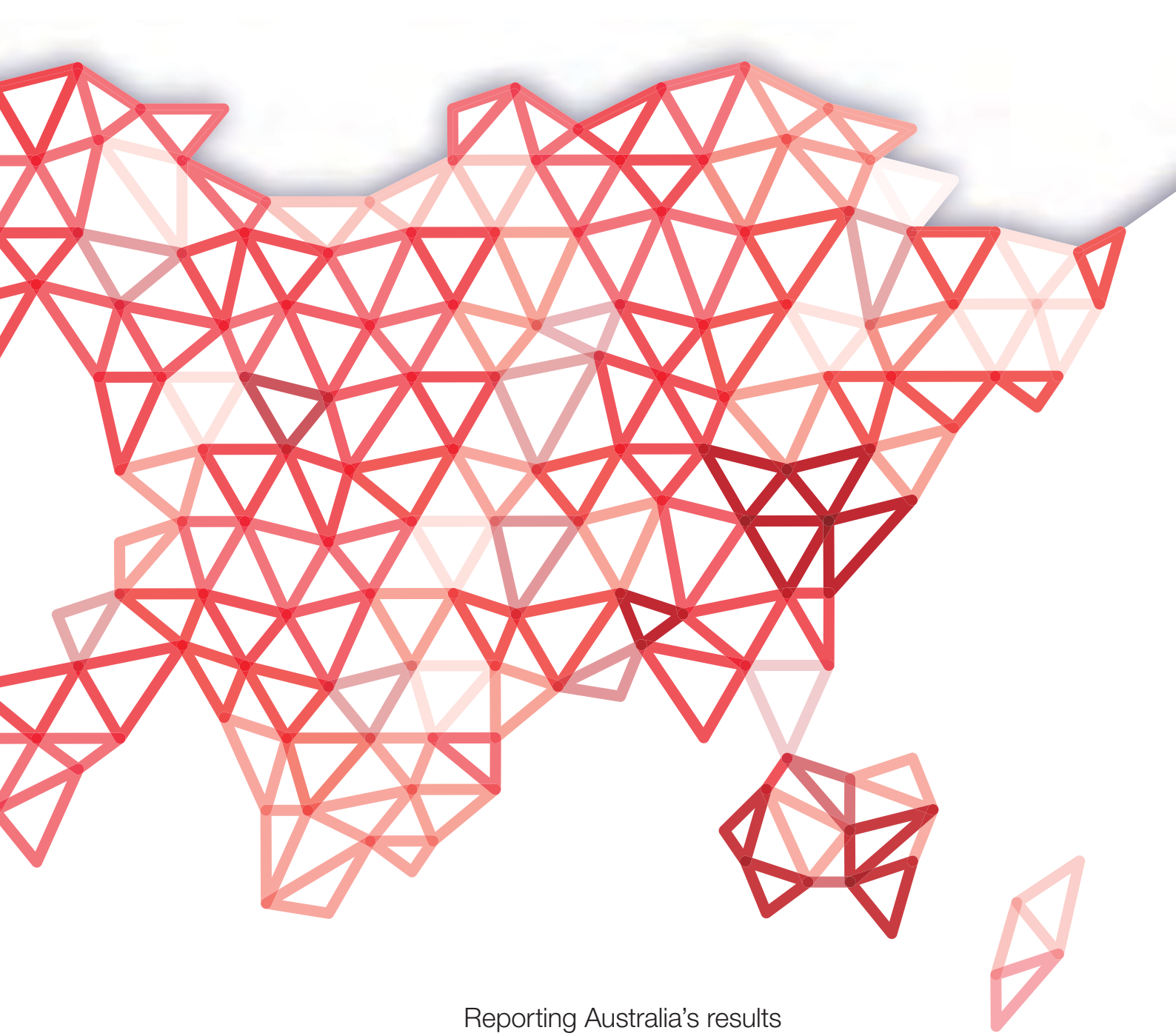


Reporting Australia's results

PIRLS 2016

Sue Thomson
Kylie Hillman
Marina Schmid
Sima Rodrigues
Jessica Fullarton

ACER

First published 2017
by Australian Council *for* Educational Research Ltd
19 Prospect Hill Road, Camberwell, Victoria, 3124, Australia

www.acer.org
www.acer.org/pirls

Cover design, text design and typesetting by ACER Creative Services

A catalogue record for this
book is available from the
National Library of Australia

ISBN 9781742864952 (ebook)

Contents

List of Tables

List of Figures

Executive summary

The Progress in International Reading Literacy Study (PIRLS) is an international comparative study of student achievement directed by the International Association for the Evaluation of Educational Achievement (IEA). PIRLS 2016 represents the fourth such study since PIRLS was first conducted in 2001. Australia has participated in the two most recent cycles – PIRLS 2011 and 2016.

In Australia, PIRLS is managed by the Australian Council for Educational Research (ACER) and is jointly funded by the Australian Government and the state and territory governments.

The goal of PIRLS is to provide the best policy-relevant information about how to improve teaching and learning and to help young students become accomplished and self-sufficient readers, by assisting countries monitor and evaluate their teaching of reading across time.

Students in the fourth year of schooling typically have gained most of their reading skills in a multitude of environments – at school and at home; in different classrooms with different teachers. In order to reflect this situation, PIRLS collects a rich array of background data from students, schools and teachers, and also collects data about the education systems themselves.

This report analyses and interprets the Australian data collected as part of PIRLS 2016. Where appropriate, this report makes comparisons with the results of other countries and with the international average to better understand Australian achievement in reading literacy and its context.

Who was assessed?

Across the world, over 580,000 Year 4 students in 50 countries and 11 benchmarking entities took part in PIRLS 2016.

Within Australia, a stratified random sample of 286 primary schools participated in the data collection for PIRLS 2016. The stratification of the sample ensured that the PIRLS sample was representative of the Australian Year 4 population (according to jurisdiction, school sector, geographic location of each school and socioeconomic category for the area of each school).

At each sampled school, one intact Year 4 class – along with all Indigenous students in that year level – was selected to participate in PIRLS 2016. This resulted in a sample of 6341 Year 4 students. Statistical weighting enables these students to represent the total student population at Year 4.

What was assessed?

The reading assessment in PIRLS is organised around two dimensions – the purposes for reading, and the processes of comprehension readers use in understanding the texts and their related questions.

The two purposes for reading that account for most of the reading activities done by young students in and out of school are identified in PIRLS as *reading for literary experience* and *reading to acquire and use information*.

Within each of these two major reading purposes, four processes of comprehension are also assessed:

- focusing on and retrieving explicitly stated information
- making straightforward inferences
- interpreting and integrating ideas and information
- examining and evaluating content, language, and textual elements.

Overall, half of the PIRLS assessment focuses on reading for literary experience and half on reading to acquire and use information.

What did PIRLS 2016 participants do?

Students completed a PIRLS booklet, which contained two short texts (either two literary texts, two informational texts or one of each) and their associated questions. In total, 12 texts were used in the PIRLS 2016 assessment, which included six texts used in PIRLS 2011. These texts and their associated test questions were combined to create 16 different PIRLS booklets, each containing multiple-choice and constructed response items. The booklets were evenly distributed within each participating class, thus, only one or two students in each class completed a particular PIRLS booklet. After completing their PIRLS reading assessment, students were asked to complete a background questionnaire, which sought information on home contexts, and on their characteristics and attitudes towards learning and reading.

Teachers, principals and curriculum experts also completed questionnaires, which enabled collection of information about the various contexts of teaching and learning reading.

How are the results reported?

Results are reported as average scores with standard errors, as distributions of scores and as percentages of students who attain the international benchmarks, for countries and for specific groups of students within Australia.

The international benchmarks were developed using scale-anchoring techniques. Internationally, it was decided that performance should be measured at four levels: the 'Advanced international benchmark', which was set at 625 score points; the 'High international benchmark', which was set at 550 score points; the 'Intermediate international benchmark', which was set at 475 score points; and the 'Low international benchmark', which was set at 400 score points.

Year 4 reading results: International, national and Australian demographic groups

Key findings

- The mean score for Australian students on PIRLS 2016 was 544 points, a statistically significant 17 points higher than in PIRLS 2011.
- Australian students performed significantly higher, on average, than students in 24 countries, including three other countries that tested in English – New Zealand, Trinidad and Tobago, and Malta.
- Australian Year 4 students were outperformed by students in 13 countries, including Singapore, Hong Kong, Ireland, Northern Ireland and England (all testing in English), as well as the Russian Federation, Finland and Poland.

- Sixteen per cent of Australian students reached the Advanced international benchmark, compared to 29 per cent of students in Singapore, 26 per cent in the Russian Federation and 22 per cent in Northern Ireland.
- Eighty-one per cent of Australian Year 4 students reached the Intermediate international benchmark, which is the proficient standard for Australia.
- Australian students showed a relative strength in the Literary reading purpose (reading for interest and pleasure) but the score on the Informational reading purpose (reading to gain information) was not different to the overall reading score.
- Performance across the Australian jurisdictions was fairly similar, with the only exceptions being that students in Victoria performed at the same level as students in the Australian Capital Territory and at a level higher than all other jurisdictions, while students in South Australia performed significantly lower, on average, than students in Western Australia and the Australian Capital Territory, as well as those in Victoria.
- All jurisdictions saw an increase in the proportion of students at the Advanced international benchmark, and Victoria, Queensland and Western Australia had a large decrease in the proportion of students at or below the Low international benchmark.
- Female students continue to perform at a higher level in reading literacy, on average, than their male peers.
- Fifty-seven per cent of Australian Indigenous students reached the Intermediate international benchmark, compared to 83 per cent of non-Indigenous students.
- Students who primarily spoke English at home scored a statistically significant 15 points higher, on average, than students who spoke a language other than English at home.
- Twenty-eight per cent of students who reported *many books* in the home reached the Advanced international benchmark, compared to 17 per cent of students with *an average number of books*, and just 4 per cent of students with *a few books*.
- Eighteen per cent of students in metropolitan schools, compared with 22 per cent of students in provincial schools and 30 per cent of those in remote schools, did not achieve the Intermediate benchmark.

Schools and the learning environment in Australia

Key findings

- Forty-one per cent of students attended schools in which the principal had completed a postgraduate university degree, and about 30 per cent had a principal with between 10 and 20 years of experience.
- Thirty-five per cent of students attended schools categorised by their principals as having a *more affluent* student population, 26 per cent as having a *more disadvantaged* student population and the remainder were in schools that were *neither more affluent nor more disadvantaged*.
- Students attending *more affluent* schools scored 61 points higher, on average, than students attending *more disadvantaged* schools.
- Students in schools whose principals indicated that 90 per cent or more of the students had English as their first language tended to have higher average achievement than students in schools whose principals indicated that less than 90 per cent of the student population had English as their first language.
- Students attending *more affluent* schools were more likely than those attending *more disadvantaged* schools to be in an environment where most students spoke English as their first language.
- Students who attended schools where less than 25 per cent of students had literacy skills upon entry to school had significantly lower achievement, on average, than students who attended schools where more than 25 per cent of students had literacy skills upon entry to school.
- Of those students at *more affluent* schools, 7 per cent attended schools in which more than 75 per cent of students entered school with literacy skills, compared to none in *more disadvantaged* schools. In contrast, 81 per cent of students in *more disadvantaged* schools were in schools in

which fewer than 25 per cent of students entered with literacy skills, compared to 42 per cent of students in *more affluent* schools.

- Sixty-four per cent of students attended schools where reading instruction was *not affected* by resource shortages, and average reading scores were significantly higher in these schools compared those in which instruction was affected by resource shortages.
- A greater proportion of students in *more disadvantaged* schools than in *more affluent* schools were affected by reading resource shortages (58% and 26%, respectively).
- More than half of Australian Year 4 students were categorised as having a *high* sense of school belonging, 33 per cent had *some* sense of belonging and 10 per cent had *little* sense of school belonging. Students with a *high* sense of school belonging scored 37 points higher, on average, than students with *little* sense of school belonging.
- There was a clear relationship between Australian students' reading achievement and their principals' and teachers' reports of school emphasis on academic success, with a higher emphasis on academic success associated with higher average achievement.
- Only 4 per cent of students in *more disadvantaged* schools were in environments with a *very high* emphasis on academic success, as rated by their principals, compared to 26 per cent of students at *more affluent* schools.
- Job satisfaction was relatively high among Australian teachers, with only 2 per cent of Year 4 students being taught by a teacher who was *less than satisfied*, and 58 per cent taught by a teacher who was *very satisfied*. There was no difference in the average job satisfaction scores of teachers in *more affluent* schools and *more disadvantaged* schools.
- There was a clear relationship between Australian students' reading achievement and their principals' reports of school discipline problems – with fewer discipline problems associated with higher achievement. Students who attended *more disadvantaged* schools were far more likely than those in *more affluent* schools to face *moderate to severe problems* regarding school discipline.
- Higher teacher ratings on the Safe and Orderly Schools scale were associated with higher student achievement, on average. Sixty per cent of students at *more disadvantaged* schools and 86 per of students at *more affluent* schools had teachers who classified the school as being *very safe and orderly*, however 7 per cent of students in *more disadvantaged* schools were in environments deemed by their teachers to be *less than safe and orderly*.
- Nineteen per cent of Australian Year 4 students reported being bullied *about weekly*. Students who reported *almost never* being bullied had average reading scores more than 30 points higher than students who reported being bullied *about weekly*. Fifteen per cent of students who attended *more affluent* schools, compared to 23 per cent of students who attended *more disadvantaged* schools, reported being bullied *about weekly*.

Teachers and the teaching of reading in Australia

Key findings

- The majority of Year 4 students (84%) were taught reading by a female teacher.
- Over 80 per cent of Year 4 students were being taught by a teacher with a bachelor's degree or equivalent, with a further 12 per cent of students being taught by a teacher with a postgraduate degree.
- The relationship between the amount of time teachers reported spending in professional development and Australian student performance on the PIRLS assessments ran counter to what may have been expected – students whose teachers had spent 16 or more hours in professional development scored lower (544 points) on average than students whose teachers had spent less than six hours on professional development (556 points).
- A far greater proportion of Australian Year 4 students, compared to the international average, had computers available for use during reading lessons.
- There was a clear relationship between the reading achievement of Australian students and teachers' reports that their teaching was limited by student needs, with fewer limitations associated with higher reading achievement.
- There was a clear relationship between the reading achievement of Australian students and the frequency of student absences, with fewer absences associated with higher reading achievement.

