MINISTRY OF EDUCATION
Te Tāhuhu o te Mātauranga

PIRLS 2010/11 in New Zealand:

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

PIRLS 2010/11

Megan Chamberlain

New Zealand Government

Acknowledgements

The work for the IEA's third cycle of the Progress in International Reading Literacy Study – PIRLS – started in early 2008 with the development phase, the implementation during late 2010, and ended with the first phase of international reporting in December 2012. This cycle of PIRLS coincided with the implementation of TIMSS – the Trends in International Mathematics and Science Study, both nationally and internationally. PIRLS and TIMSS are collaborative projects, involving many people from a number of countries. In particular, I would like to acknowledge the TIMSS & PIRLS International Study Centre at Boston College in the United States; the IEA's Secretariat in the Netherlands and its Data Processing Centre in Germany; and staff from Statistics Canada, who had the challenging role of managing the international activities for the two studies.

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Executive Summary

During late 2010 and early 2011, New Zealand and 47 other countries took part in the IEA's[1] Progress in International Reading Literacy Study (PIRLS) or PIRLS-2010/11.[2] PIRLS is an international research study designed to measure trends in reading literacy achievement of middle-primary school students every five years. This was the third cycle, with the first study conducted in 2001 and the second, during 2005 and 2006.

PIRLS-2010/11 involved approximately 5,600 New Zealand Year 5 students from 192 schools, their teachers, and parents/caregivers. An overview of the key results pertaining to New Zealand was presented in a summary report that was released to coincide with the announcement of the international results by the IEA and Boston College in December 2012.[3]

The focus of the following report is to describe Year 5 student achievement in both a national and international context and to describe any changes that may have occurred since 2001.

Year 5 reading achievement in an international context

- The mean reading score for New Zealand Year 5 students (531) was significantly higher than the international *PIRLS Scale Centrepoint* (500);[4] 32 countries, including New Zealand, were significantly higher than the *PIRLS Scale Centrepoint*.[5]
- The New Zealand mean was statistically similar to the mean scores of seven countries, including Australia and four other OECD countries—Slovak Republic, Slovenia, Austria, and Poland.
- It was significantly lower than the means for 20 countries or education systems, including 14 OECD countries. Five of these jurisdictions with achievement higher than New Zealand assessed in English: Northern Ireland, United States, Ireland, England, and Canada.
- The New Zealand mean was significantly higher than the means for 17 countries, including France, Norway, and Spain, and higher than two countries that tested in English—Trinidad and Tobago and Malta.
- There was no significant change in the mean achievement of New Zealand Year 5 students from 2001 to 2010/11.
- Compared to many other countries, among New Zealand Year 5 students, there was a relatively large group who demonstrated that they were good readers. This was highlighted in two ways:

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

2 Internationally, this cycle is referred to as *PIRLS 2011*. In this report it is referred to as PIRLS-2010/11 to acknowledge the timing of the study which was administered in Southern Hemisphere countries in late 2010 and in Northern Hemisphere countries in early 2011.

3 *Key findings from New Zealand's participation in the Progress in International Reading Literacy Study (PIRLS) and Trends in International Mathematics and Science Study (TIMSS) in 2010/11* (Chamberlain & Caygill, 2012).

4 The PIRLS achievement scale uses the same point of reference (500) from assessment to assessment (refer to page 23 or the Technical Notes for details).

5 The use of 'significant' hereafter is to be understood in terms of statistical significance at 5% level. See Technical Notes at the end of this report.

  - the value of the 75th percentile (592) this being the point where 25 percent of Year 5 students achieved a higher score; and
  - Year 5 students who achieved a score at or above the PIRLS *High International Benchmark* (45% of students including 14% who reached the PIRLS *Advanced International Benchmark*).

- Relative to higher-performing countries there was however a notable-sized group of New Zealand Year 5 students who showed that they were somewhat weaker readers. This was highlighted in two ways:
  - the value of the 25th percentile (474) this being the point where 25 percent of Year 5 students achieved a lower score; and
  - Year 5 students who did not reach the PIRLS *Intermediate International Benchmark* (25% of students including 8% who did not reach the PIRLS *Low International Benchmark*).

- New Zealand's Year 5 girls (541) and Year 5 boys (521) achieved relatively well internationally.
  - There was no significant change in either Year 5 girls' or Year 5 boys' mean reading achievement from 2001 to 2010/11.
  - As observed in previous cycles of PIRLS, New Zealand had one of the largest differences between girls' and boys' mean reading scores, favouring girls, internationally.

Year 5 reading achievement in a national context

- Pākehā/European (558) and Asian (542) students scored, on average, at a significantly higher level than Māori (488) and Pasifika (473) students.
  - There was no significant change in the mean reading achievement of Year 5 students in any of the main four ethnic groupings from 2001 to 2010/2011.

- The group of lower-achieving students—defined as the group of students who did not reach the PIRLS *Intermediate International Benchmark*—was over-represented by Pasifika students, Māori students (boys more so than girls), and to a lesser extent, Year 5 boys.
  - The likelihood of Māori boys being in the lower-achievers group decreased a little from 2005/06 to 2010/11, but increased for both Pasifika boys and girls.

- The magnitude (size) of the difference between Year 5 girls and boys decreased slightly from 2001 to 2010/11, largely due to small (albeit non significant) increases in the mean achievement of both Māori and Pākehā/European boys.

- New Zealand Year 5 students were found to have a significant strength in literary reading compared to their overall reading performance; reading informational texts was neither a weakness nor strength.

  - There were no significant changes in New Zealand Year 5 students' achievement in either reading purpose from 2001 to 2010/11; the changes that were observed reflect a shift from 2005/06.
  - Pākehā/European students' mean score in literary reading increased significantly from 2005/06 to 2010/11, returning to about the same as in 2001.
  - Asian students recorded a significant decrease in their informational reading from 2005/06 to 2010/11.
  - Informational reading was a significant weakness for Year 5 girls compared to their overall reading achievement. Furthermore, Year 5 girls' mean score in informational reading decreased significantly from 2005/06 to 2010/11.
- As was the case in 2001 and 2005/06, New Zealand Year 5 students showed significantly stronger performance when required to use their reasoning skills (interpreting, integrating, and evaluating) but significantly weaker performance using their text-based skills (retrieving information and making straightforward inferences).

Year 5 students' home context

- 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 Year 5 boys than it was for Year 5 girls.
- New Zealand's Year 5 students who regularly spoke the language of the PIRLS assessment generally had higher reading literacy achievement (543) than Year 5 students who sometimes or rarely did (499).
  - The difference between the means for Year 5 students (43) in the two home language categories was larger in New Zealand than their counterparts in other countries, such as Australia (18) and Ireland (25), but similar to the United States (40).
  - The difference for New Zealand increased markedly from 2005/06 (24) to 2010/11 (43).
  - Looking specifically at Year 5 students assessed in English (the vast majority of students in PIRLS), the increase was more marked for Pasifika students than students in other ethnic groupings.
  - The *odds* of a Year 5 student who did not speak the test language at home being in the lower-achievers group in 2010/11 increased from 2005/06 to 2010/11.

Schools and school climate for learning

- New Zealand's Year 5 students' reading achievement tended to be lower in schools where proportionately few of the student body had the early/pre-requisite literacy skills at school entry than in schools where more of the student body had these skills.
  - The student intake of lower decile schools, particularly deciles 1 and 2 schools, was less likely to have early literacy skills when beginning primary than higher decile schools, particularly deciles 9 and 10 schools.

- The achievement difference in reading for students in New Zealand primary schools according to their economic composition—the mix of students from economically affluent backgrounds and those from economically disadvantaged backgrounds—was very high compared to many other countries.[6]

- New Zealand's deciles 1 and 2 schools and to a lesser extent deciles 3 and 4 schools had the greatest concentration of students from economically disadvantaged backgrounds, while decile 9 and 10 schools had the greatest concentration of students from economically affluent backgrounds.

- Although there were high-performing and low-performing students across all deciles, students in deciles 1 and 2 and to a lesser extent decile 3 and 4 schools tended to have the weakest performance.

    - About 50 percent of Year 5 students in deciles 1 and 2 schools reached the PIRLS *Intermediate International Benchmark* compared with 90 percent of their counterparts in deciles 9 and 10 schools.

    - Ten percent of New Zealand's Year 5 students were lower-achieving students in deciles 1 and 2 schools; six percent were attending deciles 3 and 4 schools.

- When students' reading achievement was examined according to school decile, there was no significant change from 2001 to 2010/11.

School climate

- Compared with other countries, New Zealand Year 5 students were more likely to be attending schools where both their principals and teachers endorsed aspects of 'academic optimism'; they shared a common view of academic success through their understanding of the school's curricular goals, implementation of the school's curriculum, and expectations for student achievement.

- New Zealand 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.

- Consistent with reporting in 2001 and 2005/06, New Zealand Year 5 students were more likely to have experienced bullying behaviours than many of their international counterparts.

    - Students in lower decile schools were more likely to report they experienced the negative behaviours than students in higher decile schools.

- Despite experiencing negative behaviours, New Zealand Year 5 students reported positively that they liked school.

    - Students in deciles 1 and 2 schools tended to be the most positive and those in deciles 7 and 8 schools the least positive.

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[6] A comparison of students in schools with *more than* 25% of the student body from economically *affluent* homes and 25% or fewer from disadvantaged homes with schools with *more than 25%* of students coming from *economically disadvantaged* homes and 25% or fewer coming from economically affluent homes and "schools with neither more affluent nor more disadvantaged students".

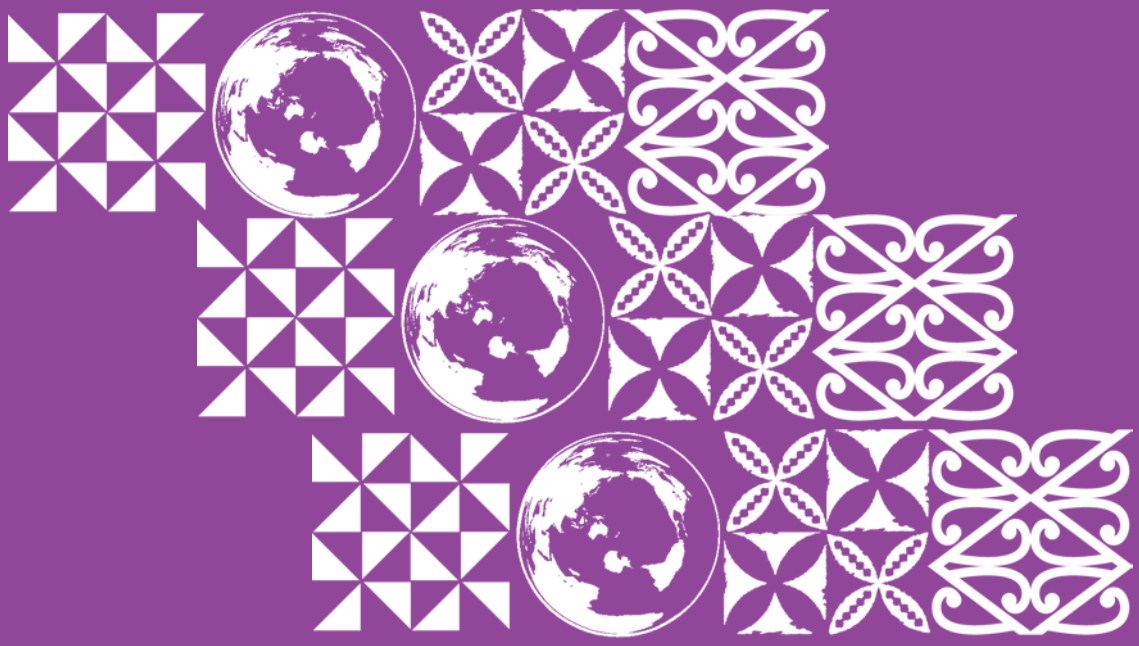
- The 2010/11 Year 5 student cohort tended to be more positive than either their 2001 or 2005/06 counterparts; this was largely due to more positive endorsements by Year 5 boys, particular Pākehā/European boys.

The classroom context for learning

- New Zealand spent the fourth highest number of hours, on average (actual and as a proportion of total instructional hours), teaching reading, both formally and informally, during the school year.
  - This amount of time is consistent with the situation in New Zealand schools in 2001 and 2005/06.
- While teachers tend to use a variety of approaches for organising their reading instruction, in New Zealand the single organisational approach reported to be used 'almost always' by teachers is to arrange Year 5 students into same-ability groups.
- Teaching reading as a whole-class activity was an approach used often in many countries but infrequently by New Zealand teachers.
- Consistent with findings in both 2001 and 2005/06, the majority of New Zealand teachers reported using a reading series as a basis for their reading programmes, often as a dual approach with children's books.
- New Zealand Year 5 students tended to like reading more than students in many other countries.
  - New Zealand's Asian students generally liked reading more than students in other groups, with Māori students liking it less. Māori boys were, however, less likely to find reading a boring activity in 2010/11 than in 2001.
- New Zealand's Year 5 students' self confidence in their reading ability was relatively low internationally.
  - New Zealand's Asian students tended to be more confident; Pasifika students were less confident.
- New Zealand's Year 5 students' motivation to read was comparable to the international average.
  - In New Zealand, Asian and Pasifika students were generally more motivated than other student groups, with Pākehā/European students somewhat less motivated.
  - New Zealand teachers tended to use a series of practices to engage Year 5 students during reading a little less often than teachers in many other countries; their students tended to be only somewhat engaged during their reading.

Section 1:

Background



Section 1: Background

This section presents a brief overview of the background to the third 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-2010/11 was the third in an international five-yearly cycle of assessments designed to measure trends in reading literacy achievement at the middle primary level (Year 5 students in New Zealand). The first cycle of PIRLS was administered in 2001, the second in 2005/06, and then the third in 2010/11.[7] 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, Martin, Kennedy, Trong, & Sainsbury, 2009, p. 11)

The framework for PIRLS describes three aspects of reading literacy:

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

The first two aspects were used to shape the reading assessment. 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.

New features of PIRLS since 2005/06

To meet the needs of the increasing number of developing countries wanting to participate in PIRLS, the IEA developed a less difficult reading comprehension assessment referred to as prePIRLS. This assessment is based around the same framework but the stories and articles are shorter in length, with easier vocabulary, and simpler grammar and sentence structure.

As another initiative PIRLS was also administered to students in Grades 5 or 6 (approximately the same as our Year 6 or Year 7) in countries where the PIRLS assessment has been found to be too difficult for the majority of Grade 4 students.

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[7] PIRLS was first administered in all countries in 2001. PIRLS then moved from being on a 4- to a 5-year cycle. The second cycle was administered in the Southern Hemisphere during late 2005 and in the Northern Hemisphere in early 2006. The third cycle of PIRLS was administered in Southern Hemisphere countries in late 2010 and in Northern Hemisphere countries in early 2011.

PIRLS and TIMSS[8]

The Trends in International Mathematics and Science Study, commonly referred to as TIMSS, was also administered in New Zealand, with the Year 9 component administered in late 2010, and the Year 5 component in 2011. The overlap of PIRLS and TIMSS provided a unique opportunity for many countries participating in both at the middle primary level as it had the advantage of one comprehensive assessment in all three learning areas: reading, mathematics, and science. Many countries that took part chose to assess the same middle primary school students in all three areas.

New Zealand, like England and the United States for example, chose to assess two different groups of students; one group was assessed as part of PIRLS and one group was assessed as part of TIMSS.

Reporting of PIRLS and TIMSS

The information in this report focuses entirely on the results for countries in PIRLS; results for countries that assessed a higher grade, benchmarking participants, or prePIRLS are excluded. All results from TIMSS are also reported in separate national publications (See for example, Caygill, Kirkham, & Marshall, 2013).

Countries and education systems involved in PIRLS

Forty-eight countries and education systems participated in PIRLS-2010/11, including four countries that assessed a higher educational level than the expected Grade 4 (or equivalent). Twenty-one of the PIRLS countries had also taken part in both the first and second cycles in 2001 and 2005/06 (see Table 1.1). There were just three prePIRLS participants.

Benchmarking participants

As well as countries or jurisdictions taking part in PIRLS-2010/11, nine benchmarking participants took part. Most of these participants represented part of an education system. For example, although Canada took part in PIRLS-2010/11, three of the provinces—Alberta, Ontario, and Quebec—also participated in order for them to benchmark their students' performance internationally. Note that, benchmarking participant information is not used in any calculations of statistics such as the mean.

New Zealand students and schools involved in PIRLS

In New Zealand, approximately 5,600 Year 5 students from 192 schools took part in the main survey of PIRLS towards the end of 2010. In addition, a group of about 880 Year 5 students from 30 schools had also taken part in the field trial administered in the last quarter of 2009. A summary of the sampling design and participation rates for New Zealand is presented in Appendix A. (Also refer to TN 1 in the Technical Notes for a brief explanation of 'weighting' and generalising to the population.)

[8] The Trends in International Mathematics and Science Study (TIMSS) is administered on a regular four-year cycle with the first cycle in 1994/95, and then again in 1998/99, 2002/03, 2006/07, and then the fifth cycle in 2010/11.

Table 1.1: Countries and education systems participating in PIRLS and prePIRLS in 2010/11

PIRLS Grade 4 participants			
Australia	Finland	† Malta	Saudi Arabia
Austria	* France	*† Morocco	* Singapore
Azerbaijan	Georgia	* Netherlands	* Slovak Republic
Belgium (French)	* Germany	* New Zealand	* Slovenia
* Bulgaria	* Hong Kong SAR	Northern Ireland	Spain
Canada	* Hungary	* Norway	* Sweden
Chinese Taipei	Indonesia	Oman	Trinidad and Tobago
† Colombia	* Iran, Islamic Rep. of	Poland	United Arab Emirates
Croatia	Ireland	Portugal	* United States
Czech Republic	* Israel	Qatar	
Denmark	* Italy	* Romania	
* England	* Lithuania	* Russian Federation	
PIRLS Grade 6 participants			
Botswana	Honduras	Kuwait	Morocco
PIRLS Benchmarking participants			
Alberta (Canada)	Maltese (Malta)	Abu Dhabi (UAE)	
Ontario (Canada)	English/Afrikaans, Grade 5 (South Africa)	Dubai (UAE)	
Quebec (Canada)	Andalusia (Spain)	Florida (USA)	
prePIRLS participants			
Botswana	Colombia	ʘ South Africa	

Notes

† Colombia's Grade 4 students participated in PIRLS and prePIRLS. Morocco's Grade 4 and Grade 6 students participated in PIRLS. Malta assessed in English, this being the main language of instruction. Its students were also assessed in Maltese to benchmark their performance against those who were assessed in English.

* These countries and provinces participated in both PIRLS-01 AND PIRLS-2005/06. Kuwait and Israel participated in the two previous cycles; however their data from these cycles are not comparable with 2010/11.

ʘ South Africa took part in prePIRLS. Grade 5 students who receive instruction in English or Afrikaans formed the benchmarking participant group and were assessed as part of PIRLS.

Age and years of schooling

The target class level for PIRLS-10/11 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 formal schooling was chosen. This was the case for New Zealand, England, Ireland, Malta, and Trinidad and Tobago, where children start formal schooling at 5 years of age; in Northern Ireland it was the sixth year as most children begin at 4 years of age.

[9] UNESCO's Institute for Statistics 1997 *International Standard Classification of Education* (1999). Level 1 corresponds to primary education, or the first stage of basic education.

To ensure only the target group of New Zealand students was selected, the definition was refined further. Specifically, the definition was Year 5 students, or those students who would enter secondary school (Year 9) in 2014.

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

Table 1.2: Age of New Zealand Year 5 students in three cycles of PIRLS

Statistic	Age statistics from each PIRLS assessment		
	2001	2005/06	2010/11
Mean	10.1	10.0	10.1
Mode	10.3	10.1	10.3
Range (5th – 95th percentiles)	9.5–10.6	9.5–10.5	9.6–10.6

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 compulsory school starting age is 6 years, while in Sweden and Finland it is 7 years. In England and Ireland 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 varies markedly across countries. Some countries have mandatory pre-primary education (e.g., Austria, Hungary), while other countries have almost 100 percent participation even though it is not compulsory. Two examples are Australia and France. Most states in Australia provide one year of schooling before the compulsory Year 1 (equivalent to New Zealand's Year 2), and variously called "kindergarten", "preparatory", "transition", "pre-primary", or "reception". In France, pre-primary education, or "nursery school", accepts children from as young as 2 years; in 2010, 100 percent of French children aged 3 to 5 years attended a nursery school, as well as 14 percent of its two-year-olds. The focus of nursery education is social development and skills such as speaking and writing. Box 1.1 presents information on pre-primary education for a small selection of countries.

Language of assessment

Countries assessed their students according to the language or languages of instruction. PIRLS was administered in languages such as Azerbaijani, Chinese, Farsi, Georgian, Hebrew, Indonesian, and Portuguese. To cover their whole (Grade 4) student population, 13 countries administered PIRLS in more than one language. New Zealand assessed in te reo Māori and English. Examples of other countries which tested in multiple languages include Finland (Finnish and Swedish) and Italy (Italian and German). Table A.1 in Appendix A shows these countries, with the languages in which their students were assessed.

Box 1.1: Pre-primary education in selected PIRLS countries

Country	Pre-primary education	Compulsory starting age
Canada	Varies from province to province. Not mandatory. Ontario and British Colombia have introduced a full-day kindergarten year in 2010–11 with children starting at age 4 years; focus is a child-centred and developmentally appropriate education programme.	Varies; starting at 5 years
Finland	Voluntary participation in one year of pre-primary education	7 years
Germany	Attendance is voluntary. Most children attend a pre-primary education facility from ages 3 to 5; framework for language, reading, writing, mathematics, and science introduced in 2004. Support programmes in German language for children from immigrant backgrounds.	6 years
Hungary	Pre-primary education is available from ages 3 to 6; it is mandatory for one year for children aged 5. This prepares children for entry into formal education. The focus is on development of skills and competencies.	6 years
Netherlands	There is no formal provision for children younger than 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 age 6 or in the 3rd year
Portugal	Public pre-primary education available for children ages 3 to 5 either attached to schools or in separate nursery schools. Approximately 99% of all five-year-olds participate. Pedagogy and curriculum developed around personal and social education, communication, and knowledge of the world.	6 years
Slovak Republic	Attendance is voluntary. Available in kindergartens for children ages 2 to 6. Main goal is to encourage development of social and learning dispositions through play, and prepare for entry into primary education. Children are considered to have graduated from pre-primary education if they attended the year prior to entering primary school.	6 years
Sweden	More than 80% of children ages 1 to 5 attend some form of pre-primary education; the majority of six-year-olds attend voluntary pre-school classes usually situated in primary schools.	Schooling starts at age 7

Source: Mullis, Martin, Minnich, Drucker, & Ragan, 2012.

PIRLS 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. To enable trends in achievement to be measured, two of the ten passages and accompanying questions had been retained from PIRLS-01(one literary text and one informational text) and four from PIRLS-2005/06 (two literary and two informational texts).

Box 1.2: Literary texts versus informational texts

Literary texts	Informational texts
The five literary texts were complete short stories or episodes accompanied by supportive illustrations. The stories included contemporary and traditional stories of approximately 800 words in length covering a variety of settings. Each story had essentially two main characters and a plot with one or two central events. The passages included a range of styles and language features, such as first person narration, humour, dialogue, and some figurative language.	The five informational texts included a variety of continuous and non-continuous texts from 600 to 900 words in length. They covered a variety of content including scientific, ethnographic, biographical, historical, and practical information and ideas. The texts had presentational features such as diagrams, maps, illustrations, photographs, or tables. Texts were structured in a number of ways, including by logic, argument, chronology, and topic. Several texts included organisational features such as subheadings, text boxes, or lists.

Students were assigned one of 13 booklets each with two passages. These passages were combinations of either: one literary text and one informational text, or two literary texts, or two informational texts. Each passage was accompanied by a set of questions (about 12 to 14), with about half in multiple-choice format and half in constructed-response format. Details of the development and design are described by Yu and Ebbs (2012) in the PIRLS 2011 technical report referenced at the end of this report.

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-2010/11 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; and
- school principals (or literacy leaders) of the schools the students attended.
- As well as summarising the assessment findings, both this report and the international report, *PIRLS 2011 International Results in Reading*,[10] provide details of, for example, students' home learning environment, and their school and classroom instructional settings, collected from the contextual questionnaires.

To complement the quantitative nature of the approach and presentation of the information collected in PIRLS-2010/11, each country and benchmarking participant contributed an article outlining the policy context for reading in their country, including details about countries' reading curriculum. These articles are published in the *PIRLS 2011 Encyclopaedia: Education Policy and Curriculum in Reading* edited by Mullis, Martin, Minnich, Drucker, and Ragan (2012).[11]

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 sampling design, calculation of countries' sampling weights, assessment item analysis and review, Item Response Theory scaling methodology, and estimation of sampling errors) used in PIRLS-2010/11 is provided in the online PIRLS 2011 technical report, *Methods and procedures in TIMSS 2011 and PIRLS 2011*.[12]

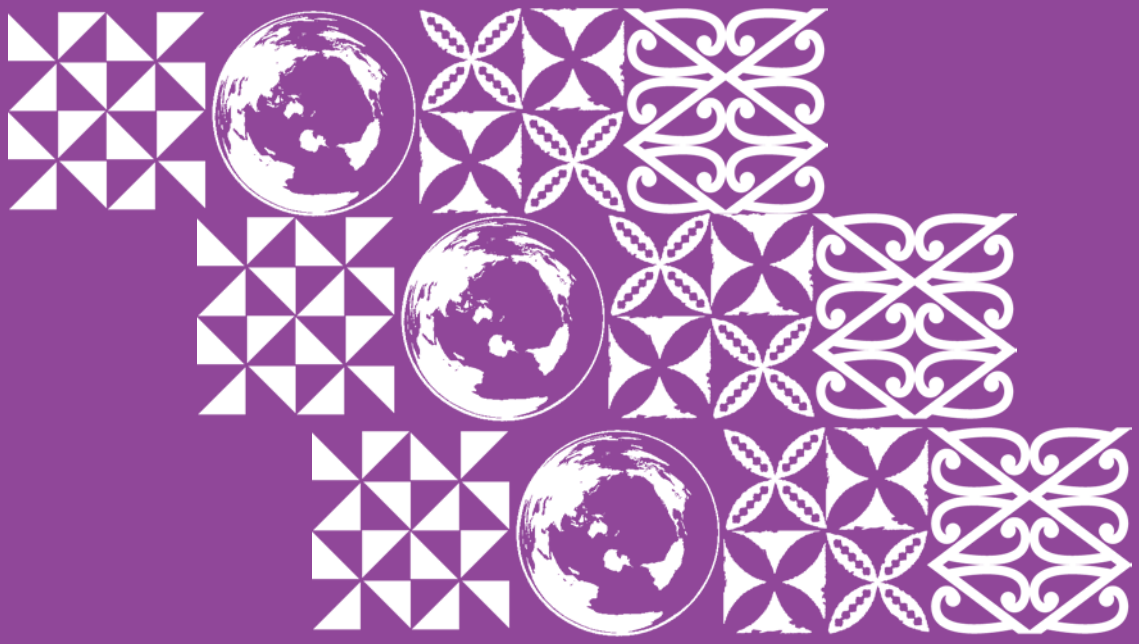
[10] Published and released in December 2012. Authors: I. V. S Mullis, M. O. Martin, P. Foy, and K. Drucker.

[11] Electronic versions of the articles are also available online at http://timssandpirls.bc.edu.

[12] http://timssandpirls/edu edited by Martin and Mullis (2012).

Section 2:

New Zealand in an International Context



Section 2: New Zealand in an International Context

Section 2 looks at the reading literacy achievement of New Zealand's Year 5 students from both international and national perspectives. First, an overview of the New Zealand results in an international context is provided, followed by comparisons made with the 2001 and 2005/06 cohorts. A detailed overview of the findings by ethnicity and gender is presented at the end of this section.

Reading literacy achievement in 2010/11

Figure 2.1 shows the means and distributions for 45 participating countries and education systems taking part in PIRLS-2010/11.[13] In order to measure trends in reading achievement over time, the reading achievement scale, established in PIRLS-2001, was designed to remain constant from assessment to assessment. This was done by setting the average (mean) of the country means to 500 with a standard deviation of 100. This average is referred to as the *PIRLS Scale Centrepoint*.[14] As shown on the figure, of the 45 countries that took part in PIRLS 2010/11, the mean reading scores of:

32 countries—Hong Kong through to Belgium (French), and including New Zealand—were significantly higher than the *PIRLS Scale Centrepoint*[15]

1 country— Romania—was not significantly different from the *PIRLS Scale Centrepoint*

12 countries—Georgia through to Morocco—were significantly lower than the *PIRLS Scale Centrepoint.*

The highest-performing group of countries or education systems were Hong Kong SAR, Russian Federation, Finland, and Singapore. The second-highest performing group were Northern Ireland, United States, Denmark, Croatia, and Chinese Taipei, with Ireland and England forming the third-highest-performing group.

The New Zealand mean was statistically similar to the means of seven countries, including Australia and four other OECD countries—Slovak Republic, Slovenia, Austria, and Poland. It was also significantly higher than the means for 17 countries, including France, Norway, and Spain, and higher than two countries that tested in English— Trinidad and Tobago and Malta.[16]

It was however significantly lower than the means for 20 countries or education systems, including 14 OECD countries.[17] Five of these jurisdictions with achievement higher than New Zealand assessed in English: Northern Ireland, United States, Ireland,[18] England, and Canada.[19]

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13 The figure does not include the results for the nine benchmarking participants and the four countries that assessed their Grade 6 students.

14 Item Response Theory (IRT) is used to summarise the reading achievement results. For further details, please refer to TN 2 and TN 3 in the Technical Notes at the end of this report or in the technical report for PIRLS 2011 (Martin & Mullis, 2012).

15 The use of 'significant' hereafter is to be understood in terms of statistical significance at the 5% level. See TN 4 in the Technical Notes.

16 The language of instruction in Malta is English but students also learn in Maltese. In PIRLS, Malta assessed its Year 5 students in English. It also assessed a separate group in Maltese to benchmark their performance against those assessed in English.

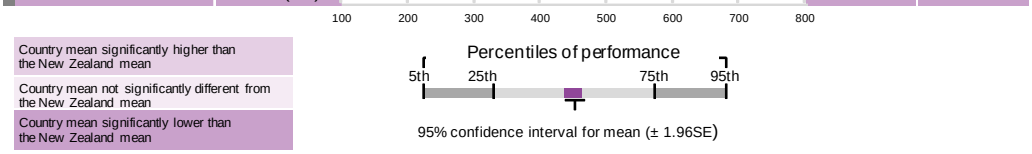
17 The United Kingdom (England, Northern Ireland, Scotland, and Wales) has single membership of the OECD, but Scotland and England have their own membership of the IEA. England and Northern Ireland data is combined as one OECD country for this comparison.

18 Ireland assessed their Irish-medium students in English (i.e., PIRLS was used as an assessment of comprehension in English).

19 Canada assessed in English and French (according to children's language of instruction).

Figure 2.1: Distribution of countries' reading literacy achievement in PIRLS-2010/11

Country	Mean reading scale score	Mean age in PIRLS	Years in primary school
[3] Hong Kong SAR	571 (2.3)	10.1	4
Russian Federation	568 (2.7)	10.8	4
Finland	568 (1.9)	10.8	4
[2] Singapore	567 (3.3)	10.4	4
† Northern Ireland	558 (2.4)	10.4	6
[2] United States	556 (1.5)	10.2	4
[2] Denmark	554 (1.7)	10.9	4
[2] Croatia	553 (1.9)	10.7	4
Chinese Taipei	553 (1.9)	10.2	4
Ireland	552 (2.3)	10.3	4
† England	552 (2.6)	10.3	5
[2] Canada	548 (1.6)	9.9	4
† Netherlands	546 (1.9)	10.2	6
Czech Republic	545 (2.2)	10.4	4
Sweden	542 (2.1)	10.7	4
Italy	541 (2.2)	9.7	4
Germany	541 (2.2)	10.4	4
[3] Israel	541 (2.7)	10.1	4
Portugal	541 (2.6)	10.0	4
Hungary	539 (2.9)	10.7	4
Slovak Republic	535 (2.8)	10.4	4
Bulgaria	532 (4.1)	10.7	4
New Zealand	**531 (1.9)**	**10.1**	**4.5-5.5**
Slovenia	530 (2.0)	9.9	4
Austria	529 (2.0)	10.3	4
[1 2] Lithuania	528 (2.0)	10.7	4
Australia	527 (2.2)	10.0	4
Poland	526 (2.1)	9.9	3
France	520 (2.6)	10.0	4
Spain	513 (2.3)	9.8	4
‡ Norway	507 (1.9)	9.7	4
[2 †] Belgium (French)	506 (2.9)	10.1	4
Romania	502 (4.3)	10.9	4
PIRLS Scale Centrepoint	500		
[1] Georgia	488 (3.1)	10.0	4
Malta	477 (1.4)	9.8	5
Trinidad and Tobago	471 (3.8)	10.3	5
[2] Azerbaijan	462 (3.3)	10.2	4
Iran, Islamic Rep. of	457 (2.8)	10.2	4
Colombia	448 (4.1)	10.4	4
United Arab Emirates	439 (2.2)	9.8	4
Saudi Arabia	430 (4.4)	10.0	4
Indonesia	428 (4.2)	10.4	4
[2] Qatar	425 (3.5)	10.0	4
Ψ Oman	391 (2.8)	9.9	4
ж Morocco	310 (3.9)	10.5	4



Notes

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

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

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

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

1 National Target Population did not include all of the International Target Population.

2 National Defined Population covered 90% to 95% of the National Target Population.

3 National Defined Population covered less than 90% of the National Target Population.

ж Mean achievement not reliably measured because percentage of students with achievement too low for estimation was between 15% and 25%.

Ψ Reservations about reliability of the mean achievement because the percentage of students with achievement too low for estimation exceeded 25%.

Source: IEA's Progress in International Reading Literacy Study (PIRLS) 2011. Adapted from Exhibits 1.1, 1.3 and C.1 in Mullis, Martin, Foy, & Drucker, 2012

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Students with very low performance in 2010/11

During the intervening years between PIRLS 2005/06 and 2010/11, an extensive investigation was undertaken by the researchers at the *TIMSS & PIRLS International Study Center* on the technical *quality* of the achievement estimates, particularly across time, generated for some low-performing countries (Mullis, Martin, & Foy, 2010). The proportion of students unable to respond to any assessment question was selected as the best indicator of the mismatch between students' skills and those demanded by the PIRLS assessment. As well as no questions answered correctly, guessing on the multiple-choice items is possible.

So, beginning in 2010/11 the criterion for having achievement too low for estimation was established for all countries. It is based on the percentage of the students having a score no higher than what would be achieved by guessing on all of the PIRLS multiple-choice questions—25 percent (or students achieving below chance). However, these students were assigned IRT scale scores by the achievement scaling procedure, despite concerns about their reliability. For some countries though, it means that comparing achievement scores across time and achievement in reading purposes and comprehension processes is not possible.

Countries with more than 10 percent of students in this category were Morocco, Oman, Qatar, and United Arab Emirates. The percentage of New Zealand students in this category was two percent, the same as that estimated for Australia. There were only a few countries without any students with achievement too low for scores to be estimated (e.g., Finland and the Netherlands). Table B.1 in Appendix B summarises the information for the countries that included English as a test language.

It could be conjectured that the percentage of students who were excluded from the PIRLS assessment affected the proportion of lower-achieving students in some countries. Exclusions were to be no more than five percent of the target group being assessed. The rate for New Zealand was 3.3 percent (c.f. 5.3% in 2005/06). A few countries did, however, record increases in their exclusion rates from 2005/06 to 2010/11 (in particular, Hong Kong and Singapore). However these changes do not appear to have had any impact on the performance of students at the lower end of the performance distributions. As well as Appendix A of this report, readers should refer to Joncas & Foy (2012) for the details on each country's sample design in 2010/11 and Appendix B in Martin, Mullis, & Kennedy (2007) for the 2005/06 information.

Range of scores

As well as presenting the mean scores, Figure 2.1 also highlights the large spread of scores among students for many countries. Table 2.1 presents the range of actual scores at various percentiles for a selection of countries that assessed all or a significant proportion of its students in English, hereafter referred to as the *English-language* countries. Each percentile reported in the table indicates the percentage of students performing below and above that point on the achievement scale. For example, 25 percent of New Zealand Year 5 students achieved below 474 and 75 percent achieved above 474.

As Table 2.1 shows, the range between New Zealand's lowest-achieving students and the highest-achieving students (i.e., the difference between the 5th and 95th percentiles) was 293 scale score points. This is relatively large when compared to high-performing countries. Other countries where students (or the majority of) were assessed in English with a similarly wide range were Malta (317), Trinidad and Tobago (290), and to a lesser extent England (274).

Table 2.1: Distribution of reading literacy achievement for New Zealand and the English-language* countries, 2010/11

Country	Standard deviation	5th percentile	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile	95th percentile	Estimate of	
									Inter-quartile range	Range
Australia	80 (1.3)	383 (4.5)	418 (3.4)	477 (2.5)	534 (2.8)	583 (2.4)	625 (1.6)	648 (3.1)	106	265
Canada	69 (0.9)	429 (4.3)	458 (2.8)	504 (1.7)	551 (1.7)	596 (1.5)	634 (1.4)	658 (3.0)	92	229
England	82 (1.4)	404 (8.7)	440 (5.8)	500 (4.0)	558 (3.0)	609 (2.4)	652 (2.9)	678 (4.7)	109	274
Ireland	75 (1.4)	417 (8.2)	452 (5.5)	506 (4.2)	555 (2.4)	603 (1.8)	643 (2.4)	665 (4.2)	97	248
Malta	97 (1.1)	303 (4.1)	340 (3.3)	412 (2.9)	487 (2.6)	546 (2.5)	594 (4.0)	620 (3.1)	134	317
New Zealand	**88 (1.2)**	**373 (3.4)**	**410 (3.5)**	**474 (3.0)**	**538 (2.1)**	**592 (4.5)**	**639 (3.7)**	**666 (4.6)**	**118**	**293**
Northern Ireland	76 (1.3)	422 (6.3)	458 (9.3)	512 (2.1)	564 (2.6)	610 (2.4)	650 (3.7)	673 (3.2)	98	251
Singapore	80 (1.8)	421 (7.0)	459 (6.1)	519 (4.6)	573 (3.3)	623 (3.9)	665 (4.4)	687 (4.4)	104	266
Trinidad & Tobago	88 (1.5)	320 (6.6)	352 (5.6)	410 (5.6)	474 (5.7)	534 (3.3)	583 (3.6)	610 (8.1)	124	290
United States	73 (1.0)	428 (3.5)	458 (3.3)	510 (2.1)	560 (1.6)	607 (1.2)	648 (2.0)	671 (3.0)	97	243

Notes

Standard errors appear in parentheses.

* Countries that assessed all or a significant proportion of their students in English.

Source: Exhibits F.1 and F.2 in Mullis, Martin, Foy, & Drucker, 2012.

In New Zealand, the range between the two points representing the group of middle-performing students—the 25th and 75th percentiles—was 118 scale score points. This spread was also comparatively wide. Interestingly, the inter-quartile ranges for the English-language countries/systems were over 90; by way of contrast other high-performing non-English-language countries recorded lower inter-quartile ranges (e.g., Croatia, 80; Denmark, 85; Finland, 83; Russian Federation, 88).

All three cycles of PIRLS have highlighted the relatively large range in the *reading* performance of New Zealand's Year 5 students. It is important to note that the wide range is not just due to the relatively weak performance of some of New Zealand's students; it also highlights the fact that New Zealand has very high-performing students—a big 'tail' AND a big 'nose'.[20]

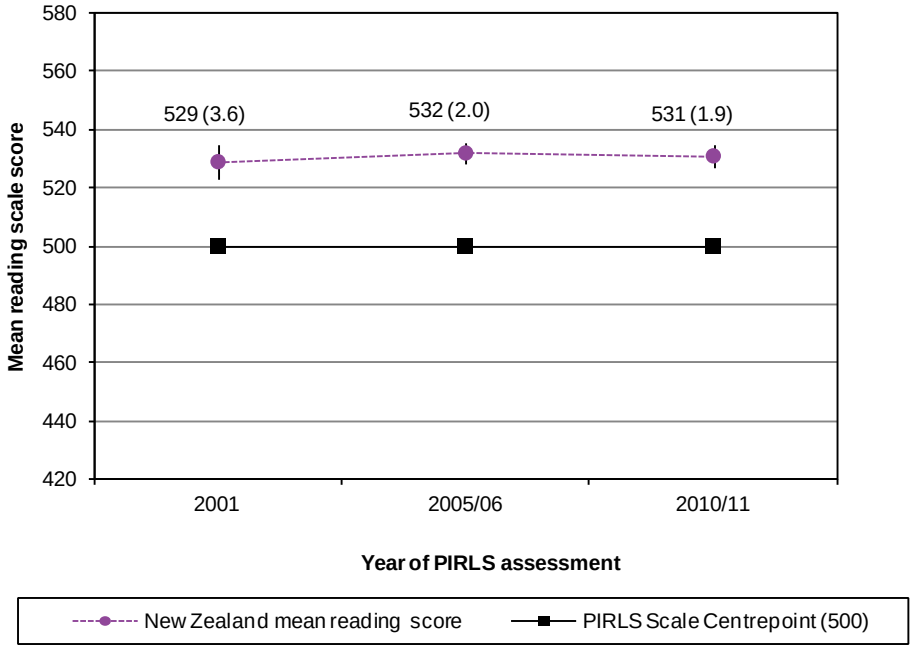
Trends in achievement from 2001 to 2010/11

It was noted at the beginning of the section that the *PIRLS Scale Centrepoint* remains constant from cycle to cycle. Achievement data from each cycle is linked to it so that changes in achievement can be monitored over time. At the end of each cycle of PIRLS a set of texts with questions is released into the public domain. To measure trends, a separate set is held over for use in subsequent cycle(s). In 2010/11, there were two texts from 2001 and four texts from 2005/06; half were informational texts and half were literary texts. These trend texts and responses to the questions are used as the basis for measuring trends in reading literacy achievement.

Figure 2.2 shows the mean reading scores for New Zealand's Year 5 students in each cycle of PIRLS. There were no significant changes over the period 2001 to 2010/11.

[20] This pattern has been observed in New Zealand's Programme for International Student Assessment (PISA) reading literacy results.

Figure 2.2: Trends in the mean reading scale scores for New Zealand Year 5 students, 2001–2010/11

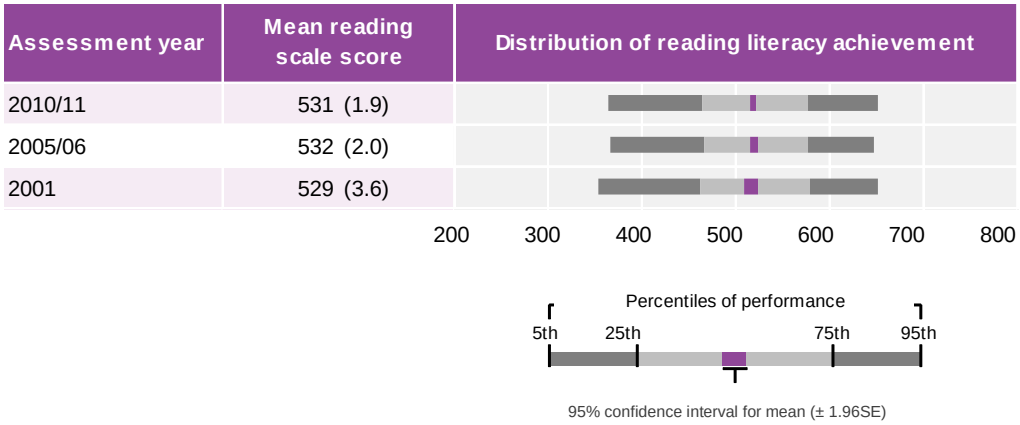


Note

Each purple data point represents the mean reading scale score for New Zealand Year 5 students in a cycle. The standard errors are in parentheses. The lines extending from each data point represent the 95 percent confidence interval around the mean (i.e. the mean score ± 1.96 standard errors).

Figure 2.3 shows the distribution of New Zealand's Year 5 reading achievement scores across the three cycles. Although the *range* of scores (the difference between the 5th and 95th percentiles) was higher in 2001 than in both 2005/06 and 2010/11, there was also less certainty about the values of the outer percentiles in 2001 than in subsequent cycles. This was due to there being more sampling variability at these extremes in 2001 than in the later cycles (i.e., there was a smaller sample for generating these statistics, which is also reflected in the standard errors).

Figure 2.3: Trends in the distribution of New Zealand Year 5 students' reading literacy achievement, 2001–2010/11



Notes

Standard errors appear in parentheses.

Interpretation of percentile: The 5th percentile is the lowest outer limit corresponding to the score at which only 5% of students achieved a lower score and 95% achieved a higher score. The 95th percentile is the highest outer limit corresponding to the score at which only 5% of students achieved a higher score and 95% a lower score. Ninety percent of students' achievement scores are then between the 5th and 95th percentiles. See Table B.2A in Appendix B for details of the percentiles and standard errors for the three cycles.

Notwithstanding this, there is some evidence to show that the very lowest performing Year 5 students (i.e., the bottom 5%) in 2010/11 were achieving at a slightly higher level than their 2001 counterparts, with the 5th percentile higher in 2010/11 than in 2001 (i.e., 373 compared to 360).[21] There were no significant changes at the top end of the distribution (i.e., the top 5%); the highest performing students in 2010/11 were performing as well as their high-performing 2001 counterparts.

As well as looking at trends in achievement using the scale scores, which take account of the responses to questions across all the reading texts, it is also possible to look at the performance on the questions pertaining to the individual trend texts that were used to link the different cycles of PIRLS. This involves looking at the percentage of questions answered correctly.[22]

Table 2.2 presents a summary of the number of questions (or items) in each text where a percentage increase or decrease was observed (i.e., proportionately more or fewer students answered correctly). The first column headed "2001 to 2010" shows the change (decrease or increase) between 2001 and 2010 for the two texts used in all three cycles; the second column headed "2005 to 2010" shows the changes for all six trend texts from 2005 to 2010 (i.e., the calendar years when PIRLS was administered in New Zealand).

Table 2.2: Change in the number of trend questions answered correctly by New Zealand Year 5 students across the three PIRLS assessment cycles

Trend reading texts	2001 to 2010				2005 to 2010			
	Decreases		Increases		Decreases		Increases	
	No. of items 0–5%	No. of items > 5%	No. of items 0–5%	No. of items >5%	No. of items 0–5%	No. of items >5%	No. of items 0–5%	No. of items > 5%
Informational texts								
Biographical (17)	6	2	3	6	9	2	1	5
Article (17)	NA	NA	NA	NA	5	0	10	2
Brochure (15)	NA	NA	NA	NA	6	2	7	0
Literary texts								
Contemporary (16)	4	1	9	2	7	0	9	0
Fable (16)	NA	NA	NA	NA	9	2	5	0
Animal adventure (19)	NA	NA	NA	NA	5	0	13	1

Note

The number in parentheses appearing alongside the descriptor of the text is the actual total (raw) score points associated with the questioning around the text.

After taking into account the decreases and increases across all questions (or parts of questions), the change from 2001 to 2010 averaged just 0.6 percentage points (or, on average 0.6 more students answered a question correctly in 2010 than in 2001); the change from 2005 to 2010 was just 0.1 percentage points. While there were some significant changes on some texts, the lack of any substantial shift in performance overall illustrates why there was no change in Year 5 students' performance.

[21] The difference between the two percentiles was statistically significant. This observation was also made from 2001 to 2005/06.

[22] The Item Response Theory methods used to generate the scale scores take into account attributes of the items such as the difficulty level, which reflects the percentage of students who answer the items correctly. More difficult items tend to have a lower proportion of students answering them correctly while easier items tend to be answered correctly by a higher proportion of students.

New Zealand trends and the international context

Figure 2.4 shows a summary of the changes for 19 of the 21 trend countries—the countries that have participated in all three cycles and where it is possible to compare achievement over the 10-year-period. Two trend countries are not included: Morocco (because the percentage of students with very low achievement exceeded 25% and so the scaling is not reliable) and Israel (because of substantial changes made to their trend text translations). This meant that information for these two countries were not comparable with those used in previous cycles.

Figure 2.4: Difference between the mean reading scale scores from 2001 to 2010/11 for 19 trend countries*

Trend country	Difference between mean scale scores 2001–2010/11	Was the change significant?
Iran, Islamic Rep. of	+ 44	▲
Hong Kong SAR	+ 43	▲
Russian Federation	+ 40	▲
Singapore	+ 39	▲
Slovenia	+ 29	▲
Slovak Republic	+ 17	▲
United States	+ 14	▲
Norway	+ 8	▲
Germany	+ 2	●
New Zealand	**+ 2**	●
Italy	+ 1	●
England	– 1	●
Hungary	– 4	●
France	– 5	●
Romania	– 10	●
Netherlands	– 8	▼
Lithuania	– 5	▼
Bulgaria	– 19	▼
Sweden	– 19	▼

Key

▲	Change significantly higher
●	Not statistically different
▼	Change significantly lower

Notes

Israel (not shown) participated in 2001 and 2005/06. In both years, Israel's mean reading score was significantly lower than that of New Zealand. However, comparisons could not be made with 2010/11 due to the changes made to their assessment materials during the translation process.

Morocco (not shown) participated in all three cycles however the percentage of students with achievement too low for estimation exceeded 25% so comparisons cannot be made across cycles.

* A number of countries did not take part in 2005/06, but had participated in 2001 and again in 2010/11. There was also another group that participated for the first time in 2005/06 and again in 2010/11. The trend information for these countries is summarised in Table C.1 in Appendix C.

Source: Adapted from Exhibit 1.4 in Mullis, Martin, Foy, & Drucker, 2012.

Eight countries recorded significant increases in their students' mean reading achievement from 2001 to 2010/11, with Iran recording the biggest shift particularly from 2005/06 to 2010/11. The mean achievement 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, with the biggest shifts occurring between 2001 and 2005/06. Slovenia also recorded a relatively large increase in mean achievement across the 10-year-period. There were five countries that recorded significant decreases in their

students' mean reading achievement. The decrease observed in the Netherlands, for example, was largely due to a decrease in their girls' mean achievement.

A number of countries that had only taken part in two of the three cycles had also shown significant changes. For example, Trinidad and Tobago recorded an increase of 35 scale score points between the 2005/06 and 2010/11 cycles (also see Table C.1 in Appendix C). The PIRLS 2001, PIRLS 2006, and PIRLS 2011 encyclopaedias all provide considerable detail and insight for the changes in all these systems. Boxes C.1 and C.2 in Appendix C encapsulate some of that detail for a selection of countries.

Has New Zealand's standing changed?

While New Zealand's mean reading literacy achievement did not change, New Zealand's standing relative to the 18 other countries across three cycles changed from 10th in 2001 to 13th in 2005/06, and 13th again in 2010/11. This is illustrated in Figure 2.5.

Figure 2.5: Relative standing of countries in three cycles of PIRLS, 2001–2010/11

Country	Mean scale score	Country	Mean scale score	Country	Mean scale score
Sweden	561 (2.2)	Russian Federation	565 (3.4)	Hong Kong SAR	571 (2.3)
Netherlands	554 (2.5)	Hong Kong SAR	564 (2.4)	Russian Federation	568 (2.7)
England	553 (3.4)	Singapore	558 (2.9)	Singapore	567 (3.3)
Bulgaria	550 (3.8)	Italy	551 (2.9)	United States	556 (1.5)
Lithuania	543 (2.6)	Hungary	551 (3.0)	England	552 (2.6)
Hungary	543 (2.2)	Sweden	549 (2.3)	Netherlands	546 (1.9)
United States	542 (3.8)	Germany	548 (2.2)	Sweden	542 (2.1)
Italy	541 (2.4)	Netherlands	547 (1.5)	Italy	541 (2.2)
Germany	539 (1.9)	Bulgaria	547 (4.4)	Germany	541 (2.2)
New Zealand	**529 (3.6)**	United States	540 (3.5)	Hungary	539 (2.9)
Singapore	528 (5.2)	England	539 (2.6)	Slovak Republic	535 (2.8)
Russian Federation	528 (4.4)	Lithuania	537 (1.6)	Bulgaria	532 (4.1)
Hong Kong SAR	528 (3.1)	**New Zealand**	**532 (2.0)**	**New Zealand**	**531 (1.9)**
France	525 (2.4)	Slovak Republic	531 (2.8)	Slovenia	530 (2.0)
Slovak Republic	518 (2.8)	France	522 (2.1)	Lithuania	528 (2.0)
Romania	512 (4.6)	Slovenia	522 (2.1)	France	520 (2.6)
Slovenia	502 (2.0)	Norway	498 (2.6)	Norway	507 (1.9)
Norway	499 (2.9)	Romania	489 (5.0)	Romania	502 (4.3)
Iran, Islamic Rep. of	414 (4.2)	Iran, Islamic Rep. of	421 (3.1)	Iran, Islamic Rep. of	457 (2.8)
Morocco	*350 (9.6)*	*Morocco*	*323 (5.9)*	*Morocco*	*310 (3.9)*
Trend country mean	527 (0.8)	Trend country mean	532 (0.7)	Trend country mean	535 (0.7)

Significantly *higher* than mean for the 19 trend countries

Not statistically different from the mean for the 19 trend countries

Significantly *lower* than the mean for the 19 trend countries

Notes

Standard errors appear in parentheses.

Israel (not shown) participated in 2001 and 2005/06. In both years, its mean reading scores were significantly lower than the New Zealand means. However, comparisons could not be made with 2010/11 due to the changes made to their assessment texts during the translation process.

The percentage of students in Morocco with achievement too low for estimation exceeded 25%. The mean scores are shown in the figure for illustrative purposes only and were not used in the calculations for the trend means.

The apparent decline in New Zealand's standing was largely due to the improvements by Hong Kong SAR, the Russian Federation, and Singapore in 2005/06, which was maintained through to 2010/11. The Slovak Republic's relative standing was lower than New Zealand in the earlier cycles but in 2010/11 its mean increased so that it was higher, but not significantly different, than New Zealand. Interestingly, two countries—Bulgaria and Lithuania—had a higher standing than New Zealand in 2001 but have showed downward trends in 2005/06 and again in 2010/11.

Reading literacy achievement and gender

Internationally, New Zealand Year 5 girls and boys typically achieved above their respective international means. The mean for Year 5 girls (541) was significantly higher than the international mean for girls (520). Similarly, the mean for Year 5 boys (521) was significantly higher than the international mean for boys (504).

Gender differences

The mean reading scores for girls in all but four countries—Italy, France, Spain, and Israel—were significantly higher than the means for boys, with the average difference greatest in Saudi Arabia (54 scale score points) and the smallest in Belgium-French (just 5 scale score points). The average difference between New Zealand girls and boys (20) was on a par with the difference observed in Iran (20), Finland (21) and Georgia (22). Although not statistically significant, Colombia was the only country where the boys' mean was (marginally) higher than the girls' mean.

An examination of the overall New Zealand distribution also illustrates the difference between girls' and boys' reading performance. The proportion of boys who achieved higher than 592 (i.e., the 75th percentile) score was 21 percent, seven percentage points lower than the proportion of girls (29%). At the lower end of the performance range, the proportion of Year 5 boys who scored less than 474 (i.e., the 25th percentile) was 29 percent, compared with 21 percent of Year 5 girls. That is, girls were more likely to be higher achievers and boys were over-represented among lower achievers. [23]

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 in previous cycles, an effect size was calculated to look at the size between New Zealand girls' and boys' mean achievement. This was calculated to be $d = 0.23$, which indicated that the mean difference between girls and boys was relatively *small.* [24]

While the magnitude of the gender gap can be considered small, internationally the gender difference of 20 scale score points observed in New Zealand is relatively large when compared with the differences in other countries.

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[23] Interestingly, the 5th percentile for girls in 2010/11 was approximately 22 scale score points higher than that recorded for boys (385 compared to 363), half the difference observed in 2005/06 (40 scale score points).

[24] 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. This interpretation of large, medium, and small is a variation of the interpretation commonly used for Cohen's *d* (large = 0.80; medium = 0.50; small = 0.20). Also see TN 5 in the Technical Notes.

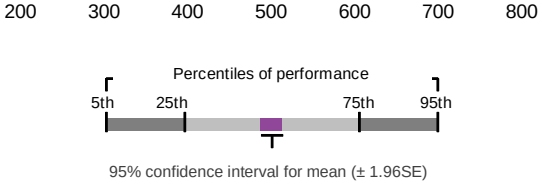
Any change from 2001 to 2010/11?

Figures 2.6 and 2.7 present the mean reading scores and the distributions of scores for New Zealand's Year 5 girls and boys respectively, for the three cycles of PIRLS. There were no significant changes in the mean reading scores for either Year 5 girls or boys from 2001 to 2010/11.

After narrowing slightly between 2001 and 2005/06 (from 300 to 272), the range of scores for girls widened slightly to an estimated 285 scale score points in 2010/11. Of note for 2010/11, are the (numerically) lower values of both the 5th and 25th percentiles, which could suggest that there were more lower-performing girls in 2010/11 than in 2005/06. However, there were no statistically significant differences across any of the values of the percentiles across the 10-year period.

Figure 2.6: Trends in the distribution of New Zealand Year 5 girls' reading literacy achievement, 2001–2010/11

Assessment year	Percentage of Year 5 population	Girls' mean reading scale score	Distribution of reading literacy achievement
2010/11	49 (1.0)	541 (2.2)	
2005/06	49 (0.9)	544 (2.2)	
2001	49 (1.3)	542 (4.7)	



Notes

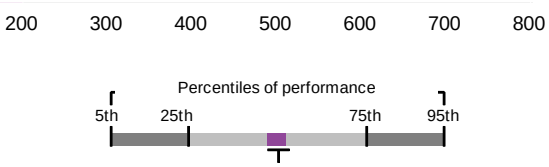
Standard errors appear in parentheses.

See Table B.2B in Appendix B for the percentiles for 2001, 2005/06, and 2010/11.

The range for Year 5 boys in 2010/11, an estimated 299 scale score points, was the same as in 2005/06 (298) and lower than the wide range (312) estimated in 2001. As with Year 5 girls, statistically there was no change. But of note is the fact that the values of the 5th and 25th percentiles (and to a lesser extent the 95th percentile) were notably (numerically) higher, suggesting the beginning of some improvements for lower-performing boys.

Figure 2.7: Trends in the distribution of New Zealand Year 5 boys' reading literacy achievement, 2001–2010/11

Assessment year	Percentage of Year 5 population	Boys' mean reading scale score	Distribution of reading literacy achievement
2010/11	51 (1.0)	521 (2.7)	
2005/06	51 (0.9)	520 (2.9)	
2001	51 (1.3)	516 (4.2)	



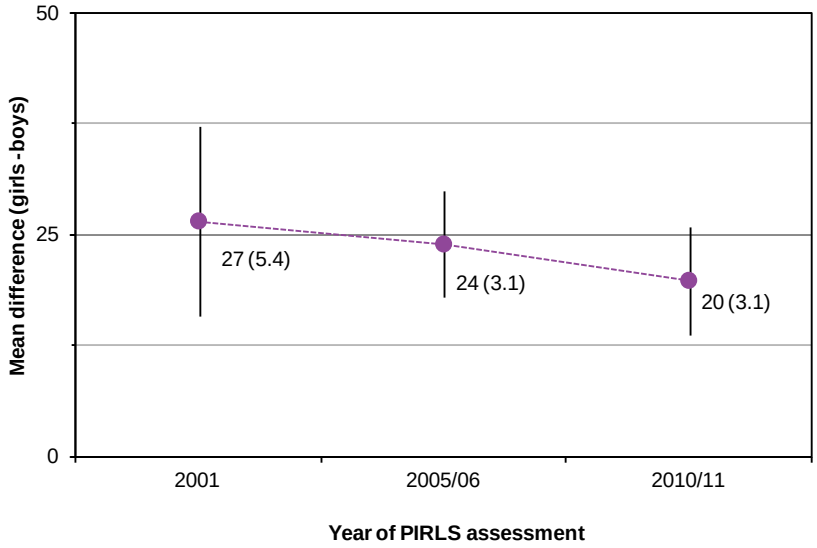
Notes

Standard errors appear in parentheses.

See Table B.2B in Appendix B for the percentiles for 2001, 2005/06, and 2010/11.

This may also account for the decrease in the 'gender gap', or the difference between the mean achievement of girls and boys, which reduced from a high of 27 scale score points in 2001 to 20 in 2010/11 as shown in Figure 2.8. This decrease is also reflected in the magnitude of the difference as measured by the effect sizes: $d = 0.23$ in 2010/11 compared with 2005/06, $d = 0.28$ and in 2001, $d = 0.29$. (See Table B.3 in Appendix B.)

Figure 2.8: Trends in the mean difference between New Zealand Year 5 girls' and boys' reading scale scores, 2001–2010/11



Note

Each data point represents the mean difference between girls' and boys' reading scale scores. The standard error of the difference appears in parentheses. The lines extending from each data point represent the 95 percent confidence interval around the mean (i.e. the mean score ± 1.96 standard errors).

Reading literacy achievement and ethnicity

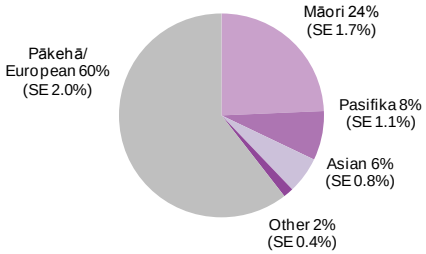
Five broad ethnic classifications are used to summarise Year 5 students' *ethnicity*: Pākehā/European, Māori, Pasifika, Asian, and Other ethnic groups.[25] Based on their reports and for the purposes of measuring trends particularly with 2001, each student is included in only one ethnic grouping.[26] The proportions of Year 5 students grouped by their ethnic identity are shown in Figure 2.9.

[25] *Māori* refers to the indigenous people of New Zealand. *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. *Pasifika* includes people who identify themselves as Cook Islands Māori, Samoan, Tongan, or Niuean. *Asian* includes those who identify as being Chinese, Indian, Korean, or Vietnamese. The grouping *Other ethnic groups* include those from Middle Eastern (e.g., Iraqi), African (e.g., Somali), or South American (e.g., Chilean) backgrounds.

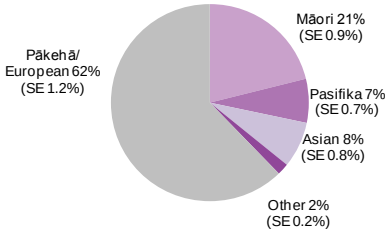
[26] The ethnic identity question students answered was formulated to allow for multiple responses in the situation where students identified with more than one ethnic group. A summary of this information, along with the reading achievement information is reported in Appendix D.

Figure 2.9: New Zealand Year 5 students in each ethnic grouping in PIRLS-01, PIRLS-2005/06, and PIRLS-2010/11 (weighted percentages)

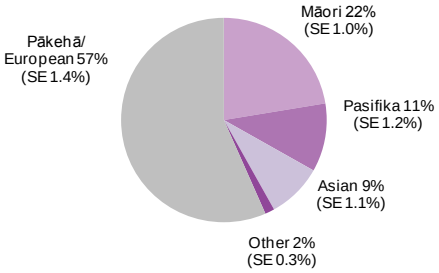
A. Year 5 students in PIRLS-2001



B. Year 5 students in PIRLS-2005/06



C. Year 5 students in PIRLS-2010/11



Notes

Standard errors (SE) appear in parentheses.

Percentages are adjusted for missing responses. Missing ethnicity information was approximately 2% in 2001, 1% in 2005/06, and less than 0.5% in 2010/11.

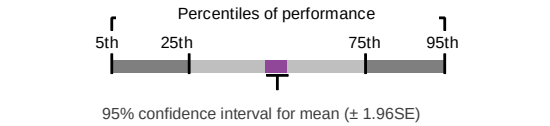
In 2001, student ethnicity data reflect information supplied by schools; in PIRLS 2005/06 and 2010/11 the data reflect information supplied by both schools and students' self-identification. The proportion of New Zealand's domestic Year 5 student population in each ethnic grouping in 2010 was: Pākehā/European, 55%; Māori, 24%; Pasifika, 10%; Asian, 9%; and Other ethnic groups, 2%. (Source: Ministry of Education, 2010a.)

