ (two-tailed). However, in cases where there are more than two means being compared (e.g., comparisons among the four ethnic groups), there are more sources of measurement error to be considered. The Dunn-Bonferoni procedure has been used in these instances. Essentially, this procedure raises the critical value that *t* must reach before the (multiple) comparisons can be considered statistically significantly different at the 5 percent level.

Although the Dunn-Bonferroni procedure guards against misinterpreting the outcome of making multiple, simultaneous significance tests, the results can vary depending on the number of groups included in the adjustment. As a rule, the Dun-Bonferroni procedure has been applied when testing multiple groups *within* a given assessment cycle (e.g., comparisons among the ethnic groupings in 2001). However, when comparing across cycles and for groups separately (e.g., Māori achievement from 2001 to 2005/2006), no adjustments have been made. Nor has this adjustment been made when considering gender comparisons within a group in a given assessment (e.g., comparing Pasifika boys' and girls' mean achievement in 2005/2006).

TN6 Effect sizes

Since statistical significance tests can partly be influenced by the sample sizes, a way of adding meaning to a difference which has been found to be *statistically significant* is to have an understanding of the *magnitude* of the difference. One way to do this is through the use of effect sizes. There are various ways of calculating and using effect sizes (see Rosenthal, 1994). In keeping with the reporting of effect sizes in the New Zealand TIMSS national reports, the following approach was used in PIRLS.

Firstly, the within pooled standard deviation (s_w) of the two groups being compared is calculated for each of the five imputed scale scores using:

$$s_w = \sqrt{\frac{\sum W_1 s_1^2 + \sum W_2 s_2^2}{\sum W_1 + \sum W_2}}$$

where:

Wi is the sample weight of group *i*

s_i is the standard deviation of the scale score of group *i*.

Then the effect size between the two groups, Cohen's *d*, is calculated for each of the five imputed scale scores using:

$$d = \frac{\bar{X}_1 - \bar{X}_2}{s_w}$$

where:

$\bar{X}_i$ is the mean imputed scale score of group *i*.

The final effect size figure reported in this report is the *mean* effect size of the five imputed scale scores.

Interpreting the effect size

When interpreting an effect size between two groups, technically an effect size of 1.0 indicates a relative advantage of one standard deviation on the utilised measure. In other words, the mean of one group will be a whole standard deviation higher than the mean of the other.

TN7 Missing data and minimum group size for reporting achievement data

For tables in this report, particularly those containing context data, unless a non-response option is reported in the table, data are adjusted so that students with missing values are excluded. In general, around one to three to five percent of students had missing values for each question. For questions where the proportion of students with missing values exceeded three percent the proportion is noted.

Internationally, PIRLS does not report mean achievement scores for groups that represent less than 2.5 percent (rounded) of the population. However, in this report, if the proportion of New Zealand students was estimated to be 2 percent (rounded), as long as there were at least 50 students (from 10 schools) in the 'cell' to estimate the proportion, achievement results are reported.

TN8 Odds and odds ratios

Odds, like probability, are a measurement of chance. The relationship between the two is that the odds of an event occurring is the ratio of the probability of the event occurring to the probability of the event not occurring. That is, if we use ***o*** to denote the odds of an event occurring and ***p*** the probability, then:

$$o = \frac{p}{1-p}$$

However, odds are better described using a simple example. Suppose a jar contains eight marbles, only six of which are black. The *probability* of selecting a black marble is the ratio of the number of black marbles to the total number of marbles.

That is, $\frac{6}{8} = \frac{3}{4}$

Therefore, the *odds* of selecting a black marble is the ratio of the number of black balls to the number of balls that are *not* black. That is, $\frac{6}{2}$, or commonly notated as 3:1.

The odds ratio *(OR)* is defined as the ratio of the odds of an event for one group (usually the group of interest) occurring to the odds of an event occurring in another group.

In the case of lower achievers discussed in this report, the *odds* of students with particular attributes scoring less than 475 (or lower achievers) were calculated and then compared with the odds of students without the characteristic.

The *OR* was defined as:

[Independent variable] have X times the odds to be in the lower-achievers group as non- [independent variable].
'X' is the odds ratio

$$X = \frac{\textit{odds} \text{ of [independent variable]}}{\textit{odds} \text{ of non-[independent variable]}}$$

TN9 Confidentiality

PIRLS is designed to describe the results or to make inferences about the (estimated) population or sub-groups of Year 5 students, and the types and locations of schools they attended. It is not designed to report on the achievement or attributes of any individuals. Because of the cluster design (selecting a class or classes), this also holds for reporting at the school level. The researchers who are responsible for PIRLS here in New Zealand and internationally treat *all* information collected from students, parents, teachers, and schools during the course of the study confidentially. As a result, no individuals or schools are identified when reporting the results of the study.

This was the statement that was included as a note on the questionnaires respondents answered:

"All information collected in this study will be treated confidentially. At no time will you, other individuals, or your school be identified when reporting the results from this study."

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