Student attitudes and engagement

Key findings

- Students who reported enjoying reading *very much* scored significantly higher, on average, in reading than students who *somewhat like reading*, who in turn scored higher, on average, than students who *do not like reading*.
- Higher levels of student confidence in reading were also associated with higher scores on the PIRLS reading assessment.
- Students who were *less than engaged* during their reading lessons, according to their own report, scored significantly lower, on average, than other students.
- Among Indigenous students, there were no significant differences in the average reading scores of students who *very much like reading* and those who *somewhat like reading*. Students in both of these groups, however, scored higher in reading than students who *do not like reading*.
- There were no differences in the average reading scores of Indigenous students who were *less than engaged*, *somewhat engaged* or *very engaged* during their reading lessons.
- For students with *a few books* in the home, according to their own estimation, there were no significant differences in reading achievement associated with enjoyment of reading.
- The proportion of students with *a few books* in the home who were classified as *not confident* readers was more than twice the proportion of students with either *an average number of books* or *many books* at home who were *not confident* in their reading abilities.

Acknowledgements

The funding for the Australian component of PIRLS 2016 was provided jointly by the Australian Government and the state and territory governments. All of Australia's share of the international overheads and half of the basic funding for PIRLS within Australia was defrayed by the Australian Government Department of Education and Training (DET), while each state and territory government school system provided funding in proportion to the size of its student population.

In Australia, PIRLS is managed by a team from the Australian Council for Educational Research (ACER) and guided by the International Assessments Joint National Advisory Committee (IAJNAC). ACER wishes to thank the IAJNAC members for the continued interest in, and commitment to, the project through each of its phases. The IAJNAC members' involvement included assisting with the implementation of PIRLS in schools in their jurisdictions, reviewing the report and providing valuable information to ensure the continued success of PIRLS in Australia.

The undertaking of PIRLS 2016 was a collaborative effort. A national survey such as PIRLS could not be undertaken successfully without the cooperation and contributions of the school systems, principals, teachers, parents and, of course, the students. Data of the quality collected and analysed in PIRLS depends upon a high participation rate of the randomly selected schools and students. Australia was able to meet the response criteria set internationally for school and students in PIRLS 2016. ACER gratefully recognises the assistance of the education system officials Australia-wide, and of the principals, teachers, parents and students in the participating schools, who gave generously of their time and support in contributing to the project.

Parts of this report are reproduced and/or modified, with permission, from the *PIRLS 2016 International Results in Reading* report and the *PIRLS 2016 Assessment Framework*:

Mullis, I.V.S., Martin, M.O., Foy, P. & Hooper, M. (2017). *PIRLS 2016 International Results in Reading*. Retrieved from: http://timssandpirls.bc.edu/pirls2016/international-results.html

Mullis, I.V.S. & Martin, M.O. (Eds.) (2015). *PIRLS 2016 Assessment Framework*. Retrieved from: http://timssandpirls.bc.edu/pirls2016/framework.html

Reader's Guide

Sample surveys

PIRLS is conducted as a sample survey in most participating countries. In surveys such as this, a sample of students is selected to represent the population of students at a particular year level in a given country. The samples are designed and conducted so that they provide reliable estimates about the population that they represent. Sample surveys are cheaper to undertake and less of a burden for schools than a full census of the particular population.

The basic sample design for PIRLS is generally referred to as 'a two-stage stratified cluster sample design'. The first stage consists of a sample of schools and the second stage consists of the identification of a single classroom selected at random from the target year level in sampled schools.

Students in the selected classrooms are representative of the students in the population, and weights are used to adjust for any differences arising from intended features of the design (e.g. to oversample minorities) or non-participation by students who were selected. In this way we can provide measures of achievement for the population, based on the responses of a sample.

PIRLS achievement scales

PIRLS 2016 used item response theory (IRT) methods to summarise the achievement of students on a scale with a mean of 500 and a standard deviation of 100 (please refer to the international PIRLS website for more information about IRT methods: https://timssandpirls.bc.edu/publications/pirls/2016-methods.html).

The PIRLS reading scales for Year 4 were based on the 2001 assessment and the methodology enables comparable trend measures from assessment to assessment.

International comparison statistics

Several international comparison statistics are given in the report: the *PIRLS scale centrepoint, the international average and the international median*.

The PIRLS scale centrepoint is the mean of the scales for (Year 4 reading) established in the first cycle of the study (2001), calibrated to be 500, with a standard deviation of 100 score points.

The international average is the mean score or percentage of all countries participating in PIRLS 2016 at that year level.

The international median is the midpoint in a ranking of countries ordered by score or percentage. By definition, half of the participating countries will have a score or percentage above the median and half below.

It should be noted that both the international average and the international median will vary depending on the set of countries included. Therefore, these statistics should be used in the context of a number of comparison statistics.

Standard errors and confidence intervals

In this and other reports, student achievement is often described using a mean score. For PIRLS, each mean score is calculated from the sample of students who undertook the assessments. These sample means are an approximation of the actual mean score (known as the population mean) that would have been derived had all students in Australia participated in the PIRLS assessment. If another sample of students was chosen on a different day, it is highly likely that the sample mean would be slightly different. Indeed, the sample mean is just one point along the range of student achievement scores, and so more information is needed to gauge whether the sample mean is an underestimation or overestimation of the population mean.

In this report, means are presented with an associated standard error. The standard error is an estimate of the error in the estimate of the population mean from the sample and is based on the standard deviation of the sampling distribution of the mean. The size of the sample, as well as the variance in the scores within the sample, can affect the size of the standard error. Smaller samples, or samples with a greater variance in scores, will have larger standard errors.

The calculation of confidence intervals can assist our assessment of a sample mean's precision as a population mean. Confidence intervals provide a range of scores within which we are 'confident' that the population mean actually lies. The confidence interval is within plus or minus 1.96 standard errors of the sample mean. Thus, a larger standard error results in a larger confidence interval and a greater likelihood that the confidence intervals of two means will overlap.

Statistical significance

The term 'significantly' is used throughout the report to describe a difference that meets the requirements of statistical significance at the 0.05 level, and would be found in at least 95 analyses out of 100 if the comparison were to be repeated. It is not to be confused with the term 'substantial', which is qualitative and based on judgement rather than statistical comparisons. A difference may appear substantial but not be statistically significant (due to factors that affect the size of the standard errors around the estimate, for example) while another difference may seem small but reach statistical significance because the estimate was more accurate.

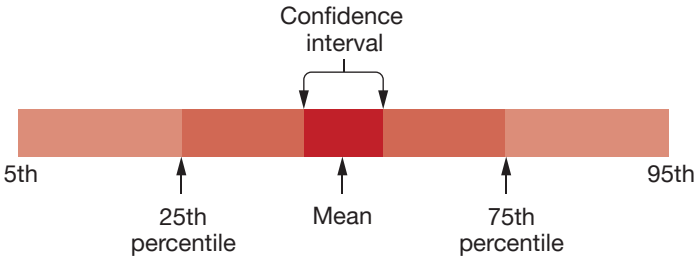
Trends

It should be noted that a change in 2015 to the method of calculating standard errors means that standard errors for data from past cycles presented in the current report will not match those presented in earlier reports (please refer to the international PIRLS website for more information on calculation of standard errors: https://timssandpirls.bc.edu/publications/pirls/2016-methods.html). PIRLS 2016 is the second cycle in which Australia has participated in PIRLS, and so analysis of any trends is restricted to comparison of data from 2011 and 2016, and the standard errors for 2011 have been recalculated for this activity.

Rounding of figures

Due to rounding to eliminate decimals, some percentages in tables and figures may not exactly add to 100. Totals, differences and averages are always calculated on the basis of exact numbers and are rounded only after calculation. When standard errors have been rounded to one decimal place and the value 0.0 is shown, this does not imply that the standard error is zero, rather that its value is smaller than 0.05.

Reading the distribution graphs



Distribution graphs are presented alongside mean achievement in Chapter 2. These distribution graphs are presented as horizontal bars with degrees of shading. The left end of the bar marks the 5th percentile – this is the score below which five per cent of the students have scored. The lightest shading on the left-hand end of the bar covers the range between the 5th and the 25th percentiles. The next band, a slightly darker shade, covers the range between the 25th percentile and the lower limit of the confidence interval for the mean. The dark band in the middle of the distribution graph is the confidence interval for the mean – that is, the dark band indicates a range within which analysts can claim to be 'confident' that the mean will lie. On the right-hand side of the bar, the medium level of shading indicates the range between the upper limit of the confidence interval and the 75th percentile. The lightest shading on the right-hand end of the bar covers the range between the 75th and the 95th percentiles, while the right end of the bar marks the 95th percentile – this is the score below which ninety-five per cent of the students have scored (with the remaining 5% scoring above this).

Notes about participating countries

A number of countries have official names that are longer than those usually employed in conversation. In order to facilitate the reading of the PIRLS reports, these countries are referred to by their shortened form (e.g. Hong Kong, Korea, Iran) in the text, but are referred to by their official name (e.g. Hong Kong SAR; Korea, Republic of; Iran, Islamic Republic of) in the box displaying participating countries in Figure 1.1.

The PIRLS target population is the grade that represents four years of schooling counting from the first year of ISCED Level 1. However, the IEA has a policy that students should not be younger than 9.5 years of age at the time of the assessment, so England, Malta and New Zealand assessed students in their fifth year of formal schooling. Norway chose to assess students in Year 5 for PIRLS to obtain better comparisons with Sweden and Finland, but also collected benchmark data at Year 4 to enable trend measurement. Where trends are reported, results for Norway (4) are used, otherwise reporting is for Norway (5). The Republic of South Africa (RSA) participated as a benchmarking entity in PIRLS with Year 5 students at schools where students receive instruction in English, Afrikaans or Zulu.

Five countries and one benchmarking entity participated in the PIRLS Literacy assessment – Egypt, Iran, Kuwait, Morocco and South Africa, as well as Denmark (with Year 3 students). Iran and Morocco also participated in the Year 4 assessment (PIRLS) and their results are based on an average of both assessments.

The proficient standard

The Measurement Framework for Schooling in Australia 2015 (Australian Curriculum, Assessment and Reporting Authority, 2015) specifies the proficient standard for PIRLS Reading as the Intermediate international benchmark. The Measurement Framework for Schooling in Australia is the basis for reporting on progress towards the Melbourne Declaration on Educational Goals for Young Australians (MCEETYA, 2008). Proficient standards represent a 'challenging but reasonable' expectation of student achievement. Further information on the PIRLS Intermediate benchmark and the types of tasks students at this level are capable of doing is provided in Chapter 1.

Definitions of background characteristics

There are various definitions used in this report that are particular to the Australian context, as well as many that are used internationally. This section provides an explanation for those that may not be self-evident.

Number of books in the home

This variable is used as a proxy for socioeconomic status, where information about parents' occupations, education and wealth are not available. It is derived from student self-reports of the number of books in their homes. Their responses have been grouped so that a *few books* equals 25 or fewer books, an *average number of books* equals between 26 and 200 books and *many books* equals more than 200 books. Students with many books in the home generally come from households with higher socioeconomic status.

School socioeconomic composition

As PIRLS does not collect detailed socioeconomic data from its Year 4 students (instead using the number of books in the home as a proxy measure of student level socioeconomic status), the school questionnaire asked school principals to report on the socioeconomic composition of their school by indicating what percentage of students came from economically affluent homes and what percentage came from economically disadvantaged homes. The responses to these questions were then used to create three categories of school socioeconomic composition:

- *more affluent* – schools where more than 25 per cent of the student body comes from economically affluent homes and not more than 25 per cent from economically disadvantaged homes
- *more disadvantaged* – schools where more than 25 per cent of the student body comes from economically disadvantaged homes and not more than 25 per cent from economically affluent homes
- *neither more affluent nor more disadvantaged* – all other response combinations.

Indigenous background

Indigenous background is derived from school records – collected from parents and guardians in accordance with the nationally agreed definitions as set out in the 2012 Data Standards Manual of the Australian Curriculum, Assessment and Reporting Authority – that identify students as being of Australian Aboriginal or Torres Strait Islander origin. Students were identified as either Indigenous or not Indigenous for the purpose of PIRLS.

Language spoken at home

The language spoken at home variable is derived from student self-report of how often English was spoken at home. Where the student spoke English 'never' or only 'sometimes', the student was considered to speak a language other than English at home. Those who indicated that they spoke English 'always' or 'almost always' were considered to be English speakers in the home environment.

Geographic location of the school

In Australia, the participating schools were coded with respect to the Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) Schools Geographic Location Classification. For the analysis in this report, only the broadest categories are used:

- metropolitan – including mainland state capital cities or major urban districts with a population of 100,000 or more (e.g. Queanbeyan, Cairns, Geelong, Hobart)
- provincial – including provincial cities and other non-remote provincial areas (e.g. Darwin, Ballarat, Bundaberg, Geraldton, Tamworth)
- remote – remote areas and very remote areas. Remote: very restricted accessibility of goods, services and opportunities for social interaction (e.g. Coolabah, Mallacoota, Capella, Mt Isa, Port Lincoln, Port Hedland and Alice Springs). Very remote: very little accessibility of goods, services and opportunities for social interaction (e.g. Bourke, Thursday Island, Yalata, Condingup, Nhulunbuy).

Teacher education

One path to becoming a qualified teacher in Australia is to complete a graduate diploma in education, following completion of an undergraduate degree. For the purposes of this report, given that the graduate diploma is necessary for teacher accreditation, the graduate diploma has been included in the same category as the bachelor's degree or equivalent. This was not the case in PIRLS 2011, when the graduate diploma was included as a postgraduate degree, thus responses to the teacher-education variable cannot be compared across cycles.