Figure 2.10 presents the mean reading scale score and the distribution of scores for each of New Zealand's ethnic groupings in PIRLS 2010/11.[27] Pākehā/European students recorded the highest mean achievement with the mean score significantly higher than the mean scores for the other groupings. Nearly four out of five Pākehā/European students (78%) achieved scores equivalent to or above the PIRLS scale mean of 500; the proportion of Asian students was (73%). Just under half of Māori students (47%) scored 500 or higher, while just two out of five Pasifika students (38%) reached this level.

[27] The mean score for Pākehā/European students was statistically significantly higher than the mean scores for Asian, Māori, and Pasifika students (adjusted for multiple comparisons, see TN 6 in the Technical Notes for details.). The mean score for Asian students was significantly higher than the mean scores for Māori, and Pasifika students; there was no significant difference between the mean scores of Māori and Pasifika students.

Figure 2.10: Distribution of New Zealand Year 5 students' reading literacy achievement in 2010/11, by ethnic grouping

Ethnic grouping	Percentage of Year 5 student population	Mean reading scale score	Distribution of reading literacy achievement
Pākehā/European	57 (1.4)	558 (2.3)	
Māori	22 (1.0)	488 (3.6)	
Pasifika	11 (1.2)	473 (5.0)	
Asian	9 (1.1)	542 (4.1)	
Other ethnic groups	2 (0.3)	510 (20.2)	
All New Zealand		**531 (1.9)**	



Notes

Standard errors appear in parentheses. Because of rounding totals may be inconsistent.

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.2C in Appendix B for the percentiles and standard deviations for 2001, 2005/06, and 2010/11.

As well as illustrating the variation in achievement across New Zealand's four main ethnic groupings, the figure also highlights the fact that there are high-performing and low-performing students in all ethnic groupings. The range was greater for Māori (287) than for Pākehā/European (262), Pasifika (264), and Asian students (252).

Any change from 2001 to 2010/11?

Table 2.3 shows the mean scores for students in each ethnic grouping for the three cycles. There were no statistically significant increases or decreases in the mean reading achievement for any of the groupings between 2001 and 2010/11.

For some groupings in 2001, there was more variation (or uncertainty) with the statistics (e.g. means) that were reported. This was due to the smaller overall national sample. This level of uncertainty is reflected in the standard errors, and therefore any shifts in achievement from 2001 to 2010/11 would have had to have been more than 10 scale score points for a change to be significant at the 5% level.

Despite there being no change, there was a shift in the (statistical) relativity across groups. In 2005/06 there was no statistical difference between the mean scores for Asian and Pākehā/European students. In 2010/11, Pākehā/European students scored, on average, 16 scale score points higher than Asian students; this difference between means was statistically significant (even when adjusted for multiple comparisons).

Table 2.3: Trends in New Zealand Year 5 students' mean reading scale scores 2001-2010/11, by ethnic grouping

Year 5 student group	Mean reading scale score for each PIRLS assessment			Change 2001–2010/11
	2001	2005/06	2010/11	
Pākehā/European	552 (3.4)	552 (2.4)	558 (2.3)	+ 5 (4.1)
Māori	481 (5.5)	483 (3.6)	488 (3.6)	+ 7 (6.6)
Pasifika	481 (7.2)	479 (6.7)	473 (5.0)	– 7 (8.8)
Asian	540 (9.9)	550 (5.3)	542 (4.1)	+ 3 (10.7)
Other ethnic groups	~ ~	539 (9.6)	510 (20.2)	~ ~
All New Zealand	**529 (3.2)**	**532 (2.0)**	**531 (1.9)**	**+ 2 (4.0)**

Notes

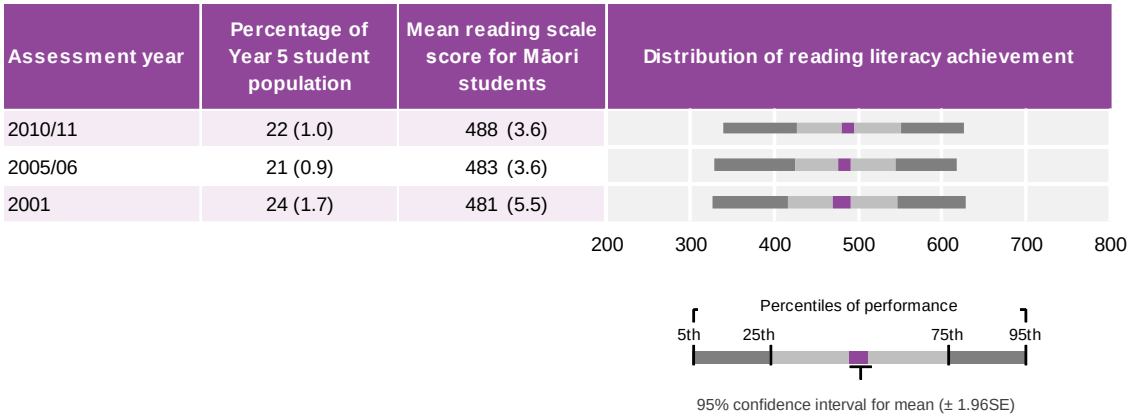
Standard errors appear in parentheses. Because results are rounded, some figures may appear inconsistent.

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

While there were no changes in the means, it is still worth considering the distributions of reading literacy achievement for each ethnic grouping in each of the three cycles of PIRLS. Figures 2.11 to 2.14 show the mean scores and distributions for Year 5 students in each main ethnic grouping for the three cycles; the values of the percentiles and their standard errors are reported in Table B.2C in Appendix B. (Note: the values for the 5th and 95th percentiles for the Pasifika and Asian groupings, particularly in 2001, should be viewed with caution because of the relatively small sample size on which these statistics have been calculated.)

Although the mean for Māori students in 2010/11 was only seven scale points higher than the mean for the 2001 cohort, it is worth noting the small positive shifts at the 5th, 50th, 75th, and 95th percentiles as illustrated in Figure 2.11. While it is not possible to affirm that there has been an improvement in Māori students' reading achievement with statistical certainty, it is encouraging to see the direction of the shift. (Also, refer to Table 2.5 on page 39).

Figure 2.11: Trends in the distribution of reading literacy achievement for Māori Year 5 students, 2001–2010/11



Notes

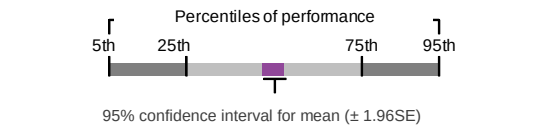
Standard errors appear in parentheses.

See Table B.2C in Appendix B for the percentiles for 2001, 2005/06, and 2010/11.

Figure 2.12 shows the means and distributions for students in the Pasifika grouping. As noted earlier, because the Pasifika grouping forms a smaller proportion of the overall population than for example, Māori students, there are fewer students on which to calculate some statistics, particularly in 2001 (e.g., the 5th and 95th percentiles). However, there is more certainty around the 25th, 50th, and 75th percentiles, which all have lower values in 2010/11 than in 2005/06, suggesting that Pasifika students tended to be a little weaker in this most recent cycle of PIRLS. Understanding more about the composition of this grouping and/or the English-language demands of some of this cohort could provide greater insight into these fluctuations across the 10 years.

Figure 2.12: Trends in the distribution of reading literacy achievement for Pasifika Year 5 students, 2001–2010/11

Assessment year	Percentage of Year 5 student population	Mean reading scale score for Pasifika students	Distribution of reading literacy achievement
2010/11	11 (1.2)	473 (5.0)	
2005/06	7 (0.7)	479 (6.7)	
2001	8 (1.1)	481 (7.2)	



Notes

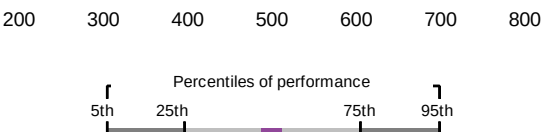
Standard errors appear in parentheses.

See Table B.2C in Appendix B for the percentiles for 2001, 2005/06, and 2010/11.

Students in the Asian grouping showed the greatest shift in mean achievement between 2001 and 2005/06; this was also observed across the distribution for students in the grouping. By way of contrast, Asian students in 2010/11 were not only scoring lower than their 2005/06 counterparts, there was also more variability in their scores reflected in the values of the percentiles and in the range of scores (see Figure 2.13). As with the Pasifika grouping, having more knowledge about composition of this grouping could provide more insight as to why these fluctuations have occurred.

Figure 2.13: Trends in the distribution of reading literacy achievement for Asian Year 5 students, 2001–2010/11

Assessment year	Percentage of Year 5 student population	Mean reading scale score for Asian students	Distribution of reading literacy achievement
2010/11	9 (1.1)	542 (4.1)	
2005/06	8 (0.8)	550 (5.3)	
2001	6 (0.8)	540 (9.9)	



Notes

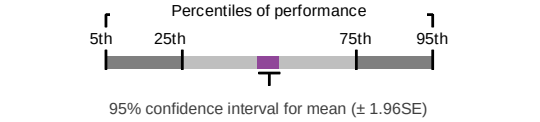
Standard errors appear in parentheses.

See Table B.2C in Appendix B for the percentiles for 2001, 2005/06, and 2010/11.

The means and distributions for students in the Pākehā/European grouping are shown in Figure 2.14. Although there has been no significant change in the mean achievement of Pākehā/European students from 2001 to 2010/11, there was a significant, positive increase at the lower end of the distribution; the value of the 5th percentile in 2010/11 was 417, up nearly 20 scale score points from 2001 (398). There were no significant changes in the values of any of the other percentiles. This suggests that fewer Pākehā/European students in 2010/11 were scoring as low as their counterparts were in 2001.

Figure 2.14: Trends in the distribution of reading literacy achievement for Pākehā/European Year 5 students, 2001–2010/11

Assessment year	Percentage of Year 5 student population	Mean reading scale score for Pākehā/European students	Distribution of reading literacy achievement
2010/11	56 (1.4)	558 (2.3)	
2005/06	62 (1.2)	552 (2.4)	
2001	60 (0.2)	552 (3.4)	



Notes

Standard errors appear in parentheses.

See Table B.2C in Appendix B for the percentiles for 2001, 2005/06, and 2010/11.

For the purpose of trends, Table B.3 in Appendix B reports the estimated effect sizes (Cohen's *d*) for the differences among Pākehā/European, Māori, Pasifika, and Asian students' mean reading scores for each of the PIRLS assessments. Of note are the increases in the value of the effect size from 2005/06 to 2010/11 between Pākehā/European and Asian ($d = 0.02$ to $d = 0.20$) and from 2001 to 2010/11 for Pākehā/European and Pasifika ($d = 0.84$ to $d = 1.07$).

Reading achievement, ethnicity and gender

Since girls and boys both represent diverse groups of students, their performance in PIRLS can also be viewed in the context of their ethnic identity. Pākehā/European (570) and Asian (552) girls, on average, performed well above the international girls' mean of 520. Furthermore, Pākehā/European girls had the highest proportion (84%) of any sub-group scoring at or above the *PIRLS Scale Centrepoint*—500.

At 498, the mean score for Māori girls was significantly lower than the international girls' mean but was about the same as the *PIRLS Scale Centrepoint*; 52 percent of Māori girls achieved a score at or above this level (500). Pasifika girls (482), on average, achieved scores below the international mean for girls; furthermore, only about two-fifths (41%) of these students achieved scores at or above the *PIRLS Scale Centrepoint*.

Pākehā/European boys scored on average 546, with nearly three-quarters (73%) scoring above the *PIRLS Scale Centrepoint* (500). Sixty-nine percent of Asian boys achieved a score above 500; the mean for this group was 533. Both groups of boys also achieved, on average, higher than the international mean for boys (504). The mean scores for Māori boys (478) and Pasifika boys (464)

were both significantly lower than the international boys' mean. Forty-two percent of Māori boys achieved scores at or above the *PIRLS Scale Centrepoint;* the corresponding proportion for Pasifika boys was 35 percent.

Any change from 2001 to 2010/11?

Tables 2.4 and 2.5 present the mean scores for girls and boys in each ethnic grouping respectively. The biggest changes were observed for Pasifika girls (Table 2.4) who, on average, scored a non-significant 18 scale score points lower than their 2001 counterparts. Māori boys (Table 2.5) in 2010/11 scored an average of 12 scale score points higher than their 2001 counterparts. Again, these changes were not found to be of statistical significance, largely due to the larger variability in 2001.

Table 2.4: Trends in New Zealand Year 5 girls' mean reading scale scores 2001–2010/11, by ethnic grouping

Ethnic grouping	Mean reading scale score for Year 5 girls in each PIRLS assessment			Change 2001–2010/11
	2001	2005/06	2010/11	
Pākehā/European	567 (4.7)	564 (2.8)	570 (2.8)	+ 3 (5.4)
Māori	495 (7.2)	498 (4.6)	498 (4.9)	+ 3 (8.7)
Pasifika	500 (10.1)	486 (6.0)	482 (5.6)	–18 (11.5)
Asian	560 (13.7)	562 (5.4)	552 (6.1)	– 8 (15.0)
All New Zealand Girls†	**542 (4.7)**	**544 (2.2)**	**541 (2.2)**	**– 1 (5.2)**

Notes

Standard errors appear in parentheses. Because of rounding, some results may appear inconsistent. None of the changes were statistically significant.

† All New Zealand Girls includes girls in the *Other ethnic groups* category. In 2001 and 2010/11 there was insufficient data to report this grouping's mean by gender (N < 50). In 2005/06 it was 542 (12.1).

Table 2.5: Trends in New Zealand Year 5 boys' mean reading scale scores 2001–2010/11, by ethnic grouping

Ethnic grouping	Mean reading scale score for Year 5 boys in each PIRLS assessment cycle			Change 2001–2010/11
	2001	2005/06	2010/11	
Pākehā/European	539 (4.2)	540 (3.3)	546 (3.3)	+ 8 (5.3)
Māori	466 (6.5)	469 (4.7)	478 (4.6)	+12 (8.1)
Pasifika	465 (10.5)	471 (9.4)	464 (6.8)	– 2 (12.5)
Asian	526 (11.9)	540 (7.3)	533 (5.5)	+ 7 (13.1)
All New Zealand Boys†	**516 (4.2)**	**520 (2.9)**	**521 (2.7)**	**+ 5 (5.0)**

Notes

Standard errors appear in parentheses. Because of rounding, some results may appear inconsistent. None of the changes were statistically significant.

† All New Zealand Boys includes boys in the *Other ethnic groups* category. In 2001 and 2010/11 there were insufficient data to report the mean for this grouping by gender (N < 50 students). In 2005/06, it was 536 (14.2).

Gender differences

Pākehā/European, Māori, Pasifika, and Asian girls on average achieved significantly higher scores than their male counterparts. The differences between means, with standard errors of the differences, were 24 (3.8), 20 (6.1), 18 (7.2), and 19 (8.1) respectively.

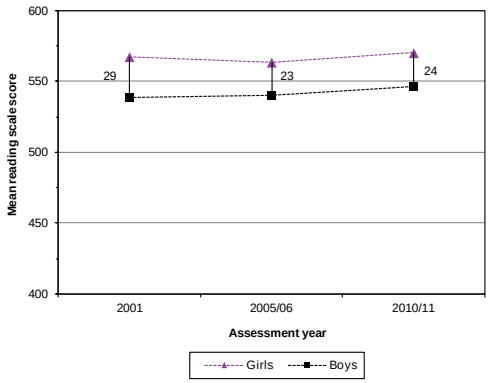
Any change from 2001 to 2010/11?

As was shown in Figure 2.8 on page 33, the average difference between girls' and boys' mean achievement has declined steadily since 2001. However, a significant difference between girls and boys *still* remains in reading; the gap has just got smaller.

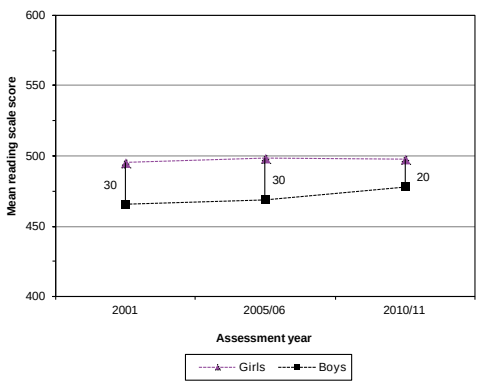
Figures 2.15A to 2.15D illustrate the change between girls and boys within each ethnic grouping. All groups show a decline in the gender difference over the period from 2001 to 2010/11. The decrease in New Zealand's gender difference appears to be mostly attributable to the positive shifts (albeit non-statistical) in the mean scores for Māori and Pākehā/European boys, who represent approximately 37 to 38 percent of the Year 5 population. Asian boys are not likely to have had much influence on the decrease in New Zealand's overall gender difference because they only formed about four to five percent of the overall population in 2010. That is, boys from the other biggest population groups would have had a greater influence on the decrease. Finally, the level of uncertainty for the estimated differences is greater for Pasifika and Asian students in 2001 than it was for other cycles (because of the smaller samples from which the statistics are calculated). The estimates of the gender differences for the Pasifika and Asian groupings are statistically more reliable in 2005/06 and 2010/11 than in 2001.

Figure 2.15 Trends in the difference between New Zealand Year 5 girls' and boys' mean reading scale scores 2001–2010/11, by ethnic grouping

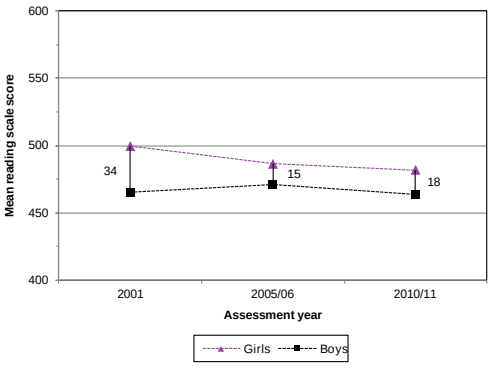
A. Pākehā/European students



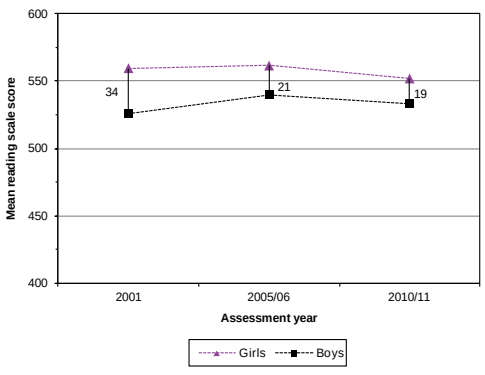
B. Māori students



C. Pasifika students



D. Asian students



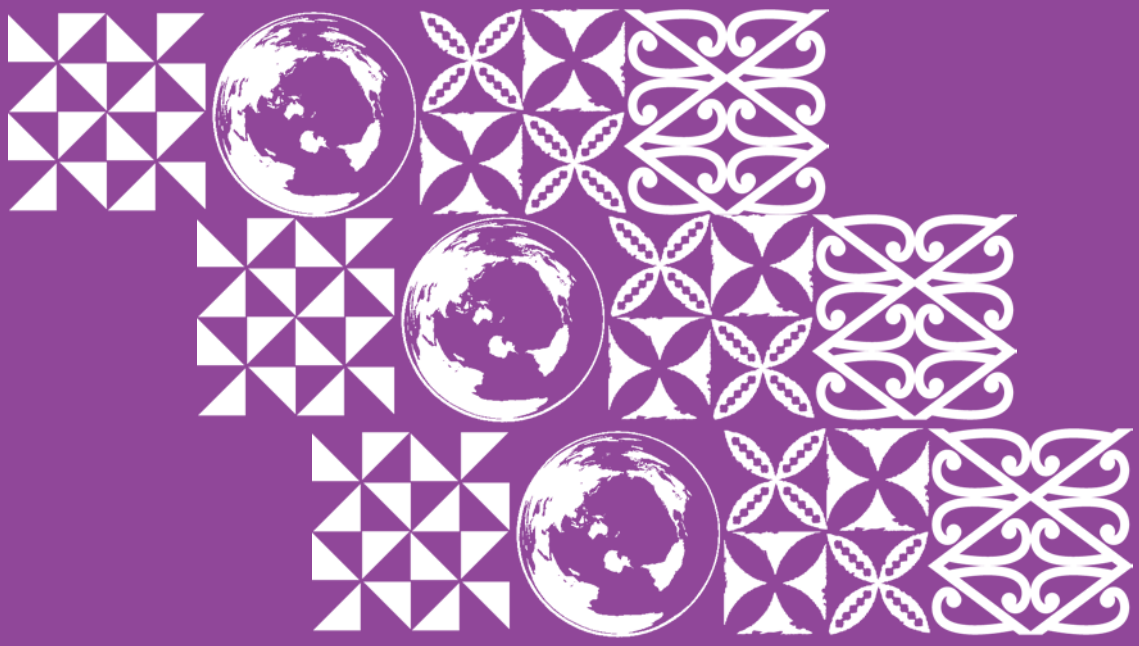
Notes

The number between the purple and black lines is the difference between girls' and boys' mean reading literacy achievement. See Table B.4 in Appendix B for details.

All differences in 2010/11 were statistically significant.

Section 3:

PIRLS International Benchmarks



Section 3: PIRLS International Benchmarks

Section 3 looks at the performance of Year 5 students in relation to the four 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.[28] Descriptions of each international benchmark associated with the type of reading text—literary and informational—are summarised in Box 3.1. 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 in the assessment, the types of questions they were able to answer successfully, and, for multiple-mark constructed response questions, the quality of their responses.

They 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. The points on the scale identified as the benchmarks are fixed over time, so that comparisons can be made with Year 5 cohorts in previous cycles.[29] The benchmarks are:

- the *Advanced International Benchmark* and corresponds to a score of 625
- the *High International Benchmark* and corresponds to a score of 550
- the *Intermediate International Benchmark* and corresponds to a score of 475
- the *Low International Benchmark* and corresponding to 400.

How did New Zealand's Year 5 students perform against the international benchmarks in 2010/11?

The percentages of New Zealand Year 5 students reaching the international benchmarks for reading in PIRLS-2010/11 are shown in Table 3.1. As a comparison, countries with higher (or the same) percentages of students reaching the *Advanced International Benchmark* are also shown.[30] As noted, students reaching a higher benchmark also reach the lower benchmarks, so the percentages shown in the table are cumulative.

In Section 2, Figure 2.1 had highlighted some very marked differences in the mean reading achievement across the countries. This variation is also illustrated in the proportions of students reaching the higher benchmarks such as the *Advanced International Benchmark*. For example, there were no students from Azerbaijan, Oman, Indonesia, or Morocco that reached this benchmark, while New Zealand recorded a relatively large proportion (14%), nearly double the international median (of 8%).

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28 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 by Mullis (2012).

29 These benchmarks are not comparable to the four benchmarks reported and published in the first cycle of PIRLS. In 2001, the 25th, 50th, 75th, and 90th percentiles 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 with the new countries, four points were subsequently fixed in 2005/06 and for future cycles. This means that countries can determine with more certainty any changes over time. The four points were also used retrospectively for examining changes since 2001. Also see Chamberlain (2007 & 2008).

30 Students' achievement results from all the participating countries were pooled for developing the benchmark descriptions in Box 3.1. The medians and descriptors do not include data from the benchmarking participants or the out-of-scope grades.

Box 3.1: Comprehension processes and skills students demonstrated at each of the PIRLS-2010/11 international reading benchmarks

	Reading for literary purposes	Reading to acquire and use information
Advanced International Benchmark	When reading literary texts, students • integrate ideas and evidence across a text to appreciate overall themes; • interpret story events and character actions to provide reasons, motivations, feelings, and character traits with full text-based support.	When reading informational texts, students could: • distinguish and interpret complex information from different parts of the text, and provide full text-based support; • integrate information across a text to provide explanations, interpret significance, and sequence activities; and • evaluate visual and textual features to explain their function.
625		
High International Benchmark	When reading literary texts, students could: • locate and distinguish actions and details embedded across the text; • make inferences to explain relationships between intentions, actions, events, and feelings, and give text-based support; • interpret and integrate story events and character actions and traits from different parts of the text; • evaluate the significance of events and actions across the entire story; and • recognise the use of some language features (e.g., metaphor, tone, imagery).	When reading informational texts, students could: • locate and distinguish relevant information within a dense text or a complex table; • make inferences about logical connections to provide explanations and reasons; • integrate textual and visual information to interpret the relationship between ideas; and • evaluate content and textual elements to make a generalisation.
550		
Intermediate International Benchmark	When reading literary texts, students could: • retrieve and reproduce explicitly stated actions, events and feelings; • make straightforward inferences about the attributes, feelings, and motivations of the main characters; • interpret obvious reasons and causes and give simple explanations; and • begin to recognise language features and style.	When reading informational texts, students could: • locate and reproduce one or two pieces of information; and • use subheadings, text boxes, and illustrations to locate parts of the text.
475		
Low International Benchmark	When reading literary texts, students could: • locate and retrieve explicitly stated detail.	When reading informational texts, students could: • locate and reproduce explicitly stated information that was at the beginning of a text.
400		
Did not reach the *Low International Benchmark*		

Source: Exhibit 2.1 in Mullis, Martin, Foy, & Drucker, 2012.

At 24 percent Singapore recorded the largest proportion reaching the *Advanced International Benchmark*. Some countries with significantly higher mean performance overall than New Zealand had proportionately fewer of their students reaching this benchmark—for example Germany (10%), Italy (10%), and Sweden (9%).

More than two-fifths of New Zealand's Year 5 students (45%) achieved at or above the *High International Benchmark*, about the same as the international median (44%), with three-quarters of New Zealand's Year 5 students (75%) reaching the *Intermediate International Benchmark*, five percentage points lower than the international median (80%). Internationally, the median proportion reaching the *Low International Benchmark* was 95 percent; 20 countries had more than 95 percent of their students scoring at this level. The proportion recorded for New Zealand was slightly lower at 92 percent.

Table 3.1: The 10 countries with the highest percentage of students at the PIRLS *Advanced International Benchmark* in 2010/11

Country	Percentages of students reaching international benchmarks			
	Advanced (625)	High (550)	Intermediate (475)	Low (400)
Singapore	24 (1.6)	62 (1.8)	87 (1.1)	97 (0.4)
Russian Federation	19 (1.2)	63 (1.7)	92 (1.1)	99 (0.2)
Northern Ireland	19 (1.2)	58 (1.4)	87 (0.9)	97 (0.6)
Finland	18 (0.9)	63 (1.3)	92 (0.7)	99 (0.2)
England	18 (1.1)	54 (1.3)	83 (1.1)	95 (0.5)
Hong Kong SAR	18 (1.2)	67 (1.5)	93 (0.8)	99 (0.2)
United States	17 (0.7)	56 (0.8)	86 (0.6)	98 (0.3)
Ireland	16 (0.9)	53 (1.4)	85 (0.8)	97 (0.5)
Israel	15 (0.9)	49 (1.3)	80 (1.3)	93 (0.8)
New Zealand	**14 (0.7)**	**45 (1.1)**	**75 (0.9)**	**92 (0.5)**
International median (45 countries)	8	44	80	95

Notes

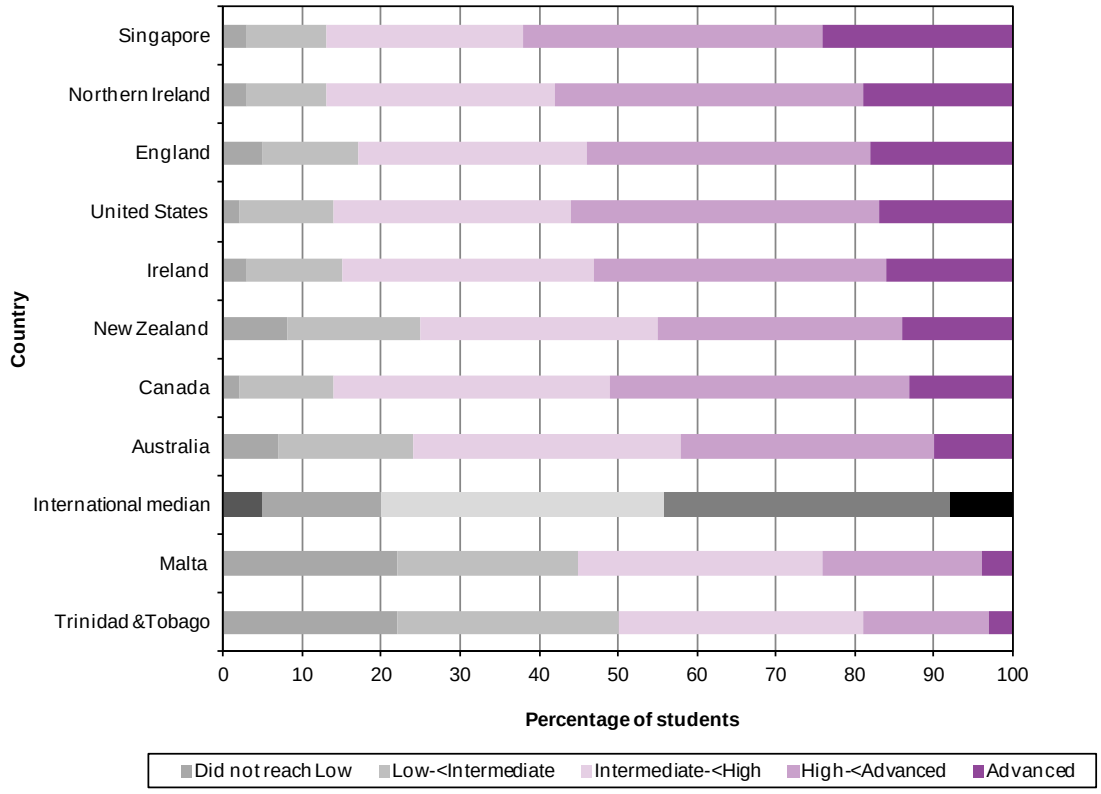
Standard errors appear in parentheses. Because results are rounded, some figures may appear inconsistent.

Refer to Figure 2.1 in Section 2 (or Appendix C.2 in Mullis, Martin, Foy, & Drucker, 2012) for target population coverage notes.

Source: Exhibit 2.2 in Mullis, Martin, Foy, & Drucker, 2012.

Six out of the 10 countries with the highest proportion at the *Advanced International Benchmark* were English-language countries/education systems. Figure 3.1 shows the percentages of students at each of the benchmarks for these six countries and education systems as well as the four other English-language countries. Note that countries are ordered by the proportion reaching the *Advanced International Benchmark.*

Figure 3.1: The percentages of students in New Zealand and the English-language countries reaching the PIRLS international reading benchmarks in 2010/11



Note

The actual percentages (and standard errors) of students reaching each benchmark from each of the countries shown in the figure are recorded in Table B.5 in Appendix B.

Source: Exhibit 2.2 in Mullis, Martin, Foy, & Drucker, 2012.

Box 3.2 on pages 47 and 48 presents a series of examples of questions that were (usually) answered correctly by students reaching the respective benchmarks; they are from the "Giant Tooth Mystery", an informational narrative presented to students in a coloured magazine format with a contemporary literary text called "Enemy Pie ". Above each example is the comprehension process that was being assessed. The comprehension processes along with the reading purposes are discussed in detail in Section 4.

Note that there were no examples of questions from "The Giant Tooth Mystery" that could be answered by students who reached just the *Low International Benchmark*. That is, any of the 'easier' questions in this text tended to be answered correctly by students who also reached the higher benchmarks. The full text with questions is shown in Appendix E.

Box 3.2: Excerpts and examples of questions from "The Giant Tooth Mystery"[31] – percentages of students from selected countries answering correctly

Purpose of the reading text: reading to acquire and use information

A. *Intermediate International Benchmark*

Excerpt from the beginning of the text that relates to question 1

A fossil is the remains of any creature or plant that lived on the Earth many, many years ago. People have been finding fossils for thousands of years in rocks and cliffs and beside lakes. We now know that some of these fossils were from dinosaurs.

Comprehension process: Focus on and retrieve explicitly stated information

1 point: correct response (C)

1. What is a fossil?

   A the surface of rocks and cliffs
   B the bones of a giant
   C the remains of very old living things
   D the teeth of elephants

Country	Students answering correctly (%)	
Finland	89	▲
United States	85	▲
England	83	▲
Northern Ireland	82	▲
Australia	82	▲
Canada	82	▲
Ireland	82	▲
Portugal	80	▲
New Zealand	76	●
International mean	75	
Singapore	75	●

B. *High International Benchmark*

Excerpt from the text that relates to question 2

Long ago, people who found huge fossils did not know what they were. Some thought the big bones came from large animals that they had seen or read about, such as hippos or elephants. But some of the bones people found were too big to have come from even the biggest hippo or elephant. These enormous bones led some people to believe in giants.

Comprehension process: Make straightforward inferences

1 point: sample correct response

2. According to the article, why did some people long ago believe in giants?

Some people long ago believed in Giants because they had found these big bones that could not be bones of creatures on earth.

Country	Students scoring 1 point (%)	
Singapore	81	▲
Portugal	64	▲
England	63	▲
Northern Ireland	62	▲
Ireland	62	▲
New Zealand	59	▲
Australia	58	▲
Canada	57	▲
International mean	53	
Finland	48	▼
United States	45	▼

Continued…

[31] Source: PIRLS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA). Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College, Chestnut Hill, MA and International Association for the Evaluation of Educational Achievement (IEA), IEA Secretariat, Amsterdam, the Netherlands.

…Continued

C. *Advanced International Benchmark*

Excerpts from the text that relate to question

> Now Gideon Mantell believed the fossil tooth had belonged to an animal that looked like an iguana. Only it wasn't two metres long. Gideon Mantell believed it was 30 metres long! He named his creature *Iguanodon*. This means "iguana tooth".
>
> Gideon Mantell did not have a whole *Iguanodon* skeleton. But from the bones he had collected over the years, he tried to figure out what one might have looked like. He thought the bones showed that the creature had walked on all four legs. He thought a pointed bone was a horn. He drew an *Iguanodon* with a horn on its nose.

> Years later, several complete *Iguanodon* skeletons were found. They were only about nine metres long. The bones showed that it walked on its hind legs some of the time. And what Gideon Mantell thought was a horn on its nose was really a spike on its "thumb"! Based on these discoveries, scientists changed their ideas about what the *Iguanodon* looked like.

Comprehension process: Interpret and integrate ideas and information

Maximum 3 points: sample correct response with all three responses correct

13. Later discoveries proved that Gideon Mantell was wrong about what the *Iguanodon* looked like. Fill in the blank spaces to complete the table.

What Gideon Mantell thought the *Iguanodon* looked like	What scientists today think the *Iguanodon* looked like
The *Iguanodon* walked on four legs.	the iguonodon walked on two legs
the iguanodon had a horn on its head	The *Iguanodon* had a spike on its "thumb".
The *Iguanodon* was 30 metres long.	it was 9 metres long

Country	Students scoring all 3 points (%)	
Singapore	57	▲
Finland	48	▲
England	46	▲
Northern Ireland	44	▲
United States	44	▲
Ireland	44	▲
Portugal	42	▲
Canada	42	▲
New Zealand	40	▲
Australia	40	▲
International mean	32	

Key:

- ▲ Significantly higher than the international mean
- ● Not significantly different from the international mean
- ▼ Significantly lower than the international mean

Any change from 2001 to 2010/11?

Table 3.2 summarises the proportions of New Zealand Year 5 students in each of the three cycles of PIRLS that reached each benchmark. There were no changes in the proportions reaching any of the benchmarks for New Zealand. Although the proportion of Year 5 students reaching the *Intermediate International Benchmark* was virtually the same in both 2005/06 (76%) and 2010/11 (75%), relative to the international median the New Zealand proportion was lower than the 2010/11 international median (80%); it had been the same as the international median in 2005/06. This is due to a higher median in 2010/11 than in 2005/06—the effect of new countries with higher performance than New Zealand and some of the trend countries having made significant shifts at the lower benchmarks. Effectively, this meant that relative to many other countries, New Zealand was now under-represented at this mid-range performance level in 2010/11.

Table 3.2: Trends in the percentage of New Zealand Year 5 students reaching the PIRLS international reading benchmarks, 2001–2010/11

Year of assessment	Percentage of Year 5 students reaching the PIRLS international benchmarks			
	Low (400)	Intermediate (475)	High (550)	Advanced (625)
2010/11	92 (0.5)	75 (0.9)	45 (1.1)	14 (0.7)
2005/06	92 (0.6)	76 (1.0)	45 (1.0)	13 (0.7)
2001	90 (1.0)	74 (1.4)	45 (1.6)	14 (1.2)

Notes

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

In 2001 the 25th, 50th, 75th, and 90th percentiles were used as benchmarks. In order to ensure that trends could be measured accurately as new countries joined in subsequent cycles, the benchmarks were fixed at 625, 550, 475, and 400.

In 2005/06, the medians were 7%, 41%, 76%, and 94%; in 2010/11, the international medians were 8%, 44%, 80%, and 95%.

The countries that recorded significant improvements in their overall mean achievement from 2001 to 2010/11 also tended to record improvements at each benchmark (e.g., Singapore, Slovenia). Proportionately more students reaching just the higher benchmarks were observed for some trend countries (e.g., Romania), while others had recorded significant decreases in the proportions reaching all benchmarks (e.g., Sweden, Lithuania).

Of interest here, is the fact that many trend countries recorded significant increases in the proportions of students reaching the lower benchmarks—that is, there were (proportionately) fewer weaker students in these countries than in earlier cycles of PIRLS, in contrast to New Zealand where the status quo had been maintained. Table 3.3 highlights the changes at the two lower benchmarks for the trend countries, and whether or not these were significant.

Table 3.3: The percentages of students reaching the lower international benchmarks in the 19 trend countries, 2001–2010/11

Trend country	Percentage of students reaching the lower international benchmarks							
	Low (400)			Change	Intermediate (475)			Change
	2001	2005/06	2010/11	2001–2010/11	2001	2005/06	2010/11	2001–2010/11
Iran, Islamic Rep. of	56	60	76	▲	28	30	45	▲
Hong Kong SAR	97	99	99	▲	81	92	93	▲
Russian Federation	96	98	99	▲	80	90	92	▲
Singapore	90	97	97	▲	76	86	87	▲
Slovenia	91	94	95	▲	67	76	79	▲
Slovak Republic	94	94	96	●	76	80	82	▲
United States	94	96	98	▲	80	82	86	▲
Norway	88	92	95	▲	65	67	71	▲
Germany	97	97	98	●	83	87	85	●
New Zealand	**90**	**92**	**92**	●	**74**	**76**	**75**	●
Italy	97	98	98	●	83	87	85	●
England	94	93	95	●	82	78	83	●
France	95	96	95	●	77	76	75	●
Romania	88	84	86	●	69	61	65	●
Netherlands	99	99	100	●	92	91	90	●
Hungary	98	97	95	▼	85	86	81	▼
Lithuania	98	99	97	▼	85	86	80	▼
Bulgaria	95	95	93	●	83	82	77	▼
Sweden	98	98	98	▼	90	88	85	▼
Median for 19 Trend countries	**95**	**96**	**96**		**80**	**82**	**82**	

Key

▲ Change significantly higher

● Not statistically different

▼ Change significantly lower

Notes

Because of rounding some figures may appear inconsistent.

The median percentage for the 19 trend countries reaching the *Advanced International Benchmark* was 9% in 2001; 11% in 2005/06; and 10% in 2010/11.

The median percentage for the 19 trend countries reaching the *High International Benchmark* was 45% in 2001; 48% in 2005/06; and 46% in 2010/11.

Source: Exhibit 2.3 in Mullis, Martin, Foy, & Drucker, 2012.

A number of countries had only participated in two cycles of PIRLS, either 2001 and 2010/11, or 2005/06 and 2010/11, some of which also had significant shifts at the lower benchmarks. For example, relatively big improvements (in the order of 6 to 14 percentage points) were observed for Trinidad and Tobago at three of the four benchmarks; the exception was no change at the *Advanced International Benchmark*. Denmark also showed significant shifts in the order of two to three percentage points at both the *Low* and *Intermediate International Benchmarks.*

From a trend perspective, it is also interesting to consider the increases or decreases on the actual questions associated with the texts. Box 3.3 presents a series of examples from “Fly Eagle Fly”, a traditional African story, with the percentages of New Zealand’s Year 5 students that answered correctly in 2005/06 and in 2010/11.

Box 3.3 Excerpts and examples of questions from "Fly Eagle Fly" [32] – percentage of New Zealand Year 5 students answering correctly in 2005/06 and 2010/11

Purpose of the reading text: reading for literary experience

A. *Low International Benchmark* example

Excerpt from the beginning of the text that relates to question 1

A farmer went out one day to search for a lost calf. The herders had returned without it the evening before. And that night there had been a terrible storm.

He went to the valley and searched by the riverbed, among the reeds, behind the rocks and in the rushing water.

He climbed the slopes of the high mountain with its rocky cliffs. He looked behind a large rock in case the calf had huddled there to escape the storm. And that was where he stopped. There, on a ledge of rock, was a most unusual sight. An eagle chick had hatched from its egg a day or two earlier, and had been blown from its nest by the terrible storm.

Comprehension process: Focus on and retrieve explicitly stated information

1 point: correct response (A)

1. What did the farmer set out to look for at the beginning of the story?

   (A) a calf
   (B) herders
   (C) rocky cliffs
   (D) an eagle chick

Year 5 students answering correctly (%)	
2005/06	2010/11
90	91

B. *Intermediate International Benchmark* example (scoring at least one point)[33]

Excerpt from the text that relates to question 7

So, the eagle lived among the chickens, learning their ways. As it grew, it began to look quite different from any chicken they had ever seen.

One day a friend dropped in for a visit. The friend saw the bird among the chickens.

"Hey! That is not a chicken. It's an eagle!"

The farmer smiled at him and said, "Of course it's a chicken. Look, it walks like a chicken. It eats like a chicken. It thinks like a chicken. Of course it's a chicken."

But the friend was not convinced. "I will show you that it is an eagle," he said.

The farmer's children helped his friend catch the bird. It was fairly heavy but the farmer's friend lifted it above his head and said, "You are not a chicken but an eagle. You belong not to the earth but to the sky. Fly, Eagle, fly!"

Comprehension process : Interpret and integrate ideas and information

At least 1 point: sample correct response (2 points)

7. Explain what the farmer's friend meant when he told the eagle, "You belong not to the earth but to the sky."

That an eagle shouldnt be brought up like a chicken and they fly and thus not always on earth but the eagle was born to fly

Number of score points	Year 5 students answering correctly (%)	
At least 1 point	80	75
2 points	47	51

Continued …

[32] Source: PIRLS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA). Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College, Chestnut Hill, MA and International Association for the Evaluation of Educational Achievement (IEA), IEA Secretariat, Amsterdam, the Netherlands.

[33] Students who scored the full two points on this question typically also reached the *High International Benchmark*.

…Continued

C. *High International Benchmark* example

Excerpt from the text that relates to question 11

"Where are we going?" asked the farmer sleepily.
"To the mountains where you found the bird."
"And why at this ridiculous time of the night?"
"So that our eagle may see the sun rise over the mountain and follow it into the sky where it belongs."
They went into the valley and crossed the river, the friend leading the way. "Hurry," he said, "for the dawn will arrive before we do."
The first light crept into the sky as they began to climb the mountain. The wispy clouds in the sky were pink at first, and then began to shimmer with a golden brilliance. Sometimes their path was dangerous as it clung to the side of the mountain, crossing narrow shelves of rock and taking them into dark crevices and out again. At last he said, "This will do." He looked down the cliff and saw the ground hundreds of metres below. They were very near the top.
Carefully, the friend carried the bird onto a ledge. He set it down so that it looked toward the east, and began talking to it. The farmer chuckled. "It talks only chicken-talk."
But the friend talked on, telling the bird about the sun, how it gives life to the world, and how it reigns in the heavens, giving light to each new day. "Look at the sun, Eagle. And when it rises, rise with it. You belong to the sky, not to the earth." At that moment, the sun's first rays shot out over the mountain, and suddenly the world was ablaze with light.

Comprehension process: Examine and evaluate content, language, and textual elements

1 point: correct response (A)

11. Why was the rising sun important to the story?

(A) It awakened the eagle's instinct to fly.
(B) It reigned in the heavens.
(C) It warmed the eagle's feathers.
(D) It provided light on the mountain paths.

Year 5 students answering correctly (%)	
2005/06	2010/11
61	60

D. *Advanced International Benchmark* example

Excerpt from the text that relates to question 8

The farmer's children helped his friend catch the bird. It was fairly heavy but the farmer's friend lifted it above his head and said, "You are not a chicken but an eagle. You belong not to the earth but to the sky. Fly, Eagle, fly!"
The bird stretched out its wings, looked about, saw the chickens feeding, and jumped down to scratch with them for food.
"I told you it was a chicken," the farmer said, and he roared with laughter.

Comprehension process: Interpret and integrate ideas and information

1 point: correct response (D)

8. Why did the farmer roar with laughter during his friend's first visit?

(A) The eagle was too heavy to fly.
(B) The eagle was difficult to catch.
(C) The eagle looked different from the chickens.
(D) The eagle proved him right.

Year 5 students answering correctly (%)	
2005/06	2010/11
53	52

PIRLS reading benchmarks, gender, and ethnicity

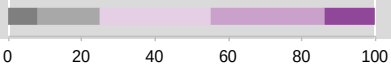
Figure 3.2 shows the proportions of New Zealand Year 5 students who reached the PIRLS international benchmarks, by gender and ethnic grouping. Consistent with previous cycles, Year 5 girls, Pākehā/European students, and Asian students were well represented at the higher benchmarks with about half or more students in these groups achieving at or above the *High International Benchmark* (i.e., scored 550 or higher). Year 5 boys, and to a much greater extent, Māori and Pasifika students were less likely to be scoring at this level; one-quarter of Māori students and about one-sixth of Pasifika students (16%) reached this benchmark.

Looking specifically at the composition of the higher-performing group (which was about 45% of all Year 5 students), relative to the proportion in the population Year 5 boys were a little under-represented, with the group comprising proportionately fewer boys (46%) than girls (54%). However, Māori and Pasifika were particularly under-represented, with the higher-performing group comprising 13 percent of Māori students (c.f., 22% in the Year 5 population) and four percent of Pasifika students (c.f., 11% in the Year 5 population).

Pasifika students (50%) and to a lesser extent Māori students (58%) were also less likely than students in the other groups to achieve at or above the *Intermediate International Benchmark* (i.e., achieve a score of 475 or higher).

Figure 3.2: Percentage of New Zealand Year 5 students reaching the PIRLS international reading benchmarks in 2010/11, by gender and ethnic grouping

Year 5 student group	Percentage of Year 5 students reaching PIRLS international benchmark	Cumulative percentages			
		Low (400)	Intermediate (475)	High (550)	Advanced (625)
Gender					
Girls		94 (0.6)	79 (1.2)	49 (1.4)	16 (1.0)
Boys		90 (0.9)	71 (1.4)	40 (1.6)	11 (1.0)
Ethnic grouping					
Pākehā/European		96 (0.5)	85 (1.0)	57 (1.5)	19 (1.1)
Māori		83 (1.6)	58 (2.1)	25 (1.8)	5 (0.8)
Pasifika		82 (2.0)	50 (2.2)	16 (2.4)	3 (0.8)
Asian		96 (1.4)	82 (2.6)	50 (2.5)	13 (1.6)
All New Zealand†		**92 (0.5)**	**75 (0.9)**	**45 (1.1)**	**14 (0.7)**



Notes

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

The dark grey sections on the left-hand-side of the bars represent the percentages of students who did not reach the *Low International Benchmark*; the mauve represents the students reaching the *Low International Benchmark* but did not reach the *Intermediate International Benchmark*, and so on. The dark purple represents the percentage reaching the *Advanced International Benchmark*.

† Includes 2% of students in the *Other ethnic groups* category.

Any change from 2001 to 2010/11?

Consistent with the overall pattern observed for New Zealand, there were no statistically *significant* changes (at the 5% level) for Year 5 student sub-populations—gender or ethnic grouping. In Appendix B, Tables B.6A and B.6B present the percentages of students who reached the international benchmarks in 2001 and 2005/06 respectively.

Despite there being no *statistical* changes during the period 2001 to 2010/11, at the *Low International Benchmark* there was a very *small* positive shift (approximately 2 percentage points) for the Pākehā/European grouping over the 10-year period,[34] as well as a small positive shift of three percentage points for Year 5 boys. Also, in keeping with the observation made in Section 2 where there was a positive, albeit *non-significant*, shift in the mean achievement of Pākehā/European boys and Māori boys, proportionately more boys in both groups also reached both the lower benchmarks in 2010/11 than in 2001.[35] Even though these changes were not *statistically* significant, it is encouraging to see these positive shifts for boys, in particular Māori boys, who have tended to be over-represented amongst lower-achievers.

Lower-achieving students in New Zealand

PIRLS is not designed to measure failure; nor does it set out to identify children that cannot read (decode) per se. PIRLS is designed to assess children's reading comprehension skills and is thus 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.

In 2005/06, New Zealand's 'lower achievers' were defined as those students who did not reach the PIRLS *Intermediate International Benchmark* (i.e., scored below 475)—24 percent of Year 5 students were in this group. The reason for choosing this particular benchmark was two-fold: firstly, and internationally, New Zealand had proportionally more students in this category compared to higher-performing education systems that conducted the assessment in English, particularly Singapore with just 14 percent. Secondly, and from a qualitative perspective, it was the types of skills and comprehension processes with which this particular group of students had difficulty (see Chamberlain, 2008).

The purpose of the following analysis is to look at this group again from a trend perspective and because the proportion of Year 5 students not reaching the *Intermediate International Benchmark* (25%), is now five percentage points lower than the international median (75% c.f. 80%). So what does this mean in terms of reading comprehension as measured by PIRLS in 2010/11? Referring back to Box 3.1, when lower-achieving students were reading the literary texts, these students had difficulty with:

- retrieving and reproducing explicitly stated actions, events, and feelings
- making straightforward inferences about the main characters
- interpreting obvious reasons and causes and giving simple explanations.

When they read the informational texts, these students had difficulty with:

- locating and reproducing two or three pieces of information from within the text
- using subheadings, text boxes, and illustrations to locate parts of the text.

Some of the students even had difficulty with locating and retrieving explicitly stated detail from both types of texts, even at the beginning of a text.

---

[34] The critical value for Pākehā/European was such that the change over the ten-year period was borderline for being statistically significant at the 5% (t = 1.957). The change is significant at the 10% level.

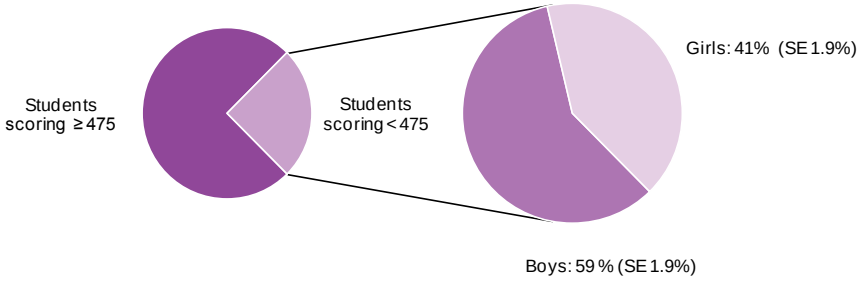
[35] The proportion of Pākehā/European boys reaching the *Low International Benchmark* increased from 93% to 95%; the proportion of Māori boys reaching this level increased from 74% to 80%. The proportion of Pākehā/European boys reaching the *Intermediate International Benchmark* increased from 78% to 81%; the proportion of Māori boys increased from 48% to 53%.

So who was in the lower-achieving group? Figures 3.3 to 3.5 present the composition of the lower-achievers group according to Year 5 students' gender, ethnicity, and gender and ethnicity.[36] As well as looking at the composition, the approach taken is also to look at the lower achievers from each sub-population as a proportion of the overall Year 5 population. Are particular sub-populations over-represented among the group of lower achievers?

Composition of the lower-achievers group

Figure 3.3 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, the majority of those in the lower-achievers group were boys (59%).

Figure 3.3: Gender composition of the New Zealand lower-achievers group, 2010/11



Notes

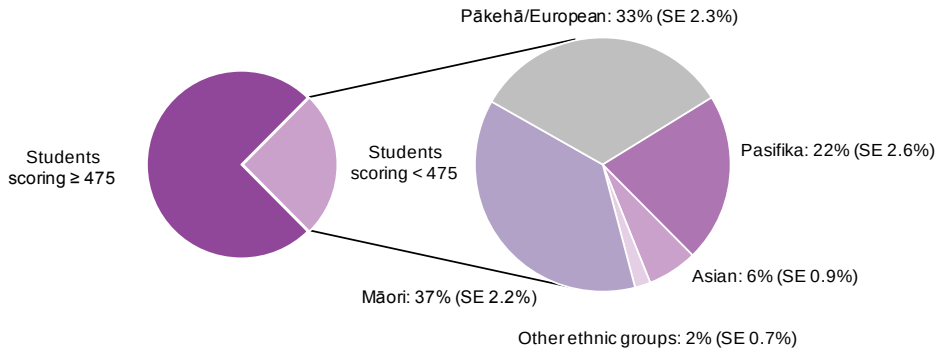
Standard errors (SE) appear in parentheses.

The proportion of all Year 5 students who reached the PIRLS *Intermediate International Benchmark* was 75 percent (SE 0.9%); the proportion who did not reach this benchmark was 25 percent (SE 0.9%).

In 2010/11 as a proportion of the total Year 5 population:

- Approximately 15 percent were lower-achieving boys (15% in 2005/06)
- 10 percent were lower-achieving girls (9% in 2005/06).

Figure 3.4: Ethnic composition of the New Zealand lower-achievers group, 2010/11



Notes

Standard errors (SE) appear in parentheses.

The proportion of all Year 5 students who reached the PIRLS *Intermediate International Benchmark* was 75 percent (SE 0.9%); the proportion who did not reach this benchmark was 25 percent (SE 0.9%).

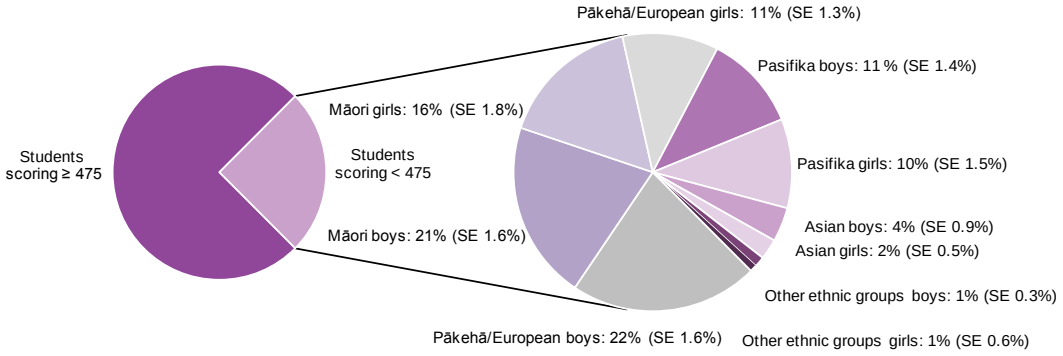
[36] In Section 5, the composition of the Year 5 lower-achievers group is also considered in terms of whether or not they spoke the test language. In Section 6, the composition is considered by the decile (band) of the school the Year 5 students attended in 2010.

In 2010/11 as a proportion of the total Year 5 population:

- 9 percent were lower-achieving Māori students (9% in 2005/06)
- 8 percent were lower-achieving Pākehā/European students (10% in 2005/06)
- 5 percent were lower-achieving Pasifika students (3% in 2005/06)
- 2 percent were lower-achieving Asian students (1% in 2005/06)
- < 1 percent were lower achieving students from Other ethnic groups (the same as in 2005/06).

The interaction between gender and ethnicity is shown in Figure 3.5. The lower-achievers group comprised mostly Pākehā/European boys (22%) and Māori boys (21%). However, when these data are compared with the proportions in the (estimated) overall Year 5 population, Māori boys (c.f. 11% of the Year 5 population) and Pasifika girls (c.f. 6%), and Pasifika boys (5%) were 'well' over-represented in the lower-achievers group.

Figure 3.5: Ethnic and gender composition of the New Zealand lower-achievers group, 2010/11



Notes

Standard errors (SE) appear in parentheses.

The proportion of all Year 5 students who reached the PIRLS *Intermediate International Benchmark* was 75 percent (SE 0.9%); the proportion who did not reach this benchmark was 25 percent (SE 0.9%).

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 something happening (or an *event*).

Using the odds, a type of an effect size was calculated—an odds ratio (*OR*).[37] If the value of the *OR* is greater than 1, the chance of something happening 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.

[37] This was achieved 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).

The observations from the analysis are summarised as follows.

- Year 5 boys had about 1.5 times the odds of being in the lower-achievers group than girls (0.41 c.f. 0.27)
- Pasifika (1.00) students had about 3.5 times the odds of being in the lower-achievers group compared to non-Pasifika (0.29); the odds for Māori were slightly lower (0.72) but more than 2.5 times the odds of non-Māori (0.26)
- Pasifika boys (1.16) followed by Māori boys and Pasifika girls (both 0.89), had the highest odds of being in the lower-achievers' group compared with all other students.

The *ORs* and confidence intervals for each demographic characteristic under scrutiny are reported in Table B.7 in Appendix B.

Any change from 2001 to 2010/11

The lower achievers definition was first applied in 2005/06 in light of the proportion of New Zealand students not reaching the *Intermediate International Benchmark*. Looking back at the 2001 Year 5 cohort, there were no significant changes in the composition of the lower-achievers group from 2001 to 2005/06 with changes mostly occurring since the second cycle in 2005/06.

As a proportion of the lower-achievers group there were fewer Year 5 boys in 2010/11 than in 2005/06 (62% to 59%), although this three percentage point decrease was not found to be statistically significant.

The lower-achievers group comprised proportionately fewer Pākehā/European students (a significant decrease of 8 percentage points from 41% to 33%). This was largely due to a significant *decrease* in the proportion of Pākehā/European *boys* in this group (from 28% in 2005/06 to 22% in 2010/11). In contrast, a significantly higher proportion of Pasifika students were found to be in the lower achievers group in 2010/11 than in 2005/06 (14% to 22%). Significant increases were observed in the proportions of both Pasifika boys and Pasifika girls (Pasifika boys: increased 8% to 11%; Pasifika girls: 6% to 10%).

There were no significant changes for either Māori or Asian students over this period.[38] However, Māori students now make up the highest proportion at 37 percent of the lower-achievers group (or 9% of all Year 5 students).

As well as looking at the composition of the lower-achievers group, we can consider the proportion of each sub-population that fell into this particular achievement category. Table 3.4 shows the proportions of each sub-population (gender and ethnic groupings) that scored below 475.

[38] Although the decrease was not statistically significant at the 5% level, proportionally fewer Māori girls were amongst the lower-achievers group in 2005/06 than was the case in 2001 (19% c.f. 15%)

Table 3.4 **Trends in the percentages of New Zealand Year 5 sub-populations in the lower-achievers group, 2001–2010/11**

Year 5 student group	Percentage in lower-achievers group		
	2001	2005/06	2010/11
Gender			
Girls	21 (1.8)	18 (1.0)	21 (1.2)
Boys	31 (1.7)	29 (1.4)	29 (1.4)
Ethnic grouping			
Pākehā/European	17 (1.4)	16 (1.0)	15 (1.0)
Māori	45 (2.7)	44 (1.9)	42 (2.1)
Pasifika	44 (4.3)	46 (3.2)	50 (2.2)
Asian	22 (4.6)	16 (2.4)	18 (2.6)

Note

Standard errors appear in parentheses.

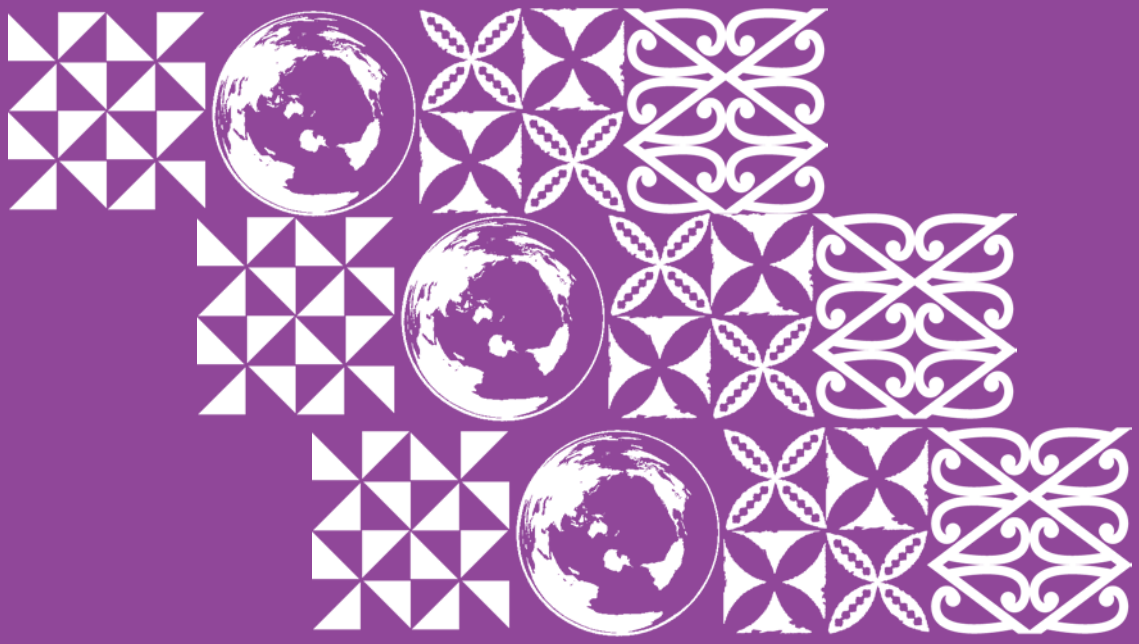
The data in this table provide another perspective to the approach whereby the composition of the lower-achievers group is examined. For example, while the lower-achievers group in 2010/11 comprised proportionately more Māori students than students from other groupings, proportionately fewer Māori students were scoring lower than 475 in 2010/11 than in 2001. There is, however, more variation around the estimates in 2001 due to the smaller sample sizes hence there were no statistical changes over the period from 2001–2010/11.

Changes in the *odds* (and *ORs*) for these particular groups being in the lower achievers are also considered. In brief, from 2005/06 to 2010/11, the odds of being a lower achiever:

- decreased slightly for Year 5 boys from being nearly twice those of Year 5 girls in 2005/06 to about 1.5 times in 2010/11
- decreased slightly for Māori from just more than three times to just *under* three times the odds of non-Māori
- decreased for Māori boys from about four times to three times the odds of non-Māori boys
- were the same for Māori girls at just over twice the odds of non-Māori girls
- increased for Pasifika students from about three to 3.5 times the odds of non-Pasifika students
- increased for Pasifika boys from three times to four times the odds of non-Pasifika boys
- increased for Pasifika girls from being 2.5 times to nearly three times the odds of non-Pasifika girls.

Section 4:

Purposes for Reading and Processes of Reading



Section 4: Purposes for Reading and Processes of Reading

PIRLS 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. This section looks at Year 5 students' achievement according to the purposes for reading and by the reading comprehension processes. An example of a PIRLS informational text, "The Giant Tooth Mystery", is presented in Appendix E, along with the questions and the specific processes of comprehension that were being assessed.

The purposes for reading

The two main purposes for reading for middle primary students are described in Box 4.1.[39] PIRLS-2010/11 used two numerical scales to look at student achievement in relation to the purposes for reading—*reading for literary experience* (literary reading) and *reading to acquire and use information* (informational reading). Each reading purpose was scaled so that countries are able to compare their students' achievement in each purpose relative to their overall reading achievement.

Box 4.1: The PIRLS-2010/11 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 his or her own experiences, feelings, appreciation of language and knowledge of literary forms to the text. For young readers, literature offers the opportunity to explore situations and feelings they've not yet encountered. 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. Readers go beyond acquisition of information and use it in reasoning and in action. 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, Martin, Kennedy, Trong, & Sainsbury, 2009.

While the scales allow countries to see their students' strengths or weaknesses relative to their overall reading achievement, scores for each scale are not directly comparable because they represent different constructs and the test questions had different levels of difficulty.[40] For many countries' Grade 4 students, informational reading was found to be more difficult than literary reading.[41]

Countries with higher mean achievement in reading overall tended to demonstrate higher achievement in both reading purposes. In literary reading, New Zealand's mean score was 533; the highest mean scores were observed for Finland (568), and the Russian Federation and Singapore (both 567). In informational reading, New Zealand's mean scale score was 530; the highest scores in

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39 Also refer to Box 1.2 in Section 1 for details on the types of texts used to assess the two purposes for reading.