Chapter 1

Introduction

In 2016, Australia participated in the Progress in International Reading Literacy Study (PIRLS) for the second time. PIRLS is an assessment of the reading literacy of students at Year 4 level and has been conducted on a five-year cycle since 2001. PIRLS is an international study directed by the International Association for the Evaluation of Educational Achievement (IEA), an independent international cooperative of national research institutions and government agencies that has been conducting studies of cross-national achievement in a wide range of subjects since 1959.

In Australia, just over 6000 Year 4 students participated in PIRLS 2016. These students completed tests in reading achievement, and answered questionnaires on their background and experiences in learning reading at school. To inform educational policy in the participating countries, alongside the assessment of reading literacy, PIRLS also routinely collects extensive background information that addresses concerns about the quantity, quality and content of instruction. This background information is collected through a series of questionnaires for students, parents, teachers, principals and curriculum specialists.

Why PIRLS?

Reading literacy is one of the most important abilities students acquire as they progress through their early school years. It forms the foundation for future learning across all academic subjects as well as for personal growth and recreation (Eunice Kennedy Shriver National Institute of Child Health and Human Development, 2000). Reading literacy also equips young students with the foundational skills that will be needed in order to participate fully in their communities and the larger society (Organisation for Economic Cooperation and Development, 2010).

The PIRLS definition of reading literacy

Reading literacy is the ability to understand and use those written language forms required by society and/or valued by the individual. Readers can construct meaning from texts in a variety of forms. They read to learn, to participate in communities of readers in school and everyday life, and for enjoyment.

The main goal of PIRLS is to assist countries to monitor and evaluate their teaching of reading across time. PIRLS offers countries an opportunity to:

- collect comprehensive and internationally comparable data about the reading concepts, processes and attitudes that students have learnt by Year 4
- assess progress internationally in reading learning across time for students in Year 4
- understand the contexts in which students learn best, since PIRLS enables international comparisons of the key policy variables in relation to school curricula, modes of instruction and provision of resources that result in higher levels of student achievement
- use PIRLS to address internal policy issues – within countries, for example, PIRLS provides an opportunity to examine the performance of population sub-groups (e.g. students in metropolitan, regional and remote school locations) and address equity concerns.

> *The goal of PIRLS is to provide the best policy-relevant information about how to improve teaching and learning and to help young students become accomplished and self-sufficient readers.*
>
> *(Mullis, Martin, Foy & Hooper, 2017)*

This report provides the Australian perspective for Year 4 achievement in reading, examining the issues presented above and issues particular to the Australian context, such as:

- How do Australian students score in reading?
- How does this compare internationally and what is happening within Australia?
- Are there trends over time in reading achievement that can be seen from these data?
- Has Australia's achievement remained the same over the last five years in comparison to other countries to which we would normally compare ourselves?

Another characteristic of PIRLS is that data are also collected at the teacher and school level, and these data can be used to highlight characteristics of reading instruction in Australia.

The PIRLS Reading Framework

The PIRLS reading assessment is based on a comprehensive framework, which is developed by the Reading Development Group, made up of representatives from participating countries along with external reading consultants and members of the PIRLS International Study Center at Boston College.

Two purposes for reading are identified as accounting for most of the reading activities done by young students in and out of school:

- for literary experience
- to acquire and use information.

Within each of these two major reading purposes, four processes of comprehension are also assessed:

- focusing on and retrieving explicitly stated information
- making straightforward inferences
- interpreting and integrating ideas and information
- examining and evaluating content, language, and textual elements.

Overall, half of the PIRLS assessment focuses on reading for literary experience and half on reading to acquire and use information. The proportion of the assessment focusing on each of the four reading processes is shown in Table 1.1, along with examples of tasks relevant to each process.

TABLE 1.1 PIRLS reading purposes, processes and proportion of assessment

Purposes for reading	Proportion of assessment (%)	Examples
Literary experience	50	Narrative fiction
Acquire and use information	50	Magazine articles
Processes of Comprehension		
Focus on and retrieve explicitly stated information	20	Identifying information that is relevant to the specific goal of reading. Looking for specific ideas. Searching for definitions of words or phrases. Identifying the setting of a story (e.g. time and place). Finding the topic sentence or main idea (when explicitly stated).
Make straightforward inferences	30	Inferring that one event caused another event. Concluding what is the main point made by a series of arguments. Identifying generalisations made in the text. Describing the relationship between two characters.
Interpret and integrate ideas and information	30	Discerning the overall message or theme of a text. Considering an alternative to actions of characters. Comparing and contrasting text information. Inferring a story's mood or tone. Interpreting a real-world application of text information.
Evaluate and critique content and textual elements	20	Judging the completeness or clarity of information in the text. Evaluating the likelihood that the events described could really happen. Evaluating how likely an author's argument would be to change what people think and do. Judging how well the title of the text reflects the main theme. Describing the effect of language features, such as metaphors or tone. Determining an author's perspective on the central topic.

Further details about the PIRLS 2016 Reading Assessment Framework are available from: https://timssandpirls.bc.edu/pirls2016/framework.html

The PIRLS 2016 Context Questionnaire Framework

Students in the fourth year of schooling typically have gained most of their reading skills in a multitude of environments – at school and at home; in different classrooms with different teachers. Community, school, classroom, and home environments that support each other can create extremely effective climates for learning. In order to reflect this situation, the PIRLS 2016 Context Questionnaire Framework encompasses five broad areas:

- national and community contexts
- home contexts
- school contexts
- classroom contexts
- student characteristics and attitudes toward learning.

This framework was used to develop questionnaires for students, parents, teachers, principals and national research centres to provide data at each level.

Table 1.2 presents a summary of the PIRLS context questionnaires, which cover a wide array of policy-relevant information about participating countries' various contexts for teaching and learning reading.

TABLE 1.2 The PIRLS Context Questionnaire Framework

Context	Associated measure	Respondents
National and community contexts	Curriculum Questionnaire	National Research Centres
	School Questionnaire	Principals
Home context	Learning to Read Survey	Parents/Guardians of students
	Student Questionnaire	Students
School contexts	School Questionnaire	Principals
	Teacher Questionnaire	Teachers
Classroom contexts	Teacher Questionnaire	Teachers
	Student Questionnaire	Students
Student characteristics and attitudes	Student Questionnaire	Students

What did participants do?

Students completed a PIRLS booklet, which contained two short texts (either two literary texts, two informational texts or one of each) and their associated questions, and two questions that asked students to rate how much they liked the texts they read. The assessment booklets were designed to be administered over two sessions of 40 minutes duration, separated by a short break. In addition to completing the assessment booklet, each student was asked to fill in a questionnaire.

The assessment task

In total, 12 texts were used in the PIRLS 2016 assessment, which included six texts used in PIRLS 2011. These texts and their associated test questions were combined to create 16 different PIRLS booklets, including one presented in a magazine-style format with a separate question booklet. The questions were either multiple-choice or constructed-response items (of a variety of lengths, for example, a single word up to a few sentences). The booklets were evenly distributed within each participating class, thus, only one or two students in each class completed a particular PIRLS booklet.

Further information on the PIRLS assessment booklets and the types of items students attempted to complete is presented later in this chapter and in Appendix A.

Further information about the methods and procedures followed during PIRLS 2016 is available on the TIMSS and PIRLS website: https://timssandpirls.bc.edu/publications/pirls/2016-methods.html

The context questionnaires

After completing their PIRLS reading assessment, students were asked to complete a background questionnaire, which sought information on home contexts, and on their characteristics and attitudes towards learning and reading.

The Learning to Read Survey was distributed to parents/guardians of participating students, with options to complete online or on paper, and focused on home contexts of learning, including parental education, language background, and early literacy experiences. Unfortunately, the response rate to the 2016 Learning to Read Survey in Australia was too low for the data to be deemed reliable or representative, and so responses to items on this survey are not reported here or in the international report.

The Teacher Questionnaire, distributed (online) to reading/English teachers of students selected to participate in PIRLS, asked about teacher preparation and experience, pedagogical practices, use of technology, assessment, assignment of homework, school and classroom climate, and their own attitudes towards reading.

The School Questionnaire, answered by the principal (or the principal's designate), sought descriptive information about school characteristics, instructional time, resources and technology, school climate for learning, students' school readiness, and principal preparation and experience.

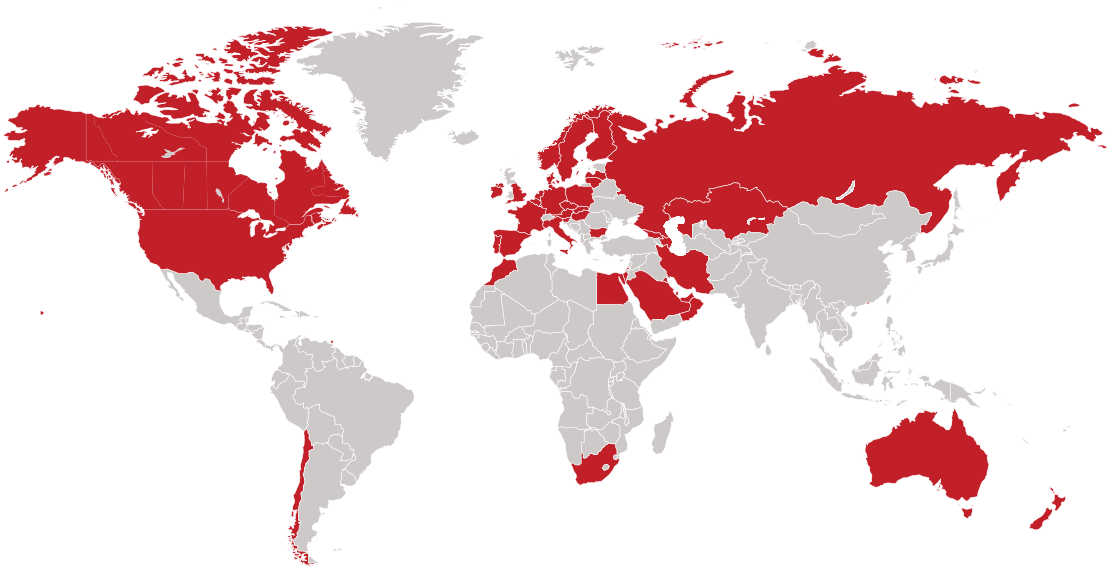
The Curriculum Questionnaire focused on the reading curriculum, school organisational approaches and instructional practices in participating countries. Australia's response to this extensive questionnaire was provided by the Australian Council for Educational Research (ACER), reviewed by curriculum experts in each state and territory education department, and then submitted to the International Study Center.

Further information about the curricula and education policies of participating PIRLS countries is available in the PIRLS 2016 Encyclopedia: https://timssandpirls.bc.edu/pirls2016/encyclopedia.html

Who participated?

Countries

There were 61 participants in PIRLS 2016, including 50 countries and 11 benchmarking entities.[1] In total, over 580 000 students participated worldwide. The participating countries are shown in Figure 1.1



Participating countries

Australia
Austria
Azerbaijan
Bahrain
Belgium (Flemish)
Belgium (French)
Bulgaria
Canada
Chile
Chinese Taipei
Czech Republic
Denmark
Egypt
England
Finland
France
Georgia
Germany
Hong Kong SAR
Hungary
Italy
Iran, Islamic Rep. of
Ireland
Israel
Kazakhstan
Kuwait
Latvia
Lithuania
Macao SAR
Malta
Morocco
Netherlands
New Zealand
Northern Ireland
Norway
Oman
Poland
Portugal
Qatar
Repulic of South Africa
Russian Federation
Saudi Arabia
Singapore
Slovak Republic
Slovenia
Spain
Sweden
Trinidad and Tobago
United Arab Emirates
United States of America

Benchmarking participants

Buenos Aires, Argentina
Ontaria, Canada
Quebec, Canada
Denmark
Norway
Moscow City, Russian Federation
Eng/Afr/Zulu RSA
Andalusia, Spain
Madrid, Spain
Abu Dhabi, UAE
Dubai, UAE

FIGURE 1.1 Map of countries and benchmarking entities participating in PIRLS 2016

1 A benchmarking participant is a province or region that participated in PIRLS for its own internal benchmarking. For example, Denmark assessed students in Year 3 for its own benchmarking purposes and students in Year 4 for PIRLS. Data from these entities are not included in the calculation of the international averages or medians and are not reported in this national report.

Schools and students

The international sample design for PIRLS is generally referred to as 'a two-stage stratified cluster sample design'. The first stage consists of a sample of schools, which in Australia is stratified by jurisdiction, school sector (government, Catholic or independent), geographic location (metropolitan, regional or remote) and a socioeconomic variable.[2] The intention is that the sample drawn will be representative of each of these strata.

The second stage of sampling consists of a sample of one or two intact classrooms from the target year in sampled schools. In most countries, 150 schools and one classroom in each school (resulting in at least 4500 participating students per country) were selected to participate in PIRLS 2016. In some countries, including Australia, a larger sample of schools and students participated in order to allow for meaningful comparisons to be made between different sections of the school population. In Australia, a larger sample of schools and students participated in PIRLS to produce reliable estimates for each of the Australian jurisdictions and also for Indigenous students.

In Australia, 286 primary schools participated in the data collection for PIRLS 2016. At least one intact class from each school from Year 4 from each school – along with all Indigenous students in that year level – was selected to participate in the assessment. In schools with composite or staged classes (i.e. classes with students from more than one year level), multiple classes were selected in order to provide sufficient numbers of Year 4 students, and only the Year 4 students participated in PIRLS. This resulted in a sample of 6341 Year 4 students. For more information about sampling and the Australian PIRLS sample, please refer to Appendix A.