40 In 2001 and 2005/06 the scaling was such that the mean score for one purpose could be compared directly with the mean score for the second purpose. New reading purposes scores have been generated for 2001 and 2005/06.

41 A simple way of looking at this is to consider the mean percentage correct across the questions internationally. Fifty percent of informational questions were answered correctly, on average, compared to an average of 59 percent of literary items on average. (Appendix E in Mullis, Martin, Foy, & Drucker, 2012).

this reading purpose, on average, were achieved by students in Hong Kong SAR (578), the Russian Federation (570), and Singapore (569).

Students in many countries exhibited a strength or weakness in one of the purposes compared to their overall reading literacy achievement. New Zealand was one of 14 countries, including Germany, Sweden, and four of the English-language countries, where literary reading was a significant strength relative to their overall reading performance. Literary reading was a significant weakness in 12 countries including Hong Kong SAR, Italy, and Portugal.

Informational reading was a significant strength in 13 countries, including the three where literary reading was noted as a weakness—Hong Kong SAR, Italy, and Portugal. It was also found to be a significant weakness for the four English-language countries— Canada, Ireland, Northern Ireland, and United States—where literary reading was found to be a significant strength. New Zealand Year 5 students' achievement in informational reading did not differ significantly from their overall reading achievement.

There were 15 countries where neither purpose was found to be a strength or weakness, for example, Australia and Finland.

Table 4.1 summarises the reading purposes for each of the English-language countries, with countries or education systems ordered according to their overall reading achievement score.

Table 4.1: The mean scale scores for the PIRLS reading purposes in 2010/11 – New Zealand and the English-language countries

Country	Mean scale score for each reading purpose						Overall mean reading scale score	
	Literary reading			Informational reading				
Singapore	567	(3.5)	●	569	(3.3)	▲	567	(3.3)
Northern Ireland	564	(2.7)	▲	555	(2.6)	▼	558	(2.4)
United States	563	(1.8)	▲	553	(1.6)	▼	556	(1.5)
Ireland	557	(2.7)	▲	549	(2.3)	▼	552	(2.3)
England	553	(2.8)	●	549	(2.6)	●	552	(2.6)
Canada	553	(1.7)	▲	545	(1.7)	▼	548	(1.6)
New Zealand	**533**	**(2.3)**	▲	**530**	**(2.0)**	●	**531**	**(1.9)**
Australia	527	(2.2)	●	528	(2.2)	●	527	(2.2)
Malta	470	(1.7)	▼	485	(1.5)	▲	477	(1.4)
Trinidad & Tobago	467	(4.1)	▼	474	(3.8)	▲	471	(3.8)

Notes

Standard errors appear in parentheses.

▲ Reading purpose significantly higher than overall reading score

● Reading purpose not significantly different from overall reading score

▼ Reading purpose significantly lower than overall reading score

Source: Exhibit 3.1 in Mullis, Martin, Foy, & Drucker, 2012.

Any change from 2001 to 2010/11?

Table 4.2 shows the mean reading scores for New Zealand's Year 5 students in the two reading purposes for each PIRLS assessment. Because of the rescaling undertaken internationally to link each reading scale directly to the overall reading scale, the scores in Table 4.2 for 2001 and 2005/06 are not the same as those reported in the international publication *PIRLS 2006 International Report*

(Mullis, Martin, Kennedy, & Foy, 2007) or in either of the two national publications (Chamberlain, 2007 & 2008).

Table 4.2: Trends in New Zealand Year 5 students' mean scale scores for the PIRLS reading purposes, 2001–2010/11

Reading purpose	Mean scale score for each PIRLS assessment			Difference 2001–2010/11
	2001	2005/06	2010/11	
Literary reading	535 (4.1)✸	529 (2.1)⟡	533 (2.3)✸	–1 ●
Informational reading	526 (4.0)	534 (2.4)◈	530 (2.0)	+ 4 ●

Notes

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

● The differences between 2001 and 2010/11 were not statistically significant.

✸ In 2001 and 2010/11, Year 5 students' performance was significantly stronger in literary reading compared to their overall reading; there was no difference between students' overall reading and their informational reading (i.e., neither a weakness nor a strength).

◈ In 2005/06, Year 5 students' performance was significantly stronger on informational reading; ⟡ their performance was significantly weaker in literary reading compared to their overall reading.

Although there were small numeric changes in the mean scores for each reading purpose across the period from 2001 to 2010/11, none of the changes were found to be statistically significant. However, there were changes in the relative performance in each of the two areas across the three cycles. In 2001, literary reading was a significant strength for New Zealand Year 5 students while informational reading was neither a strength nor weakness, compared to their overall reading performance.[42] Four years later in 2005/06, this pattern had reversed; informational reading was a significant strength, and literary reading was found to be a significant weakness compared to their overall performance in reading. In 2010/11, this pattern changed again so that it reflected the pattern in 2001; literary reading was a significant strength with informational reading neither a strength nor weakness, compared to their overall performance in reading.

Purposes for reading, by gender and ethnicity

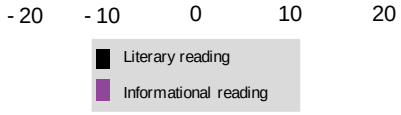
New Zealand's Year 5 girls, on average achieved significantly above the international means for girls in literary reading (546 c.f. 522) and informational reading (537 c.f. 519). Finnish girls generally had the highest achievement in literary reading (582) and Hong Kong SAR girls generally had the highest achievement in informational reading (582). Year 5 boys' means were significantly above both the international literary reading mean for boys (521 c.f. 502) and the informational reading mean for boys (522 c.f. 507). The highest mean in literary reading for boys was observed for Russian Federation boys (557), with Hong Kong SAR boys recording the highest mean in informational reading (574).

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 2010/11. Although not shown in the figure, New Zealand's Pākehā/European girls recorded the highest average achievement in both literary reading (577) and informational reading (565). Asian girls scored an average of 25 scale score points lower than Pākehā/European girls in literary reading (552); their mean score in informational reading was 555.

[42] These comparisons are subtly different from those reported in previous assessment cycles when the absolute difference between the two purposes was tested for significance. In 2001, Year 5 students' performance was generally (significantly) stronger at literary reading, thus a strength compared with their informational reading. In 2005/06, the reverse was observed with Year 5 students generally (significantly) stronger at informational reading than literary reading.

Figure 4.1: New Zealand Year 5 students' relative achievement in the PIRLS reading purposes in 2010/11, by gender and ethnic grouping

Year 5 student group	Mean scale score for literary reading	Mean scale score for informational reading	Relative difference *significant*	
			Purpose score *lower* than overall reading score	Purpose score *higher* than overall reading score
Gender				
Girls	546 (2.7)	537 (2.4)		
Boys	521 (3.3)	522 (2.8)		
Ethnic grouping				
Pākehā/European	562 (2.8)	555 (2.5)		
Māori	489 (3.8)	486 (3.3)		
Pasifika	472 (5.4)	475 (5.6)		
Asian	539 (4.5)	547 (4.6)		
New Zealand†	**533 (2.3)**	**530 (2.0)**		



Notes

Standard errors appear in parentheses.

The coloured bars indicate when the **relative difference** for each Year 5 student group is significant. The relative difference is the difference between: (a) the mean score for literary reading and the overall reading score (b) the informational reading score and the overall reading mean.

† Information for students in the *Other ethnic groups* category is not reported separately but is included in the overall New Zealand figures.

At 548, Pākehā/European boys, on average, also recorded relatively high scores in literary reading; they also tended to score well on average in informational reading (546). Compared to their overall reading performance, Asian boys tended to be weaker in literary reading (528) than they were in informational reading (539).

Māori girls scored, on average, 502 in literary reading and 493 in informational reading. Pasifika girls scored an average of 17 scale score points lower than Māori girls in literary reading score (485), which was similar to their mean score in informational reading (483). Māori boys' mean achievement in literary reading was 476, marginally lower than their mean for informational reading (480). Pasifika boys had the weakest mean achievement in both purposes: 459 in literary reading and 467 in informational reading.

Strengths and weaknesses in the reading purposes

Figure 4.1 also highlights the significance of the relative strengths and weaknesses of each sub-population in each reading purpose. It shows that relative to their overall reading, literary reading was a significant strength for Year 5 girls, with informational reading a significant weakness. While there were differences between the reading purposes for other sub-populations, the differences were only of statistical significance for the Pākehā/European grouping, with these Year 5 students significantly stronger on literary reading, and significantly weaker on informational reading.

Gender differences[43]

Internationally, the mean difference between girls' and boys' mean literary reading was approximately 20 scale score points, with the girls in all but two countries—Colombia and Israel—significantly outperforming their male counterparts. The New Zealand mean difference in literary reading was 26.

Consistent with the overall reading, New Zealand Year 5 girls in each ethnic grouping generally achieved higher reading scores in literary reading than their respective male counterparts. The difference between Pākehā/European girls and boys was highest, averaging 30 scale score points while Māori girls typically scored 26 points higher than Māori boys in literary reading; the differences between girls and boys in the Pasifika and Asian groupings were 25 and 24 scale score points respectively.

A similar pattern was observed in informational reading. On average internationally, the difference across countries averaged about 12 scale score points; the mean difference for New Zealand was a little higher at 15. A number of countries recorded small or virtually no difference between their boys' and girls' informational reading scores; for example, a (non-significant) four-score-point difference for Germany and the Netherlands, and approximately nil difference for France and Italy. The mean difference in New Zealand was most marked for Pākehā/European (19), Pasifika (16), and Māori (13); the mean difference between Asian girls and boys (16) was not statistically significant.

Any change from 2001 to 2010/11?

In order to make comparisons across the three PIRLS cycles, the mean scores for the two reading purposes for each of the cycles are shown in Tables B.9 and B.10 in Appendix B. Overall, there were no significant changes for any Year 5 sub-population in literary reading from 2001 to 2010/11 (Table B.9). However, a significant increase of 11 scale score points was observed for Pākehā/European students in literary reading from 2005/06 to 2010/11, with the mean score for this grouping returning to the level observed in 2001.

Similarly, there were no significant changes for any of New Zealand's Year 5 sub-populations in informational reading over the period 2001 to 2010/11 (Table B.10). Small increases had been observed for all sub-populations from 2001 to 2005/06, with these small shifts maintained with two exceptions. Significant decreases in informational reading were observed for Year 5 girls (an average of 9 scale score points) and Asian students (an average of 15 scale score points) from 2005/06 to 2010/11; in both cases, the mean returned to being the same as in 2001.

In terms of differences between girls and boys in literary reading, the most notable changes were an increase in the difference between the mean scores for Pākehā/European girls and boys (which favoured girls) from 23 to 30 scale score points, with an even bigger differential observed for Pasifika girls and boys—12 to 25 between 2005/06 and 2010/11. In informational reading, the most marked change was a decrease in the mean difference between Māori girls' and boys' achievement from 32 to 13 scale score points from 2005/06 to 2010/11. This was largely due to a small increase in Māori boys' informational reading (on average, 11 scale points), with a corresponding decrease (on average 8 scale score points) observed for Māori girls over this period.[44]

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[43] See Table B.8 in Appendix B for details of average differences, along with their standard errors.

[44] Because of the rescaling, the 2005/06 differences between girls and boys differ slightly from those reported in Section 4 in Chamberlain, 2008.

Processes of reading comprehension

The processes of reading comprehension are described below in Box 4.2. For reporting purposes the four processes were combined into two achievement scales. The first is the *retrieving and straightforward inferencing processes* scale, which combines the retrieval of explicitly stated information 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.

The scales are such that countries can compare their students' performance in each of the processes relative to their overall reading performance.[45] Each scale includes about half of the assessment items. Because the two scales represent quite different comprehension process skills, the assessment items relating to the processes also have varying difficulty. However, in general questions that required students to use text-based processes (retrieval and simple inferencing) were easier; internationally, the mean percent correct across the items was 64 percent. Questions requiring students to demonstrate their reasoning ability (interpret, integrate, and evaluate) tended to be more difficult; internationally, the mean percent correct was 45 percent.

Box 4.2: The PIRLS-2010/11 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.
Interpret and integrate ideas and information	Readers need to process the text beyond the phrase or sentence level. The reader is processing 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, Martin, Kennedy, Trong, & Sainsbury, 2009.

It is not surprising that countries' middle primary school students with high reading literacy achievement overall and in the two reading purposes also tended show their strengths in both the text-based processes and their ability to reason. Students from Finland (569), the Russian Federation (565), and Singapore (565) recorded the highest mean achievement in *retrieving and straightforward inferencing processes*; the mean for New Zealand was 527. Hong Kong SAR (578), the Russian

[45] In 2001 and 2005/06, the scaling was such that the scores for the *retrieving and inferencing processes* scale could be compared directly with the *interpreting, integrating, and evaluating processes* scale. All new processes scores have been generated for 2001 and 2005/06.

Federation (571), and Singapore (570) recorded the highest mean achievement in *interpreting, integrating, and evaluating processes*; the mean for New Zealand was 535.

Across many PIRLS-2010/11 countries, students demonstrated a particular strength or weakness with one type of comprehension processing. The ability to demonstrate their reasoning skills (*interpreting, integrating, and evaluating processes*) was a significant strength of students in eight out of the 12 countries with the highest overall mean reading scores. New Zealand also exhibited this pattern. Year 5 students were significantly stronger in their reasoning compared with their overall performance; they were significantly weaker on text-based processes (*retrieving and straightforward inferencing processes*). Finland, Ireland, and Croatia were exceptions in that they did equally well in both reasoning and text-based processing.

Table 4.3 summarises the reading comprehension processes for the English-language countries, with countries or education systems ordered according to their overall reading achievement score.

Table 4.3: The mean scale scores for the PIRLS comprehension processes in 2010/11 – New Zealand and the English-language countries

Country	Mean scale score for each comprehension process						Overall mean reading scale score	
	Retrieving and straightforward inferencing			Interpreting, integrating, and evaluating				
Singapore	565	(3.4)	●	570	(3.4)	▲	567	(3.3)
Northern Ireland	555	(2.5)	▼	562	(2.5)	▲	558	(2.4)
United States	549	(1.5)	▼	563	(1.6)	▲	556	(1.5)
Ireland	552	(2.8)	●	553	(2.2)	●	552	(2.3)
England	546	(2.6)	▼	555	(2.7)	▲	552	(2.6)
Canada	543	(1.5)	▼	554	(1.5)	▲	548	(1.6)
New Zealand	**527**	**(2.0)**	▼	**535**	**(1.9)**	▲	**531**	**(1.9)**
Australia	527	(2.6)	●	529	(2.2)	●	527	(2.2)
Malta	479	(1.9)	●	475	(1.8)	●	477	(1.4)
Trinidad & Tobago	474	(3.8)	▲	464	(4.0)	▼	471	(3.8)

Notes

Standard errors appear in parentheses.

▲ Comprehension process significantly higher than overall reading score

● Comprehension process not significantly different from overall reading score

▼ Comprehension process significantly lower than overall reading score

Source: Exhibit 3.3 in Mullis, Martin, Foy, & Drucker, 2012.

Any change from 2001 to 2010/11?

Many of the countries that had significant increases in their overall reading achievement results and in the two reading purposes domains (e.g., Slovenia, Iran) also showed corresponding increases in each of the comprehension process domains. Countries where decreases in the mean achievement had occurred (e.g., Bulgaria, Sweden) also recorded decreases in both processes. In some instances there was an increase in achievement in just one process domain. Norway for example showed a significant shift in just the reasoning processes, while Trinidad and Tobago showed a significant increase in performance on the text-based processes. Table 4.4 shows the mean scores for New Zealand Year 5 students in the reading processes of comprehension in each of the three cycles. There were no significant changes for New Zealand Year 5 students in either comprehension process. As

with the purposes for reading, the comprehension process scales have been linked directly to the overall reading scale, and so the scores shown in the table for 2001 and 2005/06 are not the same as those reported in Mullis, et al., (2007) or Chamberlain (2007 & 2008).

Table 4.4: Trends in New Zealand Year 5 students' mean scale scores for the PIRLS comprehension processes, 2001–2010/11

Process of comprehension	Mean scale score in each PIRLS assessment			Difference 2001–2010/11
	2001	2005/06	2010/11	
Retrieving and straightforward inferencing	525 (3.9)	527 (2.4)	527 (2.0)	3 ●
Interpreting, integrating, and evaluating	534 (4.0)†	537 (2.3)†	535 (1.9)†	1 ●

Notes

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

● The differences between 2001 and 2010/11 were not statistically significant.

† Compared to their overall reading achievement, Year 5 students were (significantly) better on interpreting, integrating, and evaluating and (significantly) weaker on retrieving and making straightforward inferences in all three cycles.

Processes of reading comprehension, gender, and ethnicity

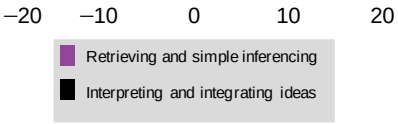
New Zealand Year 5 girls, on average, achieved significantly above the girls' international means for the text-based processes, *retrieving and straightforward inferencing* (536 c.f. 521), and reasoning processes, *interpreting, integrating, and evaluating* (545 c.f. 519). Finnish girls typically demonstrated the strongest performance in the text-based processes (579), with Hong Kong SAR girls (588) generally having the best reasoning skills.

New Zealand Year 5 boys, on average, achieved significantly above the boys' international means for both the text-based (519 c.f. 505) and reasoning (526 c.f. 502) processes. Like their respective female counterparts, Finnish boys (560) typically demonstrated the strongest performance in the text-based processes; Hong Kong SAR boys (570) generally had the best reasoning skills.

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 in 2010/11. Although not shown, Pākehā/European girls generally demonstrated the strongest text-based and reasoning skills (566 and 574 respectively); Pasifika boys generally had the weakest text-based (462) and reasoning (468) skills.

Figure 4.2: New Zealand Year 5 students' relative achievement in the PIRLS comprehension processes in 2010/11, by gender and ethnic grouping

Year 5 student group	Mean scale score for retrieving and straightforward inferencing	Mean scale score for interpreting, integrating, and evaluating	Relative difference *significant*	
			Process score *lower* than overall reading score	Process score *higher* than overall reading score
Gender				
Girls	536 (2.4)	545 (2.5)		
Boys	519 (2.8)	526 (2.5)		
Ethnic grouping				
Pākehā/European	555 (2.4)	561 (2.6)		
Māori	483 (3.7)	494 (3.6)		
Pasifika	470 (5.3)	476 (4.9)		
Asian	538 (3.6)	547 (3.7)		
New Zealand†	**527 (2.0)**	**535 (1.9)**		



Notes

Standard errors appear in parentheses.

The coloured bars indicate when the **relative difference** is significant. The relative difference is the difference between: (a) the mean score for the retrieving and straightforward inferencing process and the overall reading score (b) the interpreting, integrating, and evaluating reading score and the overall reading mean.

† Information for students in the *Other ethnic groups* category not reported separately, but is included in the overall New Zealand figures.

Strengths and weaknesses in the reading processes

Figure 4.2 also shows the strengths or weaknesses in particular processes relative to their overall reading performance. As already noted, New Zealand Year 5 students clearly demonstrated stronger performance in reasoning (*interpreting, integrating, and evaluating processes*) compared to their overall reading performance. This pattern was significant for both Year 5 girls and boys and for Māori students. Consistent with Year 5 students overall performance, Māori and Pākehā/European students were found to be significantly weaker when they used text-based processes (*retrieval and straightforward inferencing processes*) relative to their overall achievement. Similarly, Year 5 girls were also significantly weaker on the text-based processes compared to their overall performance in reading.

Gender differences[46]

Internationally, girls generally had higher achievement than boys in both the text-based and reasoning processes. For the text-based processes, on average, the difference between girls and boys was about 16 scale score points; in New Zealand it was 17. In some countries, for example, Austria and the Netherlands, there was no difference between the girls' and boys' achievement.

[46] Refer to Table B.8 in Appendix B for details of the differences between girls' and boys' mean scores and standard errors.

For the reasoning processes, the average difference internationally between girls and boys was 17 scale score points; the average difference between New Zealand's Year 5 girls and boys was 19. There was no significant difference between girls' and boys' reasoning skills in just five countries—Belgium (French), Colombia, France, Israel, and Italy.

In New Zealand, with just one exception, girls in each ethnic grouping had significantly higher achievement than boys when they were required to demonstrate both their reasoning and text-based processing skills. The one exception was for students in the Asian grouping—the mean difference between Asian girls and Asian boys in *retrieving and straightforward inferencing* was not found to be significant.

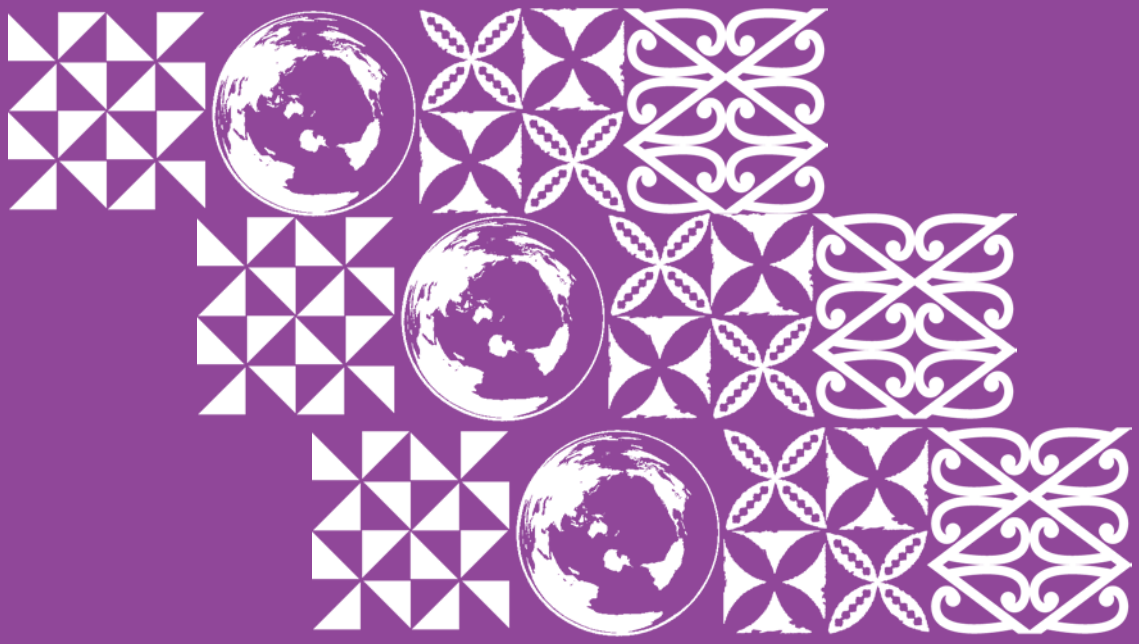
Any change from 2001 to 2010/11?

The mean scores for the two comprehension processes for each cycle of PIRLS are shown in Tables B.11 and B.12 in Appendix B. Overall, there was no significant change from 2001 to 2010/11 for any of New Zealand's Year 5 sub-populations in either *retrieving and straightforward inferencing* (see Table B.11 for details) or *interpreting, integrating, and evaluating* from 2001 to 2010/11 (see Table B.12 for details).

There were, however, some changes from 2005/06 to 2010/11. A small but significant increase of eight scale score points in the mean score was observed for Pākehā/European students' text-based skills, while there was a significant decrease of 13 scale score points in the mean score for Asian students' reasoning skills.

Section 5:

Students' Home Context



Section 5: Students' Home Context

In order to gain a greater understanding of children's literacy experience in the home, PIRLS administered the *Learning to Read Survey* to the parents or primary caregivers of the students taking part in the study. New Zealand has administered this survey in all three cycles, although in the last two cycles, the response rates were not as high as the first cycle in 2001.[47] They are, however, considered sufficient internationally for reporting purposes, although in some instances there is likely to be under reporting and/or slight bias when describing the results for some populations within New Zealand.

To summarise the contextual data, responses to individual statements or questions have been aggregated (statistically) and are reported in the form of scales, each with a mean of 10 and standard deviation of 2. In general, a scale is measuring an underlying trait, behaviour, or situation and is related to student reading achievement.[48] For any given scale there are typically three distinct areas that describe the different facets of a trait or behaviour. In this section, the percentages of students in each area of a given scale and the mean reading scores are presented. The use of scales to summarise the contextual information is new for this cycle of PIRLS and therefore it is not always possible to compare directly the findings from 2010/11 with previous cycles, although patterns are noted whenever possible.

Early literacy-related activities in the home

There is a significant body of research on the importance of parental involvement in children's early literacy development. For example, parents/caregivers reading aloud to their child and encouraging them to engage with the text and illustrations can show that the printed text means something and reading is valuable and worthwhile (Mullis, Martin, Kennedy, et al., 2009).

Parents/caregivers reading to their children frequently has also been found to be a key factor associated with *effective* homes for fostering children's literacy development by middle primary school (Martin, Mullis, & Gonzalez, 2004). Using PIRLS 2001 data, the authors showed that while 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%).

To provide information about students' early literacy activities, parents/caregivers were asked to indicate on a three-point scale how frequently ('often', 'sometimes', 'never or almost never') they or someone else in the home engaged in nine literacy-related activities with their child before the child began primary school, described in Box 5.1.[49] The *Early Literacy Activities* (ELA) *Scale* summarises parents' responses to these nine activities.

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[47] Although approximately 3,400 questionnaires were completed and returned by New Zealand parents/caregivers in 2010 (c.f. 4,000 in 2005 and 2,100 in 2001), the overall response rate (unweighted) was lower at 60 percent than in past cycles (c.f. 64% and 84%). Summary data for New Zealand is thus flagged. It also means that the summary data is slightly biased towards the respondents and therefore inferences about the population should be made with caution. In many other countries the response rate was much higher.

[48] Techniques to summarise the contextual data included Principal Components Analysis, reliability analysis on the proposed scales (Cronbach's Alpha), and 1-Parameter Item Response Theory model techniques to transform the data into a continuous scale. See TN 9 in the Technical Notes.

[49] In 2005/06, the *Early Home Literacy Activities* (EHLA) *Index* was used to summarise six of the activities. While the index and the scale are not directly comparable, the individual component statements are; New Zealand students in 2005/06 reportedly had one of the highest levels of engagement in early literacy activities.

New Zealand parents/caregivers of 55 percent of Year 5 students *often* engaged in early literacy activities when their children were pre-schoolers. Only the Russian Federation (61% of students) and Northern Ireland (59%) had higher proportions of their students who had *often* experienced these activities, with the proportions for Australia and Georgia similar to New Zealand (both 52%). Parents/caregivers in Chinese Taipei (14%) and Hong Kong (12%) were the least likely to report they *often* engaged in these activities with their children, although most children in these two countries had these experiences *sometimes*. (The parents/caregivers of 44 percent of New Zealand's Year 5 students *sometimes* did the activities, while just one percent of students *rarely or never* had engaged with the literacy activities.)

Box 5.1: Early literacy activities used in the *Early Literacy Activities* (ELA) *Scale*, 2010/11

Early literacy activities:

1. Read books
2. Tell stories
3. Sing songs
4. Play with alphabet toys
5. Talk about things you have done
6. Talk about what you had read
7. Play word games
8. Write letters or words
9. Read aloud signs and labels

Categories on the scale: students whose parents *often* did these literacy activities with them, had a score of at least 10.7, which meant that their parents reported doing five out of the nine literacy activities, 'often', and the remaining four, 'sometimes', on average. The score for students whose parents/caregivers *never or almost never* did these activities with them was not higher than 6.2, which meant parents/caregivers, on average 'never or almost never' did five of the activities and 'sometimes' did four. Parents/caregivers of the remaining students were considered to have done the activities *sometimes*.

As shown in Table 5.1, 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 had *often* engaged them in early literacy activities when they were pre-schoolers achieved on average significantly higher reading literacy scores than those who only *sometimes* engaged (567 compared to 529 scale score points).

Table 5.1: New Zealand Year 5 students in each category of the *Early Literacy Activities* (ELA) *Scale*, 2010/11

Comparison group	Engagement in Early Literacy Activities					
	Never or almost never		Sometimes		Often	
	Percentage of students	Mean reading score	Percentage of students	Mean reading score	Percentage of students	Mean reading score
New Zealand[#]	1 (0.1)	~ ~	44 (1.0)	529 (2.5)	55 (1.0)	567 (2.7)
International mean	3 (0.1)	430 (2.6)	60 (0.2)	506 (0.5)	37 (0.2)	529 (0.5)

Notes

Standard errors appear in parentheses. Tilde (~) insufficient data to report reading achievement scores.

The centrepoint of the *ELA Scale* was set at 10.0. The means for the scale ranged from 11.2 (Northern Ireland) to 8.4 (Morocco); the mean and standard error for New Zealand was 11.0 (0.05).

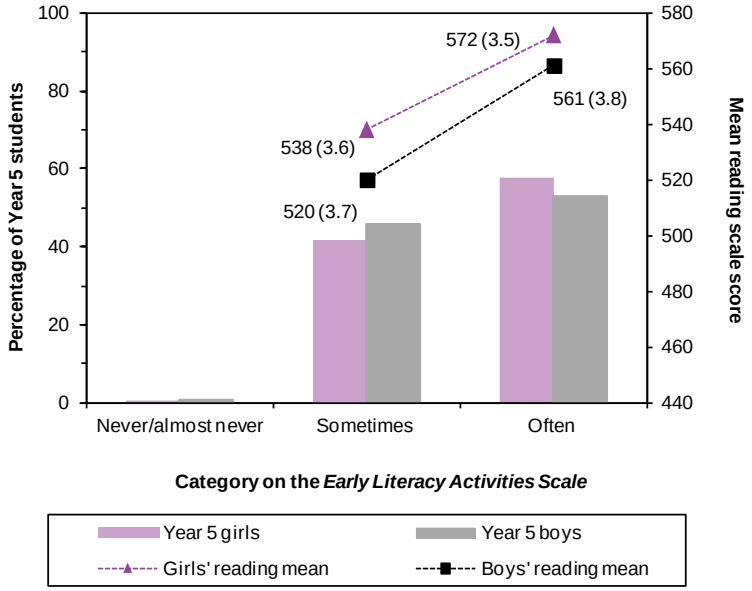
[#] Data available for 50-69% of Year 5 students.

Source: Exhibit 4.6 in Mullis, Martin, Foy, & Drucker, 2012.

Early literacy activities and gender

Figure 5.1 shows the proportions of New Zealand's Year 5 boys and girls who had *often*, *sometimes*, or *never or almost never* experienced these activities as pre-schoolers with their parents/caregivers. Parents/caregivers of almost all boys and girls had engaged in these activities either *often* or *sometimes*, with there being a strong relationship between reading literacy achievement and the frequency of experiences with early literacy activities for both. However, the average difference in reading literacy achievement between boys who *often* had these experiences and those who *sometimes* was somewhat higher (41 scale score points) than the average difference for girls (34 scale score points).

Figure 5.1: New Zealand Year 5 students in each category of the *Early Literacy Activities* (ELA) *Scale*, by gender



Notes

The bars represent the percentage of Year 5 girls and boys in each category of the scale. The data points are the mean reading scores. Standard errors are in parentheses. The percentages of boys and girls who had *never or almost never* engaged in early literacy activities with their parents/caregivers were too small to report achievement scores.

The centrepoint of the *ELA Scale* was set at 10.0. The means (and standard errors) on the *ELA Scale* for New Zealand's Year 5 girls were 11. 2 (0.08) and for Year 5 boys, 10.9 (0.06).

Early literacy activities and ethnicity[50]

Proportionately more parents/caregivers of Pākehā/European students (62%) *often* engaged in early literacy activities than the parents/caregivers of Asian and Pasifika students (both 38%). Parents or caregivers of Māori students tended to either report *often* (47%) or *sometimes* (53%) engaging in these activities. (Note: the mean scores on the *ELA Scale* were 11.4 for Pākehā/European; 10.6 for Māori; 10.2 for Asian, to 10.0 for Pasifika students.)

The difference between the mean reading achievement of students who had *often* experienced these activities with their parents/caregivers and those who had *sometimes* was higher for Māori (45) and Pasifika (45) than it was for Pākehā/European (24) and Asian students (23). Note that there were too

[50] The response rates were lower for parents/caregivers of Māori and Pasifika students (50% and 44% respectively) than for Pākehā/European (69%) and Asian students (54%), and students from Other ethnic groups (58%). Therefore, this information should be interpreted with some caution. However these responses rates were similar to those observed in 2001 and 2005/06.

few students who *never or almost never* had engaged in early literacy activities to report their achievement.

Visiting a library

New Zealand parents/caregivers were also asked how often they had visited a library with their child when they were pre-schoolers. Four out of five Year 5 students (84%) had visited a library as pre-schoolers—either 'often' (43%) or 'sometimes' (41%); parents/caregivers of 16 percent of Year 5 students reported never having visited a library. The relationship with reading achievement was strongly positive—the mean reading score for Year 5 students whose parents/caregivers reported they often visited a library (572) was significantly higher than the mean scores of Year 5 students who had sometimes (539) or rarely/never visited a library (516).

Early numeracy-related activities in the home

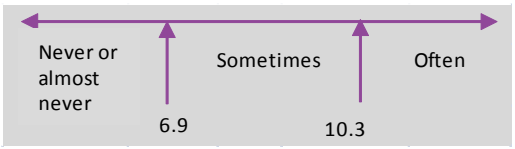
Parents/caregivers were also asked to indicate on the same three-point scale they used to respond to the early literary activities how frequently they engaged in six numeracy activities, with their child before she/he started school. The activities are described in Box 5.2. For the countries who assessed the same students in reading literacy (as part of PIRLS), and mathematics and science (as part of TIMSS), the data was summarised in the *Early Numeracy Activities* (ENA) *Scale* (see Mullis, Martin, Foy, & Arora, 2012). As noted in Section 1, New Zealand assessed a separate group of students for mathematics and science from that assessed in reading literacy. However, it is possible to gauge how often New Zealand parents/caregivers undertook these activities with their children and compare this information with other countries that also took part in TIMSS-2010/11.

Box 5.2: Early numeracy activities used in the *Early Numeracy Activities* (ENA) *Scale*, 2010/11

Early numeracy activities:

1. Say counting rhymes or sing counting songs
2. Play with number toys (e.g., blocks with numbers)
3. Count different things
4. Play games involving shapes (e.g., shape sorting toys, puzzles)
5. Play with building blocks or construction toys
6. Play board games or card games

Categories on the scale: students whose parents/caregivers *often* did the numeracy activities, had a score of at least 10.3, which meant that their parents reported doing three out of the six literacy activities, 'often', and the remaining three, 'sometimes', on average. Students who *never or almost never* had engaged in these activities with their parents/caregivers scored no higher than 6.9 on the scale, which meant parents/caregivers 'never or almost never' did three of the activities and 'sometimes' did the other three, on average. Parents/caregivers of the remaining students were considered to have done the activities *sometimes*.



The parents/caregivers of nearly two-thirds of New Zealand Year 5 students (64%) reported *often* doing these numeracy activities, about the same as the reports for Australia (61%) and Ireland (66%). Just two percent of New Zealand students had *never or almost never* engaged in these activities with their parents/caregivers, again about the same as their counterparts in Australia (3%). Internationally, there was a relatively strong relationship between engaging in early numeracy activities and students' mathematics achievement when they are in middle primary school. In New Zealand's case, the relationship can only be examined using the children's reading literacy

achievement. The mean reading scores for students who had engaged in early numeracy activities: *often* was 560; *sometimes*, 535; and *never or almost never*, 472.

Although relatively small differences it is interesting to note that a slightly higher proportion of boys than girls (65% c.f. 63%) *often* had engaged in early numeracy activities, while girls (58%) were a little more likely than boys (53%) to have *often* engaged in the early literacy activities. There were small groups of girls and boys who had *never or almost never* engaged with any of the early numeracy activities (both 2%), slightly more than observed for the early literacy activities. At 70 percent, Pākehā/European students were more likely to *often* have these early numeracy experiences than students from other ethnic groupings (Māori, 56%; Asian 53%; and Pasifika, 42%). (There were too few students from the *Other ethnic groups* category to make any valid conclusions.)

Pre-primary education

The importance of quality pre-primary education (or early childhood education) in terms of 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 one year of pre-primary education is compulsory (e.g., Denmark, Hungary). Although not compulsory in New Zealand, participation in early childhood education has increased over the decade;[51] one of the current education targets for the New Zealand Ministry of Education is *"In 2016, 98 percent of children starting school will have participated in quality early childhood education."* (Ministry of Education, 2012a, p. 7; State Services Commission, 2012).

Internationally, there was a strong relationship with achievement—the mean reading literacy achievement of students who had '3 or more years' of pre-primary education (519) was about 44 scale score points higher on average internationally than that of students who had not attended a pre-primary education facility (475).[52](The international reading mean for students who had 'less than 3 years but more than 1 year' was 513; the mean for students who had '1 year or less' was 493).[53]

The mean reading score for the 38 percent of New Zealand's Year 5 students who had participated in early childhood education as pre-schoolers for '3 or more years' was 555. This was significantly higher than the mean reading score for the relatively small proportion (4%) of Year 5 students who had not participated at all (496). Interestingly, the mean score for the Year 5 students who had 'less than 3 years but more than 1 year' in early childhood education (552) was about the same as those who had '3 years or more', which suggests that some early childhood education is better than none or very little (the mean for the 4% of students who had '1 year or less' was 522).

It is important, however, to consider each country's context for early childhood education before making comparisons across countries; comparing participation percentages is to some extent influenced by the school starting age. For example, how appropriate is it to compare New Zealand's 38 percent of children who participated in early childhood education for '3 years or more' when the school starting age is 5 years with the 81 percent of Danish children who had '3 years or more' when their starting age is 7 years? Similarly, how meaningful is it to compare the proportions for New Zealand and Denmark with the seven percent of Northern Irish children who had participated in

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51 Current participation rates are estimates as early childhood education statistics provide headcounts of enrolments in services, not a count of children. However, the percentage of children entering primary school who had attended ECE (*prior ECE participation*) is known and this rate has been increasing over the decade (Ministry of Education, 2013).

52 Source: Exhibit 4.7 in Mullis, Martin, Foy, & Drucker, 2012.

53 The (international) question directed to parents/caregivers asked about their child/s attendance at an ECE facility rather than participation in ECE. Thus, the question may not have captured information on (teacher-led) home-based services.

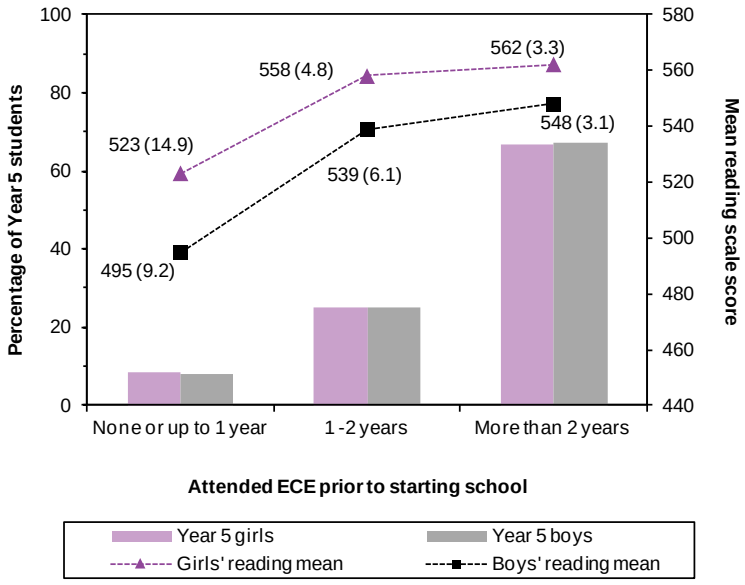
early childhood education for '3 years or more' when the majority enter primary school at age 4? What is more important is how participation related to achievement *within* a country.

Early childhood education in the New Zealand context

This section looks at Year 5 students' participation in ECE according to the categories used and reported upon nationally in previous cycles of PIRLS: 'more than 2 years'; 'more than 1 year and up to and including 2 years'; and 'less than 1 year or no ECE'. Based on the parents/caregivers who responded to the *Learning to Read Survey*, approximately two-thirds of Year 5 students (67%) in 2010/11 had participated in early childhood education as pre-schoolers for 'more than 2 years' and one-quarter had 'more than 1 year and up to and including 2 years'; four percent had 'less than 1 year' and four percent had 'not attended ECE'. The four percent of students who had *not attended* was lower than the seven percent of new school entrants—Year 1 students—that had not participated regularly in ECE prior to starting school in 2005, this being the year that most of the Year 5 students in 2010 would have started school (Ministry of Education, 2013).[54] This difference probably reflects parents/caregivers who had not responded to the PIRLS *Learning to Read Survey*.

As shown in Figure 5.2, there were no differences in the proportions of Year 5 boys and girls who had participated in ECE in each of the categories; however, there were differences in their reading achievement. Boys who had attended an ECE facility for 'more than 2 years' typically scored just over 50 scale score points higher than the eight percent of boys who had 'none or up to 1 year'. By way of contrast the difference for girls was a little lower at about 40 scale score points.

Figure 5.2: New Zealand Year 5 students who had participated in early childhood education, by gender



Notes

The bars on the graph represent the percentage of girls and boys. Note that the students who had no ECE or who had less than one year have been aggregated.

Percentages are adjusted for non-response. The mean for the 40% of Year 5 boys whose parents/caregivers did not respond to the *Learning to Read Survey* was 492 (3.8); the mean for the 37% of Year 5 girls whose parents/caregivers did not respond was 514 (3.6).

The data points are the mean scores for the Year 5 students in each ECE participation category. The standard errors appear in the parentheses.

[54] At the year ending June 2005, 93.2% of Year 1 students had been enrolled in ECE prior to starting school; at the year ending June 2006, the percentage was 93.4%.

There were no significant differences in reading achievement between those students—girls or boys—who had ‘more than 2 years’ or ‘1 and up to 2 years’. However, there were achievement differences between those girls and boys having ‘none or up to 1 year’ experience and their respective counterparts who had participated for at least one year; both groups who had either ‘1 and up to 2 years’ or ‘more than 2 years’ achieved on average significantly higher reading scores.

When the achievement of students with no ECE experience was compared with those who had just up to 1 year, there was no statistical evidence that showed reading achievement of the (small) group of Year 5 students (overall, girls or boys) who had no ECE to be lower than the (small) group who had had up to one year of ECE experience. However, the difference of 68 scale score points between Year 5 boys who had no ECE (477) compared with those boys who had had one year or more (545) was significant; the average difference between girls in these two participation categories was 46 scale score points (515 and 561).

According to parents/caregivers’ reports, 89 percent of Asian and 88 percent of Māori Year 5 students had participated in ECE for at least one year prior to starting school; the percentage of Pasifika students was a little lower at 79 percent. By way of contrast, the majority of Pākehā/European students had participated in ECE for more than one year (95%). As with girls and boys, there were no significant achievement differences between those students who had ‘more than 2 years’ or ‘1 and up to 2 years’ for any grouping. However, for Māori students and Pasifika students, there were significant achievement differences between those students who had ‘no or very little ECE’ experience and their respective counterparts who had had participated for at least one year; Māori and Pasifika students who had either ‘1 and up to 2 years’ or ‘more than 2 years’ achieved on average significantly higher reading scores. (Note: the number of students in each grouping who had no ECE experience was too small to make valid comparisons with their counterparts who had attended/participated in at least some ECE.)

The number of hours in early childhood education prior to starting school

Depending on their birth date, the majority of Year 5 students participating in PIRLS-2010/11 probably started school sometime over the period June 2005 through to May 2006. Thus, they would not be part of the cohort of children who were eligible for *20 Hours ECE* launched in July 2007. This policy enabled *all* three- and four-year-olds (and some five-year-olds with a transition-to-school plan) to receive up to 20 hours of free ECE in all teacher-led services and some kōhanga reo (Ministry of Education, 2012b). Prior to *20 Hours ECE*, subsidies were available to all early childhood services (teacher-led and parent-led) for up to 30 hours per week for children up to age 5. A programme that provided for children from low-income families also received additional subsidies (Bushouse, 2008). In order to gather baseline information for understanding more about participation in ECE, New Zealand parents/caregivers were asked for an estimate of the number of hours their child had attended an early childhood education facility in the year prior to their child starting school. The information is summarised in Table 5.2.

Table 5.2: New Zealand parents/caregivers' reports of the number of hours their children had attended an early childhood education facility in the year immediately before starting school

Number of hours per week	Year 5 students who attended ECE prior to starting school	
	Percentage of students	Mean reading score at Year 5
Less than 10 hours	15 (0.7)	553 (5.3)
10–19 hours	48 (1.1)	562 (3.1)
20–29	21 (1.0)	543 (4.1)
30–39	11 (0.7)	535 (5.7)
40 hours or more	5 (0.3)	535 (6.9)

Notes

Standard errors appear in parentheses.

Adjusted for non-response (i.e., based on the reports for the Year 5 students whose parents/caregivers completed the *Learning to Read Survey*). There was only a very small proportion of respondents who had completed the questionnaire but did not answer the question (< 2%).

Based on the responses of parents/caregivers, Year 5 students had generally spent in the range of 10 to 19 hours in ECE in the year immediately before they had started school. Parents/caregivers of Asian (55%), Māori (52%), and Pasifika (46%) students were more likely than parents/caregivers of Pākehā/European children (30%) to report that their children were in ECE for at least 20 hours. There could be a number of reasons why there is a difference. For example, the parents/caregivers of these students may have had to access early childhood care services for more hours because of the economic reasons that required both parents/caregivers to be working more than 20 hours. Income information was sought from parents/caregivers. However, the data does not relate to the period when their children were attending ECE. Students who had participated in ECE for less than 20 hours scored on average higher (560) than the group who had participated for more than 20 hours (540), with the 20 scale score point difference statistically significant (t = 4.85).

Any change from 2001 to 2010/11?

For the purpose of measuring trends, PIRLS-2010/11 Year 5 students' participation in early childhood education was examined in three categories: 'more than 2 years', 'more than 1 year and up to and including 2 years', and '1 year or less or did not attend'. Table 5.3 summarises the findings for the three PIRLS assessments. Of note is the increase in Year 5 students having participated in ECE for 'more than 2 years' at the same time as a decrease from 17 percent to eight percent in those who had participated for '1 year or less or did not attend' from 2001 to 2010/11. This information is also consistent with New Zealand's population enrolment data for ECE.

Table 5.3: Trends in New Zealand parents/caregivers' reports of their children having participated in early childhood education, 2001–2010/11

Year of PIRLS assessment	Participation in early childhood education					
	1 year or less or did not attend		More than 1 year and up to and including 2 years		More than 2 years	
	Percentage of Year 5 students	Mean reading score	Percentage of Year 5 students	Mean reading score	Percentage of Year 5 students	Mean reading score
2010/11	8 (0.6)	509 (8.8)	25 (0.8)	548 (4.1)	67 (1.0)	555 (2.5)
2005/06	9 (0.7)	526 (6.4)	30 (0.9)	551 (2.8)	61 (1.0)	550 (2.6)
2001	17 (1.2)	517 (6.1)	42 (1.5)	541 (4.8)	41 (1.3)	541 (4.3)

Note

Adjusted percentages reported. The (unweighted) response rate in 2001 was 84% (N = 2,097); in 2005/06 it was 64% (N = 3987); and in 2010/11, the rate was 60% (N = 3,411).

Reported attendance rates increased for all ethnic groupings, with the exception of Pasifika, from 2005/06 to 2010/11. Specifically, the percentages of the (PIRLS) Year 5 students who had been reported to have attended ECE increased over the five-year period by seven percentage points for Asian students (82% to 89%); three percentage points for Māori students (85% to 88%); and two percentage points for Pākehā/European, (92% to 95%); for Pasifika students, there was a 6 percentage point decrease (85% to 79%). (Note: these changes reflect the parents/caregivers who responded).

Literacy skills when starting school

Te Whāriki, the New Zealand early childhood curriculum, provides a framework for children's early learning and development within a socio-cultural context. It emphasises the relationship between teachers, parents, and whānau/families. The curriculum in its form and implementation is holistic, responding to children's learning and development in the early childhood setting and the wider context of the child's world.

In terms of learning outcomes:

> *"children moving from an early childhood setting to the first year of schooling are likely to:*
>
> - *have language skills for a range of purposes;*
> - *have had considerable experience with books and be rapidly developing secure vocabulary, grammar, and syntax;*
> - *enjoy returning to favourite books and recognising the distinctive characteristics of book language, and be ready to consolidate concepts about print;*
> - *enjoy writing and be keen to play with language and to hear and use new language;…"* (Ministry of Education, 1996; p. 73).

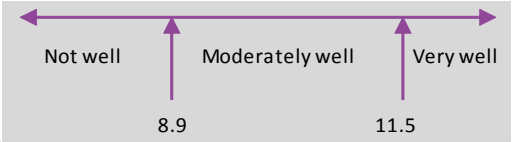
To provide information on the extent to which parents/caregivers considered their child to have some of the key skills that provide the foundation for formal reading instruction, they were asked to indicate how well (on a four-point scale – 'very well, 'moderately, 'not very well' or 'not at all') their child could do five early literacy tasks listed in Box 5.3 when they began primary school. The *Early Literacy Tasks* (ELT) *Scale* summarises parents' responses to these five activities.

Box 5.3: Literacy tasks used in the *Early Literacy Tasks* (ELT) *Scale*, 2010/11

Early literacy tasks:

1. Recognise most of the letters of the alphabet
2. Read some words
3. Read sentences
4. Write letters of the alphabet
5. Write some words

Categories on the scale: students who were judged to being able to do the tasks *very well* scored at least 11.5, which meant that the children could do three tasks 'very well' and two tasks 'moderately well', on average. Students who could do the tasks *not well* had a score no higher than 8.9, which corresponded to parents/caregivers reporting their children could not do three tasks 'not very well' and the other two 'moderately well', on average. The remaining students were considered to be able to do the literacy tasks *moderately well.*



According to the parents/caregivers nearly one-fifth of New Zealand Year 5 students could do the early literacy tasks *very well* (18%), while nearly one-half could do them *moderately well* (47%). Just over one-third of Year 5 students (35%) were judged by their parents/caregivers as being able to do the tasks *not well* at school entry.

Students' reading literacy achievement was positively related to parents' perceptions of how well students could do these tasks at entry—students who could do these tasks at school entry either *very well* or *moderately well* achieved on average significantly higher reading scores in Year 5 (568 and 556) than those students judged by their parents/caregivers as doing them *not well* (531).

As with participation in ECE, making cross-country comparisons between the proportions of children who could do these literacy tasks can be problematic. However, it is interesting to note that percentages of students in each category (and the mean reading scores) for Australian students were not dissimilar to those recorded for New Zealand students. By way of contrast, more than 40 percent of Singaporean and Hong Kong SAR students were judged by their parents/caregivers as being able to do the early literacy tasks *very well* compared to just 10 percent of Northern Irish students.

Looking at the individual components is also informative. For example, according to New Zealand parents/caregivers, at school entry:

- nearly one-half of children could recognise most letters of the alphabet (48%) 'very well'
- just over one-quarter could write the letters of the alphabet (27%) 'very well'
- about one-quarter could read some words (24%) 'very well'.

These percentages were virtually the same as the proportions of Australian children. 'Reading sentences' is an example of a skill that distinguishes the systems with a later starting age and/or very high-performing from those with an early starting age. About one-quarter of Finnish children (24%), with school entry at age 7, were judged by their parents as being able to read sentences 'very well'; more than one-third of Hong Kong (36%) and Singaporean children (34%) were also in this category. Few New Zealand students could read sentences (11%) when they started school at age 5 years.

Numeracy skills when starting school

According to *Te Whāriki*, children are likely to:

> *"have some practical concepts about numbers, counting, numerical symbols and applications of numbers, and have used mathematical understandings for everyday purposes, such as sorting, labelling, perceiving patterns, and establishing 'fair shares'"* (Ministry of Education, 1996; p. 73).

As well as judging how well their children could do a number of literacy-related tasks, parents/caregivers were also asked to judge on a four-point scale ('very well, 'moderately well', 'not very well' or 'not at all') how well their child could do certain early numeracy tasks when they started school (see Box 5.4). *The Early Numeracy Tasks* (ENT) *Scale* summarises parents/caregivers' responses to these six activities.

Based on the responses from parents/caregivers just under one-tenth of New Zealand Year 5 students were judged as being able do the early numeracy tasks *very well* (8%), about the same size as the group judged as being able to do the task *not well* (8%); the vast majority of Year 5 students being able to do them *moderately well* (84%).

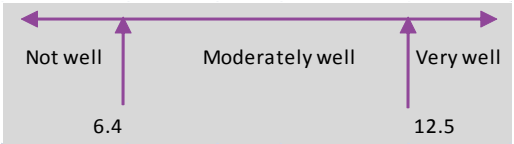
As with early literacy tasks, making comparisons across countries can be problematic if the age at which children start age is not considered. Parents/caregivers in countries where the starting age is six or seven may have different or higher expectations than parents/caregivers in countries with a younger starting age. However, it is interesting to note that the percentages for countries with an early school starting age were similar—for example—Australia and Northern Ireland. To illustrate, in Northern Ireland, five percent of students were rated by their parents/caregivers as being able to do these tasks *very well* compared to more than 60 percent of Chinese Taipei and Hong Kong students.

Box 5.4: Numeracy tasks used in the *Early Numeracy Tasks* (ENT) *Scale*, 2010/11

Early numeracy tasks:

1. Count by himself/herself (up to 100, 20, or 10)
2. Recognise different shapes (more than 4, 3-4, or 1-2)
3. Recognise the written numbers 1–10
4. Write the numbers 1–10
5. Do some simple addition
6. Do some simple subtraction

Categories on the scale: students who could do these tasks *very well* had a score of at least 12.6, which meant that the children could do all six numeracy tasks (with the first four listed in the box 'very well', and were able to do simple addition and subtraction). Students who could do these tasks *not well* had a score no higher than 6.4, which corresponded to parents/caregivers reporting their children could do the first four 'not very well' (i.e., count up to 10, recognise 1 or 2 shapes, recognise and write up to 4 numbers) but could not do subtraction or addition, on average. The remaining students were considered to be able to do the numeracy tasks *moderately well*.



Looking at the individual components identified in Box 5.4, with one exception, the proportions of New Zealand students who were judged on the actual four-point scale as being able to do the tasks 'very well' were similar to those recorded for Australia. The task where New Zealand differed markedly from almost all other countries was on item 3, 'recognising the written numbers 1–10' (New Zealand 60% c.f. the international mean of 82%).

Language spoken in the home

In PIRLS-2010/11 both parents/caregivers and Year 5 students were asked about speaking the language in which the assessment was administered—in New Zealand's case either Māori or English—although the questions for the two responding groups were constructed differently.[55] Parents/caregivers were asked whether or not their child could speak the test language, English or Māori, at school entry (in addition to any other languages). Students were asked how often they spoke the test language, English if they were assessed in English or Māori if they were assessed in Māori, at home.

It is widely acknowledged that there are significant benefits of being bilingual (or multilingual) and maintaining these language skills particularly through more informative years (for example, see Taumoefolau, Starks, Bell, & Davis, 2004). The premise for asking parents/caregivers the question was that children could be at a slight disadvantage at school entry if they have no or limited skills in the language of instruction. Despite the lower response rate to the *Learning to Read Survey*, New Zealand parents' reports on their child speaking the test language at school entry were fairly consistent with Year 5 students' self-reporting on the language that was spoken at the time they were doing the PIRLS assessment, with parents/caregivers of the majority of Year 5 students (94%) reported that their child could speak the test language—English or Māori—when they started school.

Looking specifically at those children who were assessed in English, parents/caregivers of 79 percent of Year 5 students reported that their child only spoke English at school entry (approximately five years prior to the administration of PIRLS). This is consistent with the 76 percent of Year 5 students who reported 'always or almost always' speaking English at home in 2010.

Students' reports of speaking the test language at home and achievement

In 2010/11, 74 percent of New Zealand's Year 5 students reported they 'always or almost always' spoke the PIRLS assessment language (English or Māori); 26 percent of Year 5 students 'sometimes' or 'never' spoke the test language at home. Year 5 students who frequently spoke the test language at home scored, on average, a significant 43 scale score points higher than the Year 5 students who spoke it either never or less frequently (543 compared with 499).[56] As illustrated in Figure 5.3 the achievement difference between the two home language categories in New Zealand was markedly higher than the achievement differences in other countries where English is the main or one of the languages for delivery of the curriculum.

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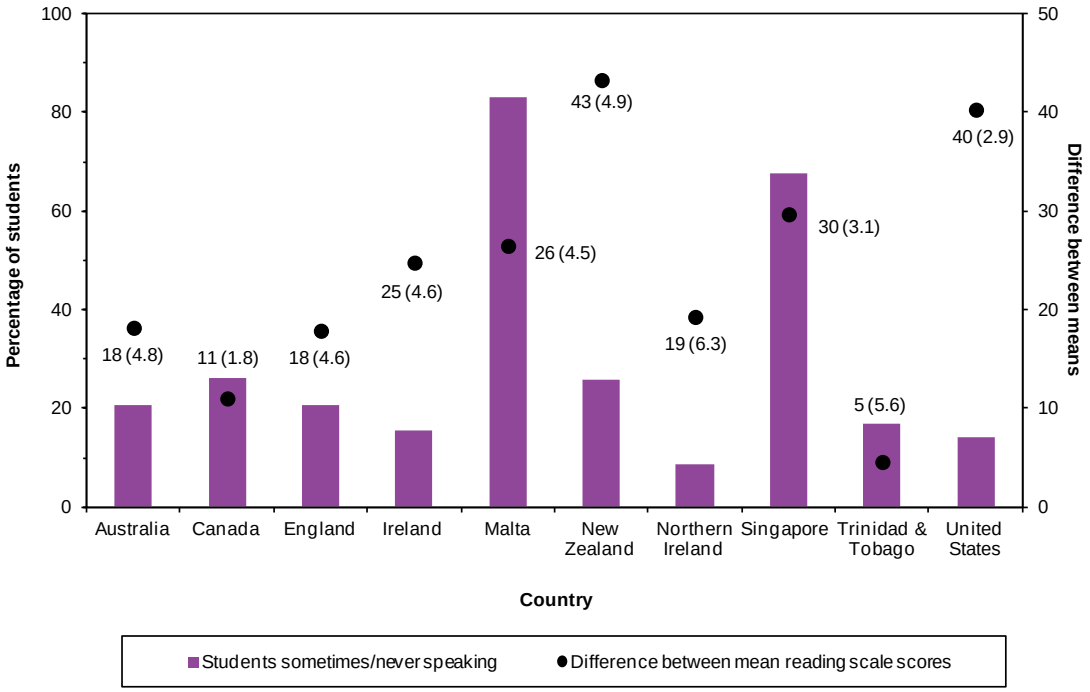
[55] Testing in te reo Māori was conducted in schools and classes where students received 81 to 100 percent of their instruction in te reo (i.e., Level 1 immersion). According to international criteria for excluding students from the PIRLS assessment, students with limited proficiency in the test language could be excluded from the assessment. Typically these were students who had received instruction in the language of the test for one or two years.

[56] For these comparisons, the sometimes and never categories were combined because of the relatively small proportion of students (2%) who reported 'never speaking' the test language. Also see Figure 5.5.

Figure 5.3: Percentages of students in New Zealand and the English-language countries who either sometimes or never spoke the test language at home, 2010/11



Note

The bars on the graph represent the percentage of students who rarely (either *sometimes* or *never*) spoke the test language at home. Each data point is the mean difference in reading achievement between students who frequently spoke the test language and those who rarely did. The standard errors appear in the parentheses.

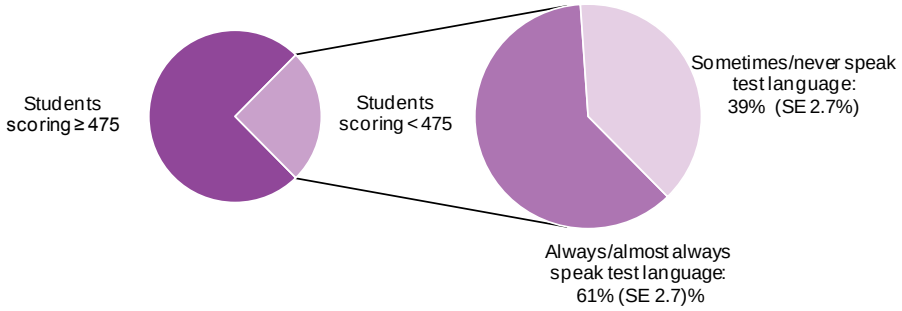
PIRLS was administered only in English in all but two of the countries in the figure—Canada (English and French) and New Zealand (English and Māori). In New Zealand, it could be conjectured that differences in achievement might change according to whether students were assessed in English or in Māori. However, because of the very small sample of students (1.5%) assessed in te reo Māori, it is not possible to *compare* the reading literacy achievement of students in the two language categories for the group assessed in Māori. Furthermore the difference shown in Figure 5.3, 43 scale score points, is largely due to the differences in achievement observed for students assessed in English, as this is by far the biggest group assessed in New Zealand. It is worth noting that most of the small proportion of learners assessed in Māori reported that they 'sometimes' spoke te reo Māori at home (86%).

Speaking the test language at home and New Zealand lower achievers

In Section 3, New Zealand's lower achievers in reading were those Year 5 students who did not reach the *Intermediate International Benchmark*, or scored less than 475. In the following discussion, the frequency with which students in the lower-achievers group spoke the language of the PIRLS assessment is examined. The purpose is to demonstrate that students who do not always speak the test language at home tended to be over-represented among New Zealand's lower achievers.

Figure 5.4 shows the composition of the lower-achievers group according to the students' reports on whether they 'always or almost always' spoke the test language at home or they 'sometimes' or 'never' spoke the test language. As the figure shows, nearly 40 percent of the lower-achievers group comprised students who 'sometimes' or 'never' spoke either English or Māori at home.

Figure 5.4: Composition of the New Zealand lower-achievers group in 2010/11, 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 75 percent (SE 0.9%); the proportion who did not reach this benchmark was 25 percent (SE 0.9%).

Another way to view this information is to look at the lower achievers by their home language status as proportions of the overall Year 5 population. In 2010/11:

- 15 percent of the Year 5 population were lower-achieving students who 'always or almost always' spoke the test language at home (16% in 2005/06)
- 10 percent of the Year 5 population were lower-achieving students who either 'sometimes' or 'never' spoke the test language at home (a little higher than the 8% recorded in 2005/06).

Odds ratio

Summing up the information above, the *odds* of a Year 5 student who spoke the test language at home infrequently (either 'sometimes' or 'never') being in the lower-achievers group was more than double the odds of a Year 5 student who regularly ('always or almost always') spoke the test language at home (0.6 c.f. 0.26).

Any change from 2001 to 2010/11?

There was little change in the proportions of students in each language-speaking response category from 2005/06 to 2010/11 as illustrated in Figure 5.5.[57] In both cycles approximately three-quarters of New Zealand Year 5 students reported they 'always or almost always' spoke the test language (English or Māori) in the home,[58] with about one-quarter reporting they 'sometimes spoke the test language and sometimes spoke another language'. Just 1 to 2 percent of Year 5 students reported 'never' speaking the test language at home.

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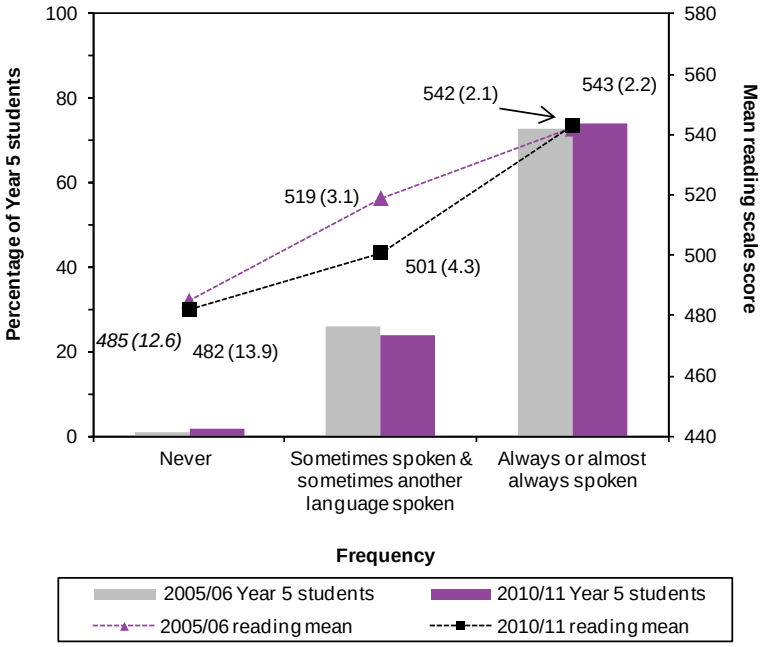
[57] The question format on speaking the test language at home was framed differently in 2001 therefore it is not possible to make any direct comparisons with the information reported for either PIRLS-2005/06 or PIRLS 2010/11.

[58] In 2010/11, the international mean percentage was 66%. The proportion of students always speaking the test language at home in England was 79%; Ireland, 83%, Australia, 81%, and Malta, 16%.

Figure 5.5: Comparison of New Zealand Year 5 students' reports of speaking the language of the PIRLS assessment at home, 2005/06 and 2010/11



Notes

The bars represent the percentage of Year 5 students in each language category. The data points are the mean reading scores. Standard errors are in parentheses. Only 1% of students in 2005/06 reported 'never' speaking the language of the PIRLS assessment at home; the mean score shown in italics for this group has been not reported in previous international and national reports. While the actual N on which the statistic is calculated does satisfy the national criteria (see Technical Notes TN 7), the statistic should be treated with caution.

The question used in PIRLS 2001 was not the same as the in the two more recent cycles. However, the relationship between reading achievement and speaking it at home is fairly consistent in all three cycles. Also see Caygill & Chamberlain, 2004.

However, of concern is the larger achievement difference between those students who frequently spoke the test language and those who rarely (sometimes or never) did. In 2005/06 the average difference for students in the two categories was 24 scale score points (an effect size $d = 0.29$); in 2010/11 it had increased to an average of 43 scale score points (an effect size $d = 0.51$).[59]

These achievement differences were also reflected in the lower-achievers group in 2010/11, which comprised proportionately more students who never/infrequently spoke the test language at home (39%) than in 2005/06 (34%).

This change in the composition was reflected in the *odds* of being in the lower-achievers group. The odds for Year 5 students who sometimes or never spoke the test language at home increased from about 1.5 times to more than twice the odds for Year 5 students who always spoke the test language at home from 2005/06 to 2010/11. (Also see Table B.7 in Appendix B.)

Looking specifically at Year 5 students who were assessed in *English*, Table 5.4 presents the proportions of students in each ethnic grouping by their home-language status in 2005/06 and 2010/11. (The mean reading scores are reported in Table B.13 in Appendix B.) The proportions of students who reported 'always or almost always' speaking English in the home were, with one exception, very similar across the two cycles. The one exception was the Pākehā/European grouping, where a small, but significantly higher proportion of students (5 percentage points) spoke only

[59] For those students assessed in English, the effect sizes for the difference between students in the two home-language categories increased from $d = 0.22$ in 2005/06 to $d = 0.41$ in 2010/11.

English in the home in 2010/11 than was the case in 2005/06. In 2005/06 information was also captured on children's country of birth; this question was not asked in 2010/11. In 2005/06, the performance of students born outside of New Zealand was found to be significantly higher than students born in New Zealand, largely due to the students in the Pākehā/European grouping who were born in another country (Chamberlain, 2008, p.45).

Table 5.4: Comparison of New Zealand Year 5 students' reports of speaking English at home in 2005/06 and 2010/11, by ethnic grouping

Year 5 student group	2005/06		2010/11	
	Always/almost always speak English (% of students)	Sometimes/never speak English (%of students)	Always/almost always speak English (% of students)	Sometimes/never speak English (% of students)
Pākehā/European	87 (0.7)	13 (0.7)	92 (0.5)	8 (0.5)
Māori	67 (1.7)	33 (1.7)	71 (2.4)	29 (2.4)
Pasifika	41 (2.8)	59 (2.8)	41 (2.7)	59 (2.7)
Asian	25 (2.4)	75 (2.4)	29 (2.7)	71 (2.7)
All New Zealand (English)†	**74 (1.0)**	**26 (1.0)**	**76 (1.3)**	**24 (1.3)**

Notes

Comparisons cannot be made with the 2001 data as the question used in PIRLS 2001 was not the same as the one used in the last two assessment cycles.

Standard errors appear in parentheses. Mean reading scores reported in Table B.13 in Appendix B.

† All New Zealand includes data from students in the *Other ethnic groups* category.

Even though the proportions of Pasifika students in each of the two home-language categories (i.e., 'always/almost always' speaking English and 'sometimes/never' speaking English) being the same in both cycles of PIRLS, the difference between the mean achievement of the two Pasifika student groups increased from a non-significant nine scale score points in 2005/06 (i.e., 489 c.f. 480) to a significant 26 scale score point difference in 2010/11 (i.e., 490 c.f. 464). Furthermore, the *odds* of a Pasifika student who spoke English infrequently at home being in the lower-achievers group increased from about 3.5 times in 2005/06 to more than four times the odds of a Pasifika student speaking English at home in 2010/11. However, it important to note that there is no suggestion that Pasifika students should be encouraged to speak English at home at the expense of their community language.

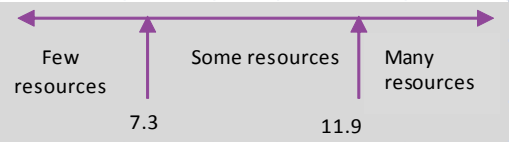
Reading literacy achievement and home resources

There is a large body of research that shows the strong, positive relationship between achievement and socio-economic status. A family's socio-economic status is also very likely to be associated with educational resources in the home and extra-curricular experiences families can provide for their children. Higher socio-economic status is generally linked to higher levels of education and semi-professional or professional occupations, and higher expectations for learning. In New Zealand, for example, Tunmer, Chapman, and Prochnow (2006) explored the connections between students who have 'literate cultural capital' at school entry. Their longitudinal study found that children from low-income households had considerably less literate cultural capital than children from high-income households.

The *Home Resources for Learning* (HRL) *Scale* is based on parents' and students' responses to questions about resources in their homes, which are listed in Box 5.5. These included: the number of books (including children's books), the presence of two home-learning aids (internet connection and/or the child had their own bedroom),[60] and parent(s)' education and occupation.

Box 5.5: Resources used in the *Home Resources for Learning* (HRL) *Scale*, 2010/11

Components:	
Parents/caregivers' reports on resources, education, and occupation	Students' reports on home resources
Number of children's books	Number of books in the home:
1. 0–10	1. 0–10
2. 11–25	2. 11–25
3. 26–100	3. 26–100
4. 101–200	4. 101–200
5. More than 200	5. More than 200
Highest level of education of either parent:	Number of home study supports:
1. Finished some primary or lower secondary or did not go to school	1. None
2. Finished lower secondary	2. Internet connection or own room
3. Finished upper secondary	3. Both
4. Finished post-secondary education	
5. Finished university or higher	
Highest level of occupation of either parent:	
1. Had never worked outside home of home, general labourer, or semi-skilled worker, craft or trade worker, plant or machine operator.	
2. Clerical (clerk or service or sales worker)	
3. Small business owner	
4. Professional (corporate manager, senior official, professional, or technician or associate professional)	
Categories on the scale: students who were in homes with *many resources* had a score of at least 11.9—typically, they were living in households with more than 100 books, more than 25 children's books, two 'home study' supports (internet connection and their own bedroom), and at least one parent/caregiver had completed university, and at least one parent/caregiver was working in a professional occupation.[61] Students who were in homes with *few resources* had a score no higher than 7.3—typically, these students were living in households with 25 or fewer books; did not have their own bedroom or internet connection; had 10 or fewer children's books, and neither parent/caregiver had tertiary education and they were in semi-professional or unskilled employment. All other students were considered to be in homes with *some resources*.	



Nearly two out of every five Year 5 students were in a home with *many resources* as measured by the *HRL* Scale (37%). This proportion was one of the highest internationally with only Norway (42%), Australia (41%), Sweden (39%), and Denmark (38%) recording higher proportions. Just two percent of New Zealand Year 5 students were in a home with *few resources*, with the majority of Year 5 students (61%) being in homes with *some resources*.

[60] This particular variable is also used in the OECD's Programme for International Student Assessment (PISA) as a household wealth indicator. In PIRLS, the relationship with achievement varied considerably across countries; it was a relatively strong relationship in New Zealand and Australia for example, while in many European countries and Canada there was no relationship. The overall scale does not take account of any specific national-level indicators which may also have a strong relationship with achievement.

[61] Education levels were determined using UNESCO's Institute for Statistics 1997 *International Standard Classification of Education.*

There were substantial differences in every country in the mean reading achievements of students in the three categories on the scale. Of note, however, is the gap between the mean achievement of New Zealand Year 5 students who were in homes with *many resources* and those with *some resources* (63 scale score points). This difference is somewhat higher than, for example, the difference in Ireland (59), Australia (55), Canada (40), and Finland (38).

Table 5.5 shows the mean scores for Year 5 students overall and in each ethnic grouping for each category of the *HRL Scale*.

Table 5.5: New Zealand Year 5 students in each category of the *Home Resources for Learning* (HRL) *Scale* in 2010/11, by ethnic grouping

Year 5 student group	Home Resources for Learning					
	Few resources		Some resources		Many resources	
	Percentage of students	Mean reading score	Percentage of students	Mean reading score	Percentage of students	Mean reading score
Pākehā/European	<0.5 (0.1)	~ ~	53 (1.7)	547 (3.2)	47 (1.7)	598 (2.6)
Māori	4 (1.2)	~ ~	77 (1.9)	499 (4.8)	19 (2.0)	545 (11.6)
Pasifika	9 (1.6)	~ ~	85 (2.3)	487 (6.7)	6 (1.5)	~ ~
Asian	2 (0.8)	~ ~	68 (4.1)	543 (6.0)	30 (4.3)	591 (6.3)
All New Zealand[#]	**2 (0.3)**	**~ ~**	**61 (1.3)**	**528 (2.4)**	**37 (1.4)**	**592 (2.4)**
International mean	9 (0.1)	448 (1.4)	73 (0.2)	510 (0.4)	18 (0.2)	571 (0.7)

Notes

Standard errors appear in parentheses. Because results are rounded, some figures may appear inconsistent. Tilde (~) insufficient number of students to report their mean reading achievement.

The centrepoint of the *HRL Scale* was set at 10.0. The means for the scale ranged from 11.5 (Norway and Sweden) to 7.2 (Morocco); the mean and standard error for New Zealand was 11.3 (0.05).

[#] Data available for 50-69% of students. Includes students who were in the *Other ethnic groups* category.

Source: Exhibit 4.1 in Mullis, Martin, Foy, & Drucker, 2012.

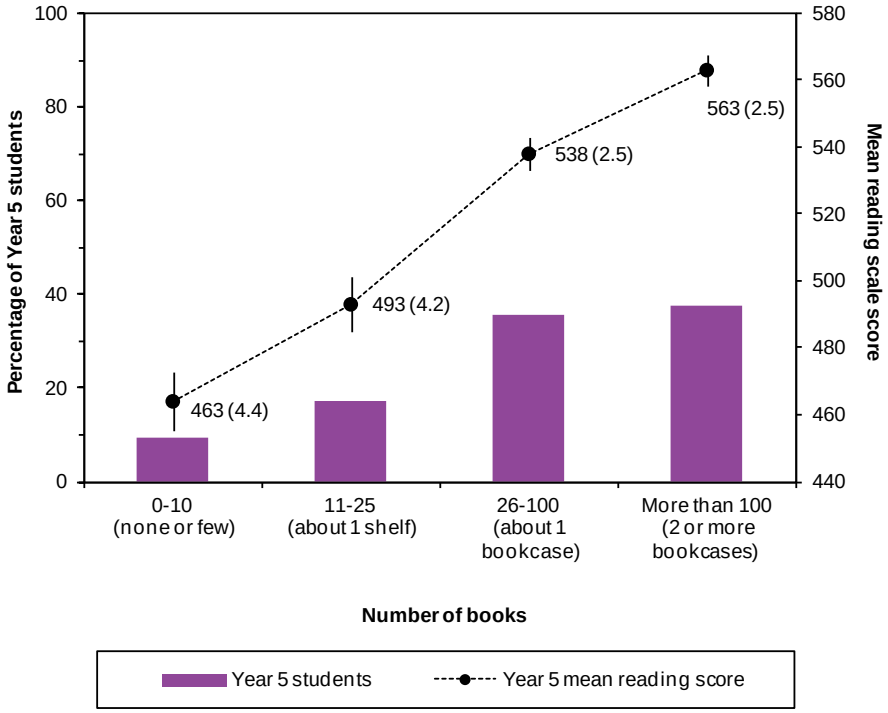
Although there was a relatively low response rate to the survey by the parents/caregivers of Māori and Pasifika learners, with the information indicative only, it is interesting to note that for those parents/caregivers who did respond, the differences between the mean achievement of Year 5 students in homes with *many resources* and those with *some resources* were: Pākehā/European (51), Māori (46), and Asian students (48). (There were too few Pasifika students with *many resources* to make this particular comparison.)

Students' reports of books in the home

The number of books in the home, a reliable proxy of students' family socio-economic status, has been used in most large-scale international assessments since the early 1990s. Students in PIRLS were asked to estimate the number of books in their home using illustrations of bookcases. Figure 5.6 summarises Year 5 students' estimates; the mean reading scores for students in each category are also shown.

Not surprisingly, there is a strong positive relationship between the number of books and reading literacy achievement. The relationship between books in the home and reading literacy achievement appears to be weaker for Pasifika students, than it is for Pākehā/European, Māori, and Asian students, as illustrated in Figure B.1, Appendix B.

Figure 5.6: Mean reading scale scores for New Zealand Year 5 students in 2010/11, by the number of books in their homes



Notes

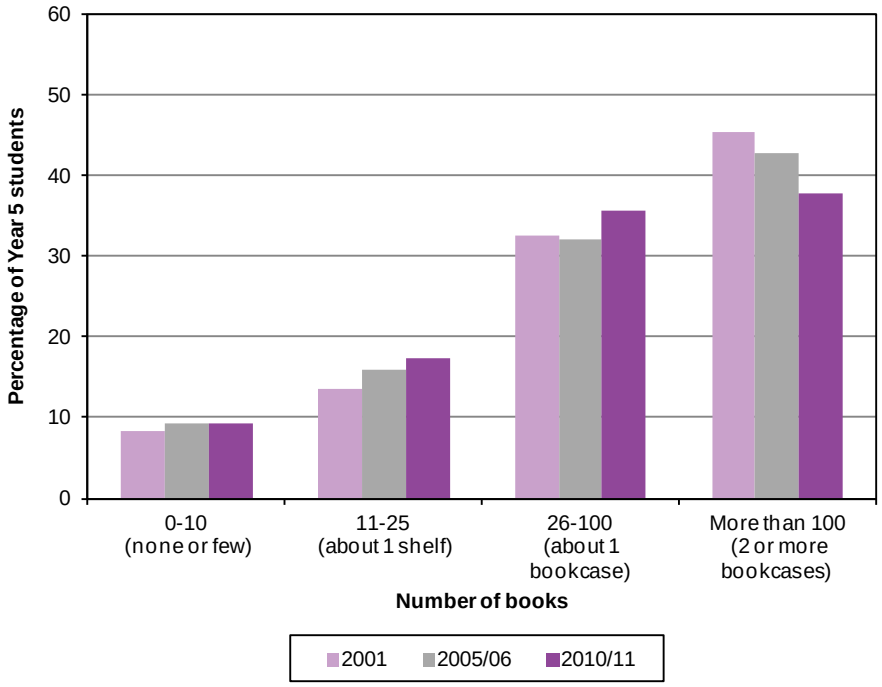
Each bar represents the percentage of Year 5 students according to the number of books.

The data points are the mean reading scores for the students in each books-in-the-home category. The vertical lines extending from each data point show the 95 percent confidence interval around the mean (i.e., ± 1.96 standard errors). The standard errors appear in parentheses.

Any change from 2001 to 2010/11?

The *Home Resources for Learning Scale* is a new measure and therefore any change across time cannot be gauged. However, the number of books in the home, a proxy for socio-economic status, shows a consistent pattern across the decade—higher reading achievement is associated with higher numbers of books in the home. Figure 5.7 shows the number of books reportedly in the homes of Year 5 students in each of the three PIRLS assessments (2001, 2005/06, and 2010/11). Of interest, is that in 2001, 45 percent of Year 5 students reported having more than 100 books in the home compared to 38 percent in 2010/11. However this change may in fact reflect a shift in books from paper to electronic form which was not captured in the 2010/11 cycle of PIRLS.

Figure 5.7: Trends in New Zealand Year 5 students' reports of the number of books in the home, 2001–2010/11



Note

Refer to Table B.14 in Appendix B for actual details of the percentages and reading literacy scores.

Table 5.6 shows the trends in Year 5 students' reports of number of books in the home according to the ethnic grouping to which they belonged. The mean reading scores, as shown in Figure B.1 in Appendix B, illustrate the strong association between books as a proxy for socio-economic status and achievement across the three PIRLS assessments.

Table 5.6: Trends in New Zealand Year 5 students' reports of the number of books in their homes 2001–2010/11, by ethnic grouping

Year of PIRLS assessment	Pākehā/European (%) with …				Māori (%) with …			
	10 or less	11–25 (about one shelf)	26–100 (about one bookcase)	More than 100 (two or more)	10 or less	11–25 (about one shelf)	26–100 (about one bookcase)	More than 100 (two or more)
2010/11	4 (2.7)	11 (0.7)	38 (1.1)	47 (1.5)	15 (1.7)	26 (1.4)	32 (1.3)	27 (1.7)
2005/06	5 (0.4)	11 (0.7)	33 (1.1)	51 (1.3)	15 (1.1)	22 (1.5)	31 (1.6)	31 (1.7)
2001	4 (0.6)	9 (0.9)	33 (1.7)	54 (2.0)	15 (1.7)	22 (1.9)	32 (2.5)	31 (2.7)

Year of PIRLS assessment	Pasifika (%) with …				Asian (%) with …			
	10 or less	11–25 (about one shelf)	26–100 (about one bookcase)	More than 100 (two or more)	10 or less	11–25 (about one shelf)	26–100 (about one bookcase)	More than 100 (two or more)
2010/11	24 (1.9)	30 (2.1)	28 (2.5)	18 (2.0)	12 (1.7)	22 (2.0)	38 (2.5)	29 (2.3)
2005/06	25 (2.6)	26 (2.3)	27 (2.6)	22 (2.6)	15 (2.1)	25 (2.1)	30 (2.2)	30 (2.6)
2001	21 (3.6)	22 (3.0)	31 (4.0)	26 (3.3)	10 (3.1)	16 (3.4)	34 (3.7)	40 (4.5)

Note

Standard errors are reported in parentheses.

Parents' views on reading

According to Martin, Mullis, and Gonzalez (2004), the attitudes of parents/caregivers towards reading is a key factor that has been found to discriminate between New Zealand's higher and lower achievers in reading. In every country in PIRLS 2001, 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 difference (39 percentage points).

The *Parents Like Reading* (PLR) *Scale* summarises parents'/caregivers' responses to seven statements about reading and one question about the frequency with which they read for pleasure. See Box 5.6 below. New Zealand parents/caregivers were found to be very positive about reading compared with parents/caregivers in many other countries, with 51 percent of students whose parents like reading. Only Sweden had a higher proportion (52%), with similar percentages for Northern Ireland (50%) and Denmark (50%). Interestingly, parents/caregivers from Chinese Taipei (17%) and Hong Kong SAR (14%) were the least positive about reading.

Box 5.6: Reading activities used in the *Parents Like Reading* (PLR) *Scale*, 2010/11

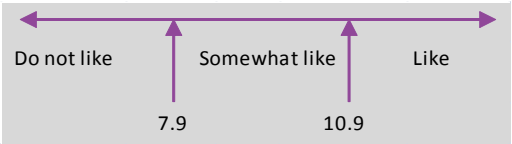
Views about reading and reading for enjoyment:

1. I read only if I have to*
2. I like talking about what I read with other people
3. I like to spend my spare time reading
4. I read only if I need information*
5. Reading is an important activity in my home
6. I would like to have more time for reading
7. I enjoy reading

* Reverse coded for the scale.

And:
When you are at home, how often do you read for enjoyment ((almost) daily, once or twice weekly, once or twice a month, (almost) never)

Categories on the scale: students whose parents/caregivers *like* reading had a score of 10.9 on the scale; their parents/caregivers' agreed 'a lot' with four of the seven statements about reading and 'a little' with the other three on average, and they read for enjoyment daily. Students whose parents *do not like reading* (7.9 on the scale) typically disagreed 'a little' with four of the seven statements, agreed 'a little' with the remaining three, and read only once or twice a month. Students whose parents' responses were typically more moderate, were considered to *somewhat like* reading.



As Table 5.7 illustrates, across all countries, the relationship between parents' views on reading and student achievement was positive. That is, students' reading literacy achievement tended to be higher as parents' views about reading were more positive.

Table 5.7: New Zealand Year 5 students in each category of the *Parents Like Reading* (PLR) *Scale*, 2010/11

Comparison group	Parents Like Reading					
	Do not like		Somewhat like		Like	
	Percentage of students	Mean reading score	Percentage of students	Mean reading score	Percentage of students	Mean reading score
New Zealand[#]	8 (0.7)	509 (6.0)	41 (0.9)	531 (2.6)	51 (1.1)	571 (2.4)
International mean	11 (0.1)	487 (0.9)	57 (0.2)	507 (0.5)	32 (0.2)	535 (0.5)

Notes

Standard errors appear in parentheses.

The centrepoint of the *PLR Scale* was set at 10.0. The means for the scale ranged from 10.9 (Sweden) to 9.3 (Hong Kong SAR and Morocco); the mean and standard error for New Zealand was 10.8 (0.05).

[#] Data available for 50-69% of students.

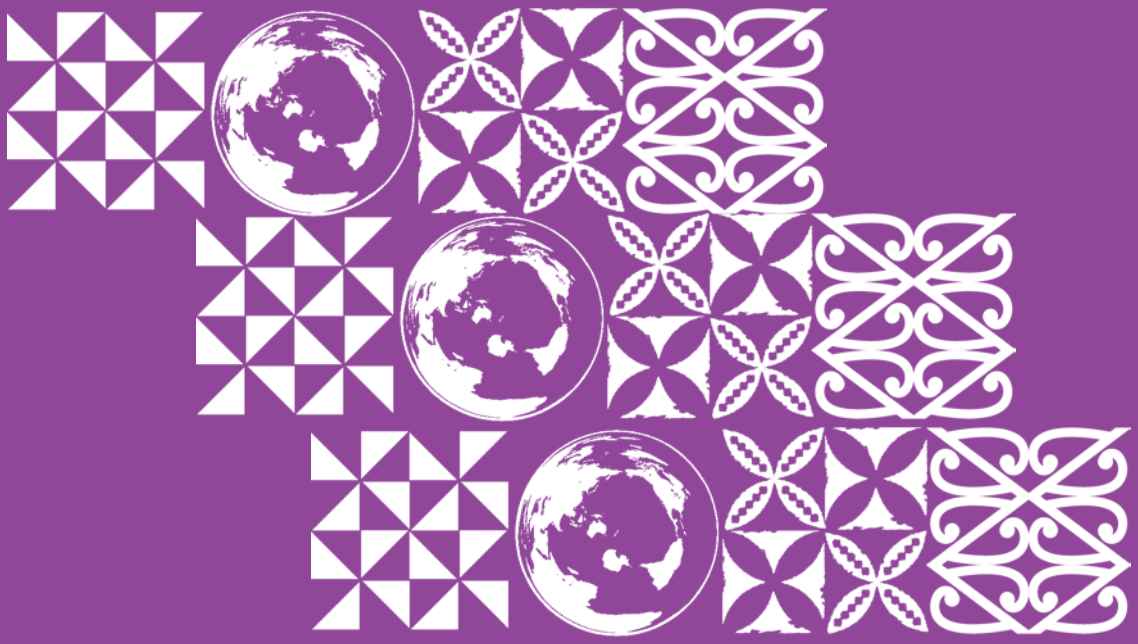
Source: Exhibit 4.4 in Mullis, Martin, Foy, & Drucker, 2012.

Any change from 2001 to 2010/11?

Although the *Parents Like Reading Scale* itself is not directly comparable with the *Parents' Attitudes Towards Reading (PATR) Index* used in 2005/06, the views of New Zealand parents/caregivers in 2010/11 were consistent with the views of parents in that cycle of PIRLS (Chamberlain, 2007). Furthermore, their views in 2010/11 were still found to be among the most positive, relative to parents and caregivers in other countries.

Section 6:

Schools and School Climate



Section 6: Schools and School Climate

While the home plays a key role in developing and fostering children's literacy, the school is the main setting where literacy instruction actually takes place. 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 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—the principal, teachers, parents, and students—feel.

The first part of this section presents an overview of the characteristics of New Zealand schools, with a particular focus on the socio-economic climate for learning. The second half looks at some of the school climate information collected in PIRLS 2010/11.

Reading literacy achievement and school characteristics

Urban-rural location

According to previous cycles of PIRLS, children attending urban or suburban schools generally achieved at a moderately higher level than those attending schools located in rural areas. However, in New Zealand, this was not the case (see Chamberlain, 2007).

In 2010/11, while the mean reading scores for students attending schools in suburban locations (545) and mid-sized cities (539) were higher than the mean reading scores for students attending schools in urban locations (529) or small towns/rural settings (526), there were no significant differences between these scores (when adjusted for multiple comparisons).[62]

Size of population centre

In addition to looking at the type of centre, the size of the community in which the school was located is considered. Internationally, there was a strong positive relationship between community size and reading achievement. That is, achievement was higher as the population size increased. In New Zealand there were no significant differences between the mean reading scores for Year 5 students in schools located in large population centres with more than 100,000 people (535), moderate-sized communities of 15,001 to 100,000 people (539) or smaller population centres with 15,000 or fewer people (526).[63]

Education region

Since PIRLS was conducted in New Zealand in 2005, the Ministry of Education's policy work has increasingly included a regional focus; understanding how achievement varies regionally had become an important factor for informing this work. When the PIRLS 2010/11 reading achievement results were looked at by education region, there were relatively small differences between the mean

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62 The *t*-values for the comparison between students in urban and suburban schools was $t = 2.08$ and in suburban and small/rural settings was $t = 2.47$, before the Dunn-Bonferroni adjustment for multiple comparisons was applied (i.e., *critical value* ≥ 2.64). See TN 6 in the Technical Notes.

63 The percentage of students in large population centres was 44%, moderate size centres, 24%, and 32% in smaller centres. The *t*-value for comparison between moderate size and smaller population centres was $t = 2.14$, before the Dunn-Bonferroni adjustment for multiple comparisons was applied (i.e., critical value ≥ 2.39). See TN 6 in the Technical Notes.

scores; the means ranged from 525 for the Northern Region to 542 for students in schools in the Central South Region. The differences were not statistically significant. (See Table B.15 for details.)

School size

The mean reading scores for New Zealand Year 5 students attending both larger schools with more than 400 students (534) and medium-sized schools with 200 to 400 students (535) were somewhat higher than for their counterparts attending smaller schools with less than 200 students (522), although the differences were found not to be of statistical significance.[64] Although 'school decile' is discussed in more detail later in this section, it is worth noting that smaller schools were also more likely to be deciles 1 or 2 schools; eight percent of PIRLS Year 5 students were in *small* deciles 1 and 2 schools. The converse to this was that the larger schools Year 5 students were attending were more likely to be deciles 9 or 10 schools; 12 percent of all Year 5 students in PIRLS were in *large* deciles 9 and 10 schools.

Any change from 2001 to 2010/11?

In PIRLS 2010/11, the question about school urban-rural location was formulated slightly differently than it had been previously and therefore the data is not comparable with the earlier PIRLS cycles. However, consistent with the findings from the previous cycles, location on its own does not appear be an explanatory factor for students' reading achievement. Furthermore, there were no significant changes in achievement for any of the regions. In 2005/06, Year 5 students in larger schools achieved on average significantly higher reading scores than Year 5 students attending smaller and medium-sized schools. However, 2010/11 findings on school size described in the previous section are consistent with similar findings in 2001 (i.e., no difference).

Economic composition of schools' student body

It is generally recognised that the work of James Coleman and his colleagues in the United States in the 1960s was the watershed for demonstrating the effects of the composition of the student body in schools.[65] That is, the achievement of students in schools where the student body is predominantly from low socio-economic backgrounds is typically lower than the achievement of students in schools where the student body is predominantly from high socio-economic backgrounds. Furthermore, it has been found that students from low socio-economic backgrounds have higher achievement if they attend schools where the student body is predominantly from high-socio economic backgrounds. In New Zealand there have been reviews of international and national literature to understand better the complexity of the issues, particularly as they relate to the New Zealand context (Biddulph, Biddulph, & Biddulph, 2003; Nechyba, McEwan, & Older-Aguila, 1999). In addition the Ministry of Education has sought to understand how the differing peer groups can influence children's achievement (Wilkinson, Hattie, Parr, et al., 2000).

Principals in all PIRLS countries were asked to provide estimates, using a four-point scale—'0–10%', '11-25%', '26-50%', and 'more than 50%'—of the proportions of students in their school that came from economically disadvantaged backgrounds and the proportion coming from economically

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[64] Twenty-eight percent of Year 5 students in PIRLS were in smaller schools, 38% were in medium-sized schools, and 35% were in larger schools. (See Appendix A for details of how schools were sampled.)

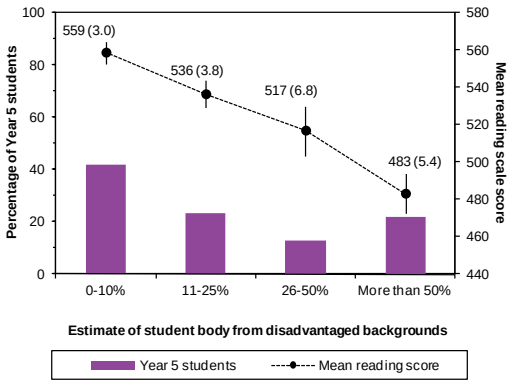
[65] The report is commonly referred to as the "Coleman Report" and is entitled *Equality of educational opportunity*. Published in 1966 by the United States Congressional Printing Office.

affluent homes.[66] Estimates from New Zealand principals and the relationship of these with the mean reading achievement scores of their Year 5 students are summarised in Figures 6.1A and 6.1B.

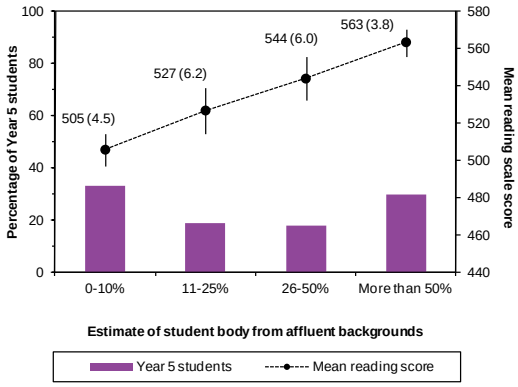
Both figures illustrate the strong relationship between the economic backgrounds of the student body in schools and reading literacy achievement. As the percentage of the schools' student body from economically disadvantaged backgrounds increased, there was a corresponding decrease in the reading achievement of the Year 5 students in those schools, as shown in Figure 6.1A. The converse is illustrated in Figure 6.1B; the higher the percentage of the student body from affluent backgrounds, the higher the reading literacy achievement of the Year 5 students in those schools.

Figure 6.1: New Zealand principals' estimates of their total student body coming from economically disadvantaged homes and economically affluent homes, 2010/11

A. Economically disadvantaged homes



B. Economically affluent homes



Notes

Each bar represents the percentage of Year 5 students in schools where principals have estimated the percentage of their student body from either disadvantaged or affluent backgrounds.

The data points are the mean reading scores for the Year 5 students in the schools according to their economic composition. The vertical lines extending from each data point show the 95 percent confidence interval around the mean (i.e., ± 1.96 standard errors). The standard errors appear in parentheses.

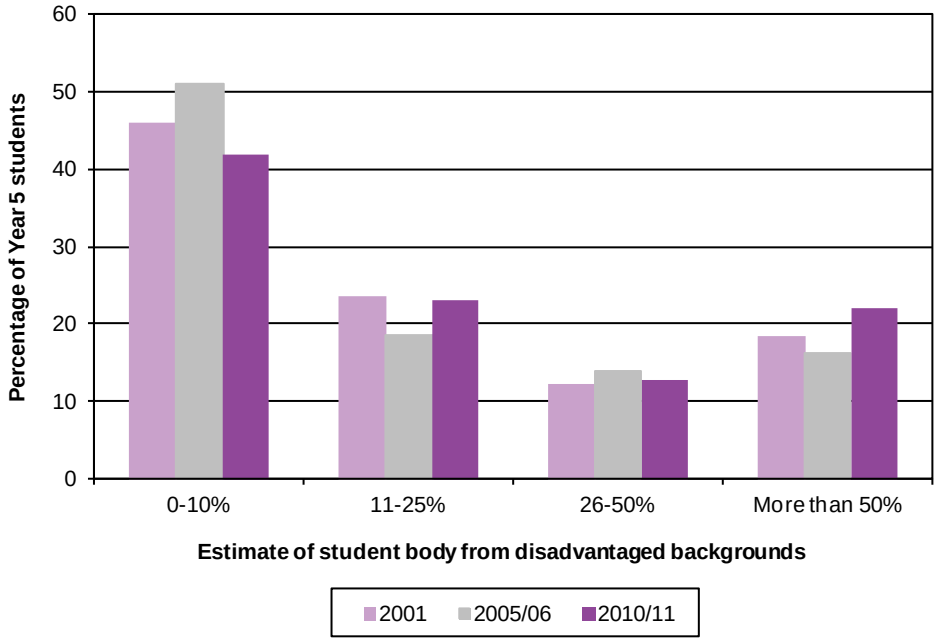
Any change from 2001 to 2010/11?

Overall, the changes in schools' estimates of levels of their student body from economically disadvantaged and affluent backgrounds across the three cycles show a slightly negative picture, with what appears to be greater concentrations of students from either background in New Zealand schools. This is illustrated in two ways—the increasing proportion of Year 5 students in schools where the student body are from mostly disadvantaged backgrounds together with an increasing proportion of Year 5 students in schools where the student body is from affluent backgrounds.

Figure 6.2 presents principals' estimates of their schools' student body from economically disadvantaged backgrounds across the three cycles of PIRLS.

[66] These terms (disadvantaged and affluent) were used internationally and therefore used in the questionnaire to principals.

Figure 6.2: Trends in school principals' estimates of the student body from economically disadvantaged backgrounds, 2001–2010/11

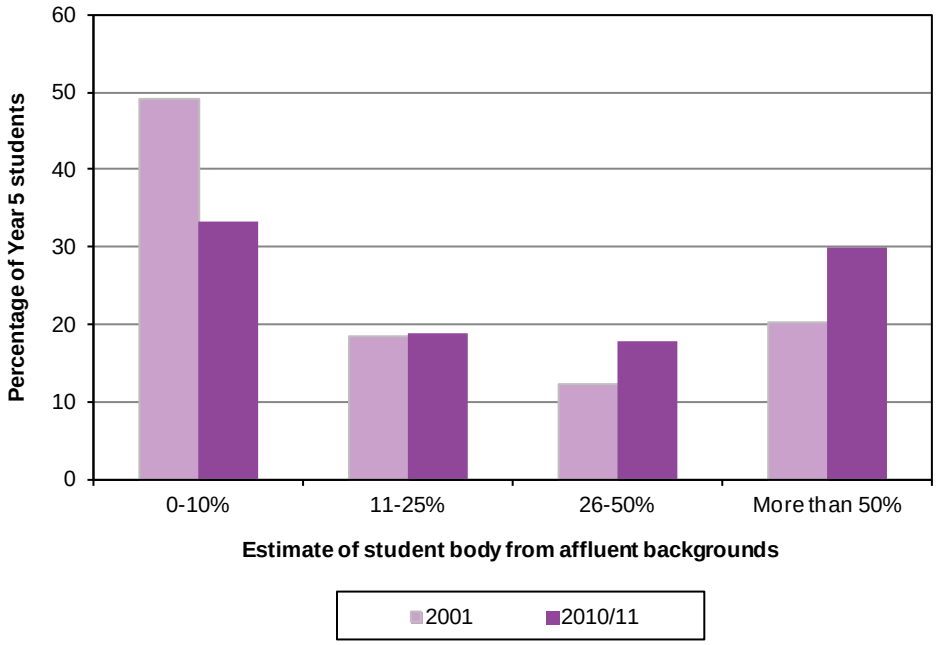


The figure shows a decrease in the proportions of Year 5 students attending schools where '0–10%' or relatively few of the student body was considered to be from economically disadvantaged backgrounds: a five percentage point increase from 2001 to 2005/06, followed by a decrease of nine percentage points from 2005/06 to 2010/11. At the same time, there is a corresponding increase in schools reporting 'more than 50%' or relatively more of the student body from economically disadvantaged backgrounds; a two percentage point decrease from 2001 to 2005/06, followed by an increase of six percentage points from 2005/06 to 2010/11.

Figure 6.3 illustrates the converse—school principals' estimates of their student body from economically affluent backgrounds for 2001 and 2010/11. (Unfortunately there was no data from New Zealand principals in 2005/06.) Proportionately more Year 5 students were in schools where increasingly more of the student body was estimated to be from economically affluent backgrounds in 2010/11 than in 2001. In particular, there was a 16 percentage point decrease in the proportion of Year 5 students attending schools where '0–10%' or relatively few of the student body was considered to be from economically affluent backgrounds from 2001 to 2010/11, together with 10 percentage points more students in schools with 'more than 50%' or relatively more of the student body from economically affluent backgrounds.

Despite these shifts, there were no significant changes in students' mean reading scores from 2001 to 2010/11 cycles of PIRLS in each of the compositional categories. (The mean reading scores for students in each category are shown in Table B.16 in Appendix B.) That is, the difference between the means for Year 5 students in schools with '0–10%' of the student body from economically disadvantaged backgrounds and those in schools with 'more than 50%' in 2010/11 was about the same as it was in 2001, with both differences lower than in 2005/06.[67] Interestingly too, the difference between the means for Year 5 students in schools with '0–10%' of the student body from economically affluent backgrounds and those in schools with 'more than 50%' in 2010/11 was a little higher than in 2001 (58 c.f. 52).

Figure 6.3: Comparison of school principals' estimates of the student body from economically affluent backgrounds, 2001 and 2010/11



Economic composition of New Zealand schools in an international context

Internationally, all principals' responses to the questions on the two socio-economic measures were then aggregated in order to describe the overall student body: schools that had proportionally *more disadvantaged than affluent students* (i.e., more than 25% from economically disadvantaged homes and 25% or fewer from economically affluent homes) and schools with *more affluent than disadvantaged students* (i.e., 25% or fewer students from economically disadvantaged homes and more than 25% of students from economically affluent homes).

Table 6.1 presents an overview for New Zealand and a selection of comparable countries. Of note is the relatively large difference between the mean reading scores for the two groups of New Zealand Year 5 students by their level of disadvantage, compared to their counterparts in these countries.

[67] In 2001, the mean difference between students in the low disadvantaged category and the high disadvantaged category was 74 scale score points, increasing to 82 in 2005/06, and then decreasing slightly to 76 in 2010/11.

Table 6.1: School composition by student economic background for selected countries, 2010/11

Country	Estimate of the difference between the mean reading scores for more affluent student body and more disadvantaged student body	More disadvantaged (schools where more than 25% of students come from economically disadvantaged homes and not more than 25% from economically affluent homes)		Neither more affluent nor more disadvantaged		More affluent (schools where more than 25% of students come from economically affluent homes and no more than 25% from economically disadvantaged homes)	
		Percentage of students	Mean reading score	Percentage of students	Mean reading score	Percentage of students	Mean reading score
Canada	24	28 (2.6)	533 (2.6)	34 (2.9)	549 (2.7)	39 (2.4)	557 (3.0)
Portugal	30	31 (4.8)	522 (4.6)	39 (4.9)	547 (4.1)	30 (4.5)	552 (4.0)
Finland	35	10 (2.6)	541 (4.0)	47 (4.3)	567 (2.7)	43 (4.2)	576 (2.4)
England	41	35 (4.0)	527 (4.7)	33 (4.9)	554 (4.0)	32 (4.8)	568 (4.9)
Northern Ireland	44	26 (3.8)	534 (5.8)	38 (4.3)	555 (3.3)	36 (4.7)	578 (4.9)
Ireland	45	31 (3.4)	523 (4.0)	30 (4.2)	554 (4.7)	39 (4.7)	568 (3.3)
Trinidad and Tobago	48	54 (4.2)	460 (5.7)	26 (4.0)	464 (9.2)	20 (3.2)	508 (7.5)
Singapore	49	10 (0.0)	541 (14.3)	50 (0.0)	556 (4.5)	40 (0.0)	590 (5.2)
United States	54	51 (2.3)	537 (2.4)	31 (2.6)	570 (3.5)	18 (2.2)	591 (2.9)
Australia	56	27 (3.4)	500 (5.7)	41 (4.0)	526 (3.6)	32 (3.9)	556 (3.9)
Malta	61	10 (0.1)	421 (5.3)	43 (0.1)	478 (2.4)	47 (0.1)	482 (2.2)
New Zealand	**71**	**27 (2.5)**	**489 (4.2)**	**34 (3.6)**	**533 (3.7)**	**39 (3.4)**	**560 (3.2)**
International mean (for 45 countries)	40	30 (0.5)	490 (1.0)	35 (0.6)	515 (0.8)	35 (0.5)	530 (0.9)

Note

The standard errors appear in parentheses.

Source: Exhibit 5.2 in Mullis, Martin, Foy, & Drucker, 2012.

Economic composition and ethnicity

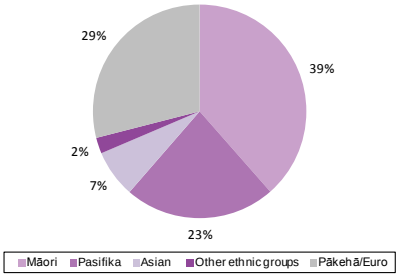
How do New Zealand principals' estimates of the economic composition of their schools' student body relate to the ethnic background of their student body? Figure 6.4 shows the Year 5 students according to the ethnic grouping to which they belong and the economic composition of the student body of the schools they attended.[68]

The figure clearly shows a relationship between the ethnic background of their students and economic composition of the schools' student body. For example, Figure 6.4C shows the proportion of Year 5 Pākehā/European students was greatest in schools where the estimated composition of the student body was judged to be from more economically affluent backgrounds. The converse to this is shown in Figure 6.4A, where the proportion of Year 5 Pākehā/European students was relatively small in schools where the estimated composition of the student body was judged to be from more economically disadvantaged backgrounds.

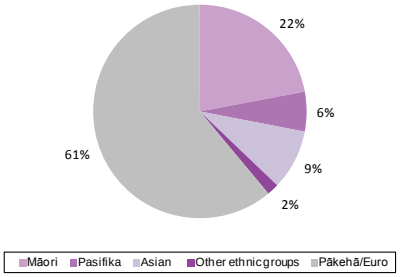
[68] Prioritised ethnic identity classification.

Figure 6.4: Ethnic composition of the schools New Zealand Year 5 students attended in 2010/11, by the economic status of schools' student body

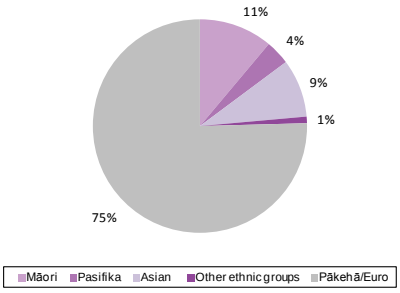
A. Schools with more disadvantaged student body



B. Schools with neither more affluent nor more disadvantaged student body



C. Schools with more affluent student body

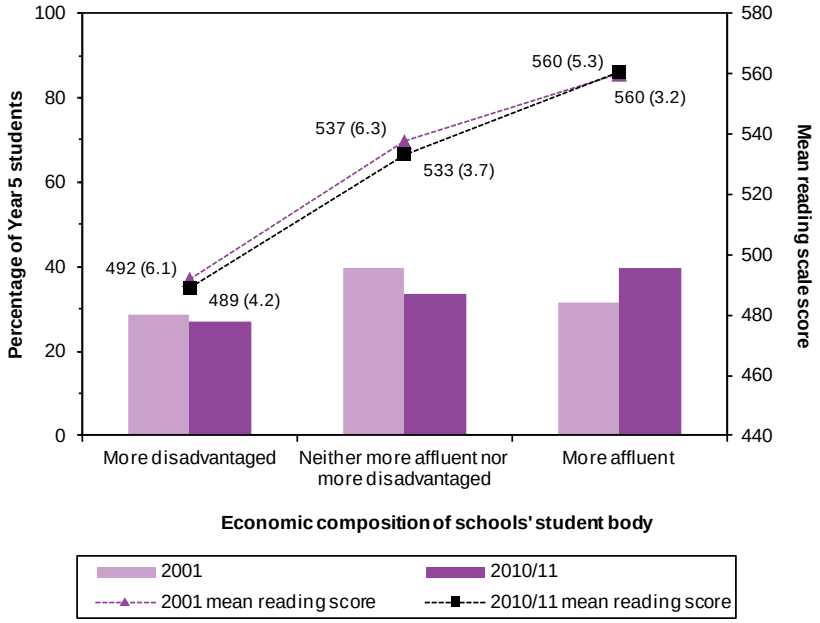


Any change from 2001 to 2010/11?

Although the data for principals' estimates of the level of economic affluence is not available for 2005/06, it is possible to look at school composition for 2001 and 2010/11 using the international aggregated measure reported in Table 6.1. (See Figure 6.5 for details.)

Between 2001 and 2010/11, there was an eight percentage point increase in the proportion of Year 5 students in schools with predominantly more affluent students. This was largely due to the six percentage point decrease in the proportion attending schools where the composition was judged to be more even, along with a small decrease (< 2 percentage points) in the percentage of Year 5 students in schools with predominantly more disadvantaged students. Despite these percentage shifts, and in keeping with achievement patterns for the individual compositional measures, there were no significant changes in the reading literacy achievement of Year 5 students in any of the three compositional categories.

Figure 6.5: Comparison of the economic composition of New Zealand schools with Year 5 students, 2001 and 2010/11



Notes

Each bar represents the percentage of Year 5 students attending schools where principals have estimated the percentage of their student body from either more disadvantaged, neither more affluent nor more disadvantaged backgrounds, or more affluent backgrounds in either 2001 (light purple) or 2010 (purple).

The data points are the mean reading scores for the Year 5 students according to their schools' economic composition. The standard errors appear in parentheses.

School decile and economic composition[69]

How well do principals' estimates of the economic composition of New Zealand schools described in the previous section align with the Ministry of Education's decile, a national-level indicator used to identify the extent to which schools are drawing students from low socio-economic communities? Is the decile a reasonable proxy for describing the economic composition of New Zealand schools?

Using census information, the decile for a school is calculated using socio-economic indicators about the communities in which its students reside:

1. Household income – the percentage of households with income equivalent to the lowest 20% nationally
2. Occupation – the percentage of employed parents in occupations that are relatively low skilled
3. Household crowding – an index of overcrowding (calculated from the number of persons per bedroom which builds in an assumption of two children per room)
4. Educational qualifications - the percentage of parents with no tertiary or school qualifications
5. Income support - the percentage of parents who receive a Domestic Purposes Benefit, Unemployment Benefit or Sickness and Invalid's Benefit.

[69] 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. (Retrieved from http://www.minedu.govt.nz/NZEducation/EducationPolicies/Schools/SchoolOperations/Resourcing/OperationalFunding/Deciles/HowTheDecileIsCalculated.aspx)

Schools are then ranked according to the five factors into 10 percent groupings, or deciles. 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 the lowest level of students from socio-economically disadvantaged communities. A school's decile does not indicate the actual socio-economic mix of the school nor is it a measure for the quality of teaching.

Economic composition estimates from the schools

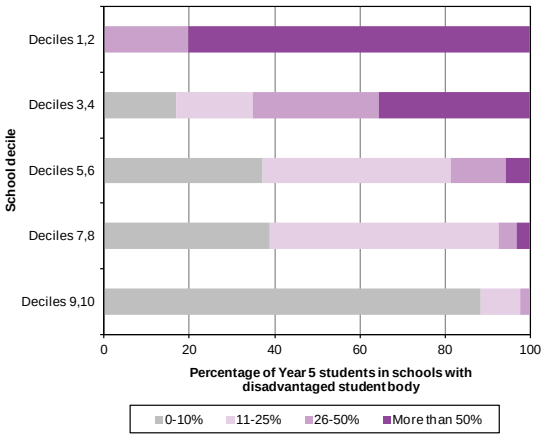
The decile for each of the PIRLS-2010/11 state and state-integrated schools was considered in relation to the international composition measure—economically disadvantaged or affluent—estimated by school principals. For example, the proportion of Year 5 students attending decile 1 schools where the student body from economically disadvantaged backgrounds was estimated to be 'more than 50 percent' was 100 percent. The converse to this was that the majority of Year 5 students (90%) attending decile 1 schools where the student body from economically affluent backgrounds was estimated to be only '0-10%'.

By way of contrast, only '0–10%' of the student body of almost all decile 10 schools was estimated to be from economically disadvantaged backgrounds (accounting for 95% of Year 5 students in decile 10 schools), while 'more than 50% of the student body' of decile 10 schools was estimated to be from affluent backgrounds (accounting for 85% of Year 5 students in these decile 10 schools).

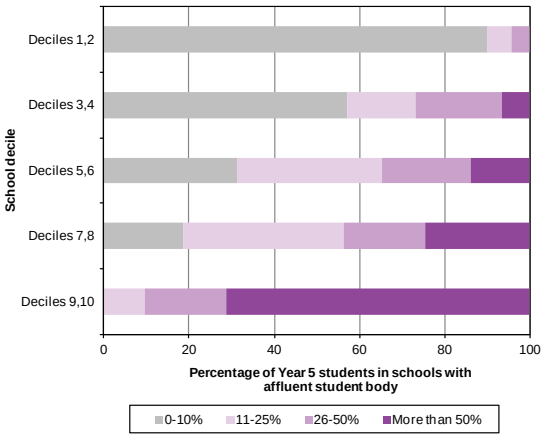
Figures 6.6A and 6.6B summarises this information in decile groupings to illustrate the strong relationship between school decile and principals' estimates of the economic composition of the student body. As the figures show, as school decile increases, the estimated proportion of the student body from disadvantaged backgrounds decreases at the same time as the proportion from affluent backgrounds increases. The converse to this is that as the school decile decreases the estimated proportion of the student body from affluent backgrounds decreases at the same time as the proportion estimated to be from disadvantaged backgrounds increases.

Figure 6.6: Relationship of school decile with economic composition estimates of schools' student body, 2010/11

A. Level of disadvantage



B. Level of affluence



To conclude, New Zealand principals' estimates of economic composition align well with the Ministry of Education's decile, and vice versa. Given that current funding and resource allocation to schools is linked to decile, the remaining analysis for this section will also consider schools' decile.

Literacy readiness of the student intake

An important element for students beginning school is having the prerequisite skills for them to transition successfully into formal education. In addition to the views of parents/caregivers about their child's literacy readiness when they started school, information was sought from school principals on the readiness of their student body at school entry. They were asked to estimate the percentage of their student intake that could do each of five early literacy skills—recognise most of the letters of the alphabet; read some words; read sentences; write letters of the alphabet; and write some words when they begin school. The list was not exhaustive and there were omissions such as oral language skills (e.g., re-telling). As with the length of time in ECE and parents'/caregivers' perceptions of their child's readiness described in Section 5, interpreting differences across countries are difficult because of factors such as differing starting ages and the relationship with pre-primary education. However, of note is the variation that exists even among some of the English-language countries that also tend to have some of the earliest starting ages (see Table 6.2).

Table 6.2: Schools in selected countries where students enter primary school with early literacy skills, 2010/11

Country	Schools where less than 25% enter with skills		Schools where 25–50% enter with skills		Schools where 51–75% enter with skills		Schools where more than 75% enter with skills	
	Percentage of students	Mean reading score	Percentage of students	Mean reading score	Percentage of students	Mean reading score	Percentage of students	Mean reading score
Singapore	1 (0.0)	~ ~	5 (0.0)	536 (15.4)	14 (0.0)	541 (11.4)	80 (0.0)	574 (3.8)
England	2 (1.6)	~ ~	12 (3.1)	540 (7.8)	26 (4.6)	533 (7.4)	60 (5.0)	562 (4.1)
Finland	7 (3.1)	555 (5.7)	22 (3.4)	562 (3.5)	48 (4.1)	572 (2.6)	23 (3.9)	571 (4.3)
Malta	44 (0.1)	455 (2.3)	22 (0.1)	490 (3.4)	13 (0.1)	517 (3.9)	21 (0.1)	501 (2.8)
Trinidad and Tobago	26 (3.8)	456 (7.1)	30 (3.9)	468 (8.9)	24 (3.9)	476 (7.8)	20 (3.3)	494 (11.2)
United States	46 (2.7)	545 (2.7)	28 (2.8)	563 (4.0)	15 (2.2)	578 (4.8)	11 (1.9)	573 (7.0)
Australia	54 (3.9)	518 (4.0)	21 (3.2)	545 (4.4)	14 (2.8)	537 (6.8)	11 (2.2)	539 (6.6)
Canada	55 (3.0)	542 (2.1)	22 (2.6)	554 (4.7)	13 (1.7)	558 (4.5)	10 (1.6)	556 (3.8)
New Zealand	**62 (4.1)**	**519 (3.6)**	**19 (3.4)**	**549 (6.9)**	**10 (2.4)**	**563 (4.8)**	**10 (2.4)**	**563 (6.5)**
Netherlands	38 (5.1)	547 (2.9)	38 (5.0)	546 (4.4)	20 (4.0)	547 (5.3)	4 (2.0)	542 (7.4)
Northern Ireland	81 (3.4)	558 (2.9)	15 (3.5)	558 (9.7)	2 (1.4)	~ ~	1 (0.9)	~ ~
International mean (for 45 countries)	40 (0.5)	500 (0.8)	22 (0.5)	512 (1.1)	18 (0.5)	511 (1.2)	20 (0.4)	516 (1.3)

Notes

Principals' responses across the five items were averaged and their students were assigned to categories based on a 4-point-scale (less than 25%=1, 25-50%=2, 51-75%=3, and more than 75%=4). More than 75% corresponded to a mean greater than 3.35; 51-75% corresponds to a mean of 2.25-3.25, 25-50%, a mean of 1.75-2.5; and less than 25% indicates a mean of less than 1.75.

Standard errors appear in parentheses.

There was no comparable data for Ireland; children in the Netherlands can start school at 4 (by entering a pre-primary programme).

Source: Exhibit 5.4 in Mullis, Martin, Foy, & Drucker, 2012.

With the exception of Singapore and England, the proportions of the student intake with differing skill levels were similar across the English-language countries, with the majority of schools reporting that proportionately few of their student intake started with the aforementioned early literacy skills. Looking specifically at England with its early starting age, a relatively high proportion of its PIRLS Year 5 students (60%) attended schools where more than half the student intake started school with prerequisite skills of recognising and writing letters of the alphabet and to a lesser extent reading some words. However, entry to 'primary school'[70] in English schools equates to entry to Year 1 rather than entry to the compulsory reception year; in the international context, the reception year actually equates to a compulsory pre-primary year for 4-year-olds.

While the relationship with reading achievement varied among countries, what is clear in New Zealand is that the mean reading score for the Year 5 students attending schools where fewer than 25 percent of the student intake was estimated to have the prerequisite skills (519) was significantly lower than the mean reading score for the Year 5 students attending schools where even 25 percent or more of the student intake could do these tasks (556).[71]

Early literacy skills and school decile

Figure 6.7 shows the relationship between the decile of New Zealand schools and the early literacy skills of their student intake. It clearly shows that higher decile schools were more likely than lower decile schools to have a greater proportion of their student intake *with* early literacy skills; the converse to this is that low decile schools (deciles 1 and 2) were more likely than higher decile schools to have a higher proportion of their student intake *without* the pre-requisite literacy skills. Furthermore, the mean reading achievement of Year 5 students in lower decile schools where proportionately few of the student intake (< 25%) had the prerequisite skills was markedly lower than those Year 5 students in higher deciles schools where few of the intake had the skills. That is, the mean reading scores for the Year 5 students in deciles 1 and 2 schools where few of the student intake had early literacy skills was 468; compared to the mean of 512 for the Year 5 students in deciles 3 and 4 schools where few of the intake had these skills.[72]

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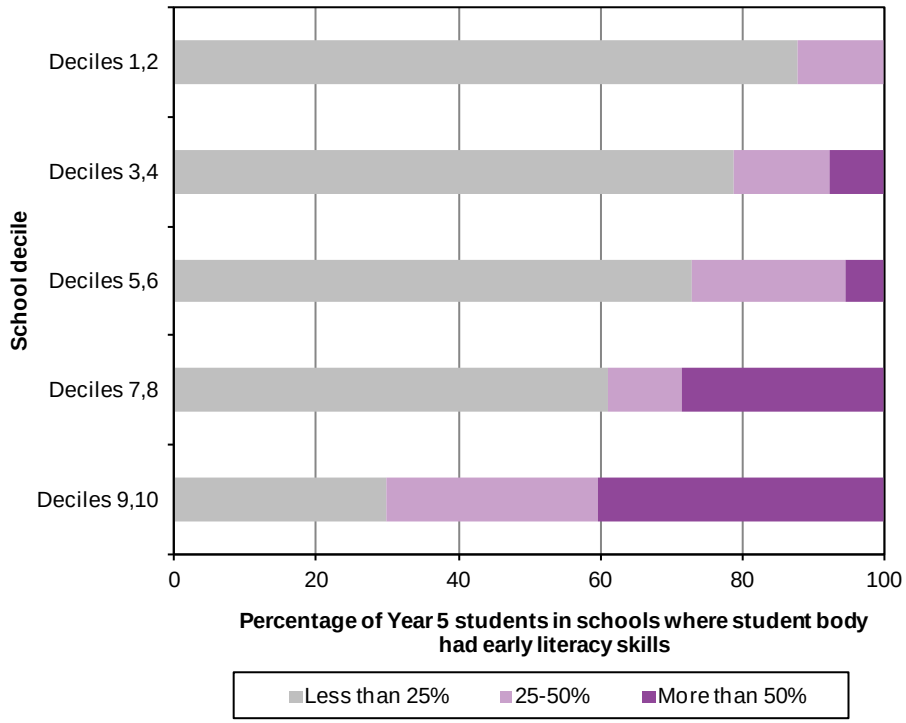
[70] In all countries, the question was adapted in accordance to the country's ISCED Level 1 definition for the beginning of primary schooling. In England, "reception is a non-statutory year so is considered at ISCED level 0 (i.e., pre-primary). During the reception year, many schools implement a play-led curriculum while some basic skills get taught." (L. Twist, personal communication, October 25, 2012).

[71] Sixty-two percent of Year 5 students were in schools where less than 25% of the intake was estimated to have the skills; 38% of Year 5 students were in schools where 25% or more of the intake had them at school entry.

[72] The corresponding means for decile grouping: 5 and 6 was 532; 7 and 8 was 545; and 9 and 10 was 561.

Figure 6.7: New Zealand schools where students enter primary schools with early literacy skills, by school decile



Numeracy skills of the student intake

In addition to early literacy skills, principals were asked to estimate the percentage of their student intake that could do three early numeracy skills when they started school—count up to 100 or higher by rote; recognise all 10 written numbers from 1 to 10; and write all 10 numbers from 1 to 10. As with the literacy skills, the list was not exhaustive in that it did not include such skills as sequence forward tasks (i.e., what number comes immediately after another when counting). The approach used to summarise principals' estimates of early literacy skills was also used to summarise their estimates of early numeracy skills (see notes below Table 6.2). In general, most schools (accounting for 75% of all Year 5 students) reported that few of their student intake (< 25%) had these early numeracy skills. Just four percent of all Year 5 students were in schools where more than 75 percent of an intake had these skills (13% were in the 25–50% category; 8% in the 51-75% category). These findings are virtually the same as those found for TIMSS in 2011 (Caygill, Kirkham, & Marshall, 2013).[73]

School decile and reading achievement

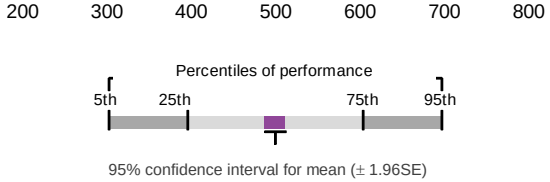
In keeping with previous cycles of PIRLS, the reading literacy achievement of Year 5 students is examined according to the decile of the school they attended. As Figure 6.8 illustrates there is a wide variation in reading achievement within each of the decile groupings, as all decile groupings had high-performing and low-performing students.

[73] See Section 1 for description of the design for the administration of both the Progress in International Reading Literacy Study and Trends in International Mathematics and Science Study (TIMSS) in 2010/11.

Note that while four percent of students in PIRLS were in independent schools, the actual number of schools from which they were sampled is too small (fewer than 10 schools) to calculate reliable statistics or make valid comparisons with either state or state-integrated schools (see TN 7 in the Technical Notes for details).

Figure 6.8: Distribution of New Zealand Year 5 students' reading literacy achievement in 2010/11, by school decile*

School decile grouping	Percentage of Year 5 students	Mean reading scale score	Distribution of reading literacy achievement
Deciles 1 and 2	19 (1.3)	471 (3.3)	
Deciles 3 and 4	17 (2.3)	506 (4.7)	
Deciles 5 and 6	20 (2.5)	535 (4.3)	
Deciles 7 and 8	15 (1.7)	549 (4.1)	
Deciles 9 and 10	26 (1.0)	570 (3.3)	
Independent	4 (1.4)	~ ~	
All New Zealand		**531 (1.9)**	



Notes

Standard errors appear in parentheses. See Tables B.18 and B.19 for details of the means and percentiles for 2001 and 2005/06.

* State and state-integrated schools only. Note there were an insufficient number of participating independent schools to be able to report the mean. Data included in All New Zealand.

Looking across the decile groupings, the following comparisons showed that:

- the mean reading scores for Year 5 students in schools in the lower decile bands (1 and 2, 3 and 4) were significantly lower than the means for students attending schools in the higher decile bands
- the mean reading scores for Year 5 students attending deciles 5 and 6 schools and deciles 7 and 8 schools were significantly lower than the means for Year 5 students in deciles 9 and 10 schools
- there was no significant difference between the mean scores of Year 5 students in deciles 5 and 6 schools and those in deciles 7 and 8 schools.

(Note: all comparisons of means were adjusted for multiple comparisons; see TN 6 in the Technical Notes.)

The variation or range (i.e., difference between the 5th and 95th percentiles) of reading achievement was widest in lower decile schools (deciles 1 and 2, the range was 280; deciles 3 and 4, 276; and deciles 5 and 6, 276) than higher decile schools (deciles 7 and 8, 267; deciles 9 and 10, 245).[74]

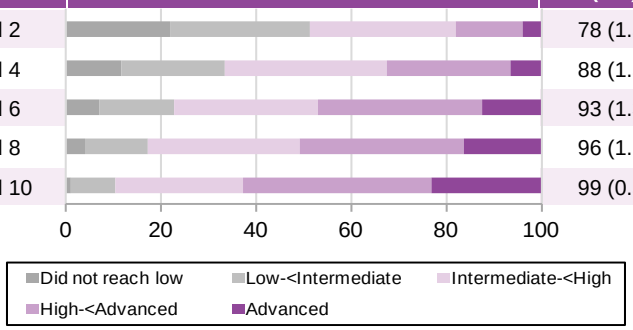
[74] The sampling design of PIRLS meant that a sample of 'intact classrooms' of students were sampled. To overcome the fact that New Zealand schools group students into composite classes and to ensure New Zealand met the international requirements for the minimum total for the country (4,500), in many schools Year 5 students were sampled from across the composite classes; in many instances the entire Year 5 cohort from participating schools took part. See Appendix A for details of the sampling design for New Zealand.

PIRLS international benchmarks and school decile

Figure 6.9 shows the percentages of Year 5 students reaching each benchmark, by decile grouping. Proportionately few students in lower decile schools reached each of the benchmarks 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 Year 5 students from mid-range decile schools with students attending higher decile schools.