Statistical weighting enables the sampled students to represent the total student population at Year 4. The weighted numbers for Australia for Year 4, along with the numbers of participating schools and students, are shown in Table 1.3.[3]

TABLE 1.3 The PIRLS 2016 designed and achieved school and student sample for Australia

Jurisdiction	Designed school sample	N schools	N students	Weighted N students	Weighted % of total Australian students
ACT	30	30	617	4489	2
NSW	45	45	1107	88770	32
VIC	44	44	867	68328	24
QLD	45	45	1169	61323	22
SA	41	41	814	19785	7
WA	39	39	884	28421	10
TAS	27	27	563	6600	2
NT	15	15	320	2374	1
Australia	**286**	**286**	**6341**	**280089**	**100**

While all of the Australian jurisdictions now include a foundation year prior to Year 1, there are still differences between the jurisdictions in school starting ages. The differences result in students' average ages at the time of PIRLS testing varying across jurisdictions, ranging from 9.9 years in Queensland and Western Australia to 10.4 years in Tasmania, as shown in Table 1.4.

2 In this report, the Australian states and territories are referred to collectively as 'jurisdictions'.

3 Sample numbers are weighted by jurisdiction in order to indicate the proportional distribution across each of the eight jurisdictions of the total Australian population of Year 4 students.

TABLE 1.4 The average age of Year 4 students by Australian jurisdiction and overall

STATE	Average age of PIRLS Year 4 students
ACT	10.1
NSW	10.1
VIC	10.2
QLD	9.9
SA	10.1
WA	9.9
TAS	10.4
NT	10.0
Australia	**10.0**

Internationally, the average age of students at Year 4 varied from 9.6 years in Kuwait to 10.9 years of age in Latvia (students in the Russian Federation, Bulgaria, Finland, Lithuania and Norway were 10.8 years old, on average, although Norway's students were in Grade 5).

For more information about the age of participating students, please refer to Chapter 5 of Methods and Procedures in PIRLS 2016: https://timssandpirls.bc.edu/publications/pirls/2016-methods.html.

When did testing take place?

For comparability across countries and across assessments, testing was conducted at the end of the school year. Southern Hemisphere countries tested in the period from October to November 2015. The remaining countries tested at the end of the Northern Hemisphere school year, from May to June 2016.

Who organises PIRLS internationally?

PIRLS 2016 was organised by the International Association for the Evaluation of Educational Achievment (IEA) and managed by the TIMSS & PIRLS International Study Center, Lynch School of Education, at Boston College in the United States. Sampling procedures were overseen by Statistics Canada and the IEA Data Processing and Research Center (DPC); the IEA Secretariat and the TIMSS & PIRLS International Study Center oversaw the translation and verification process as well as the quality-assurance program; and the IEA DPC was responsible for oversight of the data collection, data processing and data analysis.

PIRLS in Australia

In Australia, the study was funded by the Australian Government Department of Education and Training (DET) and by state and territory departments of education proportional to the size of their student populations. The study was managed in Australia by ACER, which represents Australia to the IEA.

Appendix A provides more information about the operations and procedures involved in PIRLS 2016.

PIRLS is a part of Australia's National Assessment Program (NAP). Components of the NAP include the National Assessment Program – Literacy and Numeracy (NAPLAN), which is conducted annually for every student in Years 3, 5, 7 and 9; the national sample assessments of civics and citizenship, information and communication technology (ICT) literacy, and science literacy; and the international assessments, which comprise – in addition to PIRLS – TIMSS and the OECD's Programme for International Student Assessment (PISA).

Results collected from these assessments allow for nationally comparable reporting of progress towards the *Melbourne Declaration on Educational Goals for Young Australians* (MCEETYA, 2008),

which set goals for high-quality schooling in Australia designed to secure for students the necessary knowledge, understanding, skills and values for a productive and rewarding life.

The Australian Curriculum, Assessment and Reporting Authority (ACARA) reports on the NAP assessments annually in its *National Report on Schooling in Australia*, which is the main vehicle for reporting against nationally agreed key performance measures defined in the *Measurement Framework for Schooling in Australia 2015* (Australian Curriculum, Assessment and Reporting Authority, 2015).

How are PIRLS results reported?

The PIRLS reading achievement scale summarises Year 4 students' performance when interacting with a variety of texts and questions. Students' achievement is based on their responses to test questions designed to assess the different reading purposes described earlier in this chapter. When comparing groups of students across and within countries, summary statistics such as the average, or mean, scale score are often used (please see the Reader's Guide for more information about the achievement scales and the various statistics used in this report).

A single score, whether a mean or median, does not provide detailed information as to what types of tasks students were able to undertake successfully. Instead, PIRLS uses international benchmarks to provide descriptions of achievement on the scale in relation to performance on the questions asked.

The PIRLS benchmarks

Internationally, it was decided that performance should be measured at four levels. These four levels summarise the achievement reached by:

- the 'Advanced international benchmark', which was set at 625 score points
- the 'High international benchmark', which was set at 550 score points
- the 'Intermediate international benchmark', which was set at 475 score points
- the 'Low international benchmark', which was set at 400 score points.

The descriptions of the levels are cumulative, so that a student who reached the High benchmark can typically demonstrate the knowledge and skills for both the Intermediate and the Low benchmarks.

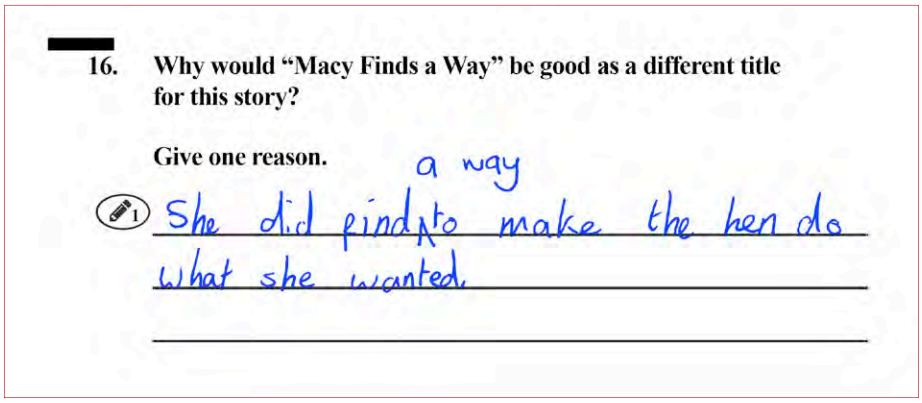
Table 1.5 provides a summary of the PIRLS 2016 Year 4 reading benchmarks.

TABLE 1.5 The PIRLS 2016 international benchmarks for Year 4 reading

International benchmarks		
Advanced	**625**	**Literacy** When reading relatively complex literary texts, students can: ▸ interpret story events and character actions to describe reasons, motivations, feelings and character development with full text-based support ▸ begin to evaluate the effect on the reader of the author's lanaguage and style choices **Informational** When reading relatively complex informational texts, students can: ▸ distinguish and interpret complex information from different parts of the text and provide full text-based support ▸ integrate information across a text to explain relationships and sequence activities ▸ begin to evaluate visual and textual elements to consider the author's point of view
High	**550**	**Literacy** When reading relatively complex literary texts, students can: ▸ locate and distinguish significant actions and details embedded across the text ▸ make inferences to explain relationships between intentions, actions, events and feelings, and provide text-based support ▸ interpret and integrate story events and character actions, traits and feelings as they develop across the text ▸ recognise the use of some language features (e.g. metaphor, tone, imagery) **Informational** When reading relatively complex informational texts, students can: ▸ locate and distinguish relevant information within a dense text or complex table ▸ make inferences about logical connections to provide explanations and reasons ▸ integrate textual and visual information to interpret the relationship between ideas ▸ evaluate and make generalisations about content and textual elements
Intermediate	**475**	**Literacy** When reading a mix of simpler and relatively complex literary texts, students can: ▸ independently locate, recognise, and reproduce explicitly stated actions, events and feelings ▸ make straightforward inferences about the attributes, feelings and motivations of main characters ▸ interpret obvious reasons and causes, recognise evidence and provide examples ▸ begin to recognise language choices **Informational** When reading a mix of simpler and relatively complex informational texts, students can: ▸ locate and reproduce two or three pieces of information from the text ▸ make straightforward inferences to provide factual explanations ▸ begin to interpret and integrate information to order events
Low	**400**	**Literacy** When reading predominantly simpler literary texts, students can: ▸ locate and retrieve explicitly stated information, actions or ideas ▸ make straightforward inferences about events and reasons for actions ▸ begin to interpret story events and central ideas **Informational** When reading predominantly simpler informational texts, students can: ▸ locate and reproduce explicitly stated information from text and other formats (e.g. charts, diagrams) ▸ begin to make straightforward inferences about explanations, actions and descriptions

At Year 4, students achieving the Advanced international benchmark are able to interpret story events and character actions to provide reasons, motivations, feelings and character traits with full text-based support, and when reading informational texts are able to distinguish and interpret complex information from different parts of text, integrate information across texts and evaluate textual and visual features to explain their function.

As an example, Box 1.1 shows an item from the literary text '*Macy and the Red Hen*'. Students were asked to provide one reason the alternative title Macy Finds a Way might be appropriate for the story. A correct response required the reader to evaluate story events and actions of the characters Macy and the hen.

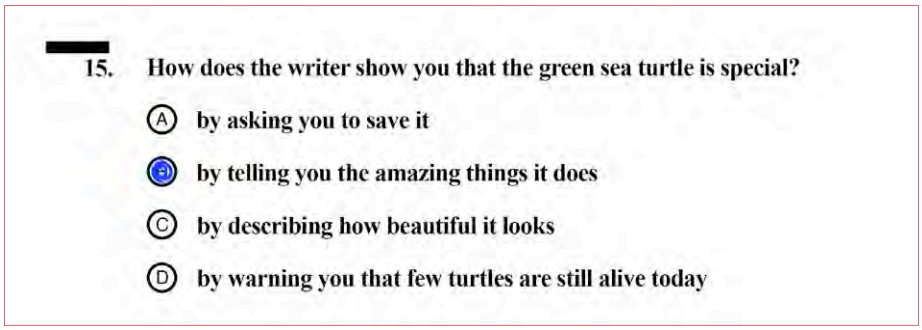

16. **Why would "Macy Finds a Way" be good as a different title for this story?**

Give one reason.

1 She did find a way to make the hen do what she wanted.

BOX 1.1 Advanced international benchmark, Year 4 reading – example literary item

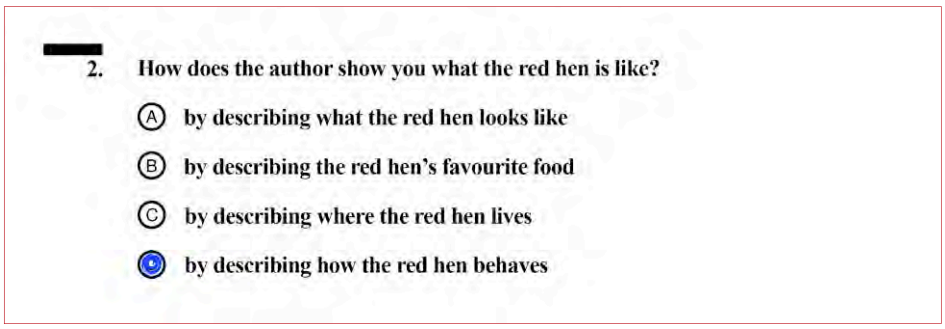
An example of an Advanced informational item is provided in Box 1.2. This multiple-choice item required the reader to evaluate textual elements and content to recognise how they exemplify the writer's point of view.


15. **How does the writer show you that the green sea turtle is special?**

- (A) **by asking you to save it**
- (B) **by telling you the amazing things it does**
- (C) **by describing how beautiful it looks**
- (D) **by warning you that few turtles are still alive today**

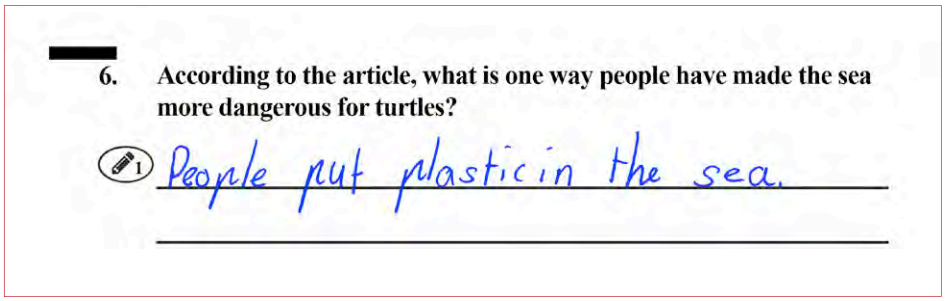
BOX 1.2 Advanced international benchmark, Year 4 reading – example informational item

At the Intermediate international benchmark, the proficient standard for Australian students, readers demonstrate greater facility in retrieving explicitly stated information and making inferences, in interpreting and integrating story events and information (please see the Readers' Guide for further information about the proficient standard). They also demonstrate an emerging ability to recognise language choices. Box 1.3 provides an example of an Intermediate literary item (multiple-choice), in which students were asked to indicate how an author could demonstrate a character's traits or personality.



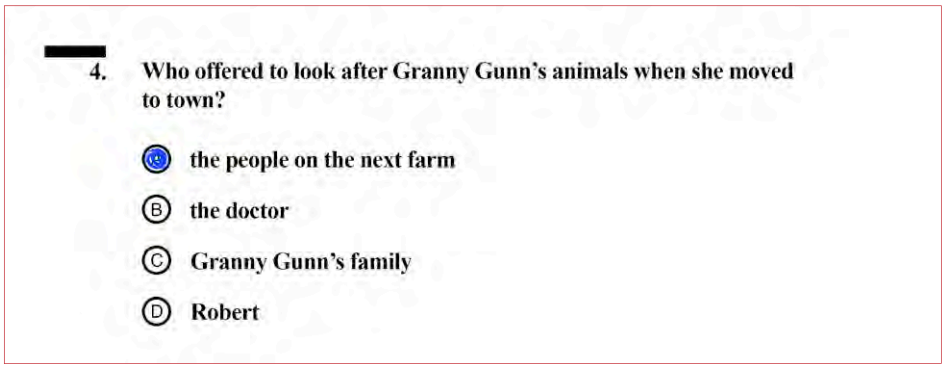
BOX 1.3 Intermediate international benchmark, Year 4 reading – example literary item

Box 1.4 provides an example of an Intermediate informational item, in which students were asked to identify one way in which people have endangered sea turtles, based on their reading of the text.