Figure 6.9: Percentage of New Zealand Year 5 students reaching the PIRLS international reading benchmarks in 2010/11, by school decile*

School decile grouping	Percentage of Year 5 students reaching the PIRLS international benchmark	Cumulative percentages			
		Low (400)	Intermediate (475)	High (550)	Advanced (625)
1 and 2		78 (1.5)	49 (1.9)	18 (2.2)	4 (1.0)
3 and 4		88 (1.5)	67 (2.6)	33 (3.2)	6 (1.5)
5 and 6		93 (1.3)	77 (2.1)	47 (2.6)	13 (1.7)
7 and 8		96 (1.1)	83 (1.8)	51 (2.3)	17 (1.8)
9 and 10		99 (0.5)	90 (1.3)	63 (1.8)	23 (2.0)



Notes

Standard errors appear in parentheses. The darker grey sections on the left side of the bar represent the percentages of students who did not reach the *Low International Benchmark*; the lighter grey represents the students who reached the *Low International Benchmark* but did not reach the *Intermediate International Benchmark*, and so on. The purple represents the percentage of students who reached the *Advanced International Benchmark*.

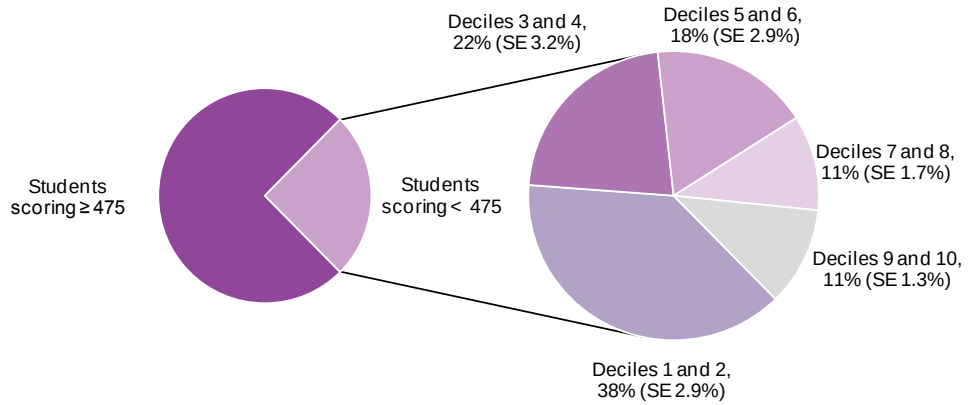
The percentage of Year 5 students not reaching the *Low International Benchmark* is the difference between 100–(the % reaching the *Low*). The percentages (and standard errors) not reaching this level were: deciles 1 and 2, 22% (1.5); deciles 3 and 4, 12% (1.5); deciles 5 and 6, 7% (1.3); deciles 7 and 8, 4% (1.1); and deciles 9 and 10, 1 % (1.1).

* State and state-integrated schools only. Note there were an insufficient number of participating independent schools to be able to report benchmark information separately for students at these schools.

School decile and lower achievers

In Section 3, lower achievers were defined as the students that did not reach the PIRLS *Intermediate International Benchmark* (i.e., scored below 475). One-quarter of Year 5 students fell into this category. In addition to looking at the demographic characteristics of this group, it is also important to understand the schools these students attended. Figure 6.10 shows the lower-achievers group by school decile.

Figure 6.10: Composition of the New Zealand Year 5 lower-achievers group in 2010/11, by school decile*



Notes

Standard errors (SE) appear in parentheses.

The proportion of all Year 5 students who reached the PIRLS *Intermediate International Benchmark* was 75 percent (SE 0.9 %); the proportion who did not reach this benchmark was 25 percent (SE 0.9%).

* State and state-integrated schools only.

What the figure shows is that there were lower achievers in all schools, regardless of the decile assigned to the school; this finding is consistent with findings from other studies such as the Programme for International Student Assessment (PISA). However, another way to view this information is to look also at each decile group as a proportion of the total (estimated) Year 5 population in New Zealand. In 2010/11:

- 10 percent were lower-achieving students attending deciles 1 and 2 schools
- six percent were lower-achieving students attending deciles 3 and 4 schools
- four percent were lower-achieving students attending deciles 5 and 6 schools
- just under three percent were lower-achieving students attending deciles 7 and 8 schools
- just under three percent were lower-achieving students attending deciles 9 and 10 schools.

Summing up, the highest proportion of New Zealand's weaker readers were in state and state-integrated deciles 1 and 2 schools, with sizeable proportions also in deciles 3 to 6 schools, representing about 20 percent of all Year 5 students.

Odds ratios

The observations from the odds ratio (*OR*) analysis can be summarised as follows:

- students in deciles 1 and 2 schools had more than four times the odds of being in the lower-achievers group than learners in other-decile schools (1.05 c.f. 0.25)
- students in deciles 3 and 4 schools had just over 1.5 times the odds of being in the lower-achievers group than learners in other-decile schools (0.50 c.f. 0.32).

The *odds* of a student in a higher decile school being in the lower-achievers group decreased as the decile increased so that the chance of a learner from a decile 9 or 10 school being in the lower-achievers group was very low.

Any change from 2001 to 2010/11?

Consistent with the overall pattern observed for New Zealand, and for each of the Year 5 student sub-populations, there were no changes in students' reading achievement by school decile that were of statistical significance. See details below in Table 6.3.

Table 6.3: Trends in New Zealand Year 5 students' mean reading scale scores 2001–2010/11, by school decile

School decile grouping	Mean reading scale score for each PIRLS assessment			Change from 2001 to 2010/11
	2001	2005/06	2010/11	
Deciles 1 and 2	470 (6.6)	469 (6.8)	471 (3.3)	+ 1 ●
Deciles 3 and 4	510 (6.9)	511 (5.7)	506 (4.7)	– 4 ●
Deciles 5 and 6	541 (8.2)	533 (4.1)	535 (4.3)	– 6 ●
Deciles 7 and 8	544 (7.2)	556 (3.5)	549 (4.1)	+ 5 ●
Deciles 9 and 10	573 (5.3)	562 (3.6)	570 (3.3)	– 3 ●
All New Zealand†	**529 (3.1)**	**532 (2.0)**	**531 (1.9)**	**+ 2 ●**

Notes

Standard errors appear in parentheses.

* State and state-integrated schools only.

● Change not statistically significant.

† All New Zealand includes the information for students in independent schools. Note that a combination of an insufficient number of independent schools AND a very small proportion of students in these schools in each cycle does not allow for valid comparisons to be made from 2001 to 2010/11.

Details of the benchmarks for the 2001 and 2005/06 Year 5 cohorts in each decile grouping are reported in Tables B.20A and B.20B in Appendix B. In 2005/06 there were decreases, albeit very small, in the proportions reaching the higher benchmarks in 2005/06 than in 2001. The converse was noted in 2010/11, with a slight increase. However, these changes were found not to be of statistical significance.

Availability of reading resources for instruction

Schools' ability to deliver the curriculum has been found to be impacted by the extent and quality of resources that facilitate the learning process. However, in general, shortages of key resources have been found to have little or no impact on reading instruction in New Zealand primary schools (see Caygill & Chamberlain, 2004).

In 2010/11, principals were asked to indicate on a four-point scale 'not at all', 'a little', 'some' and 'a lot', the extent to which shortages or inadequacies of school resources affected their schools' capacity to provide instruction in reading. PIRLS used the *Reading Resource Shortages Scale* to summarise principals' responses. The individual components of the scale as well as how the differentiation of principals' responses affected students' placement on the scale are shown in Box 6.1. (As noted on page 73, a scale measures an underlying trait, behaviour, or situation – see TN 9 for details of the approach taken to develop the scales used in PIRLS 2010/11.)

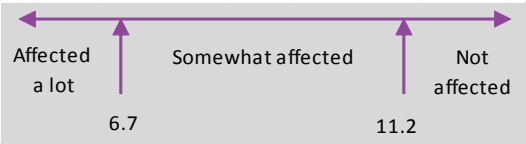
Box 6.1: Resources used in the *Reading Resource Shortages* (RRS) *Scale*, 2010/11

Resource shortages:

General resources:
1. Instructional materials (e.g., textbooks)
2. Supplies (e.g., pencils, paper)
3. School buildings and grounds
4. Heating/cooling and lighting systems
5. Instructional space (e.g., classrooms)
6. Technologically competent staff
7. Computers for instruction

Resources for reading instruction:
1. Teachers with a specialisation in reading
2. Computer software for reading instruction
3. Library books
4. Audio-visual resources for reading instruction

Categories on the scale: students in schools where instruction was *not affected* by shortages had a score on the scale of at least 11.2, which corresponded to their principals indicating 'not at all' for six of the 11 resources and 'a little' to the other five, on average. Students in schools where instruction was *affected a lot* had a score of no higher than 6.7, which meant that their principals indicated that shortages of six of the eleven resources affected instruction 'a lot' and 'some' for the other five on average. The remaining group of students were deemed to be in schools where instruction was *somewhat affected*.



More than two-fifths of New Zealand Year 5 students (43%) attended schools where reading instruction was *not affected* by resource shortages. On average internationally, approximately one-quarter of students were in such schools (see Table 6.4). Only Slovenia (56%) and the United States (45%) had higher proportions, than New Zealand, while the proportions for Australia (42%) and England (40%) were almost the same. The remaining 57 percent of New Zealand's Year 5 students were in schools where reading instruction was *somewhat affected*, with no New Zealand schools *affected a lot* by resource shortages. The two countries with the highest proportions of students attending schools where reading instruction was *affected a lot* were Colombia (32%) and Qatar (28%).

Table 6.4: New Zealand schools and the *Reading Resource Shortages* (RRS) *Scale*, 2010/11

Comparison group	Reading Resource Shortages					
	Affected a lot		Somewhat affected		Not affected	
	Percentage of students	Mean reading score	Percentage of students	Mean reading score	Percentage of students	Mean reading score
New Zealand	0 (0.0)	~ ~	57 (3.6)	528 (3.3)	43 (3.6)	540 (4.4)
International mean	5 (0.2)	478 (3.0)	71 (0.5)	511 (0.5)	24 (0.5)	523 (1.1)

Notes

Standard errors appear in parentheses. Tilde (~) insufficient data to report achievement.

The centrepoint of the *RRS Scale* was set at 10.0. The means for the scale ranged from 11.6 (Slovenia) to 7.4 (Colombia); the mean and standard error for New Zealand was 11.2 (0.14).

Source: Exhibit 5.5 in Mullis, Martin, Foy, & Drucker, 2012.

Although internationally there was a relatively strong relationship between shortages of reading resources and students' reading achievement, the difference (12 scale score points) between the mean reading achievement of Year 5 students in New Zealand schools *not affected* and those in schools that were *somewhat affected* was not statistically significant.

The size of a school did not appear to impact on principals' views of the impact of resource shortages, and with one exception, neither did the decile of the school. The exception was that the principals of decile 3 and 4 schools were a little more likely than principals in other decile schools to indicate resource shortages *somewhat affected* their instructional capacity.

Home—school interface

Parents/caregivers and families can also be a valuable resource for schools in terms of the time they volunteer at a school. School principals were asked to indicate on a four-point scale how often schools ask parents to volunteer their time to do 'school projects, programmes, or trips'. The majority of Year 5 students (85%) were in schools where parents were asked to volunteer 'more than 3 times a year', with the remainder called upon '2-3 times' (15%) or less (< 0.5%). This percentage was the highest internationally; on average internationally 35 percent of students were in schools where parents were asked 'more than 3 times a year' to volunteer their time. Other countries with relatively high percentages were Austria (72%), and Singapore and the United States (both 68%).

New Zealand principals were also asked how often they asked parents to do fundraising for the school. This was a New Zealand-specific question and so there are no international comparisons available; nor was any information collected on the reasons for fundraising. More than two-thirds of Year 5 students (68%) were in schools where schools called upon their parents to do fundraising 'more than 3 times a year'. Of note, was the fact that parents/caregivers of Year 5 students attending higher decile schools were more likely to be asked than parents/caregivers of children in lower decile schools. For example, parents/caregivers of more than three-quarters of Year 5 students in deciles 9 and 10 schools (78% of Year 5 students in these schools) were asked by their schools to fundraise compared to parents/caregivers of less than two-fifths of Year 5 students (37%) in deciles 1 and 2 schools.[75]

Any change from 2001 to 2010/2011?

In the two previous cycles of PIRLS, principals' responses to a similar set of items were summarised in the *Availability of Resources* (ASR) *Index* to describe the impact of resource shortages and quality on schools' capacity to provide instruction. While it is not possible to make direct comparisons between the *ASR Index* and the *RRS Scale*, the 2010/11 findings are consistent with the previous years—for the most resource shortages did not appear to have a major impact on New Zealand schools' capacity to provide reading instruction.

School climate

Both international and national research has shown that schools where there are few behaviour problems that could potentially impact on the safety of students or teachers, are likely to be better placed for facilitating students' learning than schools where students and teachers do not feel safe (Mullis, et al., 2009). School leaders of highly effective schools promote collective responsibility and accountability for student achievement and wellbeing and have established safe and supportive learning environments through leadership by school principals with their teaching staff (Robinson, Hopeha, & Lloyd, 2009).

[75] The 78% of students in deciles 9 and 10 schools represented 21% of the total Year 5 population; the 37% of Year 5 students in deciles 1 and 2 schools represented 6%. The proportions for the other schools were: 61% of Year 5 students in deciles 3 and 4 schools (10% of all Year 5 students); 67% in deciles 5 and 6 schools (14%); and 81% in deciles 7 and 8 schools (13%). (The remainder were in independent schools – about 4% of Year 5 students.)

Schools' emphases on academic success

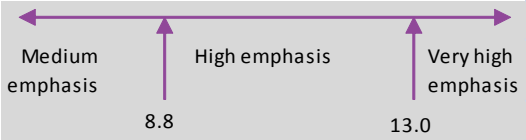
PIRLS-2010/11 captured information on 'academic optimism', that is, where the school through its leadership and teachers share a collective view on academic success and common and clear goals in order to achieve this success. Principals and teachers were both asked to rate on a five-point scale (from 'very low emphasis' to a 'very high emphasis') five aspects of academic optimism, with their responses characterised in the *School Emphasis on Academic Success Scale* described in Box 6.2.

Box 6.2: Aspects of academic optimism used in the Principals' *School Emphasis on Academic Success* (SEAS) *Scale*, 2010/11

Aspects of academic success:

1. Teachers' understanding of the school's curricular goals
2. Teachers' degree of success in implementing the school's curriculum
3. Teachers' expectations for student achievement
4. Parental support for student achievement
5. Students' desire to do well in school

Categories on the scale: students in schools where their principals were found to have a *very high emphasis* corresponded to three of the five aspects being rated as 'very high' and the other two as 'high', on average. Students in schools where principals had a *medium emphasis* corresponded to at most three of the five aspects as 'medium' and the other two as 'high', on average. All other students were considered to be in schools that placed a *high emphasis*.



Note: the *Teachers' School Emphasis on Academic Success Scale* used the same components. However, the value of the cut point between medium and high emphases was 8.7.

Compared to other countries, a relatively high proportion of New Zealand's Year 5 students (25%) attended schools where principals reported a *very high emphasis* on academic success as measured by the *SEAS Scale* (the international mean was 9%). Only Northern Ireland (33%), Qatar (31%), Ireland (28%), and England (27%) had higher proportions of students in schools with a *very high emphasis* on academic success. Just under two-thirds of New Zealand Year 5 students (63%) attended schools where principals placed a *high emphasis* on academic success, a little higher than the international mean of 59 percent. Just 12 percent of Year 5 students were in schools that placed a *medium emphasis* on academic success (compared with 32% on average internationally).

As Table 6.5 shows, New Zealand's teachers' responses to the aspects of academic success were also relatively consistent with school principals' reports; this was also the case for many other countries.

Interestingly, teachers and principals in many of the continental European countries tended not to place a *very high emphasis* on academic success, as measured by the scale. Also, for some countries, the relationship between an emphasis on academic success and reading achievement (e.g., the Netherlands and Norway) was weak. However, in New Zealand's case there was a relatively strong association. Students in schools where principals reported a *very high emphasis*, achieved on average nearly 50 scale score points higher than those students in schools where there was a *medium emphasis*.

Table 6.5: New Zealand principals and teachers and the *School Emphasis on Academic Success* (SEAS) *Scale*, 2010/11

Comparison group	School Emphasis on Academic Success					
	Medium emphasis		High emphasis		Very high emphasis	
	Percentage of students	Mean reading score	Percentage of students	Mean reading score	Percentage of students	Mean reading score
Principals	12 (2.2)	508 (9.3)	63 (4.2)	531 (3.7)	25 (3.4)	555 (4.6)
Teachers	17 (2.3)	511 (4.7)	65 (2.8)	529 (3.3)	18 (2.0)	567 (4.9)

Notes

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

The centrepoint of the Principals' *SEAS Scale* was set at 10.0. The means for the scale ranged from 11.9 (Northern Ireland) to 7.9 (Morocco); the mean and standard error for New Zealand was 11.2 (0.14).

The centrepoint of the Teachers' *SEAS Scale* was set at 10.0. The means for the scale ranged from 11.7 (Northern Ireland) to 7.2 (Morocco); the mean and standard error for New Zealand was 11.1 (0.11).

Source: Exhibits 6.1 and 6.2 in Mullis, Martin, Foy, & Drucker, 2012.

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 feel safe when I am at school
- I feel like I belong at this school

Across countries, the relationship between students' level of agreement with each statement and reading achievement varied markedly, and therefore, the information could not be summarised into an international scale. However, students' responses to each individual statement provide an indication of how they felt about aspects of their school life during 2010 and 2011.

Based on their responses, middle primary school students across countries generally liked being at school, felt safe at school, and had a sense of belonging. These findings for both liking school and feeling safe are consistent with the reporting in 2005/06 (see Chamberlain, 2007). The percentage of New Zealand Year 5 students who agreed 'a lot' with each statement is reported in Table 6.6 along with the responses from a selection of countries.

Internationally, there was a considerable range in the proportions of students who liked school 'a lot'; Azerbaijani (95%), Colombian (87%) and Georgian (87%) students were the most positive while Northern Irish (32%), Czech (31%), and Hong Kong (29%) students were the least likely to positively endorse the statement.

There was less variation in the proportions of students who strongly agreed they felt safe when they were at school with 60-70 percent of students in 27 of the 45 countries agreeing 'a lot'. Countries with relatively high proportions of students that disagreed a lot were Belgium (French), Chinese Taipei, Croatia, and to a lesser extent, France (all had at least 17 percent of their children not agreeing with this statement).

Students' sense of belonging was relatively high in most countries. The level of endorsement was highest in Indonesia (91% of students), Azerbaijan (87%), and the Russian Federation (82%), and lowest in Hong Kong SAR students (40%), and to a lesser extent in Singapore (49%) and Poland (50%).

Table 6.6: Students in New Zealand and the English-language countries agreeing 'a lot' with statements about aspects of school life in 2010/11

Country	Percentage of students agreeing 'a lot' to the statement		
	I like being at school	I feel safe when I am at school	I feel like I belong at this school
Australia	42 (1.2)	59 (1.2)	57 (1.1)
Canada	44 (1.0)	64 (0.5)	63 (0.7)
England	38 (1.6)	64 (1.4)	56 (1.2)
Ireland	34 (1.5)	70 (1.2)	62 (1.3)
Malta	51 (0.8)	59 (0.7)	59 (0.8)
New Zealand	**48 (1.1)**	**64 (1.1)**	**59 (0.8)**
Northern Ireland	32 (1.1)	69 (1.1)	64 (1.1)
Singapore	54 (0.7)	51 (0.7)	50 (0.7)
Trinidad & Tobago	72 (1.4)	60 (1.6)	62 (1.6)
United States	41 (0.8)	63 (0.7)	61 (0.8)
International mean (for 45 countries)	54	62	67

Note

Standard errors appear in parentheses.

In New Zealand, the relationship between Year 5 students' views on aspects of school and their reading literacy achievement is worth noting. Generally, the relationship was curvilinear. Year 5 students who were very positive (i.e., 'agreed a lot' with each statement) tended to achieve about 10 to 20 scale score points lower than students whose views were more moderate ('agreed a little' with each statement), with this latter group's mean reading achievement *higher* than students who disagreed a lot or disagreed a little.

In addition to the three statements on school life, New Zealand's Year 5 students were asked the extent to which they agreed with:

- I get bored at school
- I like learning new things at school.

Of some concern is the fact that more than half of Year 5 students (55%) agreed ('a lot' or 'a little') with the statement "I get bored at school". By way of contrast, "I like learning new things" attracted a high level of endorsement with 92 percent of Year 5 students agreeing with the statement. As with the other statements noted above, there were significant achievement differences; students who held positive views generally had higher reading achievement than those students who held negative views. Table 6.7 summarises these differences for all five statements.

Table 6.7: New Zealand Year 5 students' level of agreement with aspects of school life statements and mean differences between reading scale scores in 2010/11

School life statement	Percentage of Year 5 students		Mean difference between reading scores
	Agreed a lot/a little	Disagreed a lot/a little	
I like being at school	86 (0.6)	14 (0.6)	+ 10 ▲
I feel safe when I am at school	90 (0.6)	10 (0.6)	+ 23 ▲
I get bored at school	55 (1.0)	45 (1.0)	– 8 ▼
I feel like I belong at this school	84 (0.6)	16 (0.6)	+ 38 ▲
I like learning new things	92 (0.5)	8 (0.5)	+ 31 ▲

Notes

Standard errors appear in parentheses.

▲ The mean reading literacy score for students who agreed a lot or a little was significantly higher than the mean for students who disagreed a little or a lot.

▼ The mean reading literacy score for students who agreed a lot or a little was significantly lower than the mean for students who disagreed a little or a lot.

Any change from 2001 to 2010/11?

The two statements "I like being at school" and "I feel safe when I am school" were presented to students in the three cycles of PIRLS. In 2010/11, New Zealand Year 5 students tended to have more positive views about being at school than their counterparts in previous cycles. In 2001, 81 percent of Year 5 students endorsed the statement (either agreeing 'a lot' or 'a little'), increasing slightly to 83 percent in 2005/06, and then 86 percent in 2010/11; this five percentage point increase was statistically significant.

The positive shift was largely due to Year 5 boys, in particular, Pākehā/European boys being more positive. In 2001, nearly one-third of Pākehā/European boys (32%) disagreed with the statement about liking school; in 2005/06 this proportion had decreased to 28 percent, and decreased another five percentage points to 23 percent in 2010/11.

With a couple of exceptions, students' level of agreement to the five statements was similar across the different deciles. Year 5 students in deciles 1 and 2 schools tended to agree that they liked school (91%) more than students in other schools, while students in deciles 7 and 8 schools had the highest level of agreement to feeling bored at school (60%).

There were no changes in the views around Year 5 students feeling safe at school over the period, with the level of agreement approximately 90 percent in each cycle of PIRLS.

School safety

To gauge the extent to which students attended schools with few behaviour problems and who were taught by teachers not afraid for their own safety, a series of statements were presented to principals, teachers, and students, internationally. Parents/caregivers were also asked the degree to which their child's school provided a safe learning environment.

Principals' perceptions of school discipline and safety

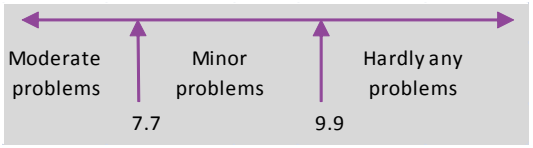
Information on principals' responses to the severity of 10 different discipline and school safety behaviours was summarised in the *School Discipline and Safety* (SDS) *Scale*, details of which are presented in Box 6.3.

Box 6.3: Behaviour issues used in the *School Discipline and Safety* (SDS) *Scale*, 2010/11

School discipline and safety components:

1. Arriving late at school
2. Absenteeism (i.e., unjustified absences)
3. Classroom disturbances
4. Cheating
5. Profanity
6. Vandalism
7. Theft
8. Intimidation or verbal abuse among students (including texting, emailing, etc)
9. Physical fights
10. Intimidation or verbal abuse of teachers (including texting, emailing, etc)

Categories on the scale: students in schools with *hardly any problems* had a score on the scale of at least 9.9, which corresponded to their principals reporting 'not a problem' for five of the ten discipline and safety issues and a 'minor problem' for each of the other five, on average. Students in schools with *moderate* problems had a score of no higher than 7.7, which corresponded to principals, on average, reporting 'moderate problem' for five of the 10 issues and a 'minor problem' for the other five. All other students were deemed to have attended schools with *minor problems*.



International comparisons of student-related behavioural issues are sometimes difficult to interpret because no account is taken of the country context or as in this instance, the differing perceptions of what constitutes a serious or moderate problem across countries. However, the underlying premise is that within countries a negative relationship exists between the degree of seriousness of the problems and achievement.

In New Zealand, Year 5 students were either attending schools with *hardly any problems* (68%) or attending schools experiencing *minor problems* (32%). On average internationally, 58 percent of students were in schools with *hardly any problems*, 31 percent in schools with *minor problems*, and 11 percent with *moderate problems*.

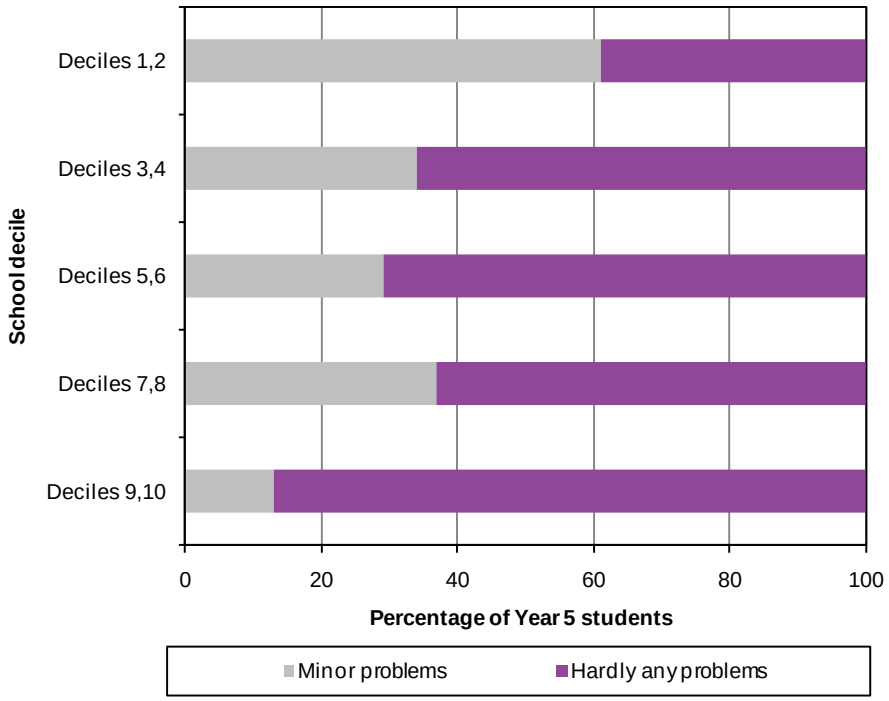
The relationship between students' reading literacy achievement and principals' views on the severity of negative behaviours was relatively strong internationally, with the mean difference in achievement between students in schools where there were *hardly any problems* and those in schools with *moderate problems* being about 43 scale score points. In New Zealand's case there were too few Year 5 students in schools with *moderate problems* (< 0.5% of students) to be able to calculate the mean for this group. However, the mean achievement difference was about 30 scale points between students in schools with *hardly any problems* (544) and *minor problems* (514), and higher than the international difference of 15 scale score points between students in these two categories (519 and 504, respectively).

As Figure 6.11 illustrates, principals of low decile schools were more likely to have some concerns about the behaviours in their schools than their counterparts in mid-range and high decile schools. Nearly three-fifths of Year 5 students in low (1 & 2) decile schools were in schools where principals viewed the behaviours as *minor problems* (58%) compared with 29 percent of students from mid-range (5 & 6) decile schools, and just 13 percent of students from high (9 & 10) decile schools. The

converse to this was principals of higher decile schools were more likely to report having *hardly any problems* than the principals of mid-decile schools, who were in turn more positive than principals of lower decile schools.

Of note is that principals of deciles 7 and 8 schools also expressed some concern about the behaviours in their schools; principals of nearly 40 percent of Year 5 students in these schools viewed the behaviours as *minor problems*.

Figure 6.11: New Zealand schools and the *School Discipline and Safety Scale* in 2010/11, by school decile*



Notes

The bars represent the proportion of Year 5 students in schools where, according to their principals, there were either *minor problems* or *hardly any problems* with student behaviours.

* State and state-integrated schools only.

Teachers' views on a safe and well-disciplined school

Teachers' level of agreement with five statements on school safety and discipline were summarised in the *Safe and Orderly School* (SOS) *Scale* as outlined in Box 6.4. According to New Zealand teachers' responses, the majority of Year 5 students were being taught by teachers who regarded their school as either *safe and orderly* (72%) or *somewhat safe and orderly* (25%), with just a small proportion of students taught by teachers who regarded their school as *not safe and orderly* (4%).

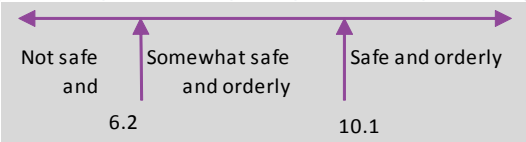
The relationship between students' reading literacy achievement and teachers' views of the qualities was moderately strong internationally, with the mean scores for students in safe and orderly schools, 518; somewhat safe and orderly, 505; and schools not safe and orderly, 486.

Box 6.4: Qualities used in the *Safe and Orderly School* (SOS) *Scale*, 2010/11

Qualities:

1. This school is located in a safe neighbourhood
2. I feel safe at this school
3. This school's security policies and practices are sufficient
4. The students behave in an orderly manner
5. The students are respectful of the teachers

Categories on the scale: students in *safe and orderly* schools had a score of at least 10.1; their teachers agreed 'a lot' with three of the five qualities and agreed 'a little' with the other two, on average. Students in schools *not safe and orderly* had a score of no higher than 6.2, which corresponded to their teachers, on average, disagreeing 'a little' with three of the five qualities and agreeing 'a little' with the other two. All other students were deemed to have attended *somewhat safe and orderly* schools.



In New Zealand's case the relationship was stronger with an average achievement difference of 40 scale points between students in *safe and orderly* schools (545) and those *somewhat safe and orderly* schools (504). The small group of Year 5 students in *not safe and orderly* schools scored on average 15 scale score points lower again (490). The achievement differences were statistically significant, with one exception; the difference between students in *somewhat safe and orderly* and *not safe and orderly* schools was not found to be statistically significant.

Students' experiences of bullying behaviours

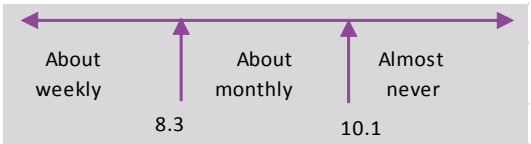
In keeping with previous cycles of PIRLS, students were asked how often—'never', 'a few times', 'once or twice a month', or at least once a week'—they had experienced a series of negative behaviours associated with bullying during the 2010 school year. Their responses to the negative behaviours, listed in Box 6.5, were summarised into a scale—*Students Bullied at School*.

Box 6.5: Bullying behaviours used in the *Students Bullied at School* (SBS) *Scale*, 2010/11

Bullying behaviours:

1. I was made fun of or called names
2. I was left out of games or activities by other students
3. Someone spread lies about me
4. Something was stolen from me
5. I was hit or hurt by other student(s) (e.g., shoved, hit, kicked)
6. I was made to do things I didn't want to do by other students

Categories on the scale: students who were *almost never* bullied had a score on the scale of at least 10.1, which corresponded to 'never' experiencing three of the six bullying behaviours and each of the other three, 'a few times a year' on average. Students bullied (up to) *about weekly* scored no higher than 8.3, which corresponded to them experiencing each of three of the six behaviours 'once or twice a month' and each of the other three 'a few times a year', on average. All other students were deemed to have been bullied *about monthly*.

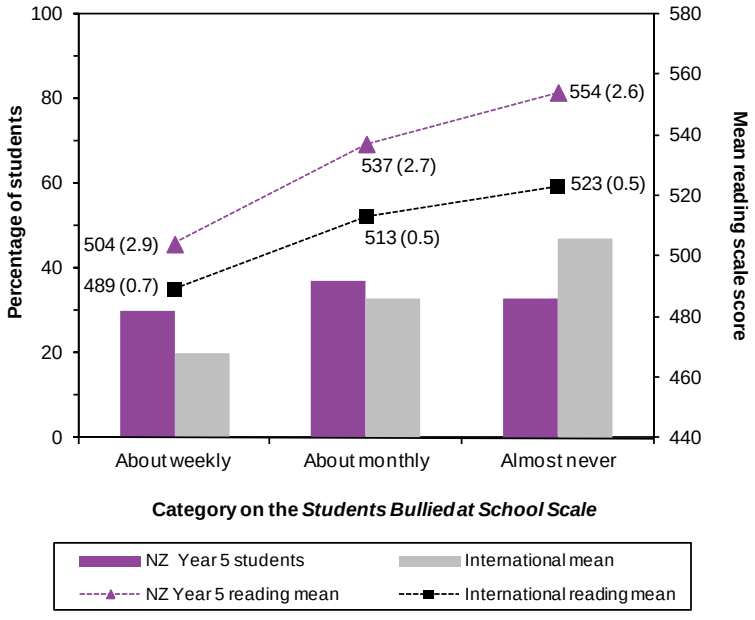


Compared to many other countries New Zealand had a smaller proportion of its students who had *almost never* experienced these bullying behaviours (33% of Year 5 students); only five countries—Belgium (French), Indonesia, Oman, Qatar, and Trinidad and Tobago—had smaller proportions, while the proportions reported for Australia (37%) and Singapore (39%) were a little higher. Thirty-seven percent of Year 5 students experienced these behaviours *about monthly* (or less). This was a little higher than the international mean (33%), but most countries had between 30 and 38 percent of their students experiencing these negative behaviours this frequently. The countries with smaller proportions were Azerbaijan (16%), Georgia (23%), Ireland (25%), Sweden (25%), Denmark (27%), Croatia (28%), and Northern Ireland (29%). Thirty percent of New Zealand's Year 5 students had experienced these behaviours between *about monthly* up to *about weekly*.

International comparisons about bullying and/or bullying behaviours has often drawn criticism in New Zealand; in this instance, the information for Year 5 students is consistent with findings from all large-scale primary school studies in which New Zealand has participated (e.g., Martin, 1997; Caygill, Sturrock, & Chamberlain, 2007; Chamberlain, 2007).

Figure 6.12 shows the relationship between New Zealand Year 5 students' experiencing the behaviours during 2010 and their reading achievement. Although not shown, Year 5 girls (37%) were more likely than Year 5 boys (28%) to have *almost never* experienced the negative behaviours, although the achievement difference between Year 5 students who *almost never* experienced the behaviours and those who had experienced them (up to) *about weekly* was greater for girls (53 scale score points) than it was for boys (43).

Figure 6.12: New Zealand Year 5 students in each category of the *Students Bullied at School Scale*, 2010/11



Notes

Each set of bars represents the percentage of students at below 8.3 or less on the scale (i.e., experiencing the behaviours up to *about weekly*) or 10.1 or higher (i.e., *almost never* experiencing them); the group of students between these two scale values experiencing the behaviours sometimes (i.e., up to *about monthly*).

The centrepoint of the *SBSS Scale* was set at 10.0. The means for the scale ranged from 11.4 (Azerbaijan) to 9.1 (Qatar and Trinidad and Tobago); the mean and standard error for New Zealand was 9.3 (0.03).

The data points are the mean reading scores for the middle primary students (Year 5 in New Zealand) at each level of the scale. Standard errors appear in parentheses.

Source: Exhibit 6.7 in Mullis, Martin, Foy, & Drucker, 2012.

Year 5 students in lower decile schools were more likely than Year 5 students in higher decile schools to experience the negative behaviours—39 percent of Year 5 students in deciles 1and 2 schools and 35 percent of Year 5 students in deciles 3 and 4 schools experienced the bullying behaviours (up to) *about weekly* compared 25 to 30 percent of students in each of the higher decile groupings of schools.

Asian students were more likely to not have experienced the bullying behaviours (40% *almost never* experiencing them) than Pākehā/European students (33%), Māori (30%), and Pasifika students (30%).

In the *Learning to Read Survey*, parents/caregivers had been asked to indicate the extent to which they agreed that their child's school provided a safe environment. New Zealand parents/caregivers who responded mostly 'agreed a lot' (83% of students) or 'agreed a little' (14%) that their child's school provided a safe environment, with only the parents/caregivers of just three percent of Year 5 students disagreeing with the statement.

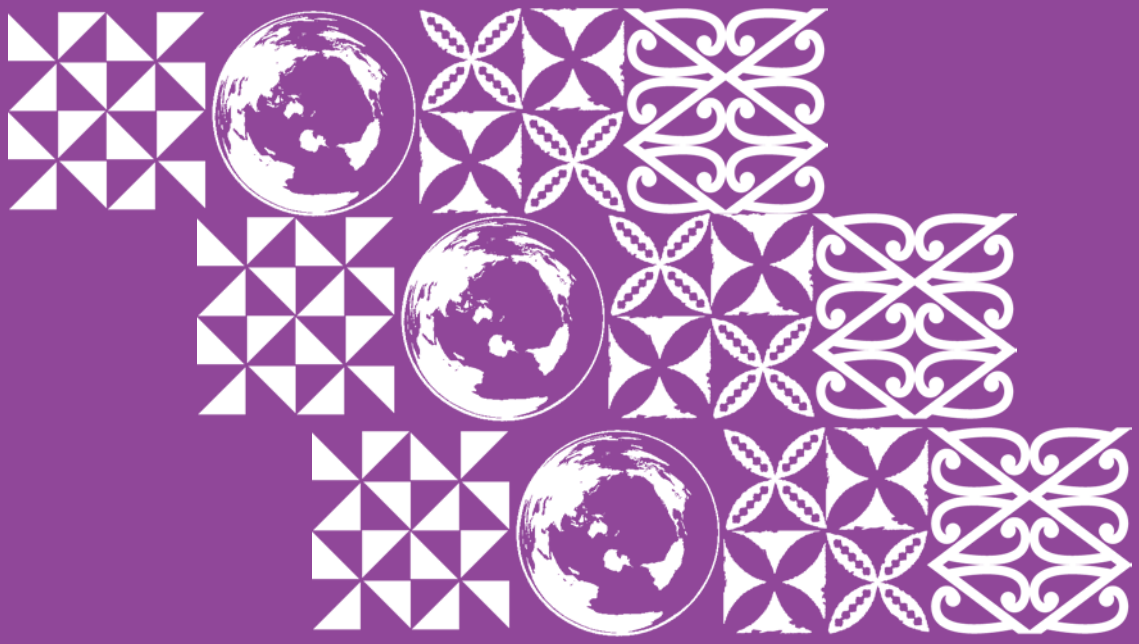
Any change from 2001 to 2010/11?

School principals' reports as measured by the *School Discipline and Safety Scale* cannot be compared directly with previous cycles but the general findings for New Zealand, and by school decile are consistent with information from a similar construct, the *Principals Perception of School Safety Index*, reported in 2005/06 (see Chamberlain, 2008).

New Zealand Year 5 students' experiences of bullying behaviours as reported in 2010/11 cannot be compared with information collected from their Year 5 counterparts in 2001 or 2005/06. However, the information is consistent with findings from other international studies. That is, relative to other countries a sizeable proportion of New Zealand's middle primary children consistently feature negatively as having had experienced bullying behaviours.

Section 7:

The Classroom Context for Learning



Section 7: The Classroom Context for Learning

Children spend a significant amount of time in the classroom each day—the classroom environment, including the number of students, will often influence how teachers approach instruction. Teachers' decisions on the approaches they take will be influenced by their prior experiences, beliefs, and knowledge, their pre-teaching education, and their teaching experience. Their decisions will also be influenced by the group of learners they are teaching—the learners' prerequisite knowledge and skills, and their motivation and attitudes to learning.

PIRLS-2010/11 sought information from middle-primary teachers responsible for teaching reading to the classes or groups of students that took part in the study. This section looks at a selection of the information provided by teachers about the classroom environment for teaching reading, activities undertaken during reading lessons, and resource materials likely to be used during reading. Where possible, the relationship between a particular practice or approach and reading literacy achievement is described.

Background

The classroom environment has a significant influence on student learning. Classes often vary in size, which may influence decisions around classroom organisation, the structure of lessons, and how teachers approach literacy instruction from highly structured and teacher-centred to more open and child-centred (Mullis, et al., 2009). Teachers have a key role as they respond to and implement both school and national curricular intentions. Their preparation to teach and their experiences teaching reading, for example, are significant for students' development of reading literacy. It is however important to remember that by the fourth or fifth year of schooling, students' reading experiences have generally been influenced by more than one teacher. The information collected from teachers in PIRLS-2010/11 is just a snapshot of just one year; in New Zealand's case 2010. Teaching practices in the year PIRLS was administered may, however, reflect practices and approaches used in schools generally.

Demographic characteristics of teachers[76]

In 2010/11, the distribution of New Zealand teachers across four age bands—'29 years and under'; '30–39'; '40–49'; and '50 years or older'—tended to be fairly even. However, the modal age band was '30–39' years with one-third of Year 5 students being taught by teachers in this age group (c.f. the international mean of 30%) and five percentage points higher than in 2005/06 (28%).[77] Just over one in five Year 5 students (21%) were being taught by teachers under the age of 30, compared with an average of 13 percent internationally (as examples, Bulgaria was 1%, Hungary, 5%; Singapore, 25%; England, 35%; and Ireland, 40%).

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[76] Responses were from the teachers of a representative sample of students only and are therefore reported to reflect this. The teacher results are not necessarily representative of all teachers at this level. In New Zealand approximately 500 teachers responded to the PIRLS *Teacher Questionnaire*.

[77] The other age bands were: '29 years and under', 21% (c.f. 22% in 2005), '40–49 years', 21% (c.f. 25% in 2005), and '50 years or older', 25% (also 25% in 2005).

In most countries most students at the middle primary level are taught by women (84% on average). The proportion of New Zealand Year 5 students taught reading by women in 2010/11 was 75 percent (77% in 2005/06). Four countries with an all or almost all-female teaching force were Poland (100%), Lithuania (99%), the Russian Federation (99%), and Italy (98%). Five countries had relatively large proportions of middle primary students taught by men: Morocco (52%), Saudi Arabia (49%),[78] Iran (39%), Northern Ireland (35%), and Indonesia (32%).

Formal education

On average internationally, 26 percent of middle primary school students were taught by teachers who had completed a post-graduate university degree (e.g., doctorate, master's, or other post-graduate degree or diploma). Only 13 percent of New Zealand's Year 5 students were taught by teachers with post-graduate qualifications, with the most taught by teachers who had completed a bachelor's degree (69% of Year 5 students c.f. 54% on average internationally), or by teachers with a college of education diploma (18% c.f.15% on average internationally). On average, internationally just six percent of middle primary students were taught by teachers without a university or college of education qualification – for example, Morocco (60% of students), Romania (34%), and Trinidad and Tobago (10%).

Nearly three-quarters of middle primary students (72%), on average internationally, were taught by teachers who had specialised in language (e.g., structure of language) during their formal education/teacher preparation, 62 percent were being taught by teachers who specialised in reading pedagogy (teaching reading), and 33 percent were being taught by teachers who specialised in reading theory. The corresponding percentages for New Zealand were similar: 70 percent, 66 percent, and 30 percent respectively. The relationship between the type of specialisation and reading achievement did vary across countries, although students who were taught by teachers where specialisation areas were emphasised tended to achieve at slightly higher level than those students who were not.

For example, in New Zealand, the mean reading literacy achievement of the 70 percent of students who were taught by teachers who had specialised in language (538) was about 16 scale score points higher than the 30 percent of students who were taught by teachers who had not included language in their teacher education programme (522). There was very little difference in achievement between those Year 5 students who were taught by teachers who had an emphasis of reading pedagogy in their programme and those who had not (534 and 532 respectively), while Year 5 students whose teachers had emphasised reading theory scored on average slightly lower (528) than their counterparts (536) whose teachers did not include reading theory as an area of emphasis.

Teaching experience

Internationally, teachers had typically been teaching for 17 years, whereas in New Zealand teachers had taught for an average of 11 years (c.f. an average of 12 years in 2005/06). There were 15 countries where teachers' experience averaged 20 years or more, including Austria, Hungary, and Italy. England and United Arab Emirates had teachers with generally the least experience—on average, 10 years teaching experience.

Table 7.1 presents a summary of the reports by New Zealand teachers. Contrary to the pattern observed internationally, Year 5 students tended to be taught by teachers with fewer years of

[78] Note that Saudi Arabian girls and boys are educated separately; girls are taught by female teachers and boys are taught by male teachers.

experience than observed internationally—55 percent of Year 5 students were taught by teachers with less than 10 years experience in contrast to the international mean of 28 percent.

Table 7.1: New Zealand teachers' number of years of teaching experience

Comparison group	Number of years teaching							
	Less than 5 years		5–9 years		10-19 years		20 years or more	
	Percentage of students	Mean reading score	Percentage of students	Mean reading score	Percentage of students	Mean reading score	Percentage of students	Mean reading score
New Zealand	27 (2.5)	521 (5.4)	28 (2.5)	540 (4.6)	26 (2.6)	533 (5.1)	20 (2.5)	542 (5.3)
International mean (45 countries)	12 (0.3)	507 (1.7)	16 (0.4)	510 (1.4)	31 (0.5)	511 (0.9)	41 (0.5)	517 (0.8)

Note

Standard errors appear in parentheses.

Source: Exhibit 7.3 in Mullis, Martin, Foy, & Drucker, 2012.

Teachers' professional development

Teachers of just over one-quarter of New Zealand's Year 5 students (27%) had spent 16 hours or more on professional development related to reading during 2009 and 2010; just 13 percent had spent no time, with the remainder (60%) at least some time and up to 16 hours. Examples of countries where relatively high proportions of their teachers had spent 16 hours or more were Israel (72% of students), Romania (51%), Iran (47%), and Portugal (45%).

Teacher career satisfaction

Information was sought from teachers to gauge how satisfied they were in their profession and with their working conditions. The underlying assumption for seeking this information is that teachers who are satisfied are likely to be more motivated, be retained in the profession and eventually become leaders in their field (Mullis, Martin, Foy, & Drucker, 2012).

The *Teacher Career Satisfaction Scale* summarises teachers' responses on how much they agreed with six statements on how satisfied they were with their careers as teachers. The statements are listed in Box 7.1, along with a description of the scale.

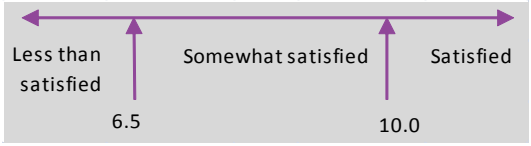
Box 7.1: Statements used in the *Teacher Career Satisfaction* (TCS) *Scale,* 2010/11

Aspects of teacher satisfaction:

1. I am content with my profession as a teacher
2. I am satisfied with being a teacher at this school
3. I had more enthusiasm when I began teaching than I have now*
4. I do important work as a teacher
5. I plan to continue as a teacher for as long as I can
6. I am frustrated with my job as a teacher*

* Negatively worded statement reverse coded for the scale.

Categories on the scale: students who were deemed to be taught by *satisfied* teachers had a score of at least 10.0, which corresponded to their teachers agreeing 'a lot' with three of the statements and 'a little' with the other three, on average. Students were taught by *less than satisfied* teachers, corresponding to the point on the satisfaction scale of no more than 6.5, if their teachers had disagreed 'a little' with three of the statements and agreed 'a little' with the other three, on average. All other students were deemed to be taught by *somewhat satisfied* teachers (typically agreeing mostly 'a little').



As measured by the *TCS Scale*, more than half of New Zealand's Year 5 students (55%) were taught by teachers who were *satisfied* with their career as a teacher, similar to the reports for Australia and Northern Ireland (54% of students in both cases). Teachers from Colombia (90%), Indonesia (89%), Croatia (83%), and Georgia (79%) were the most *satisfied*, followed by teachers in Denmark, Ireland, and Spain (all with 69% of students in this area of the scale). Swedish (29%) and French students (25%) were the least likely to be taught by *satisfied* teachers. Just five percent of New Zealand's Year 5 students were being taught by teachers who were *less than satisfied* with their career, the same as the international mean, with the remaining 40 percent in the *somewhat satisfied* category. The international data show no clear pattern between teachers' level of satisfaction for teaching as a career and reading achievement.

Classroom context

Based on the reports of New Zealand middle primary teachers, they were teaching classes with about 27 students. In many instances classes were composite classes; a class included typically 13 Year 5 students. Internationally, the relationship between achievement and class size is equivocal; in many countries smaller classes are associated with higher achievement, while in other countries—for example, New Zealand—the achievement of students in bigger classes tends to be higher than those in smaller classes. This finding is in keeping with previous cycles of PIRLS and studies such as TIMSS, where the international data show *no* clear pattern between class size and achievement.

Instructional time on reading

Using information provided by both principals and teachers it was possible to calculate firstly the number of instructional hours in a year, and then the amount of time that was spent on reading as part of language instruction. Table 7.2 presents this information for New Zealand and the English-language countries.

Based on the reports from New Zealand school principals the number of instructional hours in primary schools averaged 932 hours per year. On average, 349 hours were spent on language/language-related activities (including reading, writing, speaking, and other language skills) at Year 5, about 37 percent of the total instructional time. On average, internationally, about 26 percent of the total instructional time was spent on language.

The estimated average time spent on reading (formal and informal) was 220 hours per year or about 24 percent of the total instructional time. On average internationally, about 16 percent of the total instructional time was spent on language.

Table 7.2: Instructional time spent on language and reading per year in New Zealand and the English-language countries, 2010/11

Country	Instructional hours per year				(All) Reading as a percentage of total instructional time
	Total per year (Mean)	Language instruction	Time spent on reading as part of language instruction	Reading across the curriculum, (including time spent on reading instruction)	
New Zealand	**932 (4.9)**	**349 (8.3)**	**131 (3.9)**	**220 (6.7)**	**24%**
United States	1077 (7.9)	275 (8.5)	131 (4.9)	246 (9.5)	23%
Australia	1008 (6.9)	356 (10.4)	119 (5.1)	197 (11.0)	20%
Canada	957 (4.5)	284 (6.1)	101 (3.0)	186 (8.6)	19%
Trinidad and Tobago	1024 (17.5)	295 (18.8)	85 (6.6)	196 (16.6)	19%
Ireland	854 (0.0)	175 (3.4)	56 (1.5)	159 (9.3)	19%
Northern Ireland	970 (11.0)	274 (7.7)	80 (3.7)	155 (9.9)	16%
Singapore	1012 (0.0)	242 (5.5)	56 (1.8)	127 (6.0)	13%
England	987 (7.7)	277 (7.6)	77 (4.0)	123 (9.5)	12%
Malta	891 (0.2)	181 (0.3)	37 (0.1)	104 (0.3)	12%
International mean (for 44 countries*)	905 (2.1)	232 (1.2)	70 (0.5)	146 (1.4)	16%

Notes

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

* Countries ordered by all reading (formal and informal across the curriculum) as a percentage of total instructional time. The international means exclude France (not available).

Source: Exhibit 8.4 in Mullis, Martin, Foy, & Drucker, 2012.

Any change from 2001 to 2010/11?

Classes with Year 5 students in 2010/11 (27 students per class) were typically slightly smaller than was the case in 2001 (28). This was largely due to a significant decrease in the mean class size between 2001 and 2005/06, particularly in the proportion of students in larger classes (31 or more students). There was no change between 2005/06 and 2010/11 in the average class size.

Although the information on instructional time for 2001 and 2005/06 was reported in a slightly different format, it does suggest that there has been little change in how much instructional time is allocated to language (including reading) in the middle primary school.

In 2005/06, the data reported was for a typical *school week*; the proportion of instruction time on language/language activities in New Zealand was estimated to be about 37 percent, with 23 percent on all reading (including reading instruction and reading across the curriculum). In 2001, the mean proportion of instructional time per year that was allocated to all language-related activities was 39 percent, with 24 percent of time allocated specifically to reading.

Collaboration when teaching

Collaboration among teachers is seen as important for building a school's professional community. Teachers of the PIRLS middle primary school students were asked the extent to which they collaborated with other teaching staff for the specific purpose of improving teaching practice (the question did not explicitly ask about collaborative practices between or within schools).

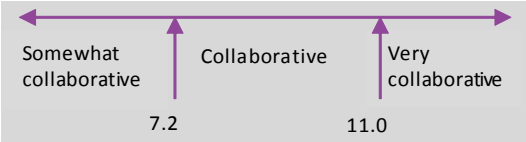
Responses to how often teachers interacted with others with regards to five interactions described in Box 7.2 were then summarised in the *Collaborate to Improve Teaching Scale*. In general, across countries, teachers of middle primary school students reported a high degree of collaboration. On average internationally, 35 percent of students were being taught by *very collaborative* teachers, 54 percent, by *collaborative* teachers, and just 11 percent of students taught by teachers who were *somewhat collaborative*.

Box 7.2: Statements used in the *Collaborate to Improve Teaching* (CIT) *Scale,* 2010/11

Collaborative interactions:

1. Discuss how to teach a particular topic
2. Collaborate in planning and preparing instructional materials
3. Share what I have learnt about my teaching experiences
4. Visit another classroom to learn more about teaching
5. Work together to try out new ideas

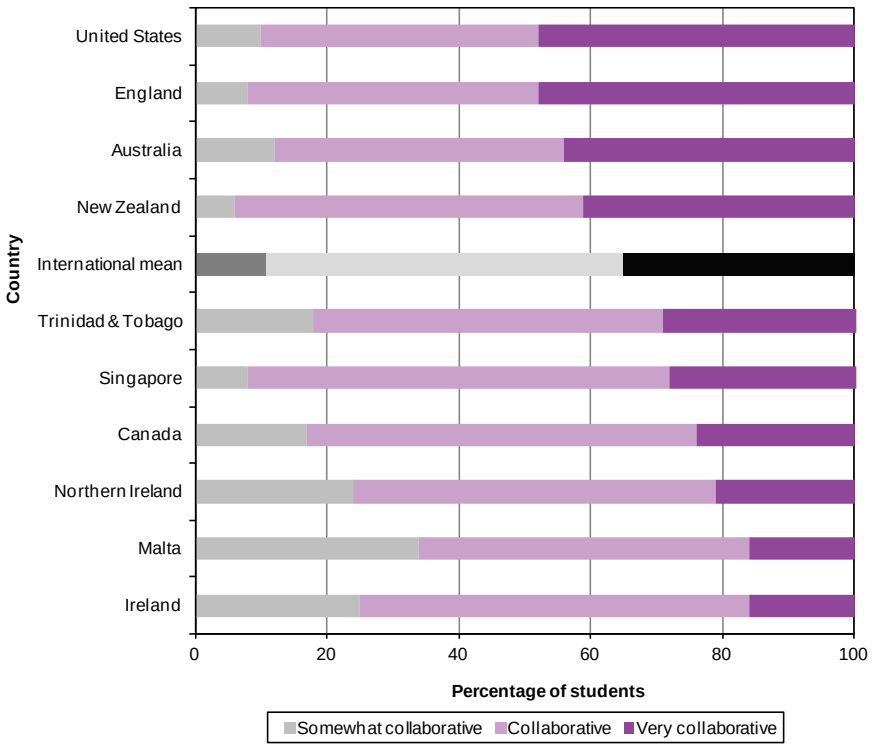
Categories on the scale: The teachers who were found to be *very collaborative* – students with a score on the scale 11.0 or higher – had interactions with other teachers at least 'one to three times per week' in three of the five areas and 'two or three times' a month in the other two. Teachers who were *somewhat* collaborative – students with a score of no higher than 7.2 – 'never or almost never' interacted with others in three of the five areas and 'two or three times a month' in the two remaining on average, while *collaborative* teachers were those who interacted in other remaining combinations.



The majority of New Zealand's Year 5 students were being taught by either *very collaborative* (41% of students) or *collaborative* teachers (53% of students); with just six percent of Year 5 students taught by *somewhat collaborative* teachers. Slovenian students were the most likely to be taught by *very collaborative* teachers (73% of students) while Irish students were the least likely (just 16% of students).

Internationally, the relationship between collaboration among teachers and reading literacy achievement was weak, although there were some exceptions within countries. In New Zealand's case the relationship was curvilinear—students who were taught by *very collaborative* teachers tended to have lower achievement (528) than students taught by *collaborative* teachers (540) and those who being taught by *somewhat collaborative* teachers had lower achievement overall (514). This relationship does suggest that New Zealand teachers had more frequent interactions when achievement among the student body in the schools and/or classes was probably already known to be a little weaker rather than it being the outcome of collaborating. Collaboration on its own may not have a direct effect on achievement, but nonetheless, is important for creating a positive, collegial climate in schools, and possibly even necessary for improving learner outcomes. Figure 7.1 summarises this information for New Zealand and the English-language countries.

Figure 7.1: ***Collaborate to Improve Teaching*** **(CIT)** ***Scale*** **– New Zealand and the English-language countries, 2010/11**



Note

Countries ordered by the percentage of students who were taught by *very collaborative* teachers. The centrepoint of the *CIT Scale* was set at 10.0. The means on the scale ranged from 11.8 (Slovenia) to 8.2 (Morocco); the mean (and standard error) for New Zealand was 10.3 (0.14).

Source: Exhibit 8.5 in Mullis, Martin, Foy, & Drucker, 2012.

Students in the classroom

Children bring their knowledge, skills, attitudes, and dispositions to the classroom, all of which have been influenced from outside of the school environment as well as from prior learning experiences in school. Students' prior knowledge, characteristics and needs will influence teacher decisions on the best learning approaches to use in instruction.

Students' participation in a remedial reading programme

The parents or caregivers of New Zealand's Year 5 students were asked if their child had received any remedial reading assistance since they had started school. This included assistance either at the school or from an organisation outside the school. The question did not seek information as to whether or not the programme was successful or when they had participated (i.e., early in their schooling or more recently). Approximately 15 percent of Year 5 students had received some form of assistance in reading since beginning school. (Note that this percentage has *not* been adjusted for the parents of 39% of students who did not respond to the *Learning to Read Survey*, (*LRS*)).

Boys were somewhat more likely to have received assistance than girls (19% of Year 5 boys compared with 12% of Year 5 girls). Pākehā/European students (17%) and Māori students were more likely to have participated (16%) than Pasifika (12%) and Asian students (11%). (Note that these percentages have not been adjusted for non-response.)

For those Year 5 students who had received remedial assistance, nearly three-quarters of Year 5 students (73%) had received their remedial assistance through *Reading Recovery*®, 28 percent had participated in another school-based programme, while 20 percent had participated in an out-of-school programme.

In general, the 15 percent of Year 5 students who had participated in a programme had lower reading achievement (499) as assessed by PIRLS than their counterparts who had not participated (568). Although there was this difference between the two groups of students, additional information is required to aid in the interpretation of the finding—for example, the reason why the students were receiving assistance, when they had actually received it, and whether or not the programme was completed. (Note: the mean score for the 39% of Year 5 students whose parents/caregivers did not respond to the *LRS*, 502, was statistically the same as the mean for students who had participated in a programme.)

Students' views on reading

Positive attitudes towards reading have been found to be strongly associated with achievement, with children who have been found to be good readers generally enjoying and valuing reading more than children who are weaker readers. The extent to which children enjoy and value reading is, however, likely to be influenced by how well they read in the first place—good readers are likely to read more frequently and read a wider range of material, particularly as a recreation, than those children who are weaker readers.

To gauge attitudes towards reading, students were asked to indicate on a four-point scale ('agree a lot' through to 'disagree a lot') how much they agreed with six attitudinal statements about reading, and how often they did two particular reading activities. The *Students Like Reading* (SLR) *Scale* summarises students' responses to the statements and activities. These components are summarised in Box 7.3.

Box 7.3: Attitudinal statements and activities used in the *Students Like Reading (SLR) Scale,* 2010/11

Aspects to liking reading:

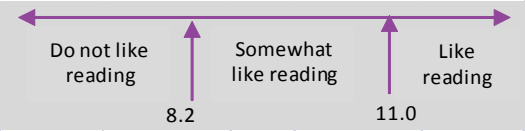
1. I read only if I have to*
2. I like talking about what I read with other people
3. I would be happy if someone gave me a book for a present
4. I think reading is boring*
5. I would like to have more time for reading
6. I enjoy reading

How often do you do these things outside of school?

1. I read for fun
2. I read things that I choose myself

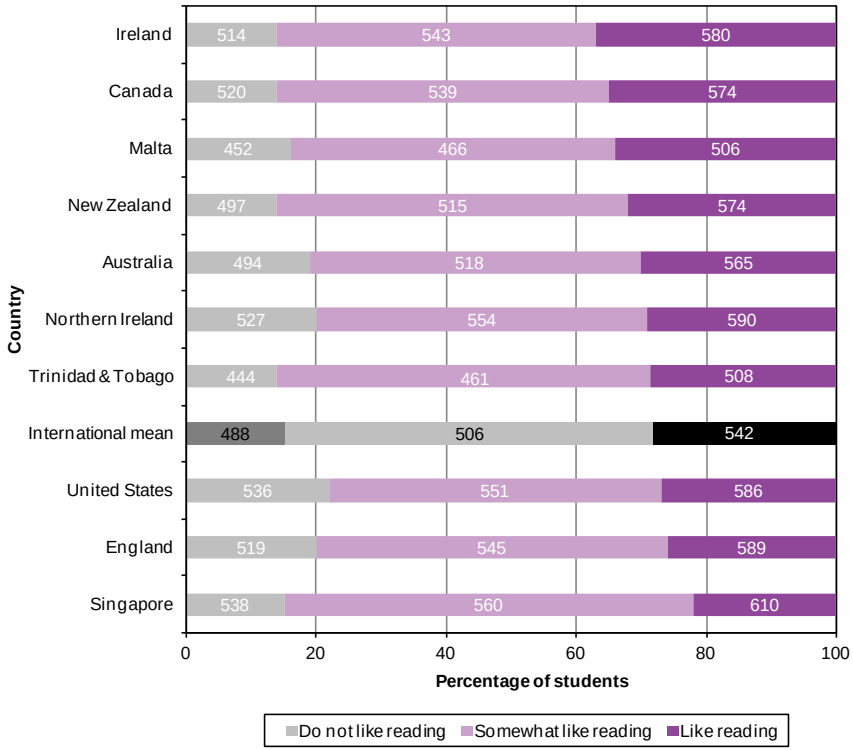
* Negatively worded statement reverse coded for the scale.

Categories on the scale: students who *like reading* had a score of at least 11.0 on the scale, and had agreed 'a lot' with at three of the six statements and agreed 'a little' to the other three, as well as read for fun and chose reading material they liked almost every day, on average. Students who *do not like reading* scored at most 8.2 on the scale, had typically disagreed 'a little' with three statements, agreed 'a little' with the other statements, and read and chose their own reading material only once or twice a month. All other students were considered to *somewhat like reading*.



About one-third of New Zealand Year 5 students (32%) *like reading* (c.f. 28% on average internationally), while 14 percent of Year 5 students *do not like reading (*about the same as the international mean of 15%); most Year 5 students' views tended to be moderate with just over half (53%) who *somewhat like reading* (c.f. 57% on average internationally). The difference between the mean reading scores for those Year 5 students who *like reading* and those who *do not like reading* was 78 scale score points. The findings for New Zealand and the English-language countries are summarised in Figure 7.2, with countries ordered by the proportion of students who *like reading.*

Figure 7.2: *Students Like Reading* (SLR) *Scale* – New Zealand and the English-language countries, 2010/11



Notes

Countries are ordered by the percentage of students who *like reading*. The mean reading scores for students in each category on the scale are shown on the respective bars (without the standard errors). See Table B.21 in Appendix B for the standard errors.

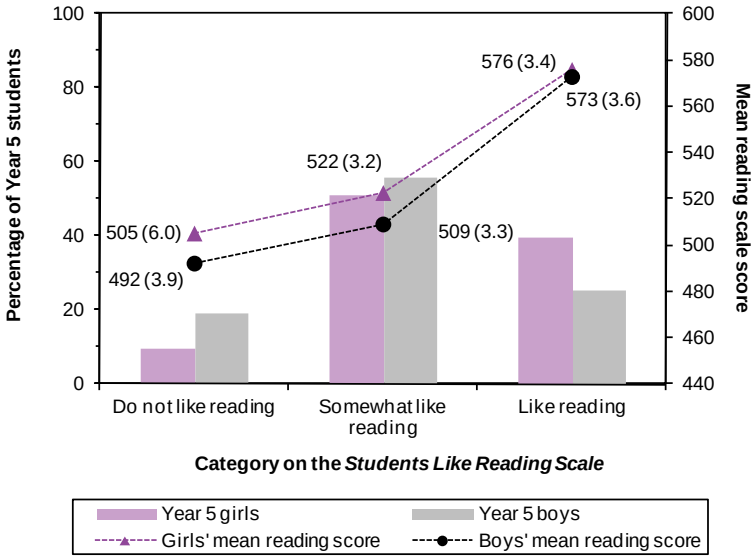
The centrepoint of the *SLR Scale* was set at 10.0. The means on the scale ranged from 10.9 (Portugal) to 9.3 (Croatia); the mean (and standard error) for New Zealand was 10.2 (0.05).

Source: Exhibit 8.1 in Mullis, Martin, Foy, & Drucker, 2012.

Students' views of reading and gender

Year 5 girls tended to *like reading* more than Year 5 boys—39 percent of girls compared with 25 percent of boys. Almost one in five of boys *do not like reading* (19%) compared with about one in 10 of girls (9%). As Figure 7.3 illustrates, the relationship between liking reading and reading achievement was a little stronger for Year 5 boys than it was for was for Year 5 girls, with boys who were in the *like reading* category scoring an average of 80 scale score points higher than those Year 5 boys who were in the *do not like reading* category. The average difference in achievement between Year 5 girls in the two categories was 70 scale score points. Interestingly, there was no difference between the mean achievement of girls and boys who *like reading*.

Figure 7.3: New Zealand Year 5 students in each category of the *Students Like Reading* (SLR) *Scale* in 2010/11, by gender



Notes

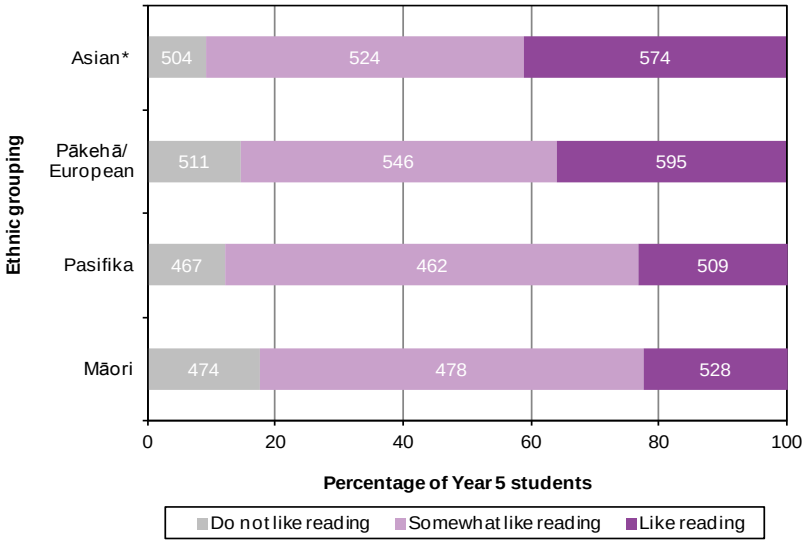
The bars represent the percentage of Year 5 girls and boys in each category of the scale. The data points are the mean reading scores. Standard errors are in parentheses.

The international centrepoint of the *SLR Scale* was set at 10.0. The mean (and standard error) on the *SLR Scale* for New Zealand's Year 5 girls was 10.6 (0.05) and for Year 5 boys 9.8 (0.06).

Students' views of reading and ethnicity

Figure 7.4 shows the proportion of Year 5 students in each ethnic grouping at each level of the *SLR Scale*, ordered by the proportion of students who *like reading*. Asian and Pākehā/European students tended to be more positive towards reading than Māori and Pasifika students. Proportionately more Māori students did not like reading (17%) than students from the other ethnic groupings.

Figure 7.4: New Zealand Year 5 students in each category of the *Students Like Reading* (SLR) *Scale* in 2010/11, by ethnic grouping



Notes

Groups are ordered by the highest percentage of students who *like reading*. The mean reading scores for students in each category of the scale are shown on the bars. (*)The mean score for Asian students who *do not like reading* should be treated with caution as the statistic is based on just under 50 observations.

The international centrepoint of the *SLR Scale* was set at 10.0. The *SLR Scale* mean (and standard error) for Asian students was 10.6 (0.12); Pākehā/European, 10.3 (0.06); Pasifika, 9.9 (0.08); and Māori, 9.7 (0.07).

The relationship between reading literacy achievement and students' attitudes towards reading, as measured by the *SLR Scale*, was strongest for Pākehā/European students (i.e., an 83 scale score point difference between the mean scores of students who *like reading* and those who *do not like reading*) and weakest for Pasifika students (i.e., a difference of 42 scale score points). When the interaction of gender and ethnicity was considered, the gender pattern shown in Figure 7.3 was also evident within each ethnic grouping. That is, proportionately more girls than boys in each ethnic grouping were found to *like reading*.

Any change from 2001 to 2010/11?

The PIRLS-2010/11 *Students Like Reading Scale* is not comparable to the *Students Attitudes to Reading* (SATR) *Index* used in PIRLS 2001 and in PIRLS 2005/06 that summarised students' attitudes to reading.[79] However, there were statements common to both the indices and the scale. Looking at the individual statements used in the scale, Year 5 students in 2010/11 were more likely to endorse "I like talking about what I read with other people"; "I enjoy reading"; and "I read for fun" in 2010/11 than in 2001 (and 2005/06). They were less likely to agree with "I read only if I have to" and "I think reading is boring",[80] which suggests that New Zealand Year 5 students were somewhat more positive about reading in 2010/11 than their counterparts in the earlier cycles.

The changes were particularly evident for Year 5 boys from 2005/06 to 2010/11, with boys in 2010/10 less likely than the 2005/06 cohort to endorse negative statements such as "I think reading is boring". Māori students, particularly Māori boys, also tended to be less negative in 2010/11 than their 2001 counterparts. Specifically, proportionately fewer Māori boys (7 percentage points) endorsed the statement "I think reading is boring" in 2010/11 than in 2001 (22% c.f. 15%).

Students' confidence in their reading

"Motivation is affected by the learner's self-concept and sense of self-efficacy…A belief in themselves and their ability to succeed in classroom tasks has an energising effect on both teachers and students." (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 Confident in Reading* (SCR) *Scale* summarises a series of statements developed to elicit information on students' level of confidence as readers. Students were asked to indicate on a four-point scale ('agree a lot', 'agree a little', 'disagree a little', 'disagree a lot') their level of agreement with the seven statements in Box 7.4.

Just 27 percent of New Zealand Year 5 students were found to be *confident* readers as measured by the *SCR Scale* (c.f. the international mean of 36%). This proportion was relatively low, with only six other countries having a lower proportion than New Zealand – France (26%), Singapore (26%), Colombia (24%), Chinese Taipei (21%), Hong Kong SAR (20%), and Morocco (17%). Countries with relatively more *confident* readers included Israel (49%), and Austria, Croatia, and Finland (all 48%). Across all countries confidence in reading was associated with higher reading achievement.

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[79] See Chamberlain, 2007 and Chamberlain, 2008.

[80] All improvements were found to be statistically significant (i.e., endorsement of positive statements or disagreement with negative worded statements).

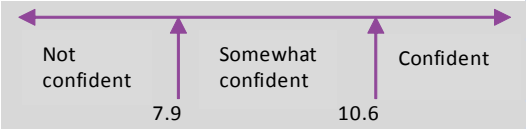
Box 7.4: Confidence statements used in the *Students Confident in Reading (SCR) Scale*, 2010/11

Confidence statements:

1. I usually do well in reading
2. Reading is easy for me
3. Reading is harder for me than for many of my classmates*
4. If a book is interesting, I don't care how hard it is to read
5. I have trouble reading stories with difficult words*
6. My teacher tells me I am a good reader
7. Reading is harder for me than any other subject*

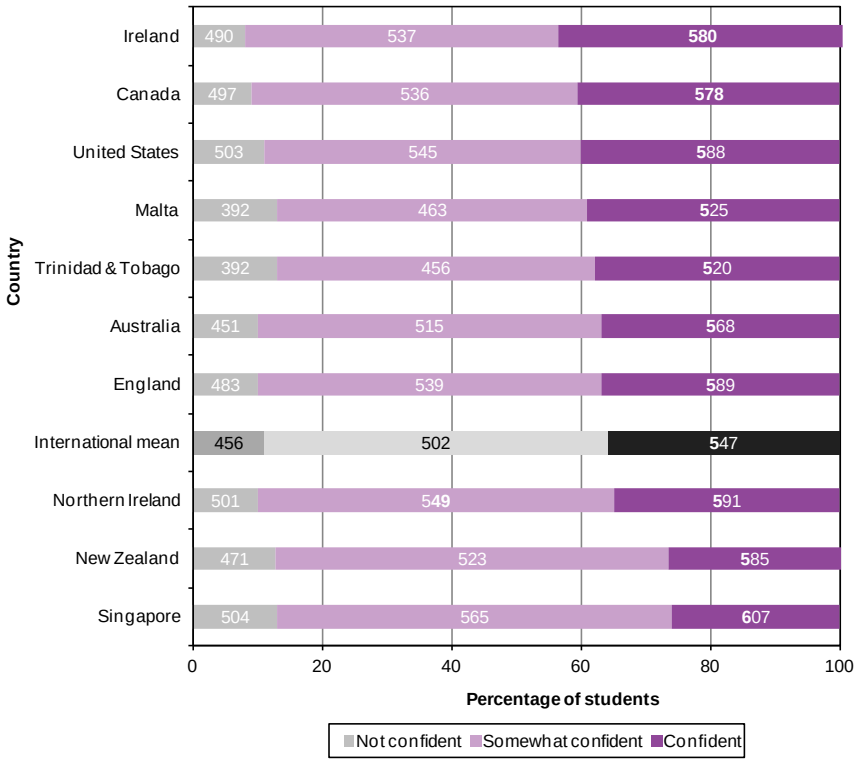
* Negatively worded statement reverse coded for the scale.

Categories on the scale: students who were *confident* had a score on the scale of at least 10.6, which corresponded to their agreeing 'a lot' with four of the seven statements and agreeing 'a little' with the other three, on average. Students who were *not confident* had a score no higher than 7.9, which corresponded to students disagreeing 'a little' with four of the statements and agreeing 'a little' with the other three on average. All other students were considered to be *somewhat confident*.



The mean reading score for New Zealand Year 5 students who were *confident* (585) was significantly higher than the mean for Year 5 students who were *somewhat confident* (523), which in turn was higher than the mean for Year 5 students who were *not confident* (471). Figure 7.5 shows the percentages of students in the different categories of the scale along with the mean scores, for New Zealand and the English-language countries.

Figure 7.5: *Students Confident in Reading* (SCR) *Scale* – New Zealand and the English-language countries, 2010/11



Notes

Countries ordered by the percentage of students who were *confident* readers. Mean reading scores for students in each category of the scale are shown on the respective bars (without the standard errors). See Table B.22 in Appendix B for details of the standard errors.

The centrepoint of the *SCR Scale* was set at 10.0. The means ranged from 10.6 (Israel and Austria) to 9.1 (Morocco); the mean (and standard error) for New Zealand was 9.6 (0.04).

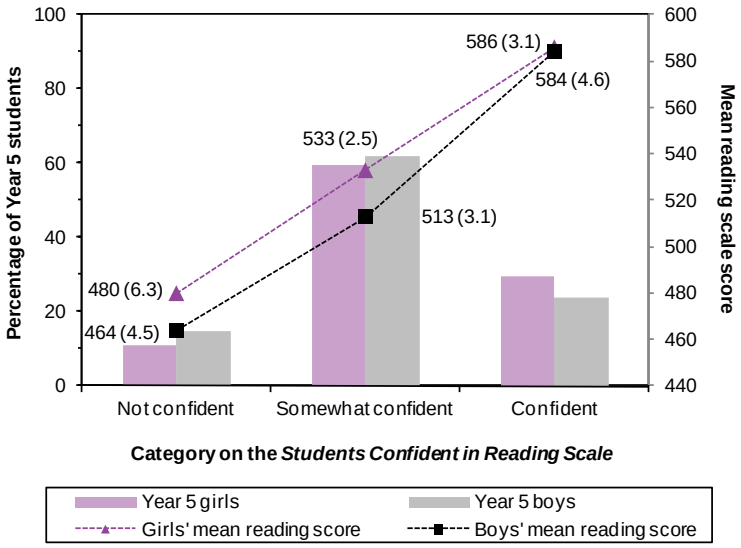
Source: Exhibit 8.3 in Mullis, Martin, Foy, & Drucker, 2012.

Self-confidence and gender

Figure 7.6 shows the percentages of New Zealand's Year 5 girls and boys at each level of the *SCR Scale*. Consistent with the overall pattern reported for New Zealand, relatively small proportions of both girls (30%) and boys (24%) were found to be *confident* readers. Furthermore, Year 5 boys tended to be slightly over-represented among the readers who were *not confident* (15% of boys compared to 11% of girls), although this difference was not quite as marked as at the high end of the scale.

The difference between the mean scores for boys who were *confident* readers and boys who were *not confident* (120 scale score points) was greater than the difference between girls in these two categories (106 scale score points). Interestingly, there was no difference in the mean reading literacy achievement of boys who were *confident* readers and girls who were *confident* readers.

Figure 7.6: New Zealand Year 5 students in each category of the *Students Confident in Reading* (SCR) *Scale* in 2010/11, by gender



Notes

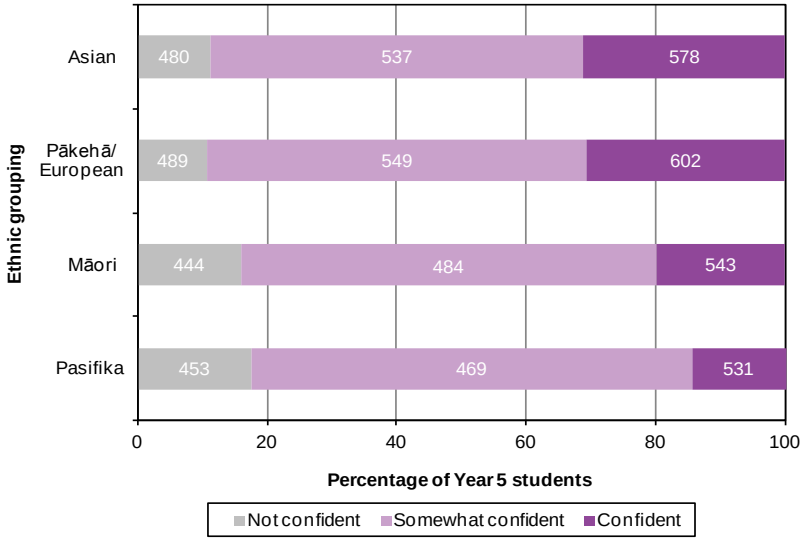
The bars represent the percentage of Year 5 girls and boys in each category of the scale. The data points are the mean reading scores. Standard errors are in parentheses.

The international centrepoint of the *SCR Scale* was set at 10.0. The mean (and standard error)) on the *SCR Scale* for New Zealand's Year 5 girls was 9.7 (0.04) and Year 5 boys 9.5 (0.05).

Self-confidence and ethnicity

Figure 7.7 shows the percentages of Year 5 students in each ethnic grouping in each category of the the *SCR Scale*, ordered according to the proportion of *confident readers*. Proportionately more Pākehā/European and Asian students (both 31%) were found to be *confident* readers than Māori (20%) and Pasifika students (14%). Māori students tended to be more moderate with their views with the majority *somewhat confident*.

Figure 7.7: New Zealand Year 5 students in each category of the *Students Confident in Reading* (SCR) *Scale* in 2010/11, by ethnic grouping



Notes

Groups are ordered by the highest percentage of *confident* readers. The mean reading scores for students in each category of the scale are shown on the bars.

The international centrepoint of the *SCR Scale* was set at 10.0. The mean (and standard error) on the *SCR Scale* for Asian was 9.8 (0.10); Pākehā/European, 9.8 (0.05); Māori, 9.3 (0.06); and Pasifika, 9.02 (0.07).

The gender pattern observed in Figure 7.6 was also apparent within each ethnic grouping. That is, girls from each ethnic grouping tended to be more confident in reading, with boys from each grouping having more moderate views.

The positive relationship between confidence and reading literacy achievement was observed for all ethnic groupings. However, the relationship was most marked for Pākehā/European students, with the mean difference in achievement between those students who were confident and those who were not, 113 scale score points. The smallest difference was observed for Pasifika students (about 78 scale score points). Māori and Asian differences were about the same (99 and 98, respectively).

Any change from 2001 to 2010/11?

In 2001 and 2005/06, PIRLS reported on students' self-concept using the *Students' Reading Self-Concept Index*, an index that looked at students' perceptions of their ability in reading. The 2010/11 scale, *Students Confident in Reading*, is not comparable to the index on students' self-concept.

Student motivation to read

According to Mullis, et al., (2009), being a motivated reader involves being interested or engaged in what is being read and a positive disposition towards their reading ability. In PIRLS-2010/11, students' motivation to read is viewed in two ways: either as inherent (because students just like reading) or because of external factors (such as parents' pleasure or recognition). Students were asked the extent to which they agreed with six motivational facets of reading described in Box 7.5. Their responses were subsequently summarised in the *Students Motivated to Read Scale*.

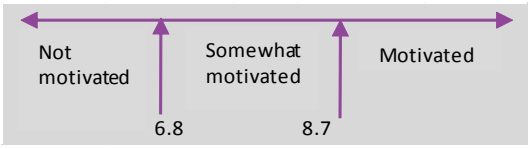
On average internationally, about three-quarters of students were *motivated* to read (74%), one-fifth *somewhat motivated* (21%), and the remainder (5%) *not motivated*. Not surprisingly, students who were *not motivated* tended to have much lower reading achievement than those who were *motivated*.

Box 7.5: Statements used in the *Students Motivated to Read* (SMR) *Scale*, 2010/11

Facets of motivation to read:

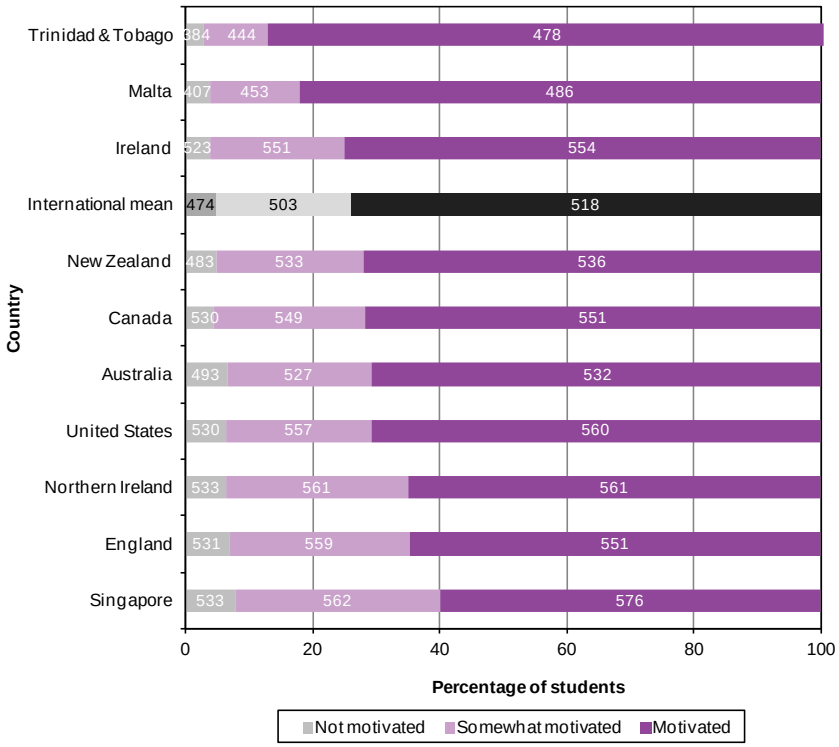
1. I like to read things that make me think
2. It is important to be a good reader
3. My parents like it when I read
4. I learn a lot from reading
5. I need to read well for my future
6. I like it when a book helps me imagine other worlds

Categories on the scale: students were considered to be *motivated* (corresponding to a score of at least 8.7 on the scale) to read if they agreed 'a lot' with three of the six statements and agreed 'a little' with the other three on average. Students who were considered *not motivated* scored no higher than 6.8 which corresponded to them disagreeing 'a little' with three statements and agreeing 'a little' with the other three. All other students were considered to be *somewhat motivated*.



In general, the countries with the highest proportions of *motivated* readers tended to have lower performance overall—Georgia (92%), Indonesia (91%), and Trinidad and Tobago (88%), while the countries with the least *motivated* students were higher-achieving countries Singapore (60%), Finland (59%), and Hong Kong SAR (52%). Figure 7.8 shows the proportions of students in each category for New Zealand and the English-language countries.

Figure 7.8: *Students Motivated to Read* (SMR) *Scale* – New Zealand and the English-language countries, 2010/11



Notes

Countries are ordered by the percentage of students who were *motivated* to read. Mean scores for students in each category of the scale are shown on the bars (without the standard errors). See Table B.23 in Appendix B for details of the standard errors.

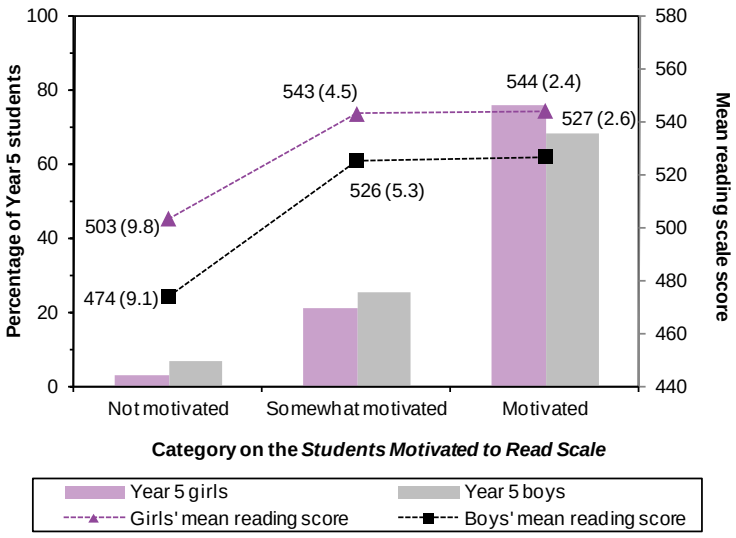
The centrepoint of the *SMR Scale* is set at 10.0. The scale means ranged from 11.2 (Georgia) to 8.9 (Hong Kong SAR). The mean (and standard error) for New Zealand was 9.8 (0.04).

Source: Exhibit 8.2 in Mullis, Martin, Foy, & Drucker, 2012.

Motivation and gender

Figure 7.9 shows the percentages of New Zealand's Year 5 girls and boys at each level of the *SMR Scale*. Year 5 girls tended to be a little more *motivated* about their reading than Year 5 boys, who were more likely to be *somewhat* or *not motivated* about reading. The difference between the mean reading scores of *motivated* students and those who were found to be *not motivated* was greater for boys (on average 53 scale score points) than it was for girls (41 scale score points).

Figure 7.9: New Zealand Year 5 students in each category of the *Students Motivated to Read* (SMR) *Scale* in 2010/11, by gender



Notes

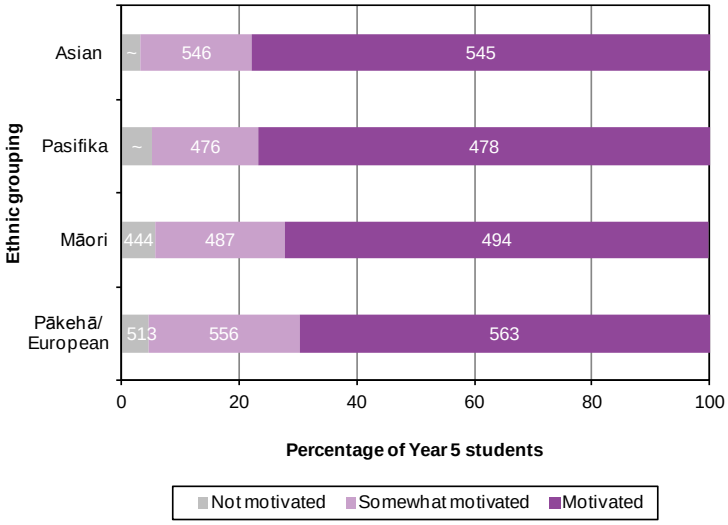
The bars represent the percentage of Year 5 girls and boys in each category of the scale. The data points are the mean reading scores. Standard errors are in parentheses.

The international centrepoint of the *SMR Scale* was set at 10.0. The mean (and standard error) on the *SMR Scale* for New Zealand's Year 5 girls was 10.02 (0.05) and Year 5 boys 9.7 (0.06).

Motivation and ethnicity

Student motivation was examined for students in each ethnic grouping, with the findings summarised in Figure 7.10, ordered by the highest proportion of motivated students. At least 70 percent of students in each of the four main ethnic groupings were *motivated* to read as measured by the *SMR Scale;* Asian and Pasifika students were somewhat more likely to be *motivated* to read than Māori and Pākehā/European students. In keeping with the pattern observed overall, there were no significant differences between the mean reading scores for students who were *motivated* and *somewhat motivated*. However, there were very marked, significant achievement differences beween the mean reading scores for both Māori and Pākehā/European students who were *motivated* and those who were *not motivated* (of about 50 scale score points). Note that there were too few Asian and Pasifika students in the *not motivated* category to report their achievement.

Figure 7.10: New Zealand Year 5 students in each category of the *Students Motivated to Read* (SMR) *Scale* in 2010/11, by ethnic grouping



Notes

Groups are ordered by the highest percentage of *motivated* students. The mean reading scores for students in each category of the scale are shown on the bars. Tilde (~)-the actual numbers on which the means are calculated are too small to calculate reliable estimates of the means.

The international centrepoint of the *SMR Scale* was set at 10.0. The mean (and standard error) on the *SMR Scale* for Asian was 10.1 (0.08); Pasifika, 10.2 (0.07), Māori, 9.9 (0.07); and Pākehā/European, 9.7 (0.05).

Factors limiting instruction

As well as teachers having to negotiate negative dispositions towards learning, teachers often have to deal with external factors such as students without specific skills and with (social) problems associated with poor nutrition or not having had enough sleep. PIRLS sought information from teachers using a three point scale—'not at all', 'some' and 'a lot'—to gauge the extent to which a number of factors, including prerequisite knowledge, sleep deprivation, disruptive and uninterested Year 5 students, limited their ability to teach. This section examines some of these limiting factors. While this information was collected in New Zealand in late 2010, it is interesting to note that the findings described below are consistent with the reports from teachers of Year 5 students in TIMSS in 2011 (Caygill, et al., 2013).

Instruction limited by students lacking prerequisite knowledge/skills

On average internationally, 61 percent of middle primary students were being taught by teachers who considered their instruction was being compromised to *some* extent by their students' lack of prerequisite knowledge, with just 11 percent of students taught by those whose teaching was compromised *a lot*. Twenty-eight percent of students, on average internationally, were being taught by teachers who considered their instruction was *not at all* compromised by students' lack of prerequisite knowledge. Teachers in the Netherlands (49% of students) and Norway (47%) were most likely to record that lack of prerequisite knowledge was not compromising their teaching, while teachers in Morocco (7%) and the United States (14%) were the least likely.

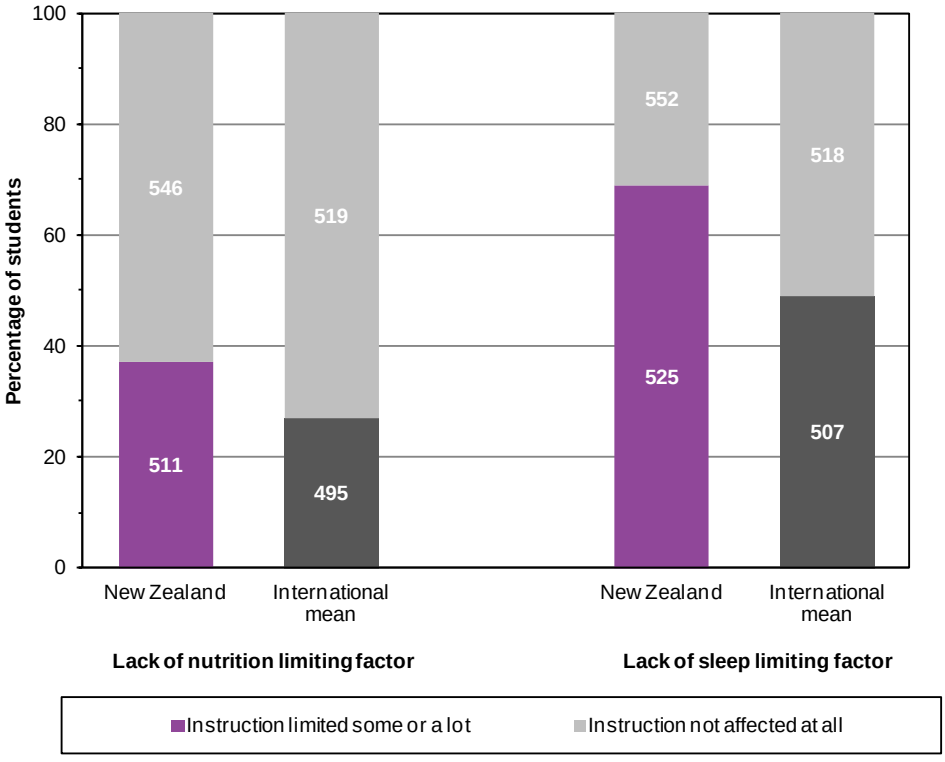
The corresponding figures for New Zealand were not dissimilar to the international means—the teachers of 64 percent of Year 5 students were limited to *some* extent, 10 percent were limited *a lot*, and teachers of 26 percent of Year 5 students were not limited at all. The relationship with achievement was relatively strong for New Zealand with the mean for the 10 percent of students

whose teachers found lack of prerequisite knowledge limiting (492), about 40 to 60 scale score points lower than the mean for the 64 percent of students whose teachers found it to *some* extent limiting (533) and the 26 percent of students whose teachers did not find it limiting (552).

Instruction limited by students suffering from lack of nutrition or sleep

Figure 7.11 summarises the information on the extent to which students who suffered from a lack of basic nutrition and not enough sleep limited teachers' teaching for New Zealand and internationally. Teachers of just under two-thirds of New Zealand's Year 5 students (63%) did not find (or had experience with) their students' lack of basic nutrition as limiting their instruction. This percentage was lower than the international mean (73%) and lower than the reports from teachers in, for example, Finland (91%), Ireland (78%), and Australia (73%), but just higher than the teachers' reports in the United Arab Emirates (62%), United States (60%), and Azerbaijan (60%).

Figure 7.11: New Zealand teachers' reports on the extent to which lack of sleep and basic nutrition limited instruction, 2010/11



Note

The bars represent the percentages of middle primary students—New Zealand and the international mean percentages—whose teachers reported basic nutrition and lack of sleep among students limited instruction. The mean reading scores for students in each category are shown on the bars.

Source: Exhibit 8.10 in Mullis, Martin, Foy, & Drucker, 2012.

The converse to this is that teachers of more than one-third of New Zealand's Year 5 students (37%) considered the effects of basic nutrition impacted their teaching to either *some* extent or *a lot*, 10 percentage points higher than the international mean proportion (27%). The highest proportions were recorded for Morocco (79%) and Iran (70%); the lowest for the Czech Republic (1%), Sweden (4%), and the Slovak Republic (5%). The figure for New Zealand was the second-highest amongst the English-language countries; only the United States had a higher proportion of students (40%).

In some countries like the United States and England, some schools provide free or reduced price lunches to students from low socio-economic backgrounds. In New Zealand a significant number of schools servicing lower socio-economic communities run breakfast clubs, either in partnership with local businesses or funded from their schools' operating budgets.

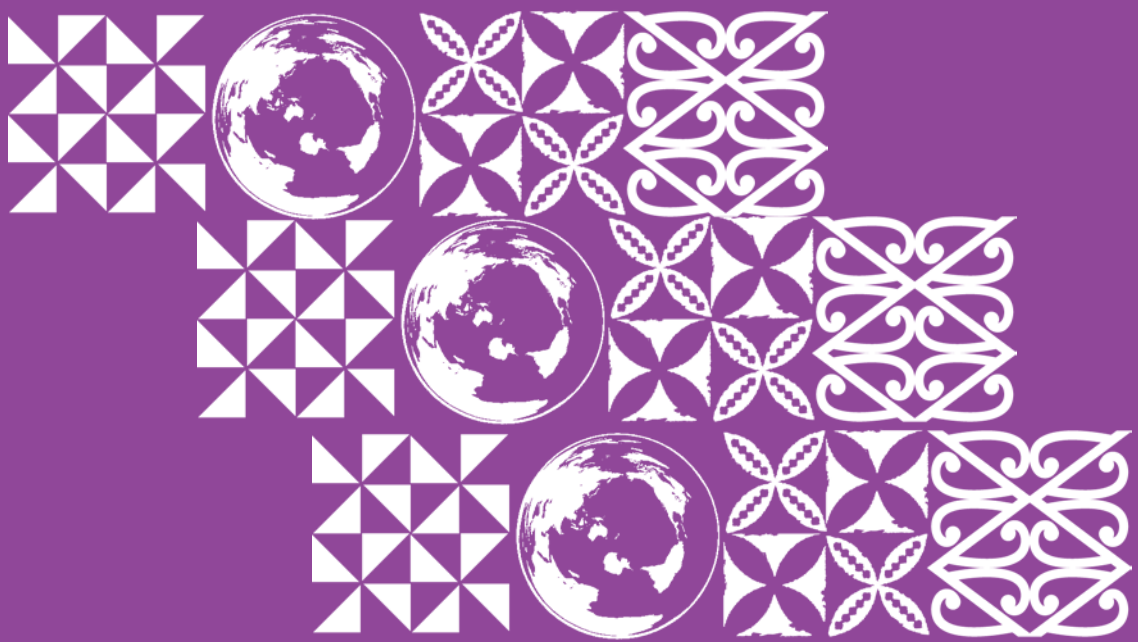
As Figure 7.11 showed, the relationship with achievement was relatively strong internationally – students taught by teachers who reported that lack of basic nutrition impeded their instruction achieved, on average, at a lower level (495) than students whose teachers were not impacted by their students' nutritional needs (519). In New Zealand the relationship was more marked – the mean for Year 5 students whose teachers' instruction was impeded achieved about 35 scale score points lower (511) than Year 5 students whose teachers' instruction was not affected.

Compared to nutritional needs of students, in many more countries students' lack of sleep tended to be more of a impediment for teachers. Teachers of at least 50 percent of students in about half the participating countries reported that their students' lack of sleep limited their instruction *some* or *a lot*. France (80%) and Belgium–French Community (77%) recorded the highest proportions; Azerbaijan (16%) and the Slovak Republic (20%) recorded the lowest proportions. New Zealand teachers also tended to be impacted by their students' lack of sleep more than many other countries (teachers of 69% of Year 5 students), although on a par with Australia and Canada (both 67%).

In New Zealand the relationship between reading achievement and children's lack of sleep was more marked than it was internationally. Year 5 students whose teachers' instruction was impeded by students' lack of sleep achieved about 27 scale score points lower (525) than Year 5 students whose teachers' instruction was not affected (552); the average difference internationally was 11 scale score points.

Section 8:

Classroom Organisation and Practice for Learning



Section 8: Classroom Organisation and Practice for Learning

Educational studies have often found it difficult to link student achievement *directly* to teachers' instructional practices and activities. However, students' daily classroom experiences are likely to have more of an *influence* on their reading progress than the overall school environment. Reading instruction is likely to be most effective when teachers integrate various approaches or elements that best meet the needs of their students; these may include the use of a wide range of reading texts; teacher- and student-led discussions; guided reading; shared and independent reading; and explaining and modelling strategies for developing comprehension strategies (Ministry of Education, 2006; Mullis, et al., 2009). In this most recent cycle of PIRLS an attempt was made to understand better the factors that interact with teacher practice and delivery of the curriculum, one of these being student content engagement (from both teacher and student perspectives). This section looks at the organisation of classrooms for reading instruction, and some of the preferred instructional practices including those around student content engagement.

Implementation and organisation of reading classes

Teachers in PIRLS-2010/11 were asked to indicate on four-point scale how often ('always or almost always', 'often', 'sometimes', or 'never') they used types of organisational approaches to teach reading and/or reading activities (see Figure 8.1, page 146). Internationally, teaching reading as a whole-class activity was the most preferred *single* organisational approach with about three-quarters of students taught reading this way either 'always or almost always' (36%) or 'often' (40%). New Zealand teachers rarely taught reading in a whole-class setting; just 12 percent of Year 5 students were in classes where the whole-class approach was used this frequently (2% and 10% respectively).

Other countries where relatively few students (< 15% of students) were in classes where reading was taught as a whole-class activity were Australia (13% of students), Denmark (9%), Northern Ireland (8%), Hungary, (6%), England (5%), and Netherlands (5%). While few teachers in these six countries reported using the approach 'always or almost always', they did report using it 'often' (e.g., Denmark, 49%; England, 38%). Most New Zealand teachers reported they either 'sometimes' (73% of students) or 'never' (16%) taught reading as a whole-class activity.

In keeping with information from earlier cycles of PIRLS, New Zealand teachers' preference of 'always or almost always' using same ability grouping for reading instruction was greater than any other country, with teachers of virtually all Year 5 students using this approach either 'always or almost always' (66% of students) or 'often' (30%). Northern Ireland was the only other system where same-ability grouping was used relatively frequently (53% and 41% respectively). On average internationally, teachers of just 10 percent of students 'always or almost always' used same-ability grouping while teachers of 27 percent of students 'often' used this approach.

Of particular interest, is having a better understanding as to how and why ability grouping is virtually the only approach used to teach reading in New Zealand. In 1990, for example more than three-quarters of New Zealand "Standard 3" teachers (equivalent to the current Year 5) disagreed with the statement: "Children should always be grouped by reading ability" (Chamberlain, G., 1993). In a review of (international) literature on grouping by ability undertaken by Sukhnandan and Lee (1998), the authors noted that there are disadvantages and advantages of forming within-class

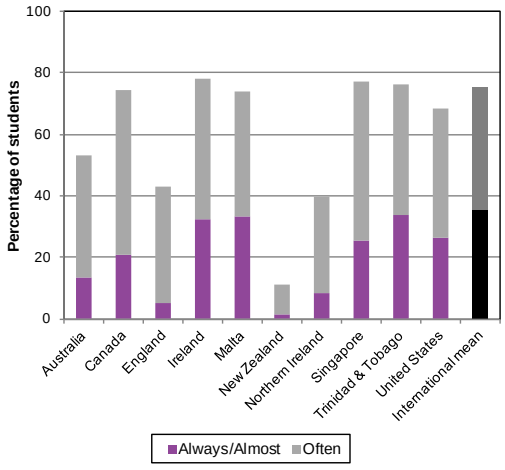
groups of students based on ability. For example, while it allows teachers to meet the needs of the varying groups by being able to modify the learning objectives and pace of instruction, it does reduce the amount of direct instructional time that students receive.

Mixed-ability grouping was rarely used in most countries including New Zealand (3% of students in classes where it was 'always or almost always' used). Sukhnandan and Lee also noted in their review that there are both advantages and disadvantages of using mixed-ability grouping; for example, it improves opportunities for all students to access a 'common' or same curriculum, the teacher, and resources, although greater demands are put on teachers to provide more individualised teaching.

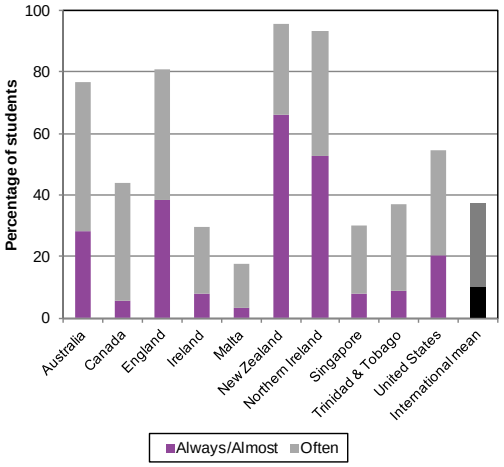
Figure 8.1 presents information on how often New Zealand teachers and teachers from the English-language countries (i.e., the countries where English was the only or one of the assessment languages) taught reading as a whole-class activity, created same- or mixed-ability groups, or used individualised instruction.

Figure 8.1: Organisational approaches for teaching reading used by teachers in New Zealand and the English-language countries, 2010/11

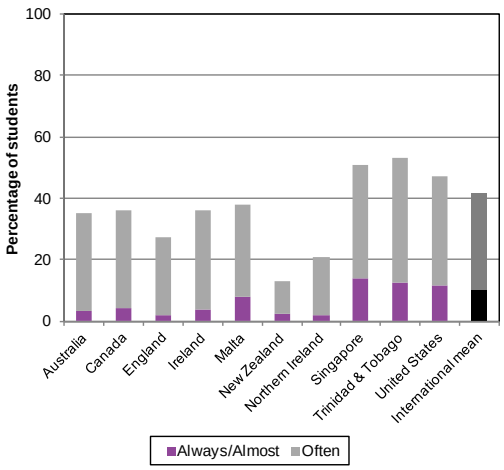
A.Teach reading as a whole-class activity



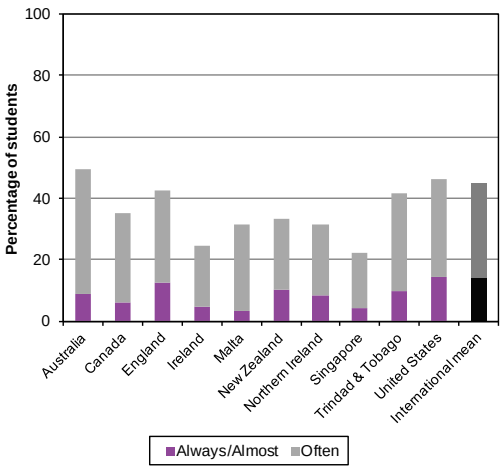
B. Create same-ability groups



C. Create mixed-ability groups



D. Use individualised instruction for reading



Source: PIRLS 2011 International Database *Teacher Questionnaire Data Almanac* (Foy & Drucker, 2013).

The relationship between reading achievement and the frequency with which a particular organisational approach was used by teachers varied across countries as well as within countries. For example, in Finland, there were virtually no differences in achievement among Finnish students by teachers' reports of using a whole-class approach—32 percent of Finnish students who were always taught reading as a whole-class activity (567), achieved on average about the same as the 50 percent of students who were 'often' taught reading this way (570), and the 16 percent of students who were 'sometimes' taught in a whole-class setting (569). Just two percent of Finnish students were in classes where the teacher never taught reading as a whole class activity (558).

Looking at the relationship for New Zealand, Year 5 students who were in classes where a whole-class approach was used either 'sometimes' or 'often' (83% of students) achieved on average significantly higher (537) than Year 5 students (16%) whose teachers never used the approach (520).[81] (Note: there were too few observations to report the mean or make comparisons for students who were 'always or almost always' taught reading in a whole-class setting). The opposite was observed for Year 5 students (66%) whose teachers reported always/almost always using same-ability grouping (529) and those Year 5 students (34%) whose teachers used the approach less frequently (541),[82] with the difference, 12 scale score points, significant (t = 2.07).

While there are significant *associations* between these two particular approaches and students' reading achievement, no account has been taken of other variables such as class size or the ability composition of the entire class, or the grade/class structure (e.g., composite classes), which may influence teachers' decisions on how they organise their classes.

Any change from 2001 to 2010/11?

There was very little change in New Zealand teachers' reports in 2010/11 of how classes were organised for reading from the patterns observed in 2005/06 or 2001 (See Caygill & Chamberlain, 2004; Chamberlain, 2007).

Students' reports of small group work

Given that the main organisational approach in New Zealand is to have students work in groups for reading, there is a possibility that students do not have regular, direct interactions with their classroom teacher, particularly as reading is rarely carried out as a whole class activity. To gauge whether or not this was the case, Year 5 students were asked how often they read in a small group with their teacher. Note that the question was a New Zealand-specific question and so there are no international comparisons. Figure 8.2 summarises the frequency with which Year 5 students read with their teacher during reading.

As the figure shows just over two-thirds of Year 5 students (68%) had interactions with their teacher at least weekly, with nearly one-third (32%) reporting they only read with their teacher at most once or twice a month (including 14% who reported never working in small groups). Furthermore, the reading achievement of Year 5 students who read in a group less frequently tended to be higher than those students who read in a group frequently. This level of interaction with their class teacher is consistent with the reports of New Zealand's Year 5 students during their mathematics lessons (See Caygill, et al., 2013).

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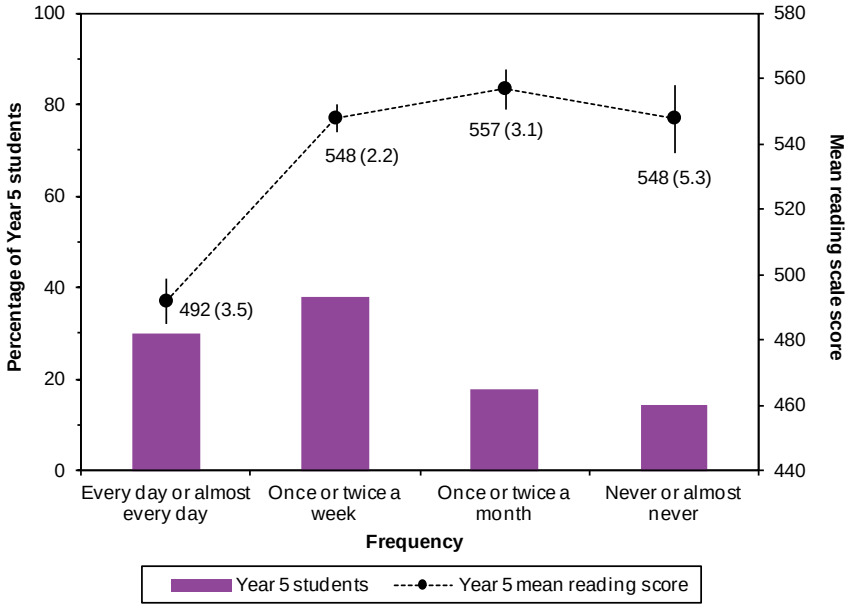
[81] For this analysis, the 10% of students whose teachers 'often' used the approach was combined with the group whose teachers sometimes used it (73%). The test statistic was t = 2.01.

[82] Includes students (<0.5%) whose teachers never used same-ability grouping.

Figure 8.2: New Zealand Year 5 students' reports of working in small groups with their teachers, 2010/11



Note

The bars on the graph represent the percentage of Year 5 students who reported how often they worked with their teacher when they were in groups for reading. The data points are the mean reading scores for students according to the frequency with which they worked with their teacher. Standard errors appear in parentheses. The vertical lines extending from each data point show the 95% confidence interval around the mean (i.e., ± 1.96 × standard error).

Instructional activities used when teaching reading

Teachers were asked how often they undertook particular instructional activities ('every day or almost every day', 'once or twice a week', 'once or twice a month', 'never or almost never') when working with their students during reading. Table 8.1 summarises the information that was collected from teachers on three of these practices for New Zealand and the English-language countries.

Table 8.1: An overview of instructional activities undertaken daily in New Zealand and the English-language countries, 2010/11

Country	Percentage of students whose teachers reported doing various reading activities daily		
	Teacher reads aloud to class	Students read aloud	Students read silently on their own
Australia	72	57	81
Canada	71	50	89
England	65	42	70
Ireland	64	82	63
Malta	69	73	45
New Zealand	**71**	**30**	**90**
Northern Ireland	66	58	72
Singapore	49	41	66
Trinidad & Tobago	85	85	82
United States	73	64	84
International mean (for the 45 countries)	62	70	65

Source: PIRLS 2011 International Database *Teacher Questionnaire Data Almanac* (Foy & Drucker, 2013).

The practice of the teacher reading aloud to the class varied considerably across countries. While it was relatively common in the English-language countries, it was relatively uncommon among Danish (19%), German (19%), Czech (21%), Chinese Taipei (22%), and Finnish (32%) teachers; teachers in Austria were the least likely to read aloud to their students on a daily basis (9% of students). Bulgarian and Azerbaijani teachers were the most likely to read aloud daily (92% and 89% of students in such classes, respectively).

A teacher asking their students to read aloud whether it is to the whole class, in small groups or pairs, or one-on-one to the teacher was more common in other countries than it was in New Zealand.[83] Teachers of at least 50 percent of students in 36 countries, including those in Finland and Germany (both 68%), reported asking their students to read aloud at least daily. Students' reading aloud was relatively uncommon as a daily activity in New Zealand classrooms, with just 30 percent of students in such classes, although not dissimilar to the reports from Sweden (26% of students), Chinese Taipei (23%), and Denmark (21%). Bulgarian teachers were more likely than teachers in other countries to use this practice with 97 percent of students in such classes. While relatively few New Zealand students were asked to read aloud on a daily basis, more than half were in classes where their teachers used this type of activity weekly (52%).

On average, internationally just under two-thirds of students were asked by their teachers daily to do some silent reading (65%); in five countries the proportion was more than 85 percent—New Zealand (90%), Bulgaria (89%), Canada (89%), the Russian Federation (87%), and Portugal (86%). As with the class organisational approaches, the relationship between reading achievement and the frequency of using a particular instructional approach varied across and within countries. For example, the reading achievement of New Zealand Year 5 students whose teachers reported that their students read silently on their own daily was generally much higher (535) than those students who read silently monthly (489); in Northern Ireland, the opposite was observed with the mean reading achievement lower (558) for those students who did silent reading daily than those students who did silent reading monthly (578).

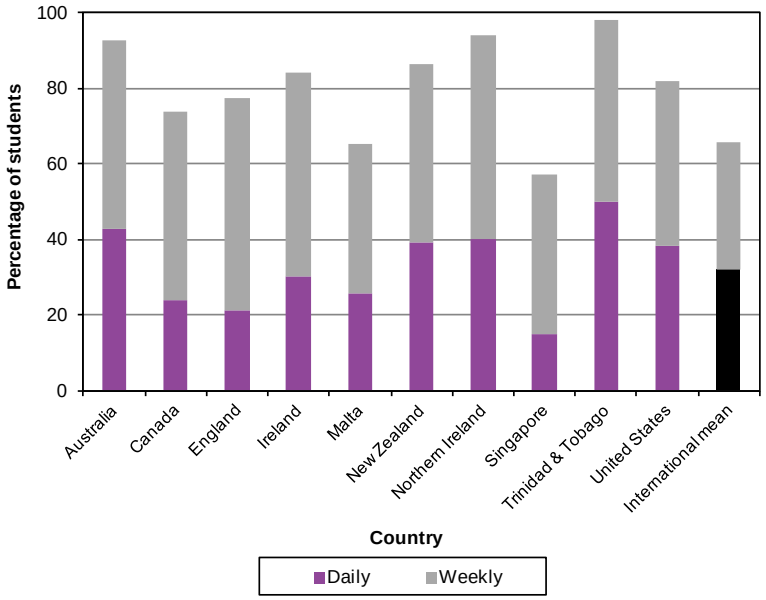
Teaching decoding strategies

Teachers were also asked how often they taught specific skills and strategies for decoding sounds and words. More than four-fifths of New Zealand Year 5 students (86%) were being taught strategies, *at least weekly*, on how to decode sounds and words, including one-third of students (39%) being taught these strategies 'every day or almost every day'. The latter proportion was about the same as the United States (39%), and was lower than the proportion for Australia (43%) but nearly double the proportion for England (21%).

There was a considerable range across countries with the teachers of less than 10 percent of students in Finland (3%), Sweden (6%), Belgium-French Community (7%), and France (7%) teaching decoding strategies daily, while Azerbaijani (74%) and Polish teachers were the most likely (77%) to be teaching them. Figure 8.3 summarises the information for New Zealand and the English-language countries.

[83] In 2005, the questions were 'reading aloud to the class' and 'reading aloud in small groups or pairs'. In 2010, the situation was not specified.

Figure 8.3: Teachers' reports of teaching decoding strategies – New Zealand and the English-language countries, 2010/11



Source: PIRLS 2011 International Database *Teacher Questionnaire Data Almanac* (Foy & Drucker, 2013).

The 39 percent of New Zealand Year 5 students who were taught decoding strategies on a daily basis, scored an average of 18 scale score points lower (521) than the students who were taught these strategies weekly (539), and on average 26 points lower than the 14 percent of Year 5 students who rarely were taught these skills (547).

Any change from 2001 to 2010/11?

As shown in Table 8.2 Year 5 students were only marginally more likely to be taught strategies for decoding sounds and words strategies on a daily basis in 2010/11 than in either 2005/06 or 2001; there were no significant differences between these proportions across the years.

Table 8.2: Trends in New Zealand teachers' reports of teaching Year 5 students decoding strategies, 2001–2010/11

Year of PIRLS assessment	Every day/almost every day		Once or twice a week		Less than weekly	
	Percentage of Year 5 students	Mean reading score	Percentage of Year 5 students	Mean reading score	Percentage of Year 5 students	Mean reading score
2010/11	39 (3.1)	521 (3.6)	47 (3.1)	539 (4.1)	14 (1.9)	548 (9.8)
2005/06	33 (2.8)	518 (3.7)	49 (2.8)	536 (3.0)	18 (2.3)	551 (6.0)
2001	36 (4.0)	524 (6.5)	44 (4.0)	526 (7.2)	20 (3.5)	546 (9.6)

Note

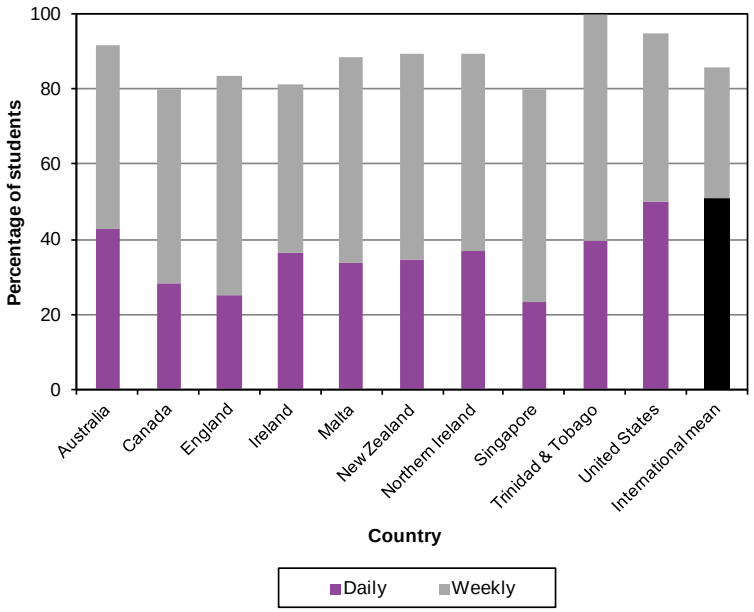
Standard errors appear in parentheses. Because of rounding, some figures may appear inconsistent.

Teaching new vocabulary

Across countries, middle primary students were more likely to be taught new vocabulary than they were decoding strategies. On average internationally, 51 percent of middle primary students were being taught new vocabulary systematically on a daily basis. The proportion of New Zealand Year 5 students being taught daily was 35 percent; the proportions for the other countries ranged from just nine percent in Sweden and 13 percent in Finland to approximately 90 percent in Georgia, Lithuania,

and the Russian Federation. Figure 8.4 summarises the information for New Zealand and the English-language countries.

Figure 8.4: Teachers' reports of teaching new vocabulary – New Zealand and the English-language countries, 2010/11



Source: PIRLS 2011 International Database *Teacher Questionnaire Data Almanac* (Foy & Drucker, 2013).

Any change from 2001 to 2010/11?

Table 8.3 shows that Year 5 students were more likely to be taught new vocabulary on a daily basis in 2010/11 (35% of students) than they were in 2001 (19%); the difference between the two proportions was significant ($t = 3.53$). This finding is also reflected in the 'less than weekly' category—in 2010/11 teachers were much *less* likely to teach new vocabulary infrequently (just 11% of students in this category) than in 2001 (27%).

Table 8.3: Trends in New Zealand teachers' reports of teaching Year 5 students new vocabulary, 2001–2010/11

Year of PIRLS assessment	Every day/almost every day		Once or twice a week		Less than weekly	
	Percentage of Year 5 students	Mean reading score	Percentage of Year 5 students	Mean reading score	Percentage of Year 5 students	Mean reading score
2010/11	35 (3.0)	531 (4.3)	55 (3.0)	535 (3.8)	11 (1.7)	535 (9.9)
2005/06	25 (2.7)	528 (4.4)	46 (3.2)	534 (2.9)	29 (3.1)	534 (4.8)
2001	19 (3.4)	521 (8.2)	54 (4.4)	530 (6.8)	27 (3.7)	533 (7.7)

Note

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

Resources used for teaching reading

Teachers were asked how a selection of resources were used in their reading programme with their middle primary school students (in New Zealand's case Year 5 students) – either as a 'basis for instruction', a 'supplement', or it was 'not used'. Teachers' reports of the resources they used in their classrooms for New Zealand and a selection of countries are summarised in Table 8.4.

Table 8.4: Resources teachers in New Zealand and selected countries used in their reading programmes, 2010/11

Country	Percentage of students whose teachers used									
	A variety of children's books		Textbooks		Reading series		Workbooks or worksheets		Computer software for reading instruction	
	Basis of instruction	As a supplement	Basis of instruction	As a supplement	Basis of instruction	As a supplement	Basis of instruction	As a supplement	Basis of instruction	As a supplement
Australia	r 61 (4.0)	39 (4.1)	r 14 (2.7)	48 (3.6)	r 51 (4.2)	41 (4.2)	r 16 (2.6)	80 (3.1)	r 18 (3.2)	66 (4.2)
Canada	61 (2.3)	39 (2.4)	33 (2.3)	50 (3.0)	25 (2.5)	55 (2.7)	27 (2.3)	65 (2.3)	6 (1.0)	51 (2.3)
Denmark	55 (3.6)	44 (3.7)	50 (3.8)	48 (3.6)	27 (3.1)	72 (3.1)	41 (3.4)	54 (3.4)	3 (1.2)	71 (3.2)
England	83 (2.9)	17 (2.9)	20 (3.7)	62 (4.5)	29 (3.9)	45 (4.0)	9 (2.5)	77 (3.4)	17 (3.3)	54 (3.9)
Finland	22 (2.9)	77 (2.9)	86 (2.3)	12 (2.0)	8 (1.4)	73 (2.7)	53 (3.4)	44 (3.5)	2 (0.7)	60 (3.9)
Ireland	38 (3.4)	61 (3.4)	74 (3.2)	25 (3.2)	36 (3.4)	51 (3.6)	19 (2.8)	79 (2.9)	6 (1.6)	62 (3.3)
Malta	24 (0.1)	72 (0.1)	86 (0.1)	13 (0.1)	59 (0.1)	34 (0.1)	45 (0.1)	50 (0.1)	16 (0.1)	55 (0.1)
New Zealand	**51 (3.4)**	**48 (3.4)**	**14 (2.3)**	**38 (2.8)**	**84 (2.7)**	**16 (2.7)**	**14 (2.3)**	**81 (2.5)**	**9 (1.6)**	**73 (2.7)**
Northern Ireland	r 69 (4.6)	31 (4.6)	r 30 (3.9)	66 (4.2)	r 54 (4.2)	41 (4.2)	r 17 (3.2)	81 (3.3)	r 9 (2.2)	73 (4.1)
Portugal	32 (4.7)	67 (4.7)	67 (5.0)	33 (5.0)	32 (3.7)	63 (3.8)	50 (4.7)	49 (4.6)	10 (2.3)	63 (4.6)
Singapore	13 (1.8)	82 (2.0)	78 (2.4)	11 (1.9)	18 (2.3)	60 (2.7)	71 (2.4)	29 (2.4)	13 (1.4)	68 (2.5)
Trinidad and Tobago	14 (2.9)	84 (3.1)	55 (4.2)	45 (4.1)	61 (3.8)	35 (3.5)	26 (3.5)	73 (3.6)	5 (1.4)	33 (4.0)
United States	r 47 (2.5)	51 (2.5)	r 46 (2.8)	40 (2.5)	r 47 (2.9)	36 (2.2)	r 19 (2.1)	75 (2.2)	r 9 (1.5)	65 (2.7)
International mean (for 45 countries)	27 (0.4)	69 (0.5)	72 (0.4)	23 (0.4)	27 (0.4)	59 (0.5)	40 (0.5)	56 (0.5)	8 (0.3)	48 (0.5)

Notes

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

An "r" indicates data are available for at least 70% but less than 85% of the students.

Source: Exhibit 8.12 in Mullis, Martin, Foy, & Drucker, 2012.

On average internationally, nearly three-quarters of middle primary students (72%) were in classes where textbooks were used as the basis for their reading instruction programme, while children's books (on average, 27%) or a reading series (on average, 27%) were much less likely to be used as the basis. The use of textbooks was common in the majority of countries including Croatia (92% of students), Finland (86%), and the Netherlands (84%). In contrast to the popular use of textbooks, the use of reading series as a basis for reading programmes was very common in Slovenia (89% of students) and New Zealand (84% of students), with teachers from these two countries more likely to use them than teachers in most other countries. The use of worksheets or workbooks as a basis for reading programmes was very common in Hungary (76% of students), Saudi Arabia (72%), and Singapore (71%). Computer software was the resource that tended to be used the least across countries (8% of students on average internationally); it was most likely to be used as a basis in Qatar (26%) and the United Arab Emirates (22%).

Although some of these resources noted in the table were rarely used as a basis for reading instruction in New Zealand classes, they did tend to be used as a supplementary resource. For example, teachers of 81 percent of Year 5 students made use of worksheets or workbooks, with computer software used by teachers of 74 percent of Year 5 students. Although not shown in the

table, teachers also made use of materials from other curriculum areas as a supplementary resource (64%).

The association between the frequency of use of published resources and reading achievement varied across countries. In New Zealand for example, the 51 percent of Year 5 students taught by teachers who used children's books as a basis for their instruction tended to have higher reading achievement (540) than the 49 percent of students whose teachers used them as a supplementary resource (525). The opposite was observed for reading series—the mean achievement of the 84 percent of Year 5 students whose teachers reported using a reading series as a basis (530) was on average 17 scale score points lower than the 16 percent of Year 5 students whose teachers reported using the series as a supplement (547).

Use of children's books and reading series

In New Zealand, like Australia, France, and Northern Ireland, teachers often used a dual approach whereby both children's books and reading series were used as a basis for their reading instruction for the majority of students. According to Twist (2007), whereas a reading series or textbooks have been developed for the specific purpose of teaching reading at different levels of development, children's books have the advantage of having vocabulary that is *not* regulated or restricted to the ability level of the reader.

Looking just at the use of reading series and children's books for New Zealand, Figure 8.5 shows the percentage of New Zealand's Year 5 students whose teachers reported they used:

- A *reading series* as the *basis* for instruction and *children's books (*with or without other resources) as a *supplement*. The very small number of students whose teachers reported using a reading series as a basis with resources such as workbooks or curricular materials as the supplement and did not use children's books, were assigned to this category.
- Both a *reading series* and *children's books* as a *basis* for instruction (with or without other resources as a supplement).
- Another resource or resources, typically other curricular materials, used as the *basis* of instruction, with a *reading series* and *children's books* used as a *supplement.*
- *Children's books* as the *basis* for instruction and a *reading series (*with or without other resources) as a *supplement*. The very small number of students whose teachers reported using children's books as the basis with resources such as curricular material or worksheets as a supplement and did not use a reading series, were assigned to this category.

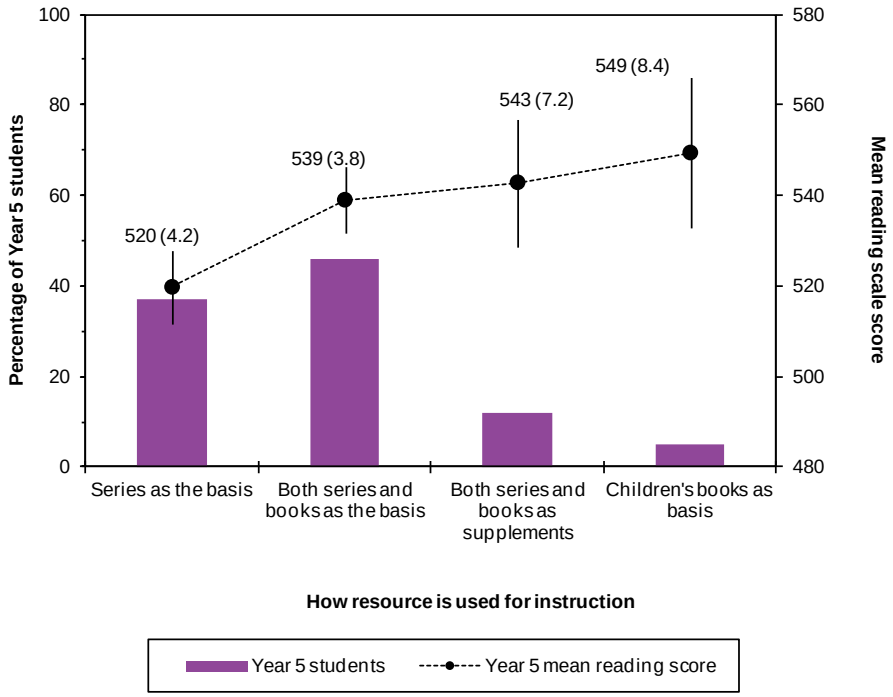
Year 5 students whose teachers used a reading series as the basis for their reading programme (520) achieved on average significantly lower reading scores than those Year 5 students whose teachers used children's books and reading series both as the basis (539), both resources as a supplement (543), or who used children's books as the basis (549).[84] There was no significant difference in achievement between students whose teachers reported using both resources as a basis and when children's books were used as the basis.