BOX 1.4 Intermediate international benchmark, Year 4 reading – example informational item

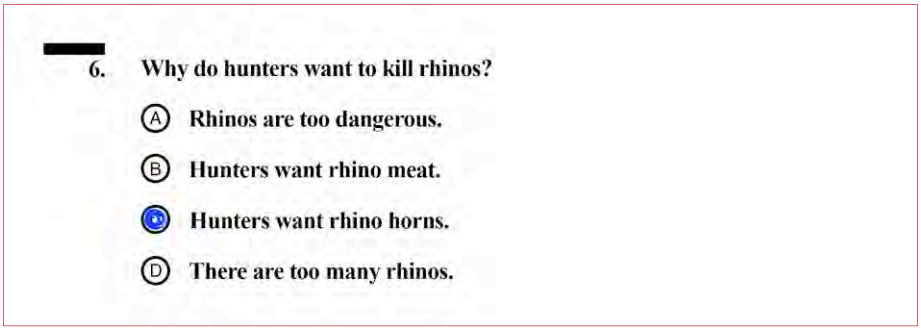
At the Low international benchmark, students are able to retrieve an explicitly stated detail in a literary text, or to locate and reproduce two or three pieces of information from within the text. Box 1.5 provides an example of a multiple-choice literary item at the Low benchmark, in which students were required to identify who had offered to care for Granny Gunn's animals at the beginning of the story '*Flowers on the roof*'.



BOX 1.5 Low international benchmark, Year 4 reading – example literary item

Box 1.6 provides an example of a Low informational items. This text, titled '*Rhinos*' was not presented to Australian students, but to students in countries participating in PIRLS Literacy. However, it does represent the type of informational item at the Low benchmark that Australian students would have faced in the other, secured, PIRLS texts.

Again, this item required students to make an inference based on information presented in the text, namely, the reason hunters would want to kill rhinoceroses.



BOX 1.6 Low international benchmark, Year 4 reading – example informational item

Further information about the types of reading skills demonstrated by Year 4 students who performed at each of the international benchmarks, along with examples of the types of responses given by students at each of the benchmarks, is provided in *PIRLS 2016 International Results in Reading*, available from: http://timssandpirls.bc.edu/pirls2016/international-results.html.

Structure of this report

Chapter 2 describes Australia's results in PIRLS 2016 within the international context, followed by a detailed presentation of results for the Australian jurisdictions and for different demographic groups within Australia, including male and female students. The next section provides the PIRLS 2016 results in the purposes and processes domains. The final section in Chapter 2 presents a more detailed examination of the characteristics of Australia's poorest readers – those who do not reach the Low international benchmark.

Chapters 3, 4 and 5 of this report present the results from the contextual questionnaires. Each chapter focuses on a different element of the contexts in which learning and achievement occur. Chapter 3 examines the school environment, Chapter 4 focuses on teachers and classrooms, and Chapter 5 reports on student attitudes and engagement.

Year 4 reading results: International, national and Australian demographic groups

Chapter 2

Key findings

- The mean score for Australian students on PIRLS 2016 was 544 points.
- Australian students performed significantly higher, on average, than students in 24 countries, including three other countries that tested in English – New Zealand, Trinidad and Tobago, and Malta.
- Australian Year 4 students were outperformed by students in 13 countries, including Singapore, Hong Kong, Ireland, Northern Ireland and England (all testing in English), as well as the Russian Federation, Finland and Poland.
- Australia's score was a statistically significant 17 points higher than in PIRLS 2011.
- Sixteen per cent of Australian students reached the Advanced international benchmark, compared to 29 per cent of students in Singapore, 26 per cent in the Russian Federation and 22 per cent in Northern Ireland.
- Eighty-one per cent of Australian Year 4 students reached the Intermediate international benchmark, which is the proficient standard for Australia.
- Australian students showed a relative strength in the Literary reading purpose (reading for interest and pleasure) but the score on the Informational reading purpose (reading to gain information) was not different to the overall reading score.
- Performance across the Australian jurisdictions was fairly similar, with the only exceptions being that students in Victoria performed at the same level as students in the Australian Capital Territory and at a level higher than all other jurisdictions, while students in South Australia performed significantly lower, on average, than students in Western Australia and the Australian Capital Territory, as well as those in Victoria.

- The average scores for students in Victoria, Queensland and Western Australia were significantly higher in PIRLS 2016 than in PIRLS 2011, by 21, 26 and 28 points respectively.
- All jurisdictions saw an increase in the proportion of students at the Advanced international benchmark, and Victoria, Queensland and Western Australia had a large decrease in the proportion of students at or below the Low international benchmark.
- Female students continue to perform at a higher level in reading literacy, on average, than their male peers.
- Fifty-seven per cent of Australian Indigenous students reached the Intermediate international benchmark, compared to 83 per cent of non-Indigenous students.
- Students who primarily spoke English at home scored a statistically significant 15 points higher, on average, than students who spoke a language other than English at home.
- Twenty-eight per cent of students who reported *many books* in the home reached the Advanced international benchmark, compared to 17 per cent of students with *an average number of books*, and just 4 per cent of students with *a few books*. At the opposite end of the achievement scale, 11 per cent of students with *many books*, compared to 14 per cent of those with *an average number of books* and 35 per cent of those with *a few books*, failed to reach the Intermediate benchmark.
- Eighteen per cent of students in metropolitan schools, compared with 22 per cent of students in provincial schools and 30 per cent of those in remote schools, did not achieve the Intermediate benchmark.

Australia's Year 4 reading results within the international context

This chapter presents the PIRLS 2016 reading results as average scores and distributions on the PIRLS Reading scale (please refer to the Reader's Guide for further information about the achievement scale).

Figure 2.1 provides a summary of the overall performance of students in Year 4 across different countries on the PIRLS reading achievement scale, in terms of the mean (average) scores achieved by students in each country, the standard error of the mean, and the range of scores between the 5th and 95th percentiles.

Countries are presented in Figure 2.1 according to decreasing level of achievement, with the highest scoring countries – the Russian Federation and Singapore – at the top. The shading in the figure indicates whether the mean score for a country is statistically different to that of Australia. Multiple-comparison tables, for use in comparing scores between all participating countries, are available in the PIRLS 2016 International Results in Reading: http://timssandpirls.bc.edu/pirls2016/international-results.html.

Students in the Russian Federation performed better, on average, than students in all other participating countries, apart from those in Singapore. Students in Singapore, in turn, performed better in reading than students in all other countries, apart from Hong Kong. The average scores of students in these countries was above the High benchmark, but not quite at the Advanced benchmark.

Australia's average reading score of 544 was significantly higher than the scores of 24 other countries, including France and French-speaking Belgium, New Zealand, Trinidad and Tobago and Malta (the latter three countries tested in English). This places the average achievement of Australian students above the Intermediate benchmark (the proficient standard) and just under the High benchmark.

Australia's average score was lower than the average scores for 13 other countries, including Singapore, Hong Kong, Ireland, Northern Ireland and England (who all tested in English), as well as other top-performing countries Finland, Poland and the Russian Federation.

Figure 2.1 also shows a measure of the range of achievement within participating countries (between the 5th and 95th percentile of achievement). A larger range between the 5th and 95th percentile indicates that there is greater diversity in the achievement of students in a particular country, while a smaller range indicates greater similarity in achievement, whether this be higher (i.e. placed closer to the right side of the figure) or lower (i.e. placed towards the left side of the figure. When comparing the performance of Australia with that of other countries, it is worthwhile considering the range of achievement as well as the mean score. Australia's gap between high and low achievers – 274 points – was mid-range, similar to that of Northern Ireland (267), the Slovak Republic (266) and Bulgaria (280 points). In the Netherlands, only 198 score points separated the 5th and 95th percentiles, while more than 350 score points separated the highest and lowest scoring students in Egypt (408 score points), Qatar (359 score points) and Iran (355 score points).

	Country/Region	Mean	SE	Range 5th–95th percentiles	Reading achievement distribution
Higher than Australia	Russian Federation	581	2.2	219	
	Singapore	576	3.2	263	
	Hong Kong SAR	569	2.7	206	
	Ireland	567	2.5	243	
	Finland	566	1.8	218	
	Northern Ireland	565	2.2	267	
	Poland	565	2.1	239	
	Chinese Taipei	559	2.0	212	
	England	559	1.9	259	
	Norway (5)	559	2.3	215	
	Latvia	558	1.7	205	
	Sweden	555	2.4	222	
	Hungary	554	2.9	247	
Not different to Australia	Bulgaria	552	4.2	280	
	United States	549	3.1	256	
	Italy	548	2.2	215	
	Lithuania	548	2.6	230	
	Denmark	547	2.1	225	
	Macao SAR	546	1.0	217	
	Netherlands	545	1.7	198	
	Australia	**544**	**2.5**	**274**	
	Canada	543	1.8	250	
	Czech Republic	543	2.1	221	
	Slovenia	542	2.0	238	
	Austria	541	2.4	213	
	Germany	537	3.2	257	
Lower than Australia	Kazakhstan	536	2.5	206	
	Slovak Republic	535	3.1	266	
	Israel	530	2.5	295	
	Portugal	528	2.3	216	
	Spain	528	1.7	215	
	Belgium (Flemish)	525	1.9	200	
	New Zealand	523	2.2	300	
	France	511	2.2	228	
	Belgium (French)	497	2.6	228	
	Chile	494	2.5	258	
	Georgia	488	2.8	259	
	Trinidad and Tobago	479	3.3	309	
	Azerbaijan	472	4.2	282	
	Malta	452	1.8	294	
	United Arab Emirates	450	3.2	362	
	Bahrain	446	2.3	322	
	Qatar	442	1.8	359	
	Saudi Arabia	430	4.2	319	
	Iran, Islamic Rep. of	428	4.0	355	
	Oman	418	3.3	346	
	Kuwait	393	4.1	349	
	Morocco	358	3.9	349	
	Egypt	330	5.6	408	
	South Africa	320	4.4	351	

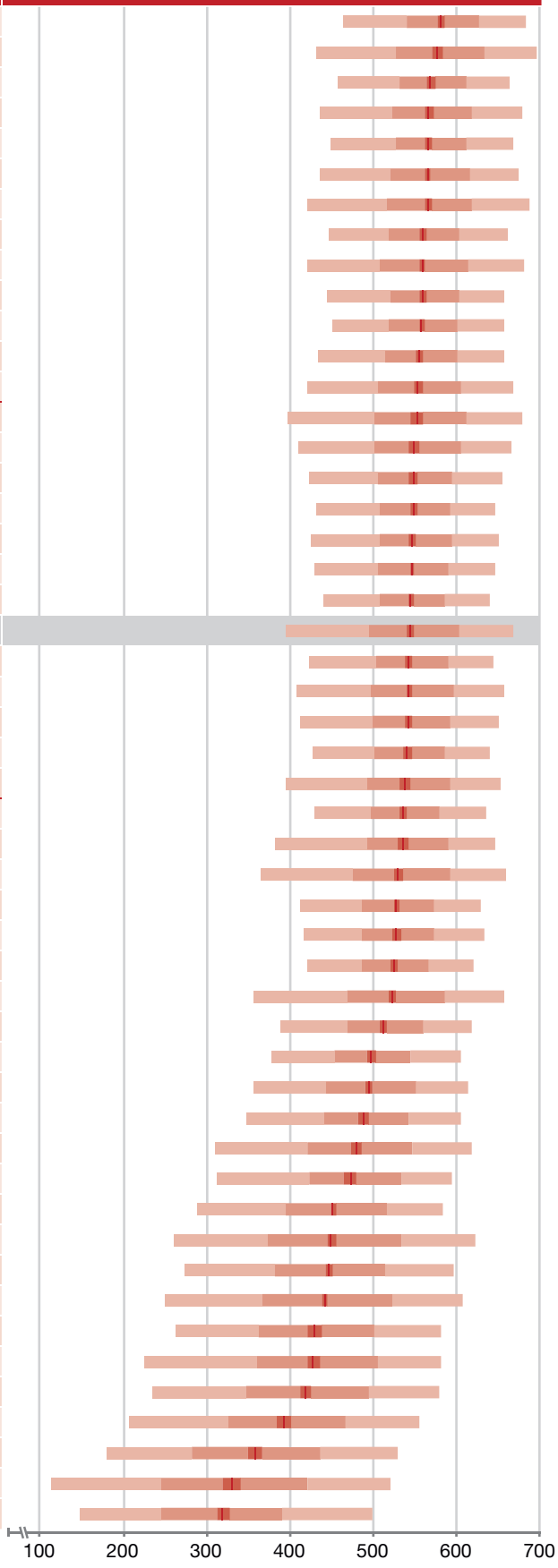


FIGURE 2.1 Mean scores and distribution of Year 4 reading achievement, by country

Performance at the international benchmarks across countries

Figure 2.2 presents the percentage of students in each country who performed at each of the international benchmarks, which are described in Chapter 1. The countries are ordered by the percentage of students reaching the Intermediate benchmark, which is the proficient standard set for PIRLS reading in Australia (please see the Reader's Guide for further information about the proficient standard).