Were there any differences in the resources being used according to the decile of a school? Teachers in deciles 7 to 10 schools were less likely than teachers in lower decile schools to use a reading

[84] $t = 3.03$, $t = 2.81$, and $t = 3.16$ respectively.

series as the basis of instruction, with teachers in the former more likely to use both reading series and children's books as the basis for their instruction. For example, teachers of 51 percent of Year 5 students in the deciles 1 and 2 schools used a reading series as the basis (c.f. 23% in deciles 9 and 10 schools), while teachers of 37 percent used both a series and children's books as a basis (c.f., 56% in deciles 9 and 10 schools). Children's books as a basis were used mostly by teachers of students in deciles 9 and 10 schools. When the students' reading achievement was considered, there were some small differences, particularly at lower decile schools. Although not statistically significant at the 5% level, the mean reading score of Year 5 students in deciles 1 and 2 schools whose teachers used a reading series as a basis (466) was lower than their counterparts whose teachers used both resources (484). A similar pattern was observed in deciles 3 and 4 schools (504 c.f. 516); with less marked differences in higher decile schools.

Figure 8.5: New Zealand teachers' reports of using either a reading series or children's books when teaching reading, 2010/11



Notes

The bars on the graph represent the percentage of Year 5 students whose teachers reported using: (a) a reading series as the basis with either children's books or other resources as a supplement; (b) both a series and children's books as the basis (c) a reading series and books as supplements with other resource as the basis; or (d) children's books as the basis with either a reading series or other resource as a supplement.

The data points are the mean reading scores for students at each level of agreement. Standard errors appear in parentheses. The vertical lines extending from each data point show the 95% confidence interval around the mean (i.e., ± 1.96 × standard error).

It is important to remember these associations between student achievement and types of reading resources used during reading instruction are not causal, with the relationships worth exploring further. For example, do teachers' who use both types of resources as a basis have more years of teaching experience and thus more confidence to use both when teaching reading? That is, differences in achievement could reflect differences between teachers who have more experience using both children's books and a reading series effectively and those teachers who have less experience, rather than differences due to the reading series per se.

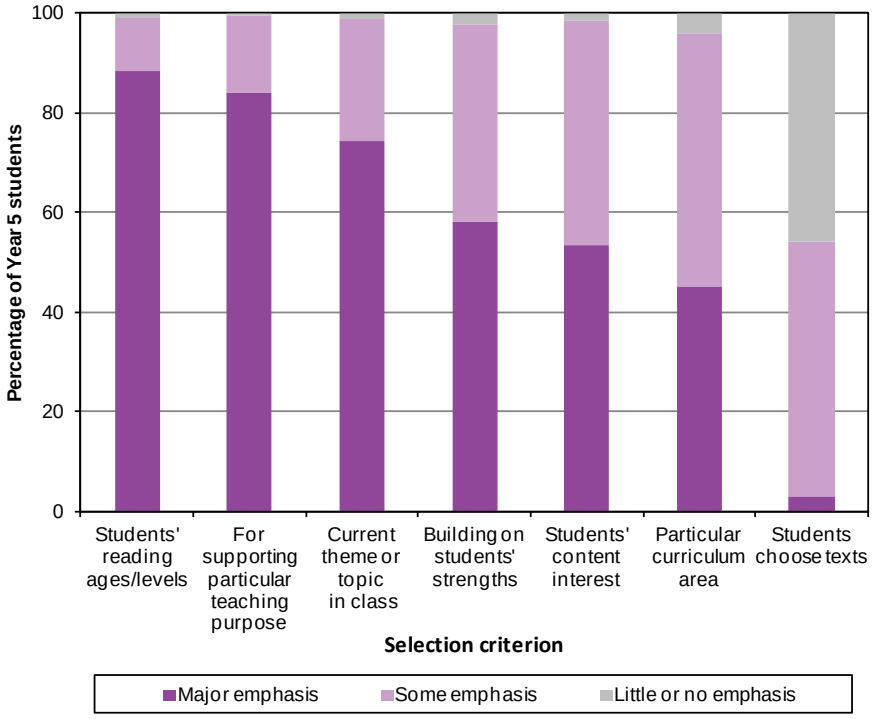
Teachers' reports of the use of the *School Journal* in their classes

In New Zealand, the *School Journal* is the main instructional material for literacy (reading and writing) at Years 4 to 8 in state and state-integrated schools; it is also aligned to curriculum Levels 2, 3, and 4 of *The New Zealand Curriculum*, the curriculum for English-medium instruction (Ministry of Education, 2007). The magazine-style publication includes a mix of fiction and non-fiction material. The *Teacher Support Materials* that accompany selected issues describe, for example, how they can be used for differentiated instructional purposes across the curriculum, provide suggestions for deliberate acts of teaching for supporting reading and writing, and also show how the characteristics of selected pieces of text relate to a given national reading standard (first implemented in 2010).

To assist the Ministry of Education's understanding of how the *School Journal* aligns with the reading comprehension processes underpinning PIRLS, and how well the series and its accompanying support materials were helping teachers with literacy teaching, a series of New Zealand-specific questions were directed to the teachers of Year 5 students in PIRLS. Unlike the international question on resources, this question did not consider the purpose (i.e., as a basis or as supplement). Almost all Year 5 students (98%) were taught by teachers who used the *School Journal*, which is consistent with information reported in Table 8.4.

Teachers were then asked to indicate on a three-point scale how much emphasis they placed on a set of criteria when they chose *School Journal* texts to use with their Year 5 students; Figure 8.6 summarises this information. With one exception, there was no relationship with teachers' emphases and students' reading achievement. The one exception was that the 88 percent of students whose teachers placed a 'major' emphasis on reading age when selecting texts tended to have significantly lower reading achievement (531) than the relatively small group of students (12%) whose teachers placed 'some' or 'little or no' emphasis (551).

Figure 8.6: New Zealand teachers' emphases given to criteria when selecting *School Journal* texts, 2010/11

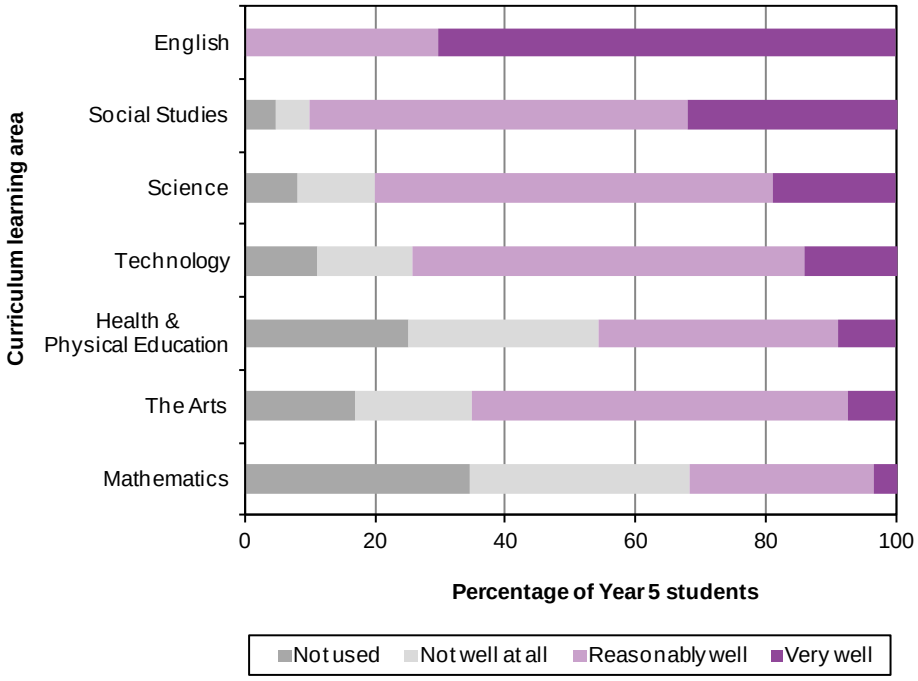


The *School Journal* and its use across *The New Zealand Curriculum*

The *School Journal* also supports students to develop the knowledge and skills required to meet the reading demands of all curriculum areas, not just reading during language instruction. Teachers were asked how well the *School Journal* helped them to meet the teaching aims of each learning area in *The New Zealand Curriculum (*the curriculum for English-medium settings*)*. Figure 8.7 summarises the responses of teachers.

As the figure illustrates, English and Social Studies were the two curriculum areas where the *School Journal* was most likely to meet teachers' aims 'reasonably well'. Teachers of roughly a third of Year 5 students reported that the *School Journal* did not meet curriculum aims for Mathematics (34% of Year 5 students) and Health and Physical Education (29%). The series was also less likely to be used for teaching in these two curriculum areas.

Figure 8.7: New Zealand teachers' reports on how well the *School Journal* helped them meet the aims of each learning area in *The New Zealand Curriculum*, 2010/11



Teachers of almost all Year 5 students indicated (either agreeing a lot or a little) that the *School Journal* helped students experience a range of literary genre (98% of Year 5 students) and a range of informational texts (99% of Year 5 students). It was also considered a source of rich texts for developing students' critical thinking (94%), and had a variety of good texts for modelling students' writing (96%).

Students' views

Students were also asked for their views of the *School Journal*. They were asked the extent to which they disagreed or agreed with 10 statements about the reading resource as it related to them in 2010. The statements covered aspects of enjoyment, engagement, and learning (see Table B.25 in Appendix B). Preliminary analyses showed that Year 5 students were generally very positive about the *School Journal*, with most students endorsing positively each of the statements.

The relationship between students' level of agreement and achievement did vary across statements. In some instances students who either strongly agreed or strongly disagreed tended to have lower reading achievement than students who either agreed or disagreed 'a little' (i.e., a curvilinear relationship, for example, "I learn things when I read the *School Journals*"). In other cases, the achievement of students who strongly agreed with a statement was lower than the achievement of students who strongly disagreed (i.e., a (reverse) linear relationship, for example, "The *School Journals* help me get better at writing" and "The *School Journals* help me to really think about what I am reading").

Boys' and girls' responses to most of the statements differed quite markedly; there were also differing levels of endorsement between students in the four main ethnic groupings. For example: "I enjoy reading the *School Journals*" had the lowest level of endorsement from Pākehā/European (35% strongly agreed) compared with Asian (51%), Māori (54%), and Pasifika (64%) students.

Engagement with reading

In these most recent PIRLS and TIMSS, there has been an attempt to better understand the factors that interact with practice and curriculum, one of these being student content engagement from both teacher and student perspectives. Underlying the notion of student content engagement is the idea that classroom activities bring the student and the subject content together. According to Mullis, Martin, Foy, and Drucker (2012) engagement in this context is the "*cognitive interaction between the student and instructional content, and may take the form of listening to the teacher, reading aloud, or providing an explanation of a character's motivation*" (p.218).

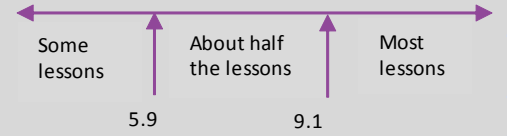
Box 8.1 presents the six statements related to teachers' instructional practices that are intended to interest students and reinforce their learning, which were summarised in the *Instruction to Engage Students in Learning* (IESL) *Scale*

Box 8.1: Statements used in the *Instruction to Engage Students in Learning* (IESL) *Scale*, 2010/11

Practices teacher uses to engage students:

1. Summarising what students should have learnt from the lesson
2. Relating the lesson to students' daily lives
3. Using questioning to elicit reasons and explanations
4. Encouraging students to improve their performance
5. Praising students for good effort
6. Bringing interesting materials to class

Categories on the scale: students who were taught by teachers who used engaging practices *most lessons* had a score of at least 9.1, which corresponded to their teachers using any three of the six practices 'every or almost every lesson' and using the other three 'about half the lessons', on average. Students whose teachers used engaging practices in *some lessons* had a score no higher than 5.9, which corresponded to their teachers using three practices in 'some lessons' and the other three in 'about half the lessons', on average. All other students were deemed to have teachers who used engaging practices in *about half the lessons*.



Teachers of 66 percent of New Zealand's Year 5 students used the engagement practices as measured by the engagement in learning scale in *most lessons*, with the remainder of students taught by teachers who used them *about half the lessons*. New Zealand teachers' tended to use these practices a little less than teachers in many countries including England (91% of students), United

States (88%), Australia (77%), and Canada (76%), with New Zealand teachers reports akin to the reports of teachers in Ireland (67%) and Spain (66%). Teachers in Norway (38%), Finland (33%), and Denmark (23%) were the least likely to use the PIRLS engagement practices in most lessons; they tended to be used in *about half the lessons.*[85]

Teachers' use of instructional practices to engage their students

Responses from teachers to individual statements that formed the *IESL Scale* also provide insight as to why New Zealand teachers' practices appear to differ from those employed by teachers in many other countries. Specifically, these were the practice of summarising at the end of the lesson and relating the lesson to children's daily lives (see Table 8.5 for details).

According to their reports, teachers of New Zealand's Year 5 students were somewhat less likely to summarise what their students should have learnt at the end of every reading lesson (47% of Year 5 students) than teachers in many other countries (c.f., the international mean 68%). Interestingly, the practice was unlikely to occur in 'every or almost every lesson' in most of the Scandinavian countries—Denmark, with just 12 percent of its students taught by teachers who used this practice, Sweden, 20 percent, and Finland, 24 percent—but was common in some of the Eastern European countries such as Bulgaria (96%), Lithuanian (94%), and Hungary (92%). The practice was also frequently used in England (87%), United States (81%), and Northern Ireland (75%).

Table 8.5: New Zealand teachers' reports of using the PIRLS engagement practices, 2010/11

Engagement practice	Percentage of Year 5 students		
	Every or almost all lessons	About half the lessons	Some lessons or never used
Summarising what students should have learnt from the lesson	47	40	12
Relating the lesson to students' daily lives	44	41	15
Questioning to elicit reasons and explanations	79	17	4
Encouraging all students to improve their performance	90	10	< 0.5
Praising students for good effort	90	9	1
Bringing interesting materials to class	23	50	28
Discussing with students (individually or in a group) how they can improve their performance†	53	38	9

Note

† This was a New Zealand-specific engagement statement.

Internationally, the relationship between how often teachers summarised at the end of a lesson and students' reading achievement was relatively weak, although this was largely due to the variation across countries. In New Zealand's case there was no significant difference between the mean achievement of Year 5 students whose teachers summarised 'every or almost every lesson' (534) and where it was for 'about half of the lessons' (542); but the mean achievement of Year 5 students whose teachers 'sometimes' summarised (506) was significantly lower (t = 2.08) than the former.

[85] As with the other scales, the centrepoint on the scale was set at 10.0. The means on the *IESL Scale* ranged from 11.4 for Romania to 7.7 for Denmark. The mean (and standard error) for New Zealand was 9.6 (0.09).

Relating the lesson to students' daily lives also tended to be experienced a little less frequently by New Zealand students than those in many other countries, with 44 percent of Year 5 students in classes where their teachers used this approach; the international mean was 58 percent. There was variation across countries, with the practice used relatively less frequent in Sweden (23%), France (24%), Belgium-French Community (24%), Norway, (25%), but relatively frequent in Croatia (86%) and Romania (83%). The overall association between achievement and relating lessons to students' daily lives was relatively weak; in New Zealand's there was no difference in achievement by the frequency of the use of the practice.

While New Zealand appears to differ in the use of these two particular practices, no account was taken of, for example, how classes are organised for reading—whole class or in ability groups—which may offer some explanation as to why these two practices (summarising and relating the lesson to students' daily lives) were used less frequently in New Zealand classrooms.

Looking at the New Zealand–specific practice (item 7 in Table 8.5), there did not appear to be a relationship between the frequency with which New Zealand teachers had discussions with their students on how they could improve their performance and their reading achievement.

Students' reports of their engagement in reading

The *Students Engaged in Reading Lessons* (SERL) *Scale* summarises a series of statements on students' engagement during instruction in reading. Students were asked to indicate on a four-point scale ('agree a lot', 'agree a little', disagree a little' and 'disagree a lot') their level of agreement to the seven statements in Box 8.2.

Box 8.2: Statements used in the *Students Engaged in Reading Lessons* (SERL) *Scale*, 2010/11

Engaging practices used by student's teacher:

1. I like what I read about at school
2. My teacher gives me interesting things to read
3. I know what my teacher expects me to do
4. I think of things not related to my lesson*
5. My teacher is easy to understand
6. I am interested in what my teacher says
7. My teacher gives me interesting things to do

* Statement reverse coded for the scale

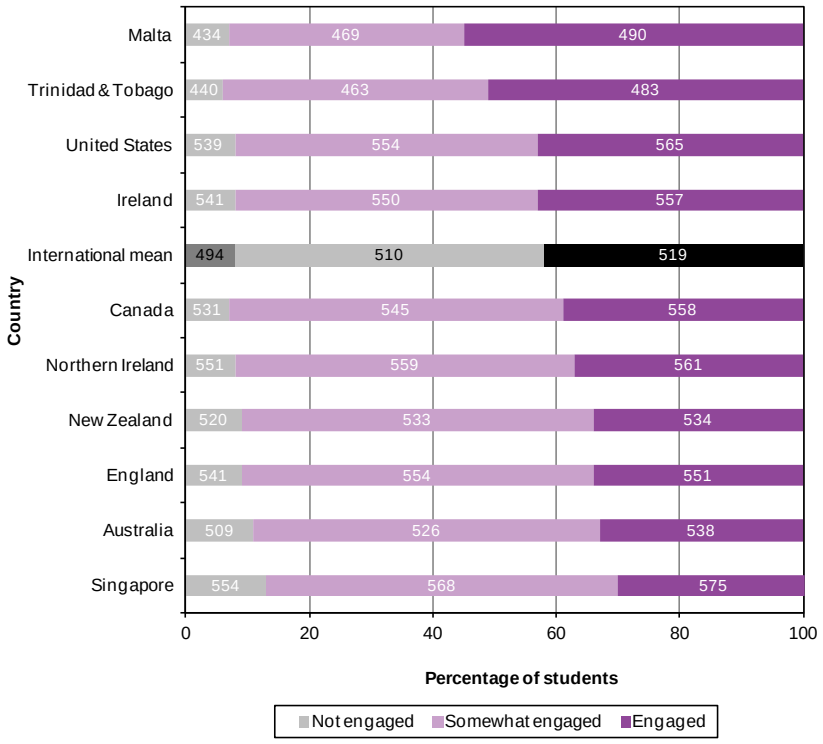
Categories on the scale: students who were *engaged* had a score on the scale of at least 10.5 which corresponded to their 'agreeing a lot' with four of the seven statements and 'agreeing a little' with the other three, on average. Students who were *not engaged* had a score no higher than 7.4 which corresponded to students 'disagreeing a little' with four of the statements and 'agreeing a little' with the other three on average. All other students were considered *somewhat engaged*.

About one-third of New Zealand's Year 5 students (34%) were found to be *engaged* during their reading lessons compared with the international mean of 42 percent. Just under one-tenth of Year 5 students were *not engaged* (9% c.f. the international mean of 8%). Countries with relatively high proportions of engaged students included Indonesia (71%) and Georgia (68%). Denmark (18%) and Finland (15%) had the smallest proportions of *engaged* students; these countries also had relatively high proportions of students *not engaged*, with 14 percent and 20 percent of their students in this category, respectively.

Although not quite as pronounced as student confidence in reading and students' liking of reading described in Section 7, reading engagement was also associated with higher reading achievement internationally. In New Zealand's case, there was no difference in the mean achievement between Year 5 students who were *engaged* (534) or *somewhat engaged* (533), but students who were *not engaged* in reading achieved at a lower level than their counterparts who were more engaged (520).

Figure 8.8 shows the percentages of students in each category of the scale, as well as the mean reading scores, for New Zealand and the English-language countries.

Figure 8.8: *Students Engaged in Reading Lessons* (SERL) *Scale* – New Zealand and the English-language countries, 2010/11



Notes

Countries are ordered by the percentage of students who were *engaged* in reading. The centrepoint of the *SERL* Scale was set at 10.0. The means ranged from 11.3 (Indonesia) to 8.7 (Finland). The mean (and standard error) for New Zealand on the *SERL Scale* was 9.7 (0.04).

Mean scores for students who were *not engaged*, *somewhat engaged*, and *engaged* are shown on the respective bars (without the standard errors). See Table B.24 in Appendix B for details of the standard errors.

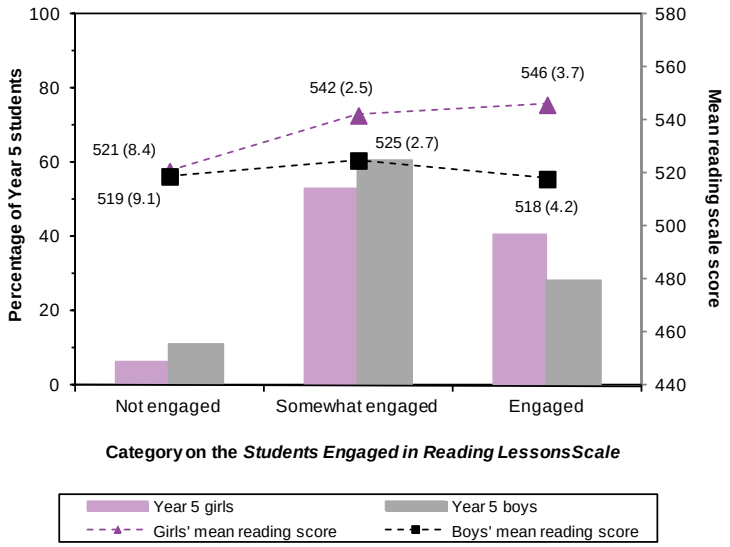
Source: Exhibit 8.7 in Mullis, Martin, Foy, & Drucker, 2012.

Engagement and gender

Figure 8.9 shows the percentages of New Zealand's Year 5 girls and boys in each category of the *SERL Scale*. Year 5 girls tended to be more *engaged* with their reading lessons than Year 5 boys were, with the latter slightly over-represented among the non-engaged readers (11% of Year 5 boys compared to 6% of Year 5 girls).

The difference between the mean reading scores for girls who were *engaged* and those who were *not engaged*—25 scale score points—was statistically significant. By way of contrast there was no significant diffence in reading achievement between boys who were *engaged* and those boys who were *not engaged*.

Figure 8.9: New Zealand Year 5 students in each category of the *Students Engaged in Reading Lessons* (SERL) *Scale* in 2010/11, by gender



Notes

The bars represent the percentage of Year 5 girls and boys at each category of the scale. The data points are the mean reading scores for Year 5 girls and boys in each category and the standard errors appear in brackets.

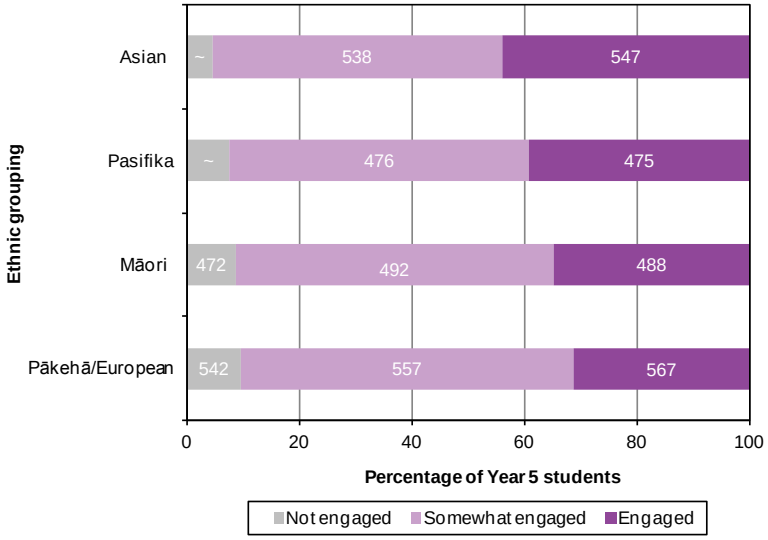
The international centrepoint on the *SERL Scale* was set at 10.0. The mean (and standard error) on the scale for New Zealand's Year 5 girls was 10.0 (0.05) and 9.4 (0.05) for Year 5 boys.

Engagement and ethnicity

When student engagement in reading was examined for students in each ethnic grouping, Asian and Pasifika students were more likely to be *engaged* during reading instruction than Māori and Pākehā/European students. Figure 8.10 summarises this information, and is ordered according to the proportion of students who were *engaged* with their reading.

The relationship between engagement and reading achievement did however vary across the ethnic groupings. For example, there was no difference between the mean reading scores of Pasifika students who were *engaged* and *somewhat engaged*, whereas Asian students who were *somewhat engaged* achieved on average lower reading scores than *engaged* Asian students.

Figure 8.10: New Zealand Year 5 students in each category of the *Students Engaged in Reading Lessons* (SERL) *Scale* in 2010/11, by ethnic grouping



Notes

The mean reading scores for Asian and Pasifika students who were *not engaged* are not reported because the actual numbers on which the statistics are calculated are too small to be reliable.

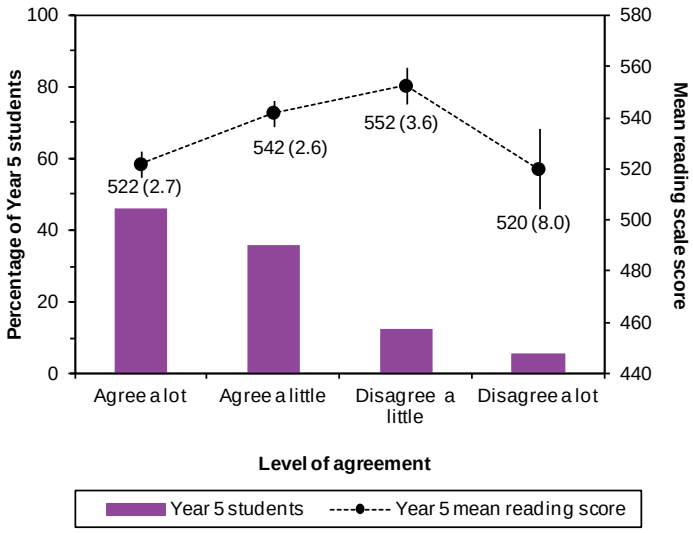
The international centrepoint of the *SERL Scale* was set at 10.0. The mean (and standard error) on the scale for Asian was 10.1 (0.09); Pasifika, 9.8 (0.08); Māori, 9.6 (0.07); and Pākehā/European, 9.6 (0.05).

Students' perceptions of receiving feedback

Providing students with regular feedback about their learning is an important strategy used by teachers. The rationale for giving feedback is that it allows students to reflect on what they currently can (and/or cannot) do, as well as guiding future learning. It should be specific enough for students to be able to respond, and in a form that motivates students to learn and highlights their role in the teaching and learning process (Ministry of Education, 2006).

In PIRLS-2005/06 and PIRLS-2010/11, New Zealand Year 5 students were presented with a statement that sought their views on receiving feedback from their teachers. In 2010/11, Year 5 students were asked how much they agreed with the statement "My teacher often tells me how I am doing in reading". As it was worded the statement was not ascertaining the type of feedback—negative or positive—rather, it was the perception of the regularity of the feedback. A little over four-fifths of Year 5 students agreed with the statement (82%). The remainder (18%) did not share this view. Interestingly, as illustrated in Figure 8.11, Year 5 students who agreed a little or disagreed a little with the statement generally had higher reading achievement than those students whose views were more positive or negative with the statement.

Figure 8.11: New Zealand Year 5 students' level of agreement with receiving verbal feedback about their progress, 2010/11



Note

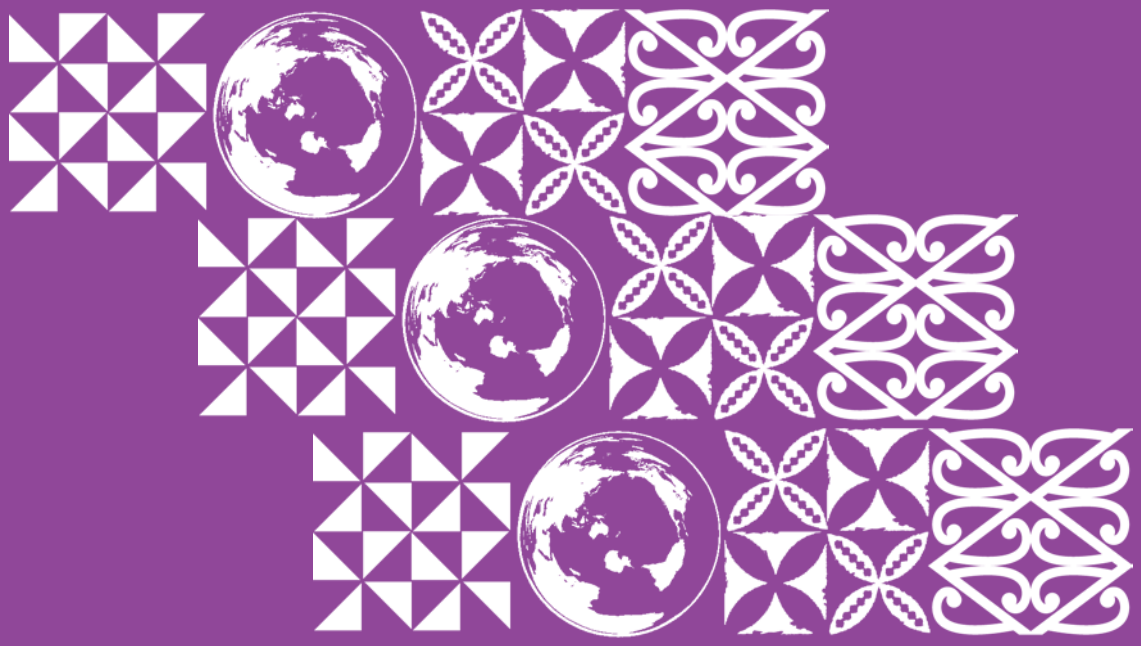
The bars on the graph represent the percentage of Year 5 students who agreed or disagreed with the statement. The data points are the mean reading scores for students at each level of agreement. Standard errors appear in parentheses. The vertical lines extending from each data point show the 95% confidence interval around the mean (i.e., ± 1.96 × standard error).

Any change from 2001 to 2010/11?

The phrasing of the statements differed slightly between 2005/06 and 2010/11, so the information is not directly comparable. In 2005/06, the statement was: "My teacher often tells me how well I read". Nearly two-thirds of Year 5 students agreed either a lot (25%) or a little (39%) with the statement (Chamberlain, 2007). Compared with Year 5 students in 2005/06, Year 5 students' level of agreement in 2010/11 was higher (46% agreed a lot and 39 % a little). However, it is unclear as to whether this finding is a reflection of a change of practice in the classroom or it just reflects a change in the wording of the statement.

Section 9:

Overview



Section 9: Overview

The discussion in this section pulls together the findings from PIRLS-2010/11 into six broad categories to allow readers to reflect on the results from this cycle and those administered in 2001 and 2005/06.

Reading achievement and attitudes

One of the most striking features of the New Zealand findings from the third cycle of the Progress in International Reading Literacy Study, PIRLS-2010/11, is the fact there has been no statistical change in achievement for any Year 5 student group – girls or boys or for the four main ethnic groupings – or in any of the aspects of reading in the 10 years since PIRLS was first administered in 2001. PIRLS highlights the range of performance among our Year 5 students as there are high and low achievers in every student group. However because there was no significant change in reading achievement across the three cycles, in general the differences among Year 5 students in the four main ethnic groupings and to a lesser extent girls and boys first observed in 2001, still persisted at the end of 2010.

In keeping with previous cycles, many of New Zealand's Year 5 students did demonstrate they had relatively strong reading comprehension skills and strategies, with a significant proportion placed among the best readers internationally. However, the proportion of the Year 5 student population which by definition constitutes New Zealand's weaker readers (i.e., did not reach the PIRLS *International Intermediate Benchmark*) is still about the same despite efforts to shift the performance for this group. Weaker readers were those students who, for example, had difficulty locating and retrieving explicitly-stated information, making straightforward inferences about characters in a story, or using text boxes and subheadings to locate parts of the texts.

The 2010/11 data also shows that while the mean achievement of both girls and boys did not changed statistically, there were some small positive shifts among the weakest boys, as evident by a decrease in the likelihood (specifically *odds*) of Māori boys and to a lesser extent Pākehā/European boys being in the lower-achievers group in 2010/11 than in 2005/06. This shift also appears to have contributed to a small reduction in the difference between the mean achievement of girls and boys.

Of some concern however is the wider gap between students who spoke the test language, in particular English, at home and those who sometimes or rarely did. This was particularly apparent for Pasifika students, despite the fact that there was no change in the proportions of Pasifika students in these two language categories. Furthermore, the likelihood (*odds*) of Pasifika students in English-medium learning settings and rarely speaking English at home, being in the lower-achievers group increased over the five years from 2005/06 to 2010/11.

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, and their motivation to read. All these factors were found to have a strong, positive association with students' reading literacy achievement. Direct comparisons cannot be made between the scale that summarised students' attitudes to reading in 2010/11 and the measures used in previous cycles. However, on individual statements about reading, boys' responses suggest that they were less negative towards reading in 2010/11 than in previous cycles. For example, Māori boys were much less likely to endorse the statement that reading was boring.

The findings on students' beliefs and attitudes do, however, highlight the fact that among New Zealand Year 5 students there is a sizeable group who are not confident readers or not motivated during reading at school.

Home-school interface

As with previous cycles, results from PIRLS-2010/11 draw attention to the importance of the relationship between home activities or experiences and reading literacy achievement. The amount of time spent on early literacy activities, participation in early childhood education, and the role parents/caregivers play in promoting reading are examples of such factors. It is also revealing to see how important these factors are in New Zealand when viewed in an international context. As well as New Zealand featuring as a system with parents/caregivers who were more likely to often engage in early literacy activities with their children and view reading positively, the relationship between reading achievement and these factors, as well as participation in early childhood education for least one year, tended to be stronger in New Zealand than in many other countries.

School climate

According to PIRLS-2010/11, New Zealand primary schools were positive learning environments that encouraged academic success, with school leaders and teachers sharing the same curricular goals and aspirations for their students. Year 5 students' opinions about aspects of school life, including whether or not they liked being at school and felt safe there, were also positive. As with students' attitudes towards reading, these factors were also found to have a strong, positive association with students' reading literacy achievement.

While Year 5 students' reports in 2010/11 indicated they liked being at school more than their counterparts in previous cycles, the findings do highlight that there is a sizeable group, albeit a minority, among Year 5 students for whom school was a place they did not like or did not feel safe.

Classroom context

According to Mullis, Martin, Foy, and Drucker (2012), it is often difficult to examine the direct effect of instructional time on student achievement, because there are a number of factors that can be influencing the productivity of instruction. These include the nature and quality of the curriculum being implemented, the instructional approaches used in the classroom, and the variables that interact with these. PIRLS-2010/11 showed there are both high-performing systems and low-performing systems that spend a relatively small proportion of instructional time on reading; the converse was also observed. Instructional time does, however, provide a good indication of the instructional opportunities for student learning. New Zealand Year 5 students were likely to be exposed to more reading instruction or reading-related activities than students in most other countries. There has been no change in the average amount of time schools allocated to reading over the 10-year-period.

In keeping with the national reporting of PIRLS-2001, there has been a closer examination of the information reported by teachers of New Zealand's Year 5 students in 2010/11. PIRLS-2010/11 highlighted a number of examples where New Zealand teachers' practices or approaches differed markedly from the practices of teachers in other countries. Furthermore, there was no change in teachers' reports of the use of these practices over the period since 2001. These practices include organising students into same-ability groups to teach reading; rarely teaching reading as a whole-

class activity; and summarising the learning at the end of a reading lesson and relate the reading lesson to students' daily lives relatively infrequently. However, teachers' use of collaborative practices was more common than among teachers in many other countries.

By the fifth year of schooling students' reading experiences have generally been influenced by more than one teacher. However, given the constancy in the results since PIRLS was implemented in 2001, it is likely that the teaching practices as evidence above reflect those valued across New Zealand schools generally or at least in Years 4 to 6.[86]

Elley (2005) provided an interesting commentary on 'stabilising' factors that were likely to be working together that probably accounted for the relative constancy in student achievement in New Zealand from the mid-1980s to the mid-2000s. He noted that the quality of teaching is likely to have been the same across the period in terms of teachers using the same teaching methods, teaching successive cohorts of students from one year to the next who come from the same kinds of families and communities.

Socio-economic factors and equity

Economic factors and their relationship with students' reading literacy achievement cannot be ignored. The findings described in this report highlight the relationship in three different ways – by summarising at the individual level, by using an international measure of school composition, and by examining them using New Zealand's funding measure, *decile*.

The *Home Education Resource Scale* uses indicators of socio-economic status (e.g., parents' education and occupation) and home resources (e.g., books in the home) and is sourced from both parents/caregivers (through the *Learning to Read Survey*) and from students (*Student Questionnaire*). This scale highlighted relatively large achievement differences between New Zealand students who were in well-resourced households and those in moderately-resourced households, compared to achievement differences found in other countries.

While this information is available for New Zealand for each of 2001, 2005/06, and 2010/11, data for the last two cycles cannot be used with quite the same level of confidence as in 2001. This is because the response rate (percentage) to the *Learning to Read Survey* in both 2005/06 and 2010/11 was lower than in 2001, despite there being more parents/caregivers who responded.[87] The response rate for parents/caregivers of Māori and Pasifika, and to a lesser extent, Asian, children also tended to be lower than parents/caregivers of Pākehā/European children.

The relative inequity observed at an individual level was also observed at a school level. Using the PIRLS measure on school composition, New Zealand students who were attending schools where the student body was estimated to be from predominantly economically disadvantaged backgrounds generally had much lower achievement than those Year 5 students where the student body was from predominantly affluent backgrounds. New Zealand recorded one of the largest achievement differences between these two groups of students. This finding, which was also affirmed using schools' decile indicators, highlights the relatively large inequities in achievement according to students' socio-economic circumstances. However, it is also important to remember that there are both high and low achievers in all types of schools.

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[86] Many teachers of Year 5 students were also teaching Year 4 or Year 6 students in composite class settings.

[87] The response rates for both 2005/06 and 2010/11 also met international criteria for reporting purposes.

Schools with higher proportions of students from economically disadvantaged backgrounds were also more likely to be faced with other challenges, such as dealing with negative student behaviours, than schools with fewer students from these backgrounds. While an individual learner's economic background need not be a barrier, there are significant number of schools that are presented with challenges associated with the composition of their student body being from predominantly economically disadvantaged backgrounds. In addition, as reported by principals, their student intake not having the necessary early literacy or numeracy skills, or language skills when beginning school.

According to the OECD (2012), schools with higher proportions of economically disadvantaged students are at greater risk of challenges that result in low performance. Findings from PIRLS are consistent with this – children in deciles 1 and 2 schools had four times the likelihood of being among the lower achievers group (not reaching the *Intermediate International Benchmark*) than students in other schools.

Five areas identified by the OECD that have been shown to be effective in supporting the improvement of schools with lower-performing, disadvantaged students, are to:

1. Strengthen and support school leadership
2. Stimulate a supportive school climate and environment for learning
3. Attract, support, and retain high-quality teachers
4. Ensure effective classroom learning strategies
5. Prioritise linking schools with parents and communities.

These areas are also consistent with evidence on factors that can influence improvements in education in general identified as part of the Ministry of Education's Best Evidence Synthesis (BES).[88]

In previous reports on PIRLS in New Zealand, it has been demonstrated that differences in achievement among the ethnic groupings can, to some extent, be accounted for by differences in the socio-economic circumstances of the households in which students reside. However, there has been little work on how or the extent to which other variables such as reading practices in the home, children's attitudes towards reading and school in general take account of these differences. One exception is the analysis of the New Zealand PIRLS 2001 data, undertaken by Nash (2004). He found that the strong interaction of New Zealand' students' socio-economic circumstances and their ethnicity with reading achievement was reduced when the statistical effect of students' attitudes to reading, their self-concept, and parents/caregivers' estimates of their children's ability were taken into account.

According to a synthesis of findings from larger-scale New Zealand studies including those of Nash, the *direct* effect ethnicity plays in explaining differences between groups become relatively small, although it does not entirely disappear after adjusting for socio-economic factors and prior achievement, family practices, values and attitudes to literacy, such as reading practices and resources (Harker, 2007).

[88] Examples include: Alton-Lee (2003); Biddulph, et al., (2003); and Robinson, et al., (2009).

Context for improving reading literacy achievement outcomes

As noted in Section 2 there were a number of countries that had significant improvements in their middle primary school students' reading achievement since 2001, with examples of descriptions of the country's context described in Appendix C. In addition to these examples, Ireland, although not taking part in PIRLS until 2010/11, is an example of a country that used information ensuing from its participation in the IEA's 1991 Reading Literacy Study (RLS) to inform the thinking around its current English reading curriculum on which work began in the early 1990s (e.g., the categorisation of text types and the types of comprehension processes assessed). Furthermore both the RLS and PIRLS have been used to inform its national assessment frameworks (Eivers, 2012). Additional examples of how PIRLS has impacted on policy or reforms are also described in a series of articles in Schwippert (2007) and Schwippert & Lenkeit (2012).

For the countries that have had significant changes, there are some common themes; they all highlight both the scale and amount of time needed for improvements to embed before their success is reflected in system-level data provided by a study like PIRLS.

The New Zealand context

Recommendations made by the Literacy Taskforce informed the work of the *Literacy and Numeracy Strategy* (Ministry of Education, 1999) which provided a foundation for much of the policy work in literacy until around 2009.

The (literacy) strategy essentially provided a mechanism for aligning and ensuring consistency among a range of policies, programmes, and projects that were designed to improve the literacy achievement outcomes in English-medium settings. *Te Reo Matatini Māori-medium Literary Strategy*, launched in May 2007, also aligned several literacy-related activities as well as prioritising future initiatives within the broader context of Māori-medium education (Ministry of Education, 2007a).

Although there have been national strategies, until quite recently, the programmes and practices which aimed to improve outcomes or make changes were, in general, delivered through frameworks and guidelines rather than prescriptions for all schools to implement. The scale of some of the more successful literacy-related initiatives has also tended to be relatively small compared to those implemented in some other countries.

For example, one of the key programmes under the umbrella of the literacy strategy was the Literacy Professional Development Project (LPDP). This whole-school, two-year intervention programme which started in 2004 and ended in 2009, supported schools with Years 1 to 8 students to improve English-language learning and raise achievement in literacy (reading comprehension and writing). According to the 2007 evaluation by McDowall, Cameron, Dingle with Gilmore and MacGibbon it was a very successful intervention. However, by the end of 2009, LPDP had only involved just fewer than 400 schools (out of about 2,100 primary schools).

Change of focus since 2009

New Zealand education has seen a number of important system-wide changes that are likely to have a greater impact on reading literacy achievement at the system level than previously. *The New Zealand Curriculum* (The NZC) introduced in 2007 was fully implemented at the beginning of 2010, while *Te Marautanga o Aotearoa* (TMoA), the curriculum for teaching and learning in Māori-medium education was introduced in 2008 and fully implemented in 2011 (Ministry of Education,

2007b & 2008). National standards for literacy (including kōrero/speaking in Māori-medium) and mathematics were introduced into primary schooling settings with Years 1 to 8 to concur with the full implementation of The NZC and TMoA in 2010 and 2011, respectively.[89]

Beginning in 2011, as part of their governance process, state and state-integrated schools with students in Years 1 to 8 using The NZC were required to set out in their charters priorities and targets for accelerating student achievement using their National Standards information. In 2012, schools using TMoA started setting achievement goals and targets in relation to Ngā Whanaketanga Rumaki Māori (Ministry of Education, 2010c).

Also starting from 2012, each school with Years 1 to 8 students that uses The NZC is now required to report annually to the Ministry of Education on the analysis of the information from the National Standards. The reporting includes an overview of a school's strengths as well as areas for improvement; the basis for identifying areas for improvement; and targets and accompanying actions planned for lifting achievement. Schools are also required to provide the number and proportion of Māori, Pasifika, and girls and boys at, above, below or well below the standard for each learning area. Schools or kura with Years 1 to 8 students and using TMoA are required to report against Ngā Whanaketanga Rumaki Māori from 2013 (Ministry of Education, 2011).

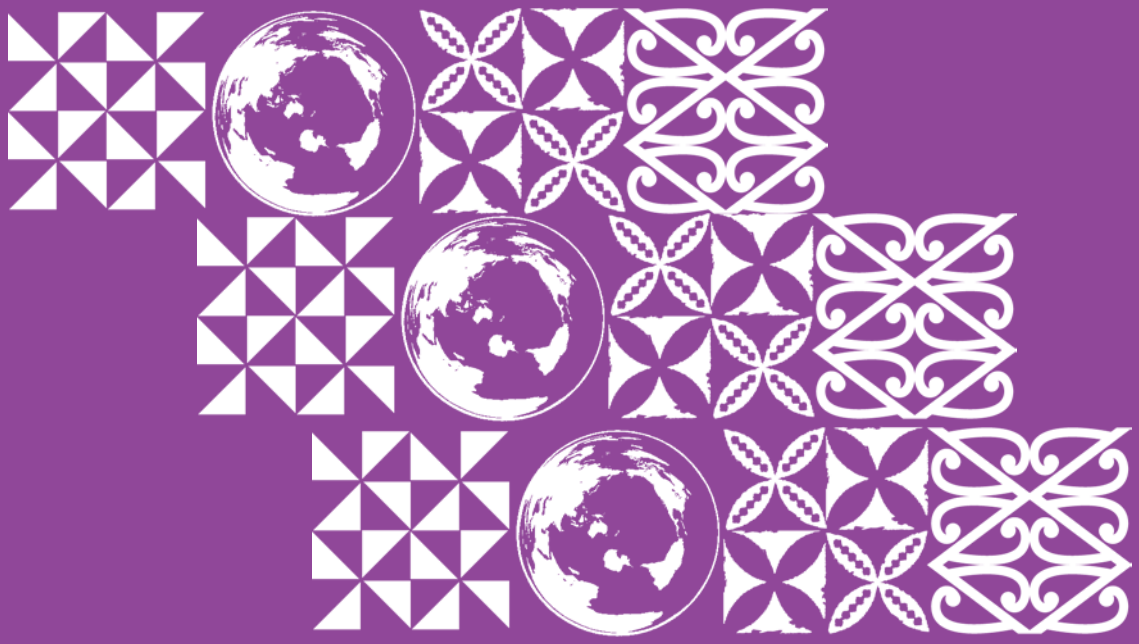
Two groups of students identified in PIRLS that were generally over-represented among New Zealand's weaker readers were Māori and Pasifika students. As well as a system-wide approach, there continue to be policies or strategies that directly target New Zealand's children who are most at risk of not succeeding educationally. *Ka Hikitia – Managing for Success*, the Māori education strategy for 2008–2012 set out the Ministry of Education's strategic approach to achieving educational success for and with Māori through to 2012 (Ministry of Education, 2009b). The strategy is currently being 'refreshed' for a further five years. *The Pasifika Education Plan—2013 – 2017* (PEP) includes a specific literacy-related target whereby: "85 percent of year 1–10 Pasifika learners will meet literacy and numeracy expectations, including achieving at or above in *National Standards* across Years 1–8, in 2017" (Ministries of Education & Pacific Island Affairs, 2012).

Final comment

The fourth cycle of PIRLS is scheduled for 2015 in Southern Hemisphere countries and 2016 in Northern Hemisphere countries. If New Zealand participates, some preliminary (national) data will become available during the first half of 2016. This would provide an indication of the progress made since 2010 in relation to the major literacy-related initiatives that were implemented to support improved literacy outcomes.

[89] *The New Zealand Curriculum reading and writing standards for years 1–8* and *Te Marautanga o Aotearoa whanaketanga reo kōrero, pānui, tuhituhi (*Ministry of Education, 2009a & 2010b) The main purpose of the standards is to provide reference points for teachers that describe students' progress and achievement at each Year level. Also, see Chamberlain (2012) for an overview of the curricula and standards pertaining to reading.

Appendices



Appendix A: Languages of Assessment, Sample Design, Achieved Samples, and Exclusion Details

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

Country	Number of languages used in PIRLS	Languages
Canada	2	English, French,
Finland	2	Finnish, Swedish
Ireland	2	English, Irish*
Italy	2	German, Italian
Malta	2	English, Maltese†
New Zealand	**2**	**English, Māori**
Norway	2	Bokmål, Nynorsk
Oman	2	Arabic, English
Qatar	2	Arabic, English
Romania	2	Hungarian, Romanian
Saudi Arabia	2	Arabic, English
Spain	5	Basque, Catalan, Galician, Spanish, Valencian
United Arab Emirates	2	Arabic, English

Notes

* Only in TIMSS. For PIRLS, the assessment was viewed as assessment of reading comprehension in English for both instructional language settings.

† The assessment in Maltese was used to benchmark students' performance in relation to their performance in English. English is the language of instruction in Malta.

Sample design and size

For PIRLS 2010/11, the sample design served a dual purpose—it incorporated a design for PIRLS and TIMSS, which was also administered in 2010/11. This meant that there were explicit strata which took account not only of the language of instruction, but the educational level structure, and school size.

There were nine explicit strata, from which the PIRLS and TIMSS schools were allotted:

Table A.2: Explicit strata for PIRLS and TIMSS in 2010/11

Explicit stratum
1. Maori-medium,† Year 5 only
2. English-medium with Māori-medium units/classes (rumaki), Year 5 only
3. English-medium schools, Year 5 only
*4. English-medium (Year 9 only for TIMSS)**
5. Māori-medium schools with Years 5 and 9
6. English-medium with Māori-medium units/classes (rumaki) with both Years 5 and 9
7. ***Small*** schools with both Years 5 and 9
8. Schools with *small Year 5* and large Year 9
9. *Large* schools with both *Years 5* and *Year 9*

Notes:

* No PIRLS schools were sampled from this stratum; used for drawing sample for TIMSS lower secondary

† Māori-medium — refers to **Level 1 immersion settings** (i.e., the delivery of instruction is in the Māori language for 81-100% of instructional time.

To ensure representative sample of schools from within the strata, implicit stratification (or sorting) was applied according to:

- decile of state or state-integrated schools (in quintiles: deciles1 and 2, 3 and 4, 5 and 6, 7 and 8, and 9 and 10), and independent schools
- urbanisation—either major urban(≥ 30,000) or smaller centres (< 30,000)
- School size (or where the measure of size – MOS – or number of Year 5 students was in the range of 7–16)

Selecting classes/groups

One class or group of PIRLS Year 5 students was required to be sampled in strata 1 and 5. Typically two classes (one where instruction was delivered in English and the other where instruction was in Māori) were sampled from strata 2 and 6. In the remaining strata (with the exception of stratum 4), two classes in larger schools were selected, although the rule varied from one stratum to the next. In some instances all classes with Year 5 students were selected.

Tables A.3A and A.3B present details of the original and achieved New Zealand sample sizes in PIRLS-2010/11.

The achieved sample was then weighted to represent the *student* population from which they were drawn. That is, the Year 5 student sample was then weighted to reflect the population of New Zealand Year 5 students.

It also means that even though 22 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 & Foy (2012) in *Methods and Procedures in TIMSS and PIRLS 2011* referenced at the end of this report. Details of other countries' sample designs and achieved samples are also described in Mullis, Martin, Foy, & Drucker (2012).

Table A.3A: A summary of New Zealand's achieved school and Year 5 student samples in PIRLS-2010/11

Explicit stratum	Number of schools in original sample (N)	Total number of schools in achieved sample (N)	Total number of students in achieved sample (N)
1. Maori-medium, Year 5 only	6	3	27
2. English-medium with Māori medium units/classes (rumaki), Year 5 only	8	8	201
3. English-medium schools, Year 5 only	173†	170	5228
5. Māori-medium schools with Years 5 and 9	6	3	44
6. English-medium schools with Māori-medium units/classes (rumaki) with both Years 5 and 9	2	2	40
7. ***Small*** schools with both Years 5 and 9	2	2	33
8. Schools with ***small*** Year 5 and **large** Year 9	2	2	25
9. ***Large*** schools with both Years 5 and Year 9	2	2	46
Total	201 (199)	192	5644

† Includes 2 schools that closed after the sample was selected. These two schools did not contribute to the school participation rate.

Table A.3B: A summary of New Zealand's *achieved* parent, teacher, and school principal samples in PIRLS-2010/11

Respondents in the achieved sample	Number of sampled respondents (N)	Number of actual respondents	Achieved response rate % (UNWEIGHTED)
Teachers of Year 5 students	434	395	91
Principals of the schools	192	177	92
Parents of students	5644	3411	59

Exclusions

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

School-level exclusions

These were done on the basis of:

1. schools being in a small, remote geographical region (in New Zealand this included only the Correspondence School)

2. the removal of a language group, possibly due to political, organisational, or operational reasons
3. 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 one or two years of instruction in the language of the test could be excluded

New Zealand's final exclusion rates in PIRLS-2010/11 are shown in Table A.4, along with the rates for the previous cycles.

Table A.4: New Zealand's exclusions in PIRLS-01, PIRLS-05/06, and PIRLS-2010/11

Time of exclusion	Percentage of students in each PIRLS assessment cycle		
	2001	2005/06	2010/11
Students excluded at the school level	1.6	1.4	1.3
Students excluded within schools	1.7	3.9	2.1
Overall exclusion rate	3.2	5.3	3.3

Note

In 2005/06 the within school exclusion rate was somewhat higher than expected largely due to a small group of foreign-fee paying students who were excluded on the grounds of limited proficiency in English and the selection of schools where provision was made for students in languages other than English and Māori. Foreign-fee paying students were deemed as out-of-scope in 2010/11.

Special Assistance

A new criterion was applied in PIRLS 2010/11. If a country and school had a special policy for handling testing differently for students who were theoretically capable of taking the test but unable to access it because of a special need, such as hearing or visual impairment, dyslexia, or physical impairment, then this policy was applied in PIRLS. In New Zealand's case this translated into for example 'writers' used in cases where children could not write their responses because of a disability or in temporary impairment (e.g., broken arm); teacher aides sitting alongside children to keep them on task; and own test administrator for one candidate with autism. Approximately 30 children received special assistance.

Appendix B: Reference Tables and Figures

Table B.1: Percentage of students in English-language countries with achievement too low for estimating reading achievement scale scores, 2010/11

Country	Percentage of students with achievement too low for estimation		Mean percent correct	
Australia	2	(0.2)	58	(0.6)
Canada	1	(0.1)	63	(0.4)
England	2	(0.3)	64	(0.6)
Ireland	1	(0.2)	64	(0.6)
Malta	6	(0.4)	46	(0.3)
New Zealand	**2**	**(0.2)**	**59**	**(0.5)**
Northern Ireland	1	(0.1)	66	(0.6)
Singapore	1	(0.1)	68	(0.8)
Trinidad and Tobago	5	(0.6)	44	(0.9)
United States	1	(0.1)	65	(0.4)

Note

Standard errors appear in parentheses.

Source: Appendix D.1 in Mullis, Martin, Foy, & Drucker, 2012.

Table B.2A: Trends in the standard deviations and percentiles for New Zealand Year 5 students, 2001–2010/11

Year of PIRLS assessment	Standard deviation	Percentiles				
		5th	25th	50th	75th	95th
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)
2010/11	88 (1.2)	373 (3.4)	474 (3.0)	538 (2.1)	592 (4.5)	666 (4.6)

Note

Standard errors appear in parentheses.

Table B.2B: Trends in the standard deviations and percentiles for New Zealand Year 5 students 2001–2010/11, by gender

Year 5 student group	Year of PIRLS assessment	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)
	2005/06	81 (1.5)	399 (6.8)	494 (4.3)	549 (2.0)	599 (1.5)	671 (7.0)
	2010/11	85 (1.4)	385 (6.9)	488 (2.7)	549 (4.1)	601 (2.5)	670 (2.7)
Boys	2001	95 (2.6)	345 (13.3)	454 (6.6)	527 (5.3)	583 (7.7)	657 (3.6)
	2005/06	90 (1.8)	357 (3.9)	462 (4.5)	528 (3.8)	584 (2.0)	655 (4.9)
	2010/11	90 (2.0)	363 (6.0)	462 (7.0)	528 (3.1)	583 (3.5)	662 (7.5)

Note

Standard errors appear in parentheses.

Table B.2C: Trends in the standard deviations and percentiles for New Zealand Year 5 students 2001 – 2010/11, by ethnic grouping*

Year 5 student group	Year of PIRLS assessment	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)
	2005/06	80 (1.6)	408 (5.5)	503 (3.9)	558 (2.0)	606 (2.3)	674 (6.9)
	2010/11	79 (1.5)	417 (6.1)	509 (2.4)	564 (3.3)	612 (1.8)	679 (5.3)
Māori	2001	92 (3.8)	327 (18.9)	416 (4.4)	486 (6.7)	547 (10.3)	628 (9.1)
	2005/06	88 (1.9)	328 (9.2)	425 (6.6)	489 (4.5)	545 (4.1)	617 (5.5)
	2010/11	87 (2.5)	339 (6.5)	426 (5.6)	494 (7.9)	551 (5.0)	627 (5.8)
Pasifika	2001	82 (5.3)	339 (28.1)	422 (32.5)	490 (4.5)	540 (6.7)	603 (24.2)
	2005/06	77 (4.8)	345 (22.4)	428 (5.9)	482 (5.1)	532 (7.5)	599 (7.3)
	2010/11	80 (2.5)	342 (9.0)	418 (7.1)	475 (3.5)	527 (7.3)	605 (26.9)
Asian	2001	88 (10.5)	386 (97.1)	488 (14.1)	551 (8.9)	598 (7.6)	661 (7.8)
	2005/06	76 (2.7)	420 (5.1)	502 (9.2)	554 (6.6)	603 (14.3)	666 (23.0)
	2010/11	75 (3.0)	406 (14.3)	494 (8.9)	550 (7.7)	593 (10.9)	658 (9.3)

Notes

Standard errors appear in parentheses.

* The number of students in the *Other ethnic groups* category was too small to generate reliable percentiles.

Table B.3: Trends in the mean effect sizes* for Year 5 students' reading achievement 2001–2010/11, by gender and ethnic grouping

Reference group	Comparison group											
	Boys			Māori			Pasifika			Asian		
	2001	2005	2010	2001	2005	2010	2001	2005	2010	2001	2005	2010
Girls	0.287	0.278	0.226									
Pākehā/European				0.804	0.837	0.857	0.838	0.919	1.068	0.149	0.018	0.199
Māori							0.009	0.056	0.174	–0.635	–0.788	–0.648
Pasifika										–0.701	–0.937	–0.893

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 mean score for the comparison group is one standard deviation below the reference group; if it is −1.0 then the *reference* group mean score is one standard deviation below the *comparison* group.

Table B.4: Trends in the mean differences between Year 5 girls' and boys' reading scale scores 2001–2010/11, by ethnic grouping

Ethnic grouping	2001	2005/06	2010/11
Pākehā/European	29 (5.8)	23 (3.6)	24 (3.8)
Māori	30 (8.1)	30 (6.1)	20 (6.1)
Pasifika	34 (15.2)	15 (8.6)*	18 (7.2)
Asian	34 (16.3)	21 (7.8)	19 (8.1)
New Zealand†	**27 (5.4)**	**24 (3.1)**	**20 (3.1)**

Notes

Standard errors of the differences appear in parentheses.

* Not statistically significant.

† Includes students in the *Other ethnic groups* category.

Table B.5: Percentages of students from New Zealand and the English-language countries reaching the PIRLS international reading benchmarks, 2010/11

Country	Percentages of students reaching international benchmarks			
	Low (400)	Intermediate (475)	High (550)	Advanced (625)
Singapore	97 (0.4)	87 (1.1)	62 (1.8)	24 (1.6)
Northern Ireland	97 (0.6)	87 (0.9)	58 (1.4)	19 (1.2)
England	95 (0.5)	83 (1.1)	54 (1.3)	18 (1.1)
United States	98 (0.3)	86 (0.6)	56 (0.8)	17 (0.7)
Ireland	97 (0.5)	85 (0.8)	53 (1.4)	16 (0.9)
New Zealand	**92 (0.5)**	**75 (0.9)**	**45 (1.1)**	**14 (0.7)**
Canada	98 (0.2)	86 (0.6)	51 (1.1)	13 (0.7)
Australia	93 (0.7)	76 (1.0)	42 (1.1)	10 (0.7)
Malta	78 (0.6)	55 (0.8)	24 (0.7)	4 (0.4)
Trinidad & Tobago	78 (1.5)	50 (1.9)	19 (1.4)	3 (0.5)
International median (for 45 countries)	95	80	44	8

Note

Standard errors of the differences appear in parentheses. Because of rounding some totals may appear inconsistent.

Source: Adapted from Exhibit 2.2 in Mullis, Martin, Foy, & Drucker, 2012.

Table B.6A: 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			
	Low (400)	Intermediate (475)	High (550)	Advanced (625)
Gender				
Girls	93 (1.1)	79 (1.8)	50 (2.3)	17 (1.7)
Boys	87 (1.5)	69 (1.7)	40 (1.9)	11 (1.4)
Ethnic grouping				
Pākehā/European	95 (0.7)	83 (1.4)	55 (1.9)	19 (1.5)
Māori	80 (2.6)	55 (2.7)	24 (2.7)	6 (1.3)
Pasifika	80 (3.7)	57 (4.3)	21 (3.8)	2 (1.6)
Asian	95 (2.8)	78 (4.6)	50 (5.7)	15 (3.6)
All New Zealand†	**90 (1.0)**	**74 (1.4)**	**45 (1.6)**	**14 (1.2)**

Notes

Standard errors of the differences appear in parentheses. Because of rounding some totals may appear inconsistent.

International medians are not available for this first cycle. In 2001 percentiles were used for the benchmarks. The fixed points were developed internationally and first reported on in 2005/06; the 2001 data were calculated retrospectively.

† Totals include students in the *Other ethnic groups* category.

Table B.6B: Percentage of students reaching the PIRLS international reading benchmarks in 2005/06, by gender and ethnic grouping

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

Notes

Standard errors of the differences appear in parentheses. Because of rounding some totals may appear inconsistent.

† Totals include students in the *Other ethnic groups* category.

Table B.7: Odds ratios with confidence intervals for lower achievers, 2005/06 and 2010/11

Variable: (Demographic home/school)	2005/06			2010/11		
	Odds ratio	Confidence interval	Significance	Odds ratio	Confidence interval	Significance
Sex = Boys	1.84	(1.56, 2.17)	p < 0.000	1.53	(1.25,1.87)	p < 0.000
Ethnic = Asian	0.58	(0.4, 0.85)	p < 0.006	0.62	(0.44,0.89)	p < 0.0095
Asian girls	0.41	(0.22, 0.75)	p < 0.0048	0.44	(0.26,0.72)	p < 0.0023
Asian boys	0.77	(0.49, 1.24)	p < 0.279†	0.84	(0.47,1.48)	p < 0.520†
Ethnic = Māori	3.32	(2.71, 4.06)	p < 0.000	2.82	(2.29,3.46)	p < 0.000
Māori girls	1.89	(1.48, 2.43)	p < 0.000	1.86	(1.39,2.49)	p < 0.000
Māori boys	3.95	(3.12, 5.0)	p < 0.000	3.08	(2.42,3.93)	p < 0.000
Ethnic = Pākehā/European	0.32	(0.26, 0.39)	p < 0.000	0.27	(0.22, 0.33)	p < 0.000
Pākehā/European girls	0.28	(0.28, 0.350	p < 0.000	0.26	(0.20, 0.34)	p < 0.000
Pākehā/European boys	0.79	(0.65, 0.96)	p < 0.0206	0.60	(0.48, 0.74)	p < 0.000
Ethnic = Pasifika	3.00	(2.31, 3.90)	p < 0.000	3.55	(2.84, 4.42)	p < 0.000
Pasifika girls	2.49	(1.86, 3.35)	p < 0.006	2.82	(2.11, 3.77)	p < 0.000
Pasifika boys	3.23	(2.35, 4.45)	p < 0.000	3.76	(2.83, 5.0)	p < 0.000
Not speaking the test language at home	1.62	(1.31, 1.99)	p < 0.000	2.33	(1.85, 2.94)	p < 0.000
Pasifika in English-medium and not speaking English at home (as an indicator of lower proficiency in English language)	3.47	(2.4, 5.02)	p < 0.000	4.39	(3.39, 5.68)	p < 0.000
Decile = 1–3	3.81	(2.95, 4.92)	p < 0.000	4.22	(3.38,5.27)	p < 0.000
Decile = 4–7	0.76	(0.59, 0.96)	p < 0.023	0.74	(0.60, 0.92)	p < 0.008
Decile = 8–10	0.32	(0.25, 0.41)	p < 0.000	0.26	(0.21,0.32)	p < 0.000
Quintile = 1 & 2	4.32	(3.19, 5.86)	p < 0.000	4.27	(3.42, 5.35)	p < 0.000
Quintile = 3 & 4	1.60	(1.17, 2.18)	p < 0.004	1.55	(1.20, 2.01)	p < 0.001
Quintile = 5 & 6	0.87	(0.68, 1.10)	p < 0.230†	0.81	(0.62, 1.05)	p < 0.105†
Quintile = 7 & 8	0.46	(0.35, 0.59)	p < 0.000	0.55	(0.43, 0.71)	p < 0.000
Quintile = 9 & 10	0.33	(0.24, 0.45)	p < 0.000	0.25	(0.19, 0.33)	p < 0.000

Notes

The *odds* ratio was significant when $p \leq 0.05$. If the value of the *OR* is greater than 1, the chance of something happening is more likely to happen than not.

† Not significant.

Table B.8: Mean differences between Year 5 girls' and boys' achievement in the purposes for reading and the processes of comprehension in 2010/11, by ethnic grouping

Ethnic grouping	Mean difference	Purposes for reading		Processes of comprehension	
		Literary reading	Informational reading	Retrieving and straight-forward inferencing	Interpreting and integrating
Pākehā/European	24 (3.8)	30 (4.5)	19 (4.3)	21 (4.0)	24 (3.9)
Māori	20 (6.1)	26 (6.9)	13 (5.1)	19 (6.7)	18 (6.1)
Pasifika	18 (7.2)	25 (8.1)	16 (7.0)	16 (8.0)	17 (8.1)
Asian	19 (8.1)	24 (9.4)	16 (8.1)*	15 (6.7)*	20 (7.3)
New Zealand†	**20 (3.1)**	**26 (3.8)**	**15 (3.3)**	**17 (3.5)**	**19 (3.2)**

Notes

In all cases girls, on average, achieve higher scores than boys. For example in literary reading, on average a Year 5 girl scored 26 scale score points higher than a Year 5 boy.

Standard errors of the differences appear in parentheses.

* Not statistically significant.

† Totals include students in *Other ethnic groups*.

Table B.9: Trends in Year 5 students' mean scale scores for *literary reading*, 2001–2010/2011

Year 5 student group	Mean scores for literary reading			Change from 2001 to 2010/11
	2001	2005/06	2010/11	
Gender				
Girls	550 (5.6)	541 (2.3)	546 (2.7)	− 4 (6.2)
Boys	520 (4.6)	517 (3.0)	521 (3.3)	+ 1 (5.2)
Ethnic grouping				
Pākehā/European	560 (4.3)	551 (2.5)	562 (2.8) ↟	+ 2 (5.2)
Māori	485 (6.0)	479 (3.6)	489 (3.8)	+ 3 (7.1)
Pasifika	484 (8.3)	472 (6.6)	472 (5.4)	− 12 (9.9)
Asian	534 (10.4)	541 (5.5)	539 (4.5)	+ 6 (10.4)
New Zealand†	**535 (4.1)**	**529 (2.1)**	**533 (2.3)**	**− 1 (4.7)**

Notes

Due to rescaling the data for 2001 and 2005/06 differs slightly from the data reported in Table B.8 in Chamberlain, 2008.

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

None of the changes between 2001 and 2010/11 were statistically significant. ↟ The mean literary reading score for Pākehā/European students was significantly higher in 2010/11 compared to 2005/06.

† Totals include students in *Other ethnic groups*. In 2005 the mean for this grouping was 533 (9.0); the N was too small to report achievement in 2001 and 2010/11.

Table B.10: Trends in Year 5 students' mean scale scores for *informational reading*, 2001–2010/2011

Year 5 student group	Mean scores for informational reading			Change from 2001 to 2010/11
	2001	2005/06	2010/11	
Gender				
Girls	538 (5.7)	547 (2.4)	537 (2.3) ✸	–1 (6.2)
Boys	514 (4.3)	522 (3.2)	522 (2.8)	+8 (5.2)
Ethnic grouping				
Pākehā/European	549 (4.3)	553 (2.8)	555 (2.5)	+5 (5.0)
Māori	478 (6.4)	484 (3.9)	486 (3.3)	+9 (7.2)
Pasifika	481 (8.1)	485 (6.9)	475 (5.6)	–6 (9.8)
Asian	542 (9.6)	562 (5.2)	547 (4.6) ✸	+4 (10.6)
New Zealand†	**526 (4.0)**	**534 (2.4)**	**530 (2.0)**	**+4 (4.5)**

Notes

Due to the rescaling the data for 2001 and 2005/06 differs slightly from the data reported in Table B.9 in Chamberlain, 2008.

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

None of the changes between 2001 and 2010/11 were statistically significant. ✸The mean informational reading scores for both Year 5 girls and Asian students were *significantly lower* in 2010/11 than in 2005/06.

† Totals include students in *Other ethnic groups.* In 2005/06 the mean for this grouping was 543 (11.0); the N was too small to report achievement in 2001 and 2010/11.

Table B.11: Trends in Year 5 students' mean scale scores for the text-based processes – *retrieval and straightforward inferencing*, 2001–2010/11

Year 5 student group	Mean scores for the text-based processes			Change from 2001 to 2010/11
	2001	2005/06	2010/11	
Gender				
Girls	538 (5.1)	538 (2.6)	536 (2.4)	– 1 (5.7)
Boys	512 (4.5)	516 (3.1)	519 (2.8)	+ 6 (5.3)
Ethnic grouping				
Pākehā/European	548 (4.0)	547 (2.9)	555 (2.4) ✞	+ 7 (4.7)
Māori	481 (6.0)	479 (3.6)	483 (3.7)	+2 (7.0)
Pasifika	475 (9.9)	475 (6.4)	470 (5.3)	−5 (10.3)
Asian	534 (12.6)	542 (5.2)	538 (3.6) ✸	+4 (13.1)
New Zealand†	**525 (3.9)**	**527 (2.4)**	**527 (2.0)**	**+3 (4.4)**

Notes

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

None of the changes between 2001 and 2010/11 were statistically significant. ✞The mean score for retrieval and inferencing was significantly higher for Pākehā/European students in 2010/11 than in 2005/06. ✸ The mean for Asian students was significantly lower in 2010/11 than in 2005/06.

† Totals include students in *Other ethnic groups*. In 2005/06 the mean for this grouping was 533 (9.1); the N was too small to report achievement in 2001 and 2010/11.

Table B.12: Trends in Year 5 students' mean scale scores for the reasoning processes – *interpreting, integrating, and evaluating*, 2001–2010/11

Year 5 student group	Mean scores for the reasoning processes			Change from 2001 to 2010/11
	2001	2005/06	2010/11	
Gender				
Girls	549 (5.1)	549 (2.4)	545 (2.5)	–4 (5.6)
Boys	521 (4.5)	524 (3.1)	526 (2.5)	+5 (5.2)
Ethnic grouping				
Pākehā/European	559 (3.9)	557 (2.8)	561 (2.6)	+2 (4.6)
Māori	484 (6.3)	487 (3.9)	494 (3.6)	+10 (7.3)
Pasifika	489 (8.6)	483 (6.2)	476 (4.9)	−12 (9.9)
Asian	543 (10.0)	560 (5.5)	547 (3.7) ✱	+4 (10.6)
New Zealand†	**534 (4.0)**	**537 (2.3)**	**535 (1.9)**	**+1 (4.4)**

Notes

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

The differences between 2001 and 2010/11 were not statistically significant. ✱ The mean score for interpreting, integrating, and evaluating was significantly *lower* for Asian students in 2010/11 than in 2005/06.

† Totals include students in *Other ethnic groups*. In 2005/06 the mean for this grouping was 545 (9.6); the N was too small to report achievement in 2001 and 2010/11.

Table B.13 Mean reading scale scores for Year 5 students who were assessed in English in 2005/06 and 2010/11, by frequency with which they spoke English in the home

Year 5 student group	2005/06 mean reading scores		Mean difference (always–sometimes)	2010/11 mean reading scores		Mean difference (always–sometimes)
	Always speak English in the home	Sometimes/ never speak English in the home		Always speak English in the home	Sometimes/ never speak English in the home	
Pākehā/European	555 (2.3)	549 (5.3)	+6 (5.0)	559 (2.4)	545 (7.4)	+14 (7.8)
Māori	498 (5.2)	494 (5.2)	+4 (7.2)	502 (4.8)	493 (5.9)	+9 (7.2)
Pasifika	489 (8.6)	480 (5.6)	+9 (9.0)	490 (6.5)	464 (5.8)	+26 (7.7)*
Asian	557 (10.1)	549 (5.4)	+8 (9.9)	538 (8.9)	544 (4.9)	–6 (10.7)
All New Zealand (English)†	**543 (2.1)**	**524 (3.0)**	**+19 (3.2)***	**543 (2.3)**	**508 (4.1)**	**+35 (4.7)***

Notes

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

* Difference between means statistically significant at 5% level.

† Totals include students from the *Other ethnic groups* category.

Table B.14: Trends in Year 5 students' reports of the number of books in the home, 2001–2010/11

Number of books in the home	2001		2005/06		2010/11	
	Percentage of Year 5 students	Mean reading score	Percentage of Year 5 students	Mean reading score	Percentage of Year 5 students	Mean reading score
10 or less	8 (0.7)	464 (7.2)	9 (0.5)	467 (4.9)	9 (0.6)	464 (4.4)
11–25 (about one shelf)	14 (0.9)	493 (5.9)	16 (0.6)	504 (4.0)	17 (0.6)	493 (4.2)
26–100 (about one bookcase)	33 (1.3)	533 (4.5)	32 (0.8)	541 (2.2)	36 (0.7)	538 (2.5)
More than 100 (two or more)	45 (1.8)	558 (3.9)	43 (1.0)	560 (2.6)	38 (1.1)	563 (2.5)

Note

Standard errors appear in parentheses.

Table B.15: Year 5 students' mean reading scale scores in 2005/06 and 2010/11, by Ministry of Education administrative region

Education region	Mean reading scale scores	
	2005/06	2010/11
Northern	534 (4.3)	525 (5.0)
Central North	523 (6.3)	530 (4.9)
Central South	533 (6.6)	542 (6.8)
Southern	544 (4.3)	535 (6.9)
All New Zealand	**532 (2.0)**	**531 (1.9)**

Note

Standard errors appear in parentheses.

Table B.16: Trends in principals' estimates of their student body from economically disadvantaged backgrounds, 2001–2010/11

Year of PIRLS assessment	0-10%		11–25%		26-50%		More than 50%	
	Percentage of Year 5 students	Mean reading score	Percentage of Year 5 students	Mean reading score	Percentage of Year 5 students	Mean reading score	Percentage of Year 5 students	Mean reading score
Economically disadvantaged								
2001	46 (3.4)	552 (5.3)	24 (3.8)	540 (8.0)	12 (2.4)	507 (9.5)	18 (2.5)	478 (6.6)
2005/06	51 (2.9)	557 (3.0)	19 (2.6)	526 (5.6)	14 (2.4)	516 (5.1)	16 (2.0)	475 (7.0)
2010/11	42 (3.1)	559 (3.0)	23 (3.1)	536 (3.8)	13 (2.4)	517 (6.8)	22 (2.7)	483 (5.4)
Economically affluent*								
2001	49 (3.8)	512 (5.7)	19 (3.4)	536 (7.9)	12 (2.8)	551 (5.3)	20 (3.1)	564 (8.6)
2010/11	33 (3.4)	506 (4.5)	19 (3.3)	527 (6.2)	18 (3.3)	544 (6.0)	30 (2.9)	563 (3.8)

Notes

Standard errors appear in parentheses.

* There is no 'economically affluent' data for 2005/06.

Table B.17: Trends in Year 5 students' mean reading scale scores 2001-2010/11, by schools' decile band

School decile band	2001		2005/11		2010/11	
	Percentage of Year 5 students	Mean reading score	Percentage of Year 5 students	Mean reading score	Percentage of Year 5 students	Mean reading score
Low: 1–3	32 (1.9)	483 (4.7)	28 (1.1)	485 (4.9)	29 (1.9)	480 (2.2)
Medium: 4–7	35 (1.9)	537 (6.0)	34 (1.5)	538 (3.7)	33 (2.7)	535 (2.9)
High: 8–10	31 (1.7)	564 (5.5)	36 (1.4)	560 (2.9)	33 (2.0)	567 (2.9)
Independent schools	2 (0.2)	~ ~	2 (1.0)	~ ~	4 (1.4)	~ ~
All New Zealand		**529 (3.6)**		**532 (2.0)**		**531 (1.9)**

Notes

Standard errors appear in parentheses.

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

* 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.18: Trends in the standard deviations and percentiles for Year 5 students 2001–2010/11, by schools' 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)
	2005/06	89 (2.0)	332 (7.3)	425 (6.7)	490 (5.1)	547 (5.4)	624 (12.7)
	2010/11	87 (2.0)	336 (7.3)	418 (3.0)	484 (5.9)	541 (3.8)	620 (12.9)
Medium: 4–7	2001	88 (3.4)	380 (16.9)	483 (6.6)	545 (8.3)	597 (8.2)	670 (13.7)
	2005/06	81 (2.0)	400 (5.2)	486 (4.1)	542 (3.3)	592 (4.2)	666 (6.4)
	2010/11	82 (2.0)	388 (12.5)	483 (4.8)	542 (4.3)	591 (3.6)	661 (7.0)
High: 8–10	2001	81 (3.4)	414 (7.4)	518 (6.4)	569 (4.9)	618 (4.6)	688 (11.2)
	2005/06	75 (1.9)	425 (7.7)	515 (3.4)	565 (3.6)	611 (2.0)	675 (2.9)
	2010/11	75 (1.6)	437 (4.8)	519 (3.6)	571 (4.1)	619 (3.5)	686 (5.3)
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)**
	2010/11	**88 (1.2)**	**373 (3.4)**	**474 (3.0)**	**538 (2.1)**	**592 (4.5)**	**666 (4.6)**

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.

† Totals include independent schools' data.

Table B.19: Standard deviations and percentiles for Year 5 students in 2005/06 and 2010/11, by school decile*

Quintile	Year of PIRLS assessment	Standard deviation	Percentiles				
			5th	25th	50th	75th	95th
Deciles 1 & 2	2005/06	89 (3.3)	318 (7.9)	408 (6.2)	474 (12.9)	533 (6.5)	607 (13.5)
	2010/11	87 (3.1)	331 (5.0)	409 (3.7)	472 (4.5)	530 (8.2)	612 (10.8)
Deciles 3 & 4	2005/06	83 (2.5)	365 (11.2)	458 (6.8)	514 (6.0)	568 (3.3)	643 (8.3)
	2010/11	83 (2.0)	359 (3.8)	453 (4.6)	514 (5.3)	566 (7.2)	634 (8.3)
Deciles 5 & 6	2005/06	81 (3.2)	397 (10.2)	483 (4.9)	537 (6.5)	589 (3.4)	660 (7.3)
	2010/11	83 (3.0)	384 (12.5)	482 (8.2)	543 (6.2)	593 (6.8)	660 (9.2)
Deciles 7 & 8	2005/06	76 (2.1)	423 (10.4)	508 (3.6)	561 (5.4)	608 (3.6)	677 (2.8)
	2010/11	81 (3.3)	409 (14.2)	498 (6.2)	551 (6.7)	603 (3.2)	676 (7.6)
Deciles 9 & 10	2005/06	74 (2.4)	429 (11.0)	517 (3.3)	566 (2.9)	612 (5.1)	676 (5.0)
	2010/11	74 (1.6)	440 (4.9)	524 (6.7)	574 (3.2)	621 (4.1)	686 (6.9)
All New Zealand†	**2005/06**	**93 (1.9)**	**360 (4.7)**	**472 (5.9)**	**537 (3.6)**	**593 (4.5)**	**668 (5.1)**
	2010/11	**88 (1.2)**	**373 (3.4)**	**474 (3.0)**	**538 (2.1)**	**592 (4.5)**	**666 (4.6)**

Notes

Standard errors appear in parentheses. The student sample size in 2001 was too small to report reliably the percentiles by quintile.

* State and state-integrated schools only. †Totals include independent schools' data.

Table B.20A: Trends in the percentage of students reaching the PIRLS international reading benchmarks 2001–2010/11, by school decile*

Quintile	Year of PIRLS assessment	Percentage of Year 5 students reaching PIRLS international benchmark			
		Advanced (625)	High (550)	Intermediate (475)	Low (400)
Deciles 1 & 2	2001	4 (1.1)	20 (2.4)	51 (3.3)	76 (3.2)
	2005/06	3 (1.1)	19 (3.0)	50 (3.2)	72 (2.4)
	2010/11	4 (1.0)	18 (2.2)	49 (1.9)	78 (1.5)
Deciles 3 & 4	2001	8 (2.3)	36 (3.1)	68 (3.3)	88 (2.9)
	2005/06	8 (1.3)	32 (2.7)	68 (2.9)	90 (1.8)
	2010/11	6 (1.5)	33 (3.2)	67 (2.6)	88 (1.5)
Deciles 5 & 6	2001	17 (2.9)	49 (4.2)	77 (3.4)	92 (1.6)
	2005/06	12 (1.4)	44 (2.5)	78 (1.8)	95 (0.9)
	2010/11	13 (1.7)	47 (2.6)	77 (2.1)	93 (1.3)
Deciles 7 & 8	2001	17 (2.4)	50 (4.3)	81 (2.7)	94 (1.3)
	2005/06	17 (1.8)	56 (2.3)	86 (1.6)	97 (0.7)
	2010/11	17 (1.8)	51 (2.3)	83 (1.8)	96 (1.1)
Deciles 9 & 10	2001	24 (2.5)	65 (2.7)	91 (1.8)	98 (0.8)
	2005/06	19 (1.5)	59 (2.1)	88 (1.4)	97 (0.7)
	2010/11	23 (2.0)	63 (1.8)	90 (1.3)	99 (0.5)
All New Zealand†	**2001**	**14 (1.2)**	**45 (1.6)**	**74 (1.4)**	**90 (1.0)**
	2005/06	**13 (0.7)**	**45 (1.0)**	**76 (1.0)**	**92 (0.6)**
	2010/11	**14 (0.7)**	**45 (1.1)**	**75 (0.9)**	**92 (0.5)**

Notes

Standard errors appear in parentheses. * State and state-integrated schools only. †Totals include independent schools' data.

Table B.20B: Trends in the percentage of Year 5 students reaching the PIRLS international reading benchmarks 2001–2010/11, by schools' decile band*

School decile band	Year of PIRLS assessment	Percentage of Year 5 students reaching PIRLS international benchmark			
		Advanced (625)	High (550)	Intermediate (475)	Low (400)
Deciles 1–3	2001	5 (1.2)	25 (2.1)	56 (2.2)	80 (2.4)
	2005/06	5 (0.9)	24 (2.2)	57 (2.4)	82 (1.6)
	2010/11	5 (1.0)	22 (1.7)	54 (1.6)	81 (1.2)
Deciles 4–7	2001	15 (2.2)	48 (2.8)	77 (2.4)	93 (1.3)
	2005/06	13 (1.1)	46 (2.1)	79 (1.8)	95 (0.8)
	2010/11	12 (1.4)	46 (1.8)	78 (1.6)	93 (1.0)
Deciles 8–10	2001	22 (2.0)	60 (2.9)	87 (1.9)	96 (1.0)
	2005/06	19 (1.3)	58 (1.6)	87 (1.2)	97 (0.5)
	2010/11	22 (1.7)	61 (1.6)	88 (1.1)	98 (0.4)
All New Zealand†	**2001**	**14 (1.2)**	**45 (1.6)**	**74 (1.4)**	**90 (1.0)**
	2005/06	**13 (0.7)**	**45 (1.0)**	**76 (1.0)**	**92 (0.6)**
	2010/11	**14 (0.7)**	**45 (1.1)**	**75 (0.9)**	**92 (0.5)**

Notes

Standard errors appear in parentheses.

* State and state-integrated schools only. †Totals include independent schools' data.

Table B.21: *Students Like Reading* (SLR) *Scale* – New Zealand and selected countries in 2010/11

Country	Like reading		Somewhat like reading		Do not like reading		Mean SLR scale score
	Percentage of students	Mean reading score	Percentage of students	Mean reading score	Percentage of students	Mean reading score	
Portugal	46 (1.5)	555 (2.9)	51 (1.4)	529 (3.1)	3 (0.4)	520 (8.1)	10.9 (0.06)
Ireland	37 (1.2)	580 (2.5)	49 (0.9)	543 (3.0)	14 (0.9)	514 (4.9)	10.4 (0.07)
Canada	35 (0.6)	574 (2.1)	51 (0.6)	539 (1.9)	14 (0.5)	520 (2.7)	10.3 (0.03)
Malta	34 (0.8)	506 (2.5)	50 (0.8)	466 (2.4)	16 (0.6)	452 (3.9)	10.2 (0.03)
New Zealand	**32 (0.9)**	**574 (2.7)**	**53 (0.8)**	**515 (2.4)**	**14 (0.6)**	**497 (3.6)**	**10.2 (0.05)**
Australia	30 (0.9)	565 (2.7)	52 (0.8)	518 (2.8)	19 (0.7)	494 (4.0)	9.9 (0.05)
Northern Ireland	29 (1.3)	590 (3.3)	51 (1.0)	554 (2.7)	20 (0.9)	527 (3.5)	9.9 (0.07)
Trinidad and Tobago	28 (1.2)	508 (4.4)	58 (1.1)	461 (4.3)	14 (0.9)	444 (6.6)	10.1 (0.06)
United States	27 (0.6)	586 (2.1)	51 (0.7)	551 (1.7)	22 (0.6)	536 (2.4)	9.7 (0.03)
England	26 (1.1)	589 (3.9)	53 (0.9)	545 (2.9)	20 (1.0)	519 (4.0)	9.8 (0.06)
Finland	26 (1.0)	596 (2.6)	54 (0.9)	568 (2.3)	21 (0.9)	534 (2.2)	9.7 (0.06)
Singapore	22 (0.8)	610 (3.5)	63 (0.8)	560 (3.4)	15 (0.6)	538 (4.2)	9.8 (0.04)
Netherlands	20 (0.7)	569 (2.8)	53 (0.8)	548 (2.0)	27 (0.8)	526 (2.6)	9.4 (0.04)
International mean (for 45 countries)	28 (0.2)	542 (0.5)	57 (0.1)	506 (0.5)	15 (0.1)	488 (0.8)	

Note

The centrepoint of the *SLR Scale* is set at 10. Standard errors appear in parentheses.

Source: Exhibit 8.1 in Mullis, Martin, Foy, & Drucker, 2012.

Table B.22: *Students Confident in Reading* (SCR) *Scale* – New Zealand and selected countries in 2010/11

Country	Confident		Somewhat confident		Not confident		Mean SCR scale score
	Percentage of students	Mean reading score	Percentage of students	Mean reading score	Percentage of students	Mean reading score	
Finland	48 (1.2)	590 (2.0)	47 (1.1)	552 (2.3)	5 (0.5)	507 (6.7)	10.9 (0.06)
Ireland	44 (1.1)	580 (2.1)	49 (1.1)	537 (2.9)	8 (0.6)	490 (5.0)	10.4 (0.07)
Canada	41 (0.7)	578 (1.7)	51 (0.6)	536 (1.7)	9 (0.4)	497 (3.1)	10.3 (0.03)
United States	40 (0.9)	588 (1.6)	49 (0.7)	545 (1.5)	11 (0.4)	503 (2.4)	10.2 (0.03)
Malta	39 (0.8)	525 (2.2)	48 (0.8)	463 (2.3)	13 (0.6)	392 (4.6)	10.2 (0.05)
Trinidad and Tobago	38 (1.2)	520 (3.5)	49 (1.0)	456 (4.0)	13 (0.7)	392 (4.6)	9.9 (0.05)
Netherlands	37 (1.0)	565 (2.4)	48 (1.0)	541 (2.1)	15 (0.7)	519 (3.3)	9.9 (0.07)
Australia	37 (0.9)	568 (2.4)	53 (0.8)	515 (2.5)	10 (0.6)	451 (5.4)	10.1 (0.06)
England	37 (1.1)	589 (2.8)	53 (1.2)	539 (3.0)	10 (0.6)	483 (6.0)	9.7 (0.03)
Northern Ireland	35 (1.0)	591 (3.1)	55 (1.1)	549 (2.8)	10 (0.6)	501 (4.7)	9.8 (0.06)
Portugal	32 (1.4)	572 (2.7)	60 (1.2)	532 (2.7)	8 (0.5)	479 (4.9)	9.7 (0.06)
New Zealand	**27 (0.8)**	**585 (2.9)**	**61 (0.8)**	**523 (2.2)**	**13 (0.6)**	**471 (4.2)**	9.8 (0.04)
Singapore	26 (0.7)	607 (3.3)	61 (0.6)	565 (3.0)	13 (0.6)	504 (5.2)	9.4 (0.04)
International mean (for 45 countries)	36 (0.2)	547 (0.4)	53 (0.1)	502 (0.4)	11 (0.1)	456 (0.8)	

Note

The centrepoint of the *SCR Scale* is set at 10. Standard errors appear in parentheses.

Source: Exhibit 8.3 in Mullis, Martin, Foy, & Drucker, 2012.

Table B.23: *Students Motivated to Read* (SMR) *Scale* – New Zealand and selected countries in 2010/11

Country	Motivated		Somewhat motivated		Not motivated		Mean SMR scale score
	Percentage of students	Mean reading score	Percentage of students	Mean reading score	Percentage of students	Mean reading score	
Trinidad and Tobago	88 (0.9)	478 (3.6)	10 (0.7)	444 (8.0)	3 (0.4)	384 (12.3)	10.9 (0.06)
Portugal	83 (1.1)	544 (2.7)	16 (1.0)	527 (4.3)	1 (0.2)	~ ~	10.5 (0.06)
Malta	82 (0.6)	486 (1.7)	14 (0.5)	453 (4.6)	4 (0.3)	407 (9.2)	10.4 (0.03)
Ireland	75 (1.0)	554 (2.6)	20 (0.9)	551 (4.1)	4 (0.4)	523 (5.6)	10.0 (0.05)
New Zealand	**72 (0.9)**	**536 (2.1)**	**23 (0.9)**	**533 (3.7)**	**5 (0.4)**	**483 (6.6)**	**9.8 (0.04)**
Canada	72 (0.6)	551 (1.7)	24 (0.6)	549 (2.2)	4 (0.2)	530 (5.2)	9.8 (0.03)
Australia	71 (1.0)	532 (2.7)	23 (0.9)	527 (3.2)	7 (0.5)	493 (5.7)	9.7 (0.05)
United States	71 (0.6)	560 (1.5)	23 (0.5)	557 (2.3)	6 (0.3)	530 (4.5)	9.7 (0.03)
Northern Ireland	65 (1.2)	561 (2.7)	29 (1.0)	561 (2.9)	7 (0.6)	533 (5.5)	9.4 (0.05)
Netherlands	65 (1.0)	550 (2.0)	29 (0.9)	545 (2.3)	6 (0.5)	521 (5.8)	9.4 (0.05)
England	65 (1.4)	551 (2.9)	28 (1.2)	559 (3.2)	7 (0.5)	531 (7.8)	9.4 (0.06)
Singapore	60 (0.7)	576 (3.5)	31 (0.6)	562 (3.6)	8 (0.4)	533 (5.6)	9.3 (0.03)
Finland	59 (1.1)	570 (2.2)	34 (1.0)	571 (2.4)	7 (0.6)	543 (4.4)	9.2 (0.05)
International mean (for 45 countries)	74 (0.1)	518 (0.4)	21 (0.1)	503 (0.7)	5 (0.1)	474 (1.3)	

Notes

The centrepoint of the *SMR Scale* is set at 10. Standard errors appear in parentheses.

A tilde (~) indicates insufficient data to report achievement.

Source: Exhibit 8.2 in Mullis, Martin, Foy, & Drucker, 2012.

Table B.24: ***Students Engaged in Reading Lessons*** **(SERL)** ***Scale*** **– New Zealand and selected countries in 2010/11**

Country	Engaged		Somewhat engaged		Not engaged		Mean SERL scale score
	Percentage of students	Mean reading score	Percentage of students	Mean reading score	Percentage of students	Mean reading score	
Malta	55 (0.8)	490 (2.1)	38 (0.8)	469 (2.7)	7 (0.4)	434 (6.5)	10.6 (0.03)
Portugal	55 (1.7)	550 (2.8)	43 (1.6)	531 (3.4)	2 (0.4)	~ ~	10.6 (0.07)
Trinidad and Tobago	51 (1.5)	483 (4.3)	43 (1.4)	463 (4.4)	6 (0.6)	440 (10.4)	10.3 (0.07)
United States	43 (0.8)	565 (1.9)	49 (0.6)	554 (1.6)	8 (0.4)	539 (3.1)	10.0 (0.04)
Ireland	43 (1.5)	557 (2.5)	49 (1.2)	550 (3.0)	8 (0.7)	541 (5.6)	10.0 (0.07)
Canada	39 (0.9)	558 (1.9)	54 (0.7)	545 (1.9)	7 (0.4)	531 (4.4)	9.9 (0.03)
Northern Ireland	37 (1.4)	561 (3.5)	55 (1.2)	559 (2.9)	8 (0.7)	551 (5.4)	9.8 (0.06)
New Zealand	**34 (1.1)**	**534 (3.1)**	**57 (1.0)**	**533 (1.8)**	**9 (0.7)**	**520 (7.0)**	**9.7 (0.04)**
England	34 (1.5)	551 (4.0)	57 (1.2)	554 (2.8)	9 (0.8)	541 (6.1)	9.6 (0.06)
Australia	33 (1.1)	538 (3.7)	56 (0.9)	526 (2.5)	11 (0.7)	509 (4.4)	9.6 (0.05)
Singapore	31 (0.8)	575 (3.6)	57 (0.7)	568 (3.6)	13 (0.6)	554 (4.4)	9.5 (0.03)
Netherlands	20 (1.0)	548 (2.9)	65 (0.9)	549 (2.2)	15 (1.1)	532 (2.7)	9.0 (0.06)
Finland	15 (0.8)	568 (3.6)	65 (1.0)	573 (2.1)	20 (1.0)	553 (2.8)	8.7 (0.04)
International mean (for 45 countries)	42 (0.2)	519 (0.5)	50 (0.2)	510 (0.5)	8 (0.1)	494 (1.0)	

Notes

The centrepoint of the *SERL Scale* is set at 10. Standard errors appear in parentheses.

A tilde (~) indicates insufficient data to report achievement.

Source: Exhibit 8.7 in Mullis, Martin, Foy, & Drucker, 2012.

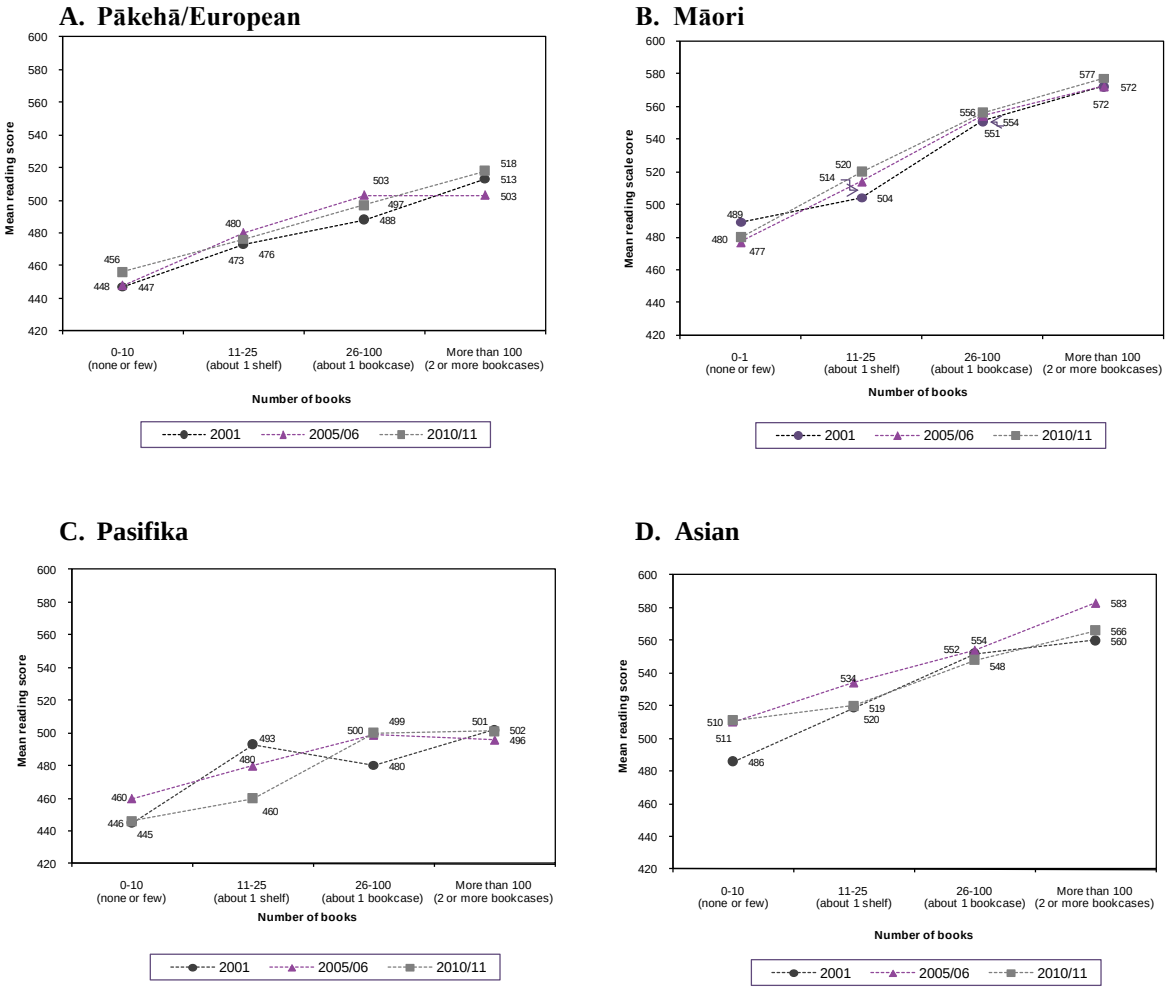
Table B.25 New Zealand Year 5 students' level of agreement with statements about the *School Journal*

Statement	Year 5 students' level of agreement with statement about the *School Journal*							
	Agree a lot	Mean reading score	Agree a little	Mean reading score	Disagree a little	Mean reading score	Disagree a lot	Mean reading score
I learn things when I read the *School Journals*	45	515 (2.9)	41	554 (2.5)	9	553 (3.6)	5	519 (5.7)
There are people like me or my family in the *School Journals*	19	494 (3.8)	29	540 (3.0)	23	560 (2.7)	29	538 (3.0)
I enjoy reading the *School Journals*	44	518 (2.5)	33	550 (2.8)	14	554 (4.1)	9	533 (5.3)
The *School Journals* show people doing things I do or I would like to do	42	517 (2.8)	37	547 (2.3)	14	563 (3.0)	6	525 (5.8)
The *School Journals* help me to get better at reading	50	516 (2.7)	32	552 (2.5)	12	563 (3.7)	7	549 (6.0)
The *School Journals* help me to really think about what I am reading	45	517 (2.5)	33	544 (2.5)	15	564 (3.3)	7	554 (6.1)
The *School Journals* help me to get better at writing	31	500 (3.5)	31	540 (2.5)	23	562 (2.3)	15	557 (3.2)
The things I read in the *School Journals* are boring	14	503 (4.5)	23	539 (3.0)	29	556 (2.9)	34	529 (2.8)
I read about different people and new ideas in the *School Journals*	50	529 (2.5)	33	547 (2.4)	11	542 (4.5)	6	515 (8.0)
Reading the *School Journals* makes me want to do more reading	39	517 (2.9)	29	541 (3.0)	20	558 (3.9)	12	542 (3.7)

Note

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

Figure B.1: Relationship between Year 5 students' reports on the number of books in the home and their reading literacy achievement, by ethnic grouping



Appendix C: Trend Country Information

Table C.1: Changes in reading achievement for countries participating in 2010/11 and either the first or second cycle

Countries	(Absolute) change in mean reading scale scores			
	2005/06–2010/11		2001–2010/11	
Austria	9	▼		
Belgium (French)	6	●		
Chinese Taipei	18	▲		
Denmark	8	▲		
Georgia	17	▲		
Indonesia	24	▲		
Poland	6	▲		
Spain	1	●		
Trinidad and Tobago	35	▲		
Colombia			25	▲
Czech Republic			9	▲

▲ Significant increase
● No significant change
▼ Significant decrease

Source: Exhibit 1.4 in Mullis, Martin, Foy, & Drucker, 2012.

Box C.1: Examples of how PIRLS has informed system level changes

Country	Examples of system changes
Chinese Taipei	After 2005/06 results, a realisation that approach to teaching reading was inadequate as emphasis had been on decoding. National reading centres associated with universities established to develop reading instruction methods.
Colombia	As a result of the 2001 results, overhaul of teacher education programmes. PIRLS information used to look at teaching practices, and use of materials and learning strategies.
Iran (Islamic Republic)	Since 2001 results, inclusion of informational texts in reading programmes. PIRLS framework and objectives incorporated into teachers' guides for instruction in Farsi.
Trinidad and Tobago	After the 2005/06 results, development of a national reading policy; expansion of Centre for Excellence for Teacher Education Programmes.

Sources: *PIRLS 2011 encyclopedia, volumes 1 and 2* (Mullis, Martin, Minnich, Drucker & Ragan, 2012).

Box C.2: Context for change in reading literacy achievement for selected countries in PIRLS-10/11

Country	Context for change
Iran (Islamic Republic)	Pre-primary education for one year at age 5; focus is on readiness for school and instruction in Farsi in areas where it is not the 'mother-tongue'. Before school entry – all children are subject to school readiness assessments to diagnose learning disabilities. Teacher Education: since 2002 universities and higher education institutes offer in-service long-term teacher education programmes as well as teacher education centres affiliated to the Ministry of Education. Curriculum: learning objectives updated for reading – informational texts have been added to texts to be used in reading instruction. The PIRLS framework and its goals now form the framework for the teachers' edition of the curriculum objectives.
Russian Federation	Structural: Primary education increased from 3 years to 4 years, with children to start at 6 years (rather than at age 7). Curriculum: after 2001, greater shift to using written assessments rather than just oral assessments to assess comprehension; there has been a major shift to 'literary reading' as part of philology (reading and writing in Russian), accompanied by increased usage of informational-type texts in other curriculum areas such as history and mathematics. In addition to curriculum changes in 2004, new goals for learners introduced in 2006.
Hong Kong SAR	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 literacy needs of students. Teachers were encouraged to extend the range of teaching materials used in lessons. Since 2006: schools have been encouraged to work with parents to create supportive home reading environments and foster positive attitudes to reading.
Singapore	Diagnostic testing at school entry: when children start Grade 1 all children undergo a screening test to identify weak English language and basic early literacy skills. 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. Teachers were given more explicit information about the teaching of language at different schooling levels. The 2001 syllabus was reviewed with a new syllabus implemented in 2010. Public Awareness: *kidsREAD* a scheme to promote reading among 4–8 year olds from low-income families (e.g., reading clubs, volunteers to read to children at the clubs).
Slovenia	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 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. Since 2006: Greater awareness around the quality of teaching reading and writing, and assessing students' literacy skills.
Portugal*	Pre-primary education available from 3–5 years participation high with 99% of five year olds. Qualified teachers – a Master's is now the minimum academic qualification for entry into the professional programme. Teachers of Grades 1–4 (Years 2–5 equivalent) teach all subjects. Many schools organised in clusters with teachers working cooperatively across educational levels to implement curriculum vertically from Grades 1-12. Teacher Education: In 2005, in-service teacher education begins for Grades 1-4 teachers to improve the teaching of Portuguese, maths, and science "train the trainer" model used whereby teachers have one year training before returning to work with other teachers in a school cluster; teachers are required to produce specific didactic resources to support their teaching in Grades 1–4; clusters are overseen by higher education establishments responsible for initial teacher education; observation of teachers in the classroom, and workshops. Increase in the total number of instructional hours per week to 25 with 8 hours for Portuguese language (reading, writing, oral comprehension and communication and language knowledge). Use of approved text books optional. National assessments for system monitoring only; however in 2011/12 exams at Grade 6 were introduced in Portuguese and maths; these have consequences for students.

Notes

* Portugal participated in PIRLS for the first time in 2011, however it had taken part in the IEA 1990 Reading Literacy Study. The Portuguese mean in the 1990 study was well below the New Zealand mean for equivalent educational level (Year 5); 20 years later, the Portuguese mean was significantly higher than the New Zealand mean.

Sources: *PIRLS 2001 encyclopedia* (Mullis, Martin, Kennedy, & Flaherty, 2002), *PIRLS 2006 encyclopedia* (Kennedy, Mullis, Martin, & Trong, 2007); and *PIRLS 2011 encyclopedia, volumes 1 and 2* (Mullis, Martin, Minnich, Drucker & Ragan, 2012).

Appendix D: Ethnicity Non-prioritised Achievement Results

What is non-prioritised ethnicity reporting?

Prioritised reporting is when a student is recorded in one of the five main ethnic categories even if the student identifies with more than ethnic group. *Priority* is given to identification as Māori, then to being one of the Pacific Islands ethnic groups (and included in Pasifika grouping), Asian, Other ethnic groups, and then to the Pākehā/European grouping.

- If a student identifies as Māori and Pākehā s/he would be considered Māori.
- If a student identifies as Māori and Samoan s/he would be regarded as Māori
- If a student identifies as Samoan and Pākehā s/he would be recorded in the Pasifika grouping.
- If a student identifies as Indian and Pākehā s/he would be recorded in the Asian grouping.
- If a student identified as West Indian and Pākehā s/he would be recorded in the MELAA (Other ethnic groups) grouping.

Non-prioritised reporting: if a student identifies as Māori and Samoan the child is counted as Māori and in the Pasifika grouping. If a learner identifies as Indian and Pākehā, s/he would be in both the Pākehā/European and Asian groupings. Percentages total more than 100%.

PIRLS and using non-prioritised student reports

Percentages for the ethnic groupings in Table D.1 are based on students' responses to the question on their ethnic identity. Because many students identified with more than one ethnic group their responses have been recorded in each (group or) grouping with which they identified. Thus, the sum of the ethnic proportions does not add to 1.0 (or 100%). Comparisons cannot be made statistically among groupings within a cycle; only across time for a given group (e.g., comparisons between Māori in 2001 with Māori in 2010).

2001 data

In 2001, data was collected only from Year 5 students (in keeping with practice with earlier TIMSS cycles). However, a number of issues arose after data entry. Firstly, a relatively high level of missing was recorded, due to the positioning of the question. Secondly, upon checking against population estimates, the prioritised ethnicity estimates were found to be markedly different: Pākehā/European, 42%; Māori, 34%; Pasifika, 9%; Asian, 5%; and Other ethnic groups, 5%. Ethnicity enrolment data in a prioritised form (as was the practice at that time) was sought directly from the schools, but unfortunately these data could not be cross checked against the students' actual questionnaire responses. Thus, the information supplied by the schools was used for reporting purposes and reported in Section 2 of this report and in previous published reports:

- Caygill, R., & Chamberlain, M. (2004). *Progress in International Reading Literacy Study (PIRLS): New Zealand's Year 5 student achievement 2001*. Wellington: Research Division, Ministry of Education.

- Chamberlain, M. (2008). *PIRLS 2005/2006 in New Zealand: An overview of national findings from the second cycle of the Progress in International Reading Literacy Study (PIRLS).* Research Division, Ministry of Education.

2005 and 2010 data

In both 2005 and 2010, data were collected from both students and school records. The students' data was used to verify school records. In some instances student information was used instead of school information. For example: students who identified themselves as "Indian" and the school had recorded them in the MELAA category. Thus, the prioritised reporting reflects both student and school-level reports.

Table D.1: Mean reading scale scores for Year 5 students by ethnicity (non-prioritised)

Year 5 student group (non-prioritised)	Mean reading scale score for each PIRLS assessment			Change 2005/06–2010/11
	2001	2005/06	2010/11	
Pākehā/European	550 (3.5)	549 (2.2)	556 (2.1)	+ 6 (3.1)
Māori	501 (4.2)	492 (3.6)	492 (3.2)	0 (4.8)
Pasifika	483 (5.2)	482 (3.6)	480 (4.5)	–3 (5.8)
Asian	527 (7.7)	535 (4.9)	537 (4.2)	+ 3 (6.5)
Other ethnic groups	527 (7.7)	511 (9.0)	513 (14.8)	+ 2 (17.4)

Notes

Because of the unreliable ethnicity data gathered in 2001, the change is calculated between 2005/06 and 2010/11.

Ethnicity (non-prioritised) percentages for 2001: Pākehā/European, 61% (1.9); Māori, 34% (1.6); Pasifika, 15% (1.2); Asian, 9% (0.7); Other ethnic groups, 11% (0.8). Missing /non-response = 5.3%.

Ethnicity (non-prioritised) percentages for 2005: Pākehā/European, 70% (1.2); Māori, 25% (0.9); Pasifika, 14% (0.9); Asian, 11% (0.8); Other ethnic groups, 2% (0.2). Missing /non-response < 2.0%.

Ethnicity (non-prioritised) percentages for 2010: Pākehā/European, 64% (1.5); Māori, 25% (1.0); Pasifika, 14% (1.3); Asian, 10% (1.1); Other ethnic groups, 2% (0.3). Missing /non-response < 1.0%.

Appendix E: Sample Passage and Questions

The passage "The Giant Tooth Mystery" is an example of one of five informational texts used in PIRLS-2010/11.[90] Each question is presented with details of the key comprehension process assessed.

The GIANT Tooth Mystery

A fossil is the remains of any creature or plant that lived on the Earth many, many years ago. People have been finding fossils for thousands of years in rocks and cliffs and beside lakes. We now know that some of these fossils were from dinosaurs.

Long ago, people who found huge fossils did not know what they were. Some thought the big bones came from large animals that they had seen or read about, such as hippos or elephants. But some of the bones people found were too big to have come from even the biggest hippo or elephant. These enormous bones led some people to believe in giants.

[90] Source: PIRLS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA). Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College, Chestnut Hill, MA and International Association for the Evaluation of Educational Achievement (IEA), IEA Secretariat, Amsterdam, the Netherlands.

Hundreds of years ago in France, a man named Bernard Palissy had another idea. He was a famous pottery maker. When he went to make his pots, he found many tiny fossils in the clay. He studied the fossils and wrote that they were the remains of living creatures. This was not a new idea. But Bernard Palissy also wrote that some of these creatures no longer lived on earth. They had completely disappeared. They were extinct.

Was Bernard Palissy rewarded for his discovery? No! He was put in prison for his ideas.

As time went by, some people became more open to new ideas about how the world might have been long ago.

Then, in the 1820s, a huge fossil tooth was found in England. It is thought that Mary Ann Mantell, the wife of fossil expert Gideon Mantell, was out for a walk when she saw what looked like a huge stone tooth. Mary Ann Mantell knew the big tooth was a fossil, and took it home to her husband.

Life-sized sketch of a fossil tooth

When Gideon Mantell first looked at the fossil tooth, he thought it had belonged to a plant eater because it was flat and had ridges. It was worn down from chewing food. It was almost as big as the tooth of an elephant. But it looked nothing like an elephant's tooth.

Gideon Mantell could tell that the pieces of rock attached to the tooth were very old. He knew that it was the kind of rock where reptile fossils were found. Could the tooth have belonged to a giant, plant-eating reptile that chewed its food? A type of reptile that no longer lived on earth?

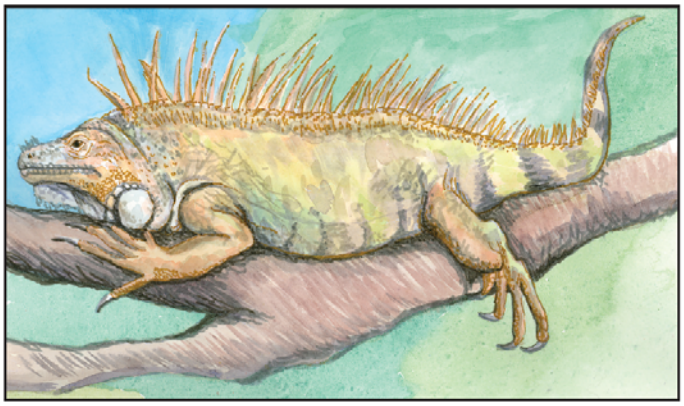
Gideon Mantell was really puzzled by the big tooth. No reptile that he knew about chewed its food. Reptiles gulped their food, and so their teeth didn't get worn down. It was a mystery.

Gideon Mantell took the tooth to a museum in London and showed it to other scientists. No one agreed with Gideon Mantell that it might be the tooth of a gigantic reptile.

Gideon Mantell tried to find a reptile that had a tooth that looked like the giant tooth. For a long time, he found nothing. Then one day he met a scientist who was studying iguanas. An iguana is a large plant-eating reptile found in Central and South America. It can grow to be more than two metres long. The scientist showed Gideon Mantell an iguana tooth. At last! Here was the tooth of a living reptile that looked like the mystery tooth. Only the fossil tooth was much, much bigger.

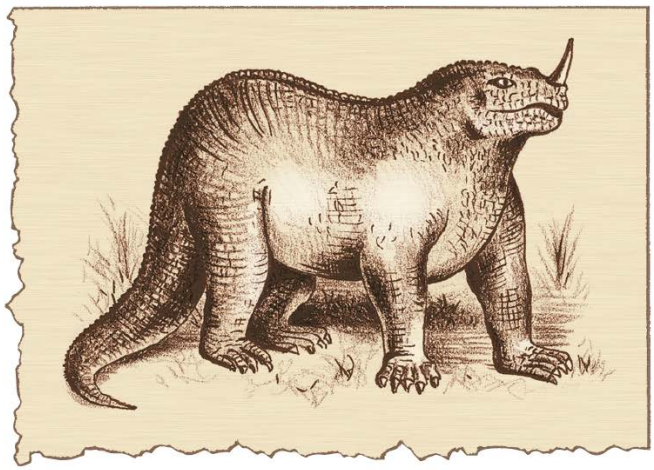
Iguana

A life-sized drawing of an iguana's tooth from Gideon Mantell's notebook



Now Gideon Mantell believed the fossil tooth had belonged to an animal that looked like an iguana. Only it wasn't two metres long. Gideon Mantell believed it was 30 metres long! He named his creature *Iguanodon*. This means "iguana tooth".

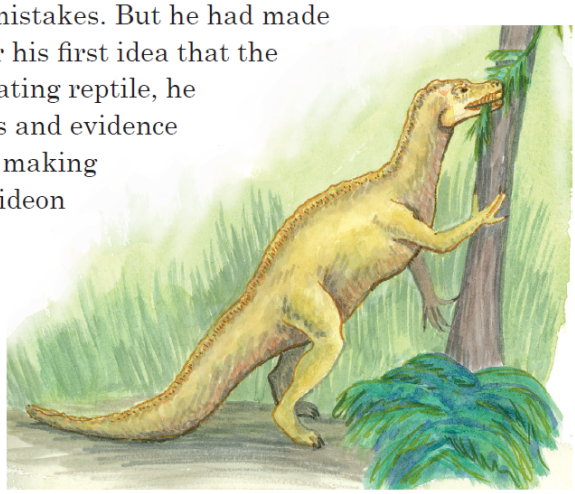
Gideon Mantell did not have a whole *Iguanodon* skeleton. But from the bones he had collected over the years, he tried to figure out what one might have looked like. He thought the bones showed that the creature had walked on all four legs. He thought a pointed bone was a horn. He drew an *Iguanodon* with a horn on its nose.



What Gideon Mantell thought an *Iguanodon* looked like

Years later, several complete *Iguanodon* skeletons were found. They were only about nine metres long. The bones showed that it walked on its hind legs some of the time. And what Gideon Mantell thought was a horn on its nose was really a spike on its "thumb"! Based on these discoveries, scientists changed their ideas about what the *Iguanodon* looked like.

Gideon Mantell made some mistakes. But he had made an important discovery too. After his first idea that the fossil tooth belonged to a plant-eating reptile, he spent many years gathering facts and evidence to prove his ideas were right. By making careful guesses along the way, Gideon Mantell was one of the first people to show that long ago, giant reptiles lived on earth. And then they became extinct.



What scientists today think the *Iguanodon* looked like

Hundreds of years before, Bernard Palissy had been thrown into prison for saying nearly the same thing. But Gideon Mantell became famous. His discovery made people curious to find out more about these huge reptiles.

In 1842, a scientist named Richard Owen decided that these extinct reptiles needed a name of their own. He called them *Dinosauria*. This means "fearfully great lizard". Today we call them dinosaurs.

Questions *The Giant Tooth Mystery*

Comprehension process: *Focus on and retrieve explicitly stated information*

1. What is a fossil?

   Ⓐ the surface of rocks and cliffs

   Ⓑ the bones of a giant

   Ⓒ the remains of very old living things

   Ⓓ the teeth of elephants

Comprehension process: *Make straightforward inferences*

2. According to the article, why did some people long ago believe in giants?

_____

_____

_____

Comprehension process: *Focus on and retrieve explicitly stated information*

3. Where did Bernard Palissy find fossils?

   Ⓐ on the cliffs

   Ⓑ in the clay

   Ⓒ by a river

   Ⓓ on a path

Comprehension process: *Interpret and integrate ideas and information*

4. What was Bernard Palissy's new idea?

1 _____

Comprehension process: *Make straightforward inferences*

5. Why was Bernard Palissy put in prison?

A People were not open to new ideas.

B He copied his ideas from Gideon Mantell.

C He left tiny fossils in his pottery.

D Studying fossils was forbidden in France.

Comprehension process: *Focus on and retrieve explicitly stated information*

6. Who found the fossil tooth in England?

A Bernard Palissy

B Mary Ann Mantell

C Richard Owen

D Gideon Mantell

Comprehension process: *Make straightforward inferences*

7. What did Gideon Mantell know about reptiles that made the fossil tooth puzzling?

   (A) Reptiles had no teeth.

   (B) Reptiles were found under rocks.

   (C) Reptiles lived long ago.

   (D) Reptiles gulped their food.

Comprehension process*: Interpret and integrate ideas and information*

8. Gideon Mantell thought the tooth might have belonged to different types of animals. Complete the table to show what made him think this.

Type of animal	**What made him think this**
A plant eater	The tooth was flat with ridges.
A giant creature	
A reptile	

Comprehension process: *Make straightforward inferences*

9. Why did Gideon Mantell take the tooth to a museum?

   (A) to ask if the fossil belonged to the museum

   (B) to prove that he was a fossil expert

   (C) to hear what scientists thought of his idea

   (D) to compare the tooth with others in the museum

Comprehension process: *Interpret and integrate ideas and information*

10. A scientist showed Gideon Mantell an iguana tooth. Why was this important to Gideon Mantell?

_____

_____

Comprehension process: *Focus on and retrieve explicitly stated information*

11. What did Gideon Mantell use when trying to figure out what the *Iguanodon* looked like?

   (A) bones he collected

   (B) ideas from other scientists

   (C) pictures in books

   (D) teeth from other reptiles

Comprehension process: *Examine and evaluate content, language, and textual elements*

12. Look at the two pictures of the *Iguanodon*. What do they help you to understand?

2

Comprehension process: *Interpret and integrate ideas and information*

13. Later discoveries proved that Gideon Mantell was wrong about what the *Iguanodon* looked like. Fill in the blank spaces to complete the table.

	What Gideon Mantell thought the *Iguanodon* looked like	**What scientists today think the *Iguanodon* looked like**
1	The *Iguanodon* walked on four legs.	
1		The *Iguanodon* had a spike on its "thumb".
1	The *Iguanodon* was 30 metres long.	

Comprehension process: *Make straightforward inferences*

14. What were found that showed Gideon was wrong about what the *Iguanodon* looked like?

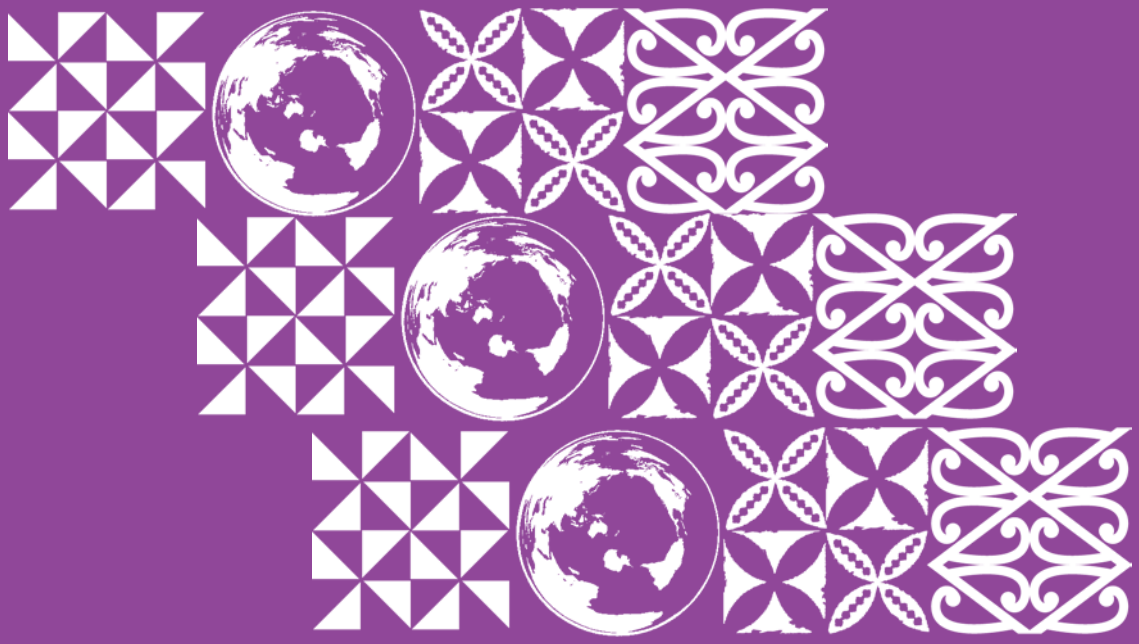
(A) more fossil teeth

(B) scientific drawings

(C) living *Iguanodons*

(D) whole skeletons

Technical Notes and References



Technical Notes

These technical notes provide a very brief outline of some of the key methodology used in PIRLS. For more detailed information on TN 1–TN 4 and TN 9 readers are advised to go to the *TIMSS & PIRLS 2011 Methods and Procedures*, edited by Martin and Mullis (2012), which is available on the PIRLS website: http://timssandpirls.bc.edu/.

TN 1 Weighting

In general, the sampling design required schools to be sampled with a 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.

TN 2 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 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 uses the plausible value methodology to produce estimates of student proficiency in reading.

PIRLS Scale Centrepoint

The PIRLS reading achievement scale was established in the first cycle in PIRLS 2001. The average (mean) of the country means of 500 and a standard deviation of 100 was set and remains constant from assessment to assessment. In earlier cycles it was referred to as the PIRLS Scale Mean. The new nomenclature refers to the fact that the achievement scale uses the same point of reference–500–from assessment to assessment, and in the case of PIRLS it relates to the original 2001 cycle. If the international mean was used in each cycle (i.e., averaging the country means) then this statistic would change from assessment to assessment as the number and characteristics of participating countries changed. This would result in unreliable estimates of changes in achievement over time.

TN 3 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 (e.g., the mean), the computation is carried out using the five plausible values, with the results then averaged. The mean for an individual country, for example, is calculated as the mean of the (weighted) means of each of the five plausible values. The international achievement means reported in relation to background variables such as gender 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 reporting. Each country contributes equally to the calculations.

TN 4 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 2010/11 the Year 5 student mean for reading is 531 and the standard error of this statistic is 1.9. Therefore, we can say with 95 percent confidence that the true mean is between 527 and 535 (i.e., $531 \pm 1.96 \times 1.9$).

Because of the complexity of the design of PIRLS (a complex survey design for the school sampling and a multiple-matrix design for assessment booklet allocation), the calculation of standard error for an achievement score 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) $$t = \frac{\overline{X}_1 - \overline{X}_2}{se_{diff}}$$

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

When comparisons are being made between, for example the New Zealand mean and the international reading mean for the trend countries, the following formula should be applied:

(3) $$\frac{\sqrt{\left(\sum_{i=1}^{n}\left(se_i^2\right) + n(n-2)se_k^2\right)}}{n}$$

where se_i represents the standard errors of all the contributing means (e.g., the standard errors from the trend countries) and se_k is the standard error of the mean that is being compared (e.g., New Zealand) and n is the number of means overall (e.g., the number of trend countries).

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

TN 5 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).

The following approach has been 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: W_i is the sample weight of group i and s_i is the standard deviation of the scale score of group i.

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

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

And where:

$\overline{X}_i$ 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.

Essentially, an 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. 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).

TN 6 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-Bonferroni 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 Dunn-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 2010/11), 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 2010/11).

TN 7 Minimum group size for reporting achievement data

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 at a level on an index was estimated to be 2 percent (rounded), as long as there were **more than 50 students from 10 schools** in the 'cell' to estimate the proportion, achievement results are reported.

TN 8 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, $\frac{6}{2} = 3$, 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

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

TN 9 Development of background scales

In order to have (continuous) measures for encapsulating and making inferences from contextual data, IRT scales were developed from sets of background or contextual questions gathered from students, teachers, and school leaders. The underlying premise during the process of selecting sets of items and then developing scales was that there should be a positive relationship within and across countries between the items or scales, and reading achievement.

The field trial data from all participating countries was used for developing the scales. The following steps were taken:

a. ***Checking for unidimensionality***: that is, the assumption that there is an underlying "unidimensional" construct to the proposed scale. In this context, a scale was considered "sufficiently unidimensional" if a single underlying construct is the dominant influence on the responses to the items. PIRLS (and TIMSS) used Principal Components Analysis (using SPSS 16.0) to confirm that there was a single principal component. If there was evidence of more than one component, the items that did not load on the first component were flagged for

elimination from a scale, unless they were considered to have crucial conceptual importance for measuring the construct.

b. ***Estimating Reliability (internal consistency)***: Conbrach's Alpha a measure of internal consistency was computed to provide an indicator of the reliability of each proposed scale. A scale was considered sufficiently reliable if Conbrach's Alpha was at least 0.7. Most of the derived scales in PIRLS (and TIMSS) had Conbrach's Alpha coefficients greater than 0.7.

c. ***Evaluating the proposed scales***: in order to check the validity of the relationship of the resulting scale with achievement, a preliminary score was constructed for each score. This was done by assigning a numerical value to each response category (e.g., disagree a lot = 1 through to agree a lot = 4); a high score indicated a supportive learning environment and a lower score less supportive. The mean achievement scores were calculated for the students in three categories on each scale (bottom 25%, middle 50%, and the top 25%) for checking the achievement relationship (i.e., higher achievement in the top 25%, than in the middle, which in turn was higher than the bottom 25%).

A few of the scales did not have the expected relationship with student achievement and were not used in reporting the main survey results. For the main survey, a 1-Parameter IRT (Rasch) measurement model was used to scale the actual responses to the items forming the scales, with a mean of 10 and standard deviation of 2. For further details refer to Mullis, Drucker, Preuschoff, Arora, & Stanco (2012).

Confidentiality

PIRLS is designed to describe the results or to make inferences about the (estimated) population or sub-populations of Year 5 students, and the types and locations of schools they attended. It is not designed to report on the achievements 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.

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