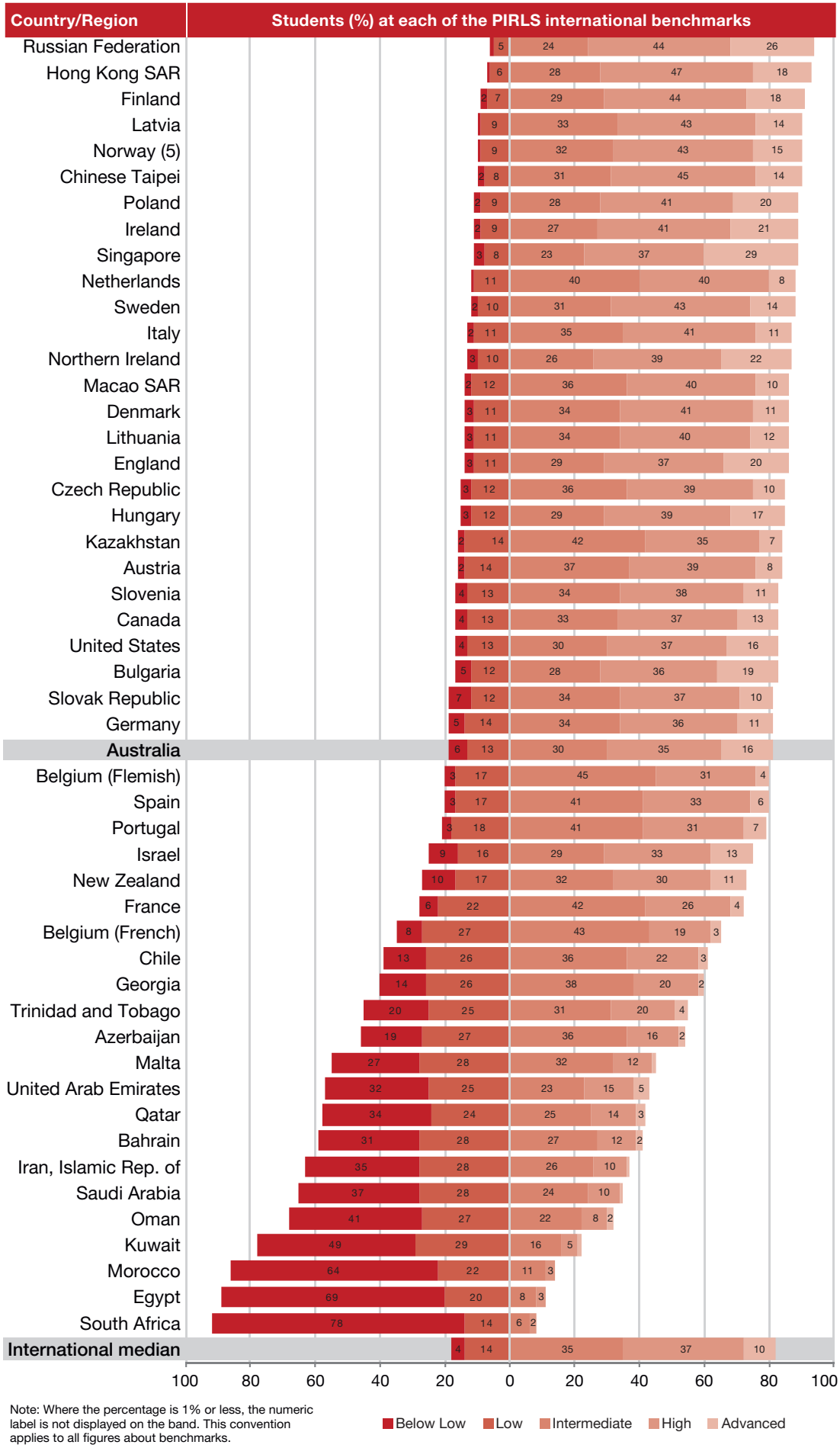
Singapore and the Russian Federation were again stand-out performers, with around one in four of their students reaching the Advanced benchmark, and very few students (3% and 1%, respectively) not reaching the Low benchmark.

Northern Ireland, Ireland, England, and Poland all had around one in five students at the Advanced benchmark, and only two in every hundred not reaching the Low benchmark.

In the Netherlands, the country with the narrowest gap between high and low achievers, 8 per cent of students achieved the Advanced benchmark, while 11 per cent were at the Low benchmark and only 1 per cent did not achieve this basic level.

Sixteen per cent of Australian students reached the Advanced benchmark, while 35 per cent performed at the High benchmark and a further 30 per cent performed at the Intermediate benchmark. This means that over 80 per cent of Australian students reached at least the Intermediate benchmark. Of concern are the 20 per cent of Australian Year 4 students reading at or below the Low benchmark (13% performed at the Low benchmark and a further 6% did not reach the Low benchmark).

While the average reading score for Australia (544 points) was significantly higher than that of Kazakhstan, Portugal, Spain and Flemish-speaking Belgium, each of these countries had significantly lower proportions of their students fail to reach the Low benchmark than did Australia.



Note: Where the percentage is 1% or less, the numeric label is not displayed on the band. This convention applies to all figures about benchmarks.

FIGURE 2.2 Percentage of students at the international benchmarks for Year 4 reading, by country

International trends in Year 4 reading performance

The trends in reading performance show more improvements than downturns over the four cycles that have been conducted since PIRLS 2001. Of the countries that have data for all PIRLS cycles, four have shown increases of over 40 points, including the top performers Singapore, Russian Federation and Hong Kong, along with Slovenia.

Australia participated in PIRLS for the first time in 2011, and so only two time points are available for monitoring trends in reading performance using PIRLS. Among the group of countries who participated in PIRLS 2011 and 2016, 18 showed improvements, 13 recorded similar achievement in both cycles and 10 showed declines.

Figure 2.3 shows trends in Year 4 reading performance for a selection of countries that have comparable data from previous PIRLS assessments. Those presented include English-speaking countries with which Australia usually makes comparisons – Canada, England, the United States and New Zealand – along with the top performers Singapore, Russian Federation and Hong Kong (all of whom showed large improvements over time).

Data and graphs for all participating countries are available in *PIRLS 2016: International Results in Reading Achievement*: http://timssandpirls.bc.edu/pirls2016/international-results.html.

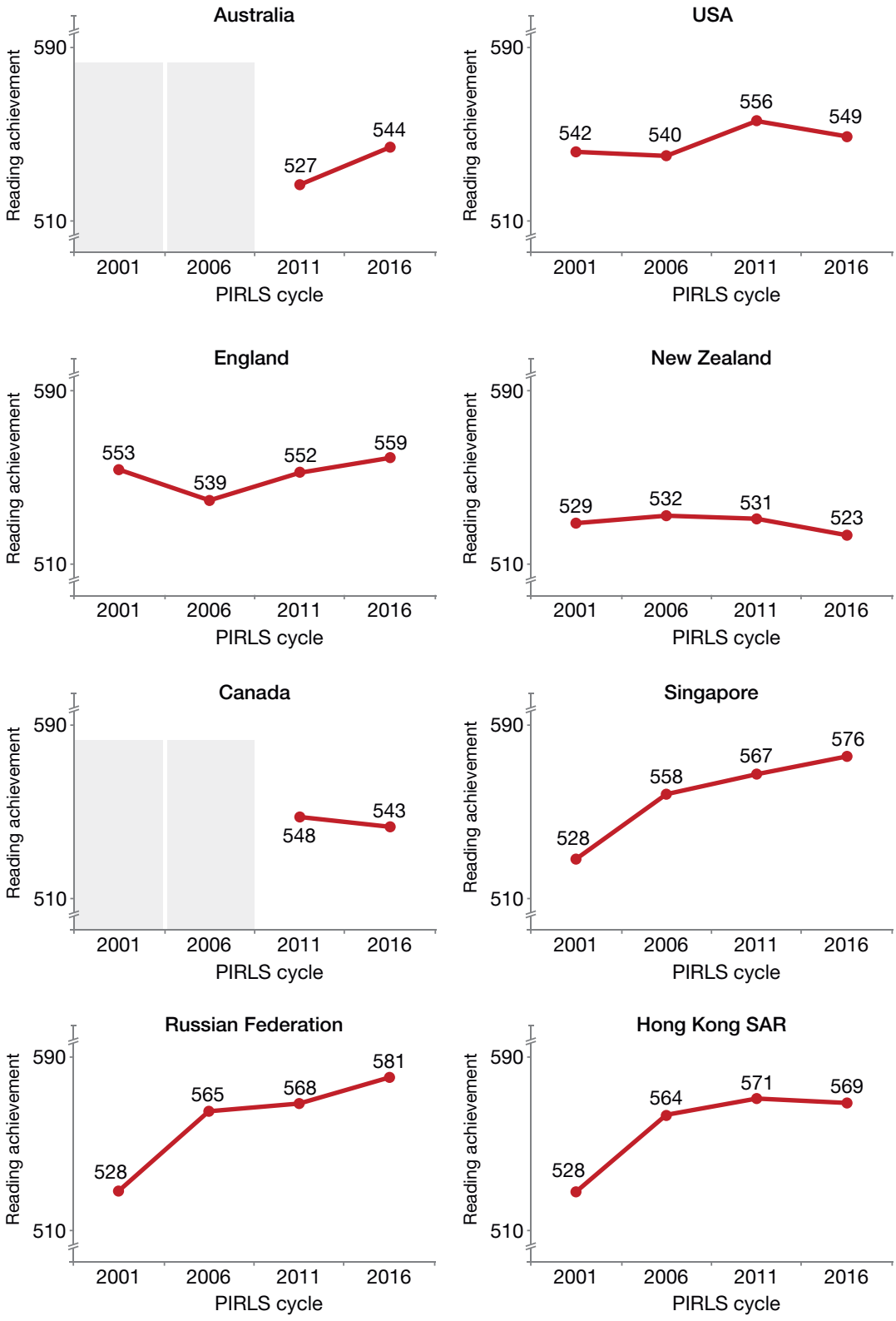


FIGURE 2.3 Trends in Year 4 reading achievement scores, 2001–2016, selected countries

As Figure 2.3 shows, Australia recorded a significant improvement of around 20 points in the average reading score between PIRLS 2011 and 2016.

Among English-speaking comparison countries, the United States showed gains between 2006 and 2011 but performance dropped off slightly in 2016 (by 7 points). Canada and New Zealand also recorded

significant, though not substantial, declines in their performance in PIRLS 2016. England showed an initial decline in reading performance from 2001 to 2006, followed by significant improvements that have brought it back, in 2016, to their initial level.

In contrast, the three top performers in PIRLS 2016 have shown great improvements in reading performance over time – the Russian Federation improved by 37 points between 2001 to 2006 and then by another 12 points between 2011 and 2016. Hong Kong and Singapore both improved dramatically between 2001 and 2006, with another (smaller) gain between 2006 and 2011.

Figure 2.4 presents the mean reading scores and distributions for Australian students in PIRLS 2011 and 2016. Along with the increase in average score noted earlier, Figure 2.4 shows that the entire distribution has shifted slightly to the right, indicating improvements in the performance of the groups of lowest scoring students and the highest scoring students.

PIRLS cycle	Mean	SE	Range 5th–95th percentiles	Reading achievement distribution
2016	544	2.5	274	
2011	527	2.2	265	

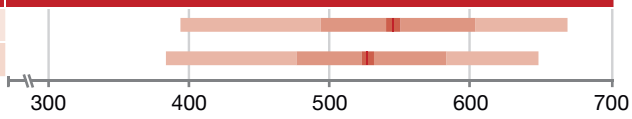


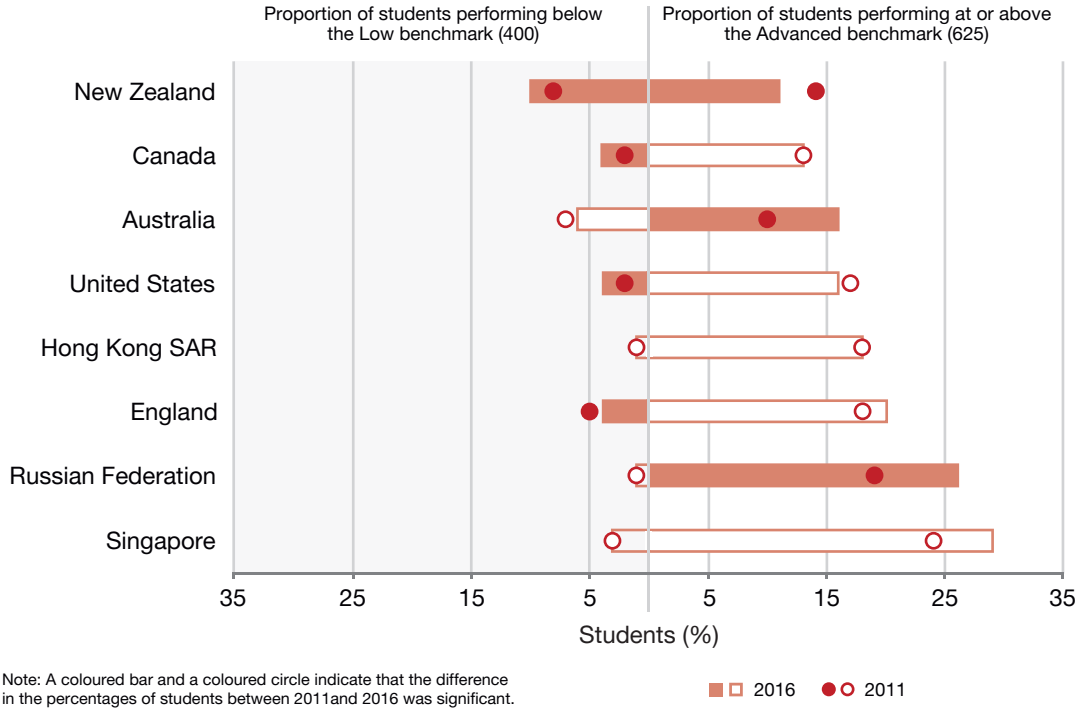
FIGURE 2.4 Trends in Year 4 reading achievement score and distribution, 2011–2016, Australia

Table 2.1 presents a comparison of Australia's average reading score with those of other participating countries over the past two cycles. This summary of relative trends indicates that Australia's performance has improved since 2011 when compared to twelve other countries. Australia's mean score was lower than that of Canada, the United States and Germany, for example, in 2011 but not significantly different in 2016. Portugal, Israel and the Slovak Republic all performed at a higher level, on average, than Australia in 2011 but scored lower, on average, than Australia in PIRLS 2016.

TABLE 2.1 Relative trends in Year 4 reading achievement, by country

Country/Region	Position relative to Australia 2016	Position relative to Australia 2011
Russian Federation	↑	↑
Singapore	↑	↑
Hong Kong SAR	↑	↑
Ireland	↑	↑
Finland	↑	↑
Northern Ireland	↑	↑
Poland	↑	•
Chinese Taipei	↑	↑
England	↑	↑
Norway (5)	↑	↓
Latvia	↑	–
Sweden	↑	↑
Hungary	↑	↑
Bulgaria	•	•
United States	•	↑
Italy	•	↑
Lithuania	•	•
Denmark	•	↑
Macao SAR	•	-
Netherlands	•	↑
Australia		
Canada	•	↑
Czech Republic	•	↑
Slovenia	•	•
Austria	•	•
Germany	•	↑
Kazakhstan	↓	–
Slovak Republic	↓	↑
Israel	↓	↑
Portugal	↓	↑
Spain	↓	↓
Belgium (Flemish)	↓	–
New Zealand	↓	•
France	↓	↓
Belgium (French)	↓	↓
Chile	↓	–
Georgia	↓	↓
Trinidad and Tobago	↓	↓
Azerbaijan	↓	↓
Malta	↓	↓
United Arab Emirates	↓	↓
Bahrain	↓	-
Qatar	↓	↓
Saudi Arabia	↓	↓
Iran, Islamic Rep. of	↓	↓
Oman	↓	↓
Kuwait	↓	–
Morocco	↓	↓
Egypt	↓	–
South Africa	↓	–

↑ average achievement significantly higher than Australia's
↓ average achievement significantly lower than Australia's
• average achievement not significantly different to Australia's
– did not participate in this cycle



Note: A coloured bar and a coloured circle indicate that the difference in the percentages of students between 2011and 2016 was significant.

FIGURE 2.5 Percentage of students in year 4 reading below the Low benchmark and at or above the Advanced benchmark in PIRLS 2011–2016, by country

While the proportion of Australian students who performed at or above the Advanced benchmark increased between 2011 and 2016, there was no change in the proportion of Australian students who failed to reach the Low benchmark (around 7% of students), as shown in Figure 2.5. Over this time period, the proportion of students in the Russian Federation who performed at or above the Advanced benchmark also increased significantly, while the proportion of English students who did not reach the Low benchmark decreased significantly. New Zealand, Canada and the United States all saw an increase between the 2011 and 2016 PIRLS cycles in the proportion of their students who did not reach the Low benchmark.

Australia's results at the national level

Figure 2.6 presents the distribution of Year 4 reading performance for each of the Australian jurisdictions for PIRLS 2016. To place the jurisdiction results in perspective, the means and distributions for Australia and for the the highest-achieving countries in PIRLS 2016, the Russian Federation and Singapore, are also included.

Figure 2.6 should be read in conjunction with Table 2.2, which presents the multiple comparisons of mean reading performance between jurisdictions and indicates which jurisdiction's performance differs significantly from the performance of each of the other jurisdictions.

Figure 2.6 and Table 2.2 together show that the spread of average scores across the jurisdictions was 33 points (less than half of a standard deviation) between the highest performing jurisdictions, Victoria and the Australian Capital Territory, and the lowest performing jurisdictions, the Northern Territory and South Australia.

The performance of students in Victoria was significantly higher than that of students in all other jurisdictions except the Australian Capital Territory. Students in South Australia performed significantly lower, on average, than students in Victoria, the Australian Capital Territory and Western Australia.

The largest range of student performance was seen in Tasmania and the Northern Territory, where the range between the 5th and 95th percentiles was over 300 points. Victoria had the narrowest range of reading achievement, at 254 points.

Jurisdiction	Mean	SE	Range 5th–95th percentiles
VIC	560	4.2	254
ACT	552	5.2	297
WA	544	6.0	275
NSW	542	5.4	272
QLD	537	5.4	286
TAS	537	8.0	303
SA	527	5.6	290
NT	527	13.5	334
Australia	**544**	**2.5**	**274**
Russian Federation	581	2.2	219
Singapore	576	3.2	263

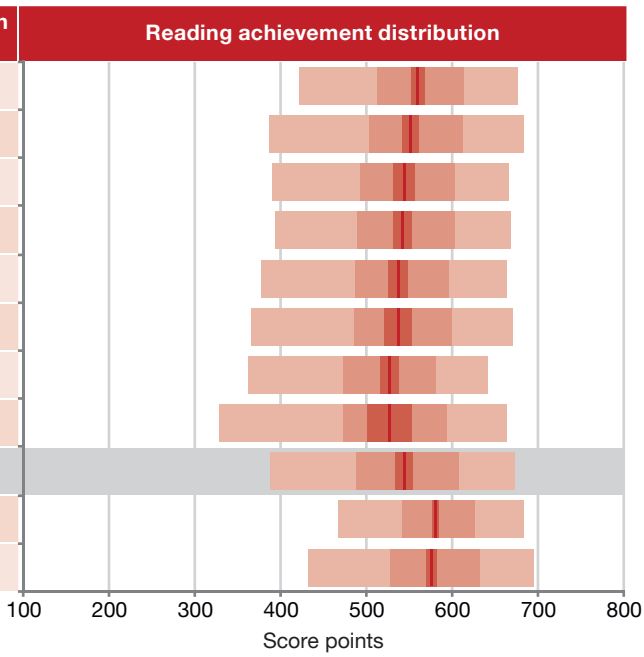


FIGURE 2.6 Mean scores and distribution of Year 4 reading achievement, by jurisdiction

TABLE 2.2 Multiple comparisons of Year 4 reading achievement, by jurisdiction

STATE	Mean	SE	VIC	ACT	WA	NSW	QLD	TAS	SA	NT
VIC	560	4.2		•	↑	↑	↑	↑	↑	↑
ACT	552	5.2	•		•	•	•	•	↑	•
WA	544	6.0	↓	•		•	•	•	↑	•
NSW	542	5.4	↓	•	•		•	•	•	•
QLD	537	5.4	↓	•	•	•		•	•	•
TAS	537	8.0	↓	•	•	•	•		•	•
SA	527	5.6	↓	↓	↓	•	•	•		•
NT	527	13.5	↓	•	•	•	•	•	•	

↑ average achievement significantly higher than other jurisdictions'

↓ average achievement significantly lower than other jurisdictions'

• average achievement not significantly different to other jurisdictions'

Figure 2.7 shows the percentage of students in each jurisdiction at each of the international benchmarks for Year 4 reading, along with the percentages for Australia, Singapore and the Russian Federation (as the highest-scoring countries) and the international median for comparison.

The jurisdictions with the highest proportion of students who reached the Advanced benchmark were the Australian Capital Territory and Victoria (20% and 19%, respectively). Sixteen per cent of students in New South Wales, Tasmania and Western Australia reached the Advanced benchmark, while 14 per cent of students reached this benchmark in Queensland and the Northern Territory. South Australia had the lowest proportion of students at this level, with 11 per cent achieving the Advanced benchmark, which was similar to the International median of 10 per cent.

Around 25 per cent of students in South Australia and the Northern Territory did not reach the Intermediate benchmark, which is the proficient standard for Australia. In the other jurisdictions, this proportion ranged from 14 per cent in Victoria to over 20 per cent in Queensland and Tasmania.

Eleven per cent of students in the Northern Territory did not reach the Low benchmark, compared to only 3 per cent of students in Victoria.

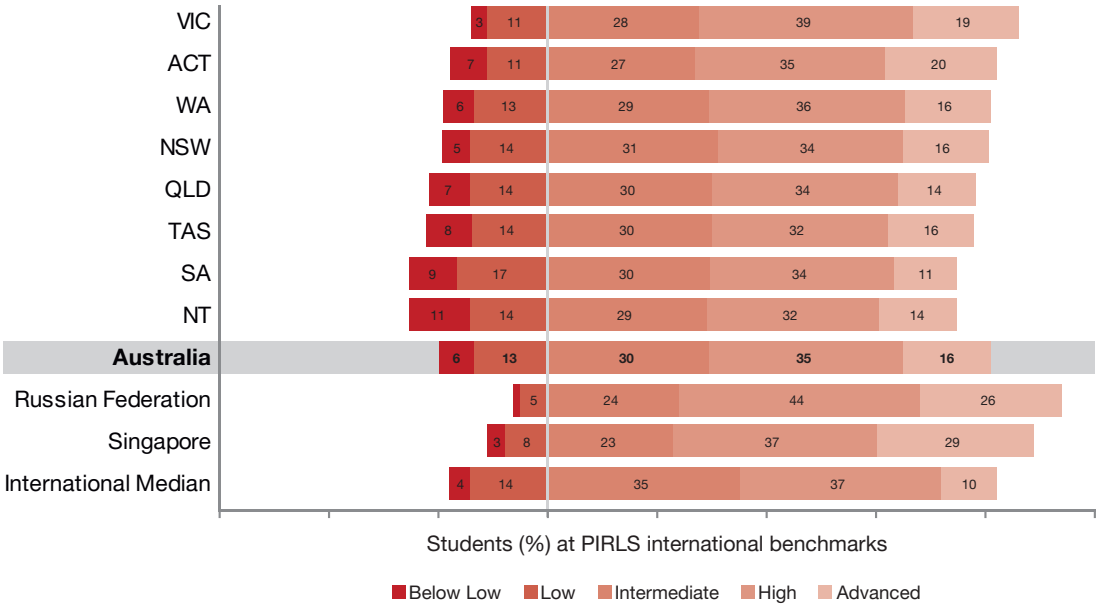


FIGURE 2.7 Percentage of Australian students at the international benchmarks for Year 4 reading, by jurisdiction and international comparisons

Trends in Year 4 reading achievement by jurisdiction

Figure 2.8 presents the trends in reading performance for each of the jurisdictions for PIRLS 2011 and 2016, along with an indication of the statistical significance of the difference between cycles. Between 2011 and 2016, there has been a significant improvement in three of the eight jurisdictions. Western Australia showed the greatest improvement of 28 points, followed by Queensland (26 points) and Victoria (21 points). There was no significant change in average scores between 2011 and 2016 in the remaining jurisdictions.

	2011		2016		Difference between 2016 and 2011
Jurisdiction	Mean	SE	Mean	SE	
ACT	558	5.5	552	5.2	-6
NSW	535	5.0	542	5.4	7
SA	518	4.4	527	5.6	9
TAS	525	7.3	537	8.0	12
NT	509	9.9	527	13.5	18
VIC	539	4.2	560	4.2	21
QLD	511	5.1	537	5.4	26
WA	516	4.6	544	6.0	28
Australia	**527**	**2.2**	**544**	**2.5**	**17**

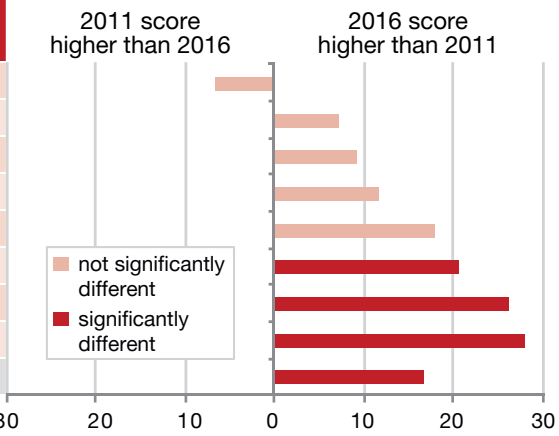


FIGURE 2.8 Trends in Year 4 reading achievement by jurisdiction

Figure 2.9 presents the proportion of students at each of the reading benchmarks in PIRLS 2011 and 2016 in each jurisdiction.

While there appear to have been increases in the proportions of students reaching the High and Advanced benchmarks across most jurisdictions, there has been little change at the opposite end of the performance scale, with few improvements in the proportions of students performing below the Low benchmark (apart from in Queensland and Western Australia).

The proportions of students who performed at or above the Intermediate benchmark increased between PIRLS 2011 and 2016 in Western Australia, Queensland, the Northern Territory, Victoria and Tasmania. In South Australia and New South Wales, there was little difference in the proportions of students at this level in 2011 and 2016, while in the Australian Capital Territory, the proportion of students reading at or above the Intermediate benchmark decreased between 2011 and 2016.

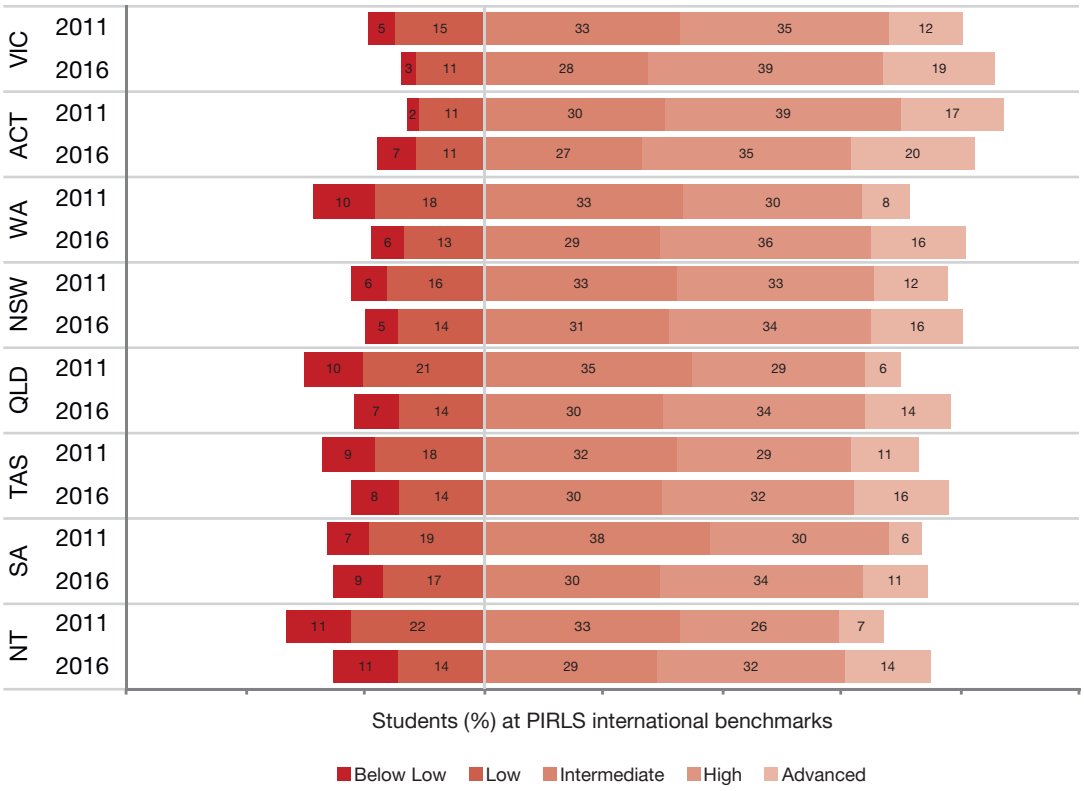


FIGURE 2.9 Percentage of students at the international benchmarks for reading in PIRLS 2011–2016, by jurisdiction

Australia's results for different demographic groups

Year 4 reading achievement by sex

Figure 2.10 shows the reading performance of male and female Year 4 students across the countries that participated in PIRLS 2016. This figure presents average achievement separately for females and males, as well as the differences between the averages. Sex differences are shown by a bar indicating the size and direction of each difference (in favour of males or females) and whether the difference was statistically significant (indicated by a darkened bar). Countries are presented in the figure in increasing order of the difference between females and males in average achievement.

Figure 2.10 shows that only two countries had no significant sex difference in reading achievement – Macao and Portugal. The remaining 48 countries, including Australia, recorded significant differences that favoured female students. These differences ranged in size from 6 score points, in Austria, through 22 points in Australia and New Zealand, to a substantial 65 points in Saudi Arabia.

Country/ Region	Females				Males				Difference (absolute value)	SE
	Students (%)	SE (%)	Mean	SE	Students (%)	SE (%)	Mean	SE		
Saudi Arabia	48	2.6	464	5.4	52	2.6	399	5.8	65	7.5
South Africa	48	0.7	347	4.0	52	0.7	295	5.1	52	3.0
Iran, Islamic Rep. of	47	1.1	452	4.5	53	1.1	407	5.1	46	5.9
Oman	50	0.7	442	3.2	50	0.7	395	3.9	46	3.0
Bahrain	50	1.5	468	2.8	50	1.5	424	3.5	43	3.8
Egypt	49	1.2	349	5.6	51	1.2	312	6.6	37	4.8
Qatar	50	2.4	460	1.9	50	2.4	424	3.4	36	4.0
Kuwait	52	1.8	410	4.8	48	1.8	376	6.4	34	7.7
United Arab Emirates	49	2.1	465	4.2	51	2.1	436	4.5	30	5.8
Morocco	49	0.7	372	4.0	51	0.7	344	4.4	28	3.0
Australia	**50**	**0.8**	**555**	**2.6**	**50**	**0.8**	**534**	**3.0**	**22**	**2.5**
Finland	50	0.9	577	1.9	50	0.9	555	2.3	22	2.2
New Zealand	50	0.9	533	2.4	50	0.9	512	3.0	22	3.2
Trinidad and Tobago	52	1.8	490	3.8	48	1.8	468	4.4	22	4.9
Malta	48	0.6	463	2.6	52	0.6	442	2.2	21	3.1
Norway (5)	50	1.1	570	2.6	50	1.1	548	2.6	21	2.3
Lithuania	50	1.0	558	2.7	50	1.0	538	3.3	20	3.1
Slovenia	50	0.9	552	2.3	50	0.9	533	2.6	19	2.9
Georgia	49	0.7	498	2.7	51	0.7	479	3.6	19	3.2
Poland	50	0.8	574	2.5	50	0.8	556	2.6	18	3.0
Northern Ireland	50	1.2	574	2.8	50	1.2	555	2.8	18	3.5
Latvia	51	1.1	566	2.1	49	1.1	549	2	17	2.4
Singapore	49	0.6	585	3.5	51	0.6	568	3.4	17	3.0
Bulgaria	49	0.7	559	4.9	51	0.7	544	4.3	16	3.4
Russian Federation	49	0.8	588	2.2	51	0.8	574	2.6	15	2.1
England	50	0.9	566	2.2	50	0.9	551	2.4	15	2.8
Sweden	49	0.9	563	2.7	51	0.9	548	2.6	15	2.5
Chile	48	1.4	501	2.9	52	1.4	487	3.2	14	3.7
Hungary	49	0.8	561	3.4	51	0.8	548	3.1	13	3.1
Denmark	51	0.9	554	2.6	49	0.9	541	2.7	13	3.1
Azerbaijan	47	0.8	479	4.3	53	0.8	466	4.5	13	3.0
Israel	51	1.5	537	2.9	49	1.5	524	3.4	13	3.8
Canada	49	0.6	549	2.2	51	0.6	537	2.1	12	2.2
Ireland	50	1.6	572	2.9	50	1.6	561	3.3	12	3.8
Kazakhstan	49	0.8	542	2.8	51	0.8	531	2.5	11	2.1
Belgium (French)	50	1.0	503	2.5	50	1.0	492	3.4	11	3.0
Germany	49	0.7	543	3.2	51	0.7	532	3.7	11	2.9
Belgium (Flemish)	51	0.9	530	2.1	49	0.9	520	2.3	10	2.0
Czech Republic	49	0.9	549	2.2	51	0.9	538	2.6	10	2.4
Netherlands	51	1.1	550	1.7	49	1.1	540	2.3	10	2.2
Hong Kong SAR	49	1.5	573	2.9	51	1.5	564	3.1	9	2.5
Slovak Republic	49	1.0	539	3.7	51	1.0	530	3.1	9	2.7
Chinese Taipei	48	0.6	563	2.2	52	0.6	555	2.3	8	1.9
France	50	0.9	515	2.6	50	0.9	507	2.5	8	2.7
United States	50	0.7	553	3.2	50	0.7	545	3.6	8	2.9
Spain	49	0.6	532	1.4	51	0.6	524	2.7	8	2.5
Italy	49	0.9	552	2.7	51	0.9	544	2.4	7	2.6
Austria	48	0.9	544	2.7	52	0.9	538	2.7	6	2.4
Macao SAR	49	0.5	546	1.6	51	0.5	545	1.7	1	2.6
Portugal	49	0.8	529	2.7	51	0.8	527	2.5	1	2.7
International Avg.	49	0.2	520	0.4	51	0.2	501	0.5	19	0.5

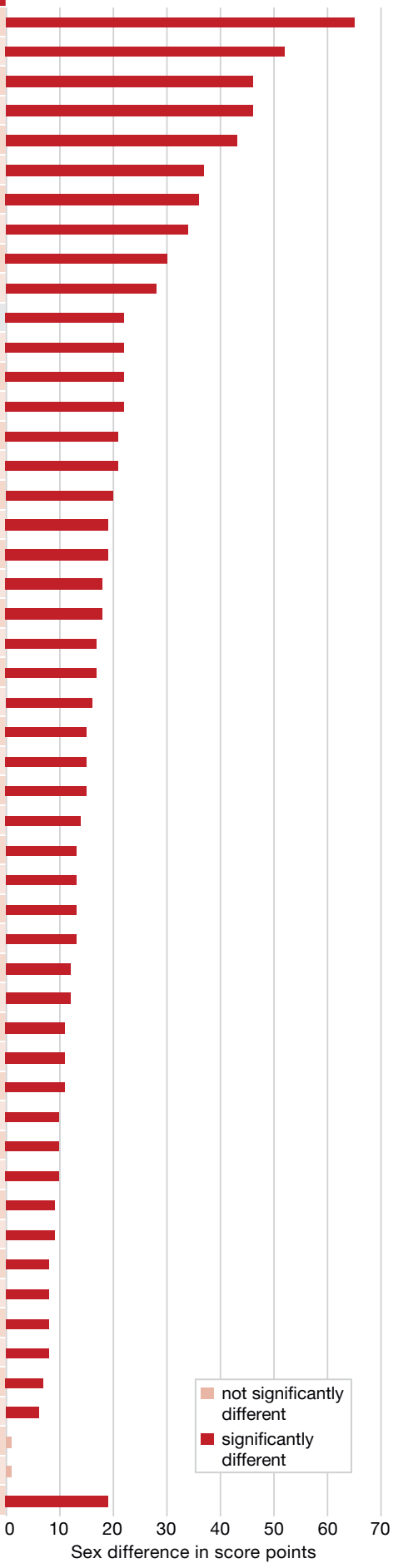


FIGURE 2.10 Sex differences in Year 4 reading achievement, by country

Figure 2.11 presents the difference in the average reading score of Australian male and female students. The range of scores was greater for Australian Year 4 male students (282 points) than for Year 4 female students (260 points), with a slightly larger 'tail' evident among male students.

Sex	Students (%)	Mean	SE	Range 5th– 95th percentiles	Reading achievement distribution
Females	50	555	2.6	260	
Males	50	534	3.0	282	

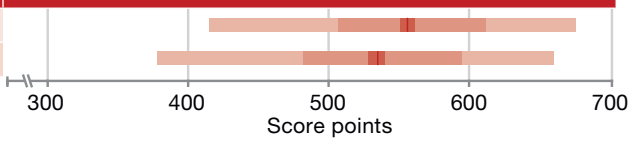


FIGURE 2.11 Mean scores and distribution of Year 4 reading achievement within Australia, by sex

Figure 2.12 also highlights the difference in the reading performance of male and female Year 4 students – with greater proportions of female students reaching the High and Advanced benchmarks and greater proportions of male students at or below the Low benchmark. These differences are statistically significant and combine to paint a less than impressive picture for male students, with fewer of them performing at relatively high standards and more of them failing to reach the minimum standard. Eighty-five per cent of female students reached the Australian proficient standard (the Intermediate benchmark), compared to 77 per cent of male students. In comparison, the results from TIMSS 2015 indicated little difference in the proportions of male and female students who reached the proficient standard in Year 4 mathematics and science.

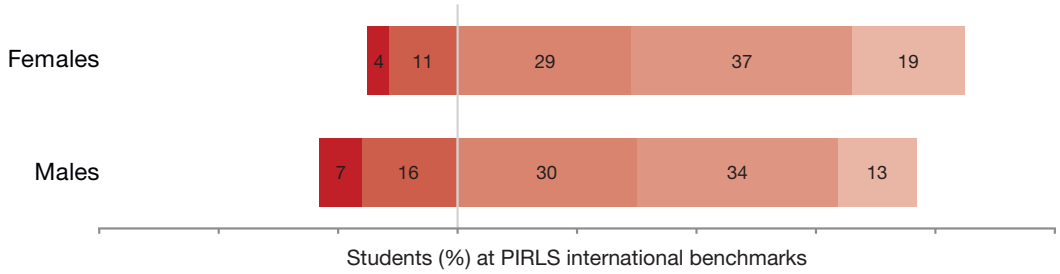


FIGURE 2.12 Percentage of Australian students at the international benchmarks for Year 4 reading, by sex

Trends in reading achievement by sex

Figure 2.13 shows that the sex difference in reading performance in Year 4 students in Australia has remained the same between PIRLS 2011 and 2016. While both male and female students have improved over the two cycles, the gender 'gap' has not changed significantly.

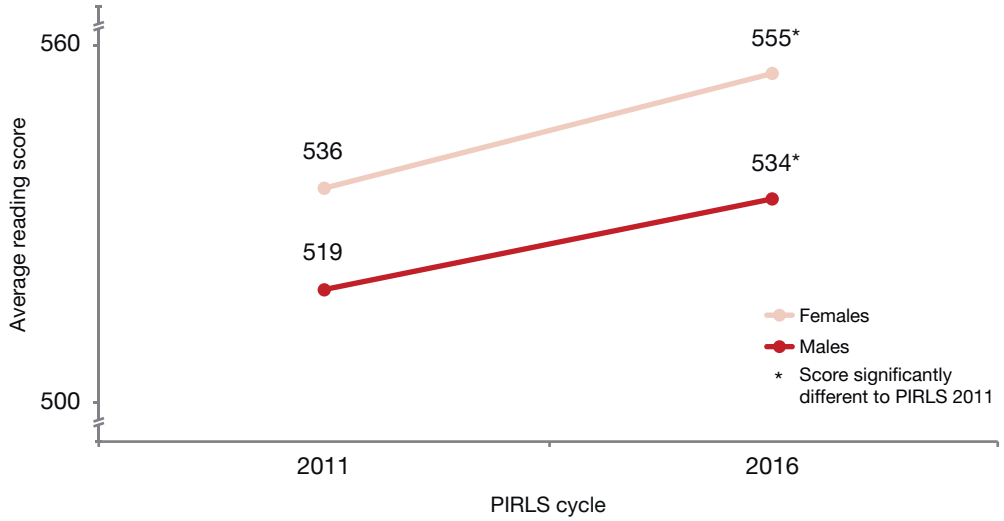


FIGURE 2.13 Trends in Year 4 reading achievement within Australia, 2011–2016, by sex

Sex differences in reading achievement by jurisdiction

Figure 2.14 shows the sex differences in Year 4 reading by jurisdiction. Female students scored higher, on average, than male students in Victoria, Queensland, Western Australia, New South Wales and South Australia. In the Australian Capital Territory, the average scores of male and female students were very similar. In Tasmania and the Northern Territory, the differences between male and female students were larger (substantially so in the case of the Northern Territory) but did not reach statistical significance due to the large standard errors.

	Females		Males		Difference (absolute value)
Jurisdiction/ Country	Mean	SE	Mean	SE	
ACT	554	8.5	549	10.4	5
VIC	567	5.3	552	4.6	15
TAS	545	7.5	529	10.0	16
QLD	548	5.7	527	6.2	21
WA	555	5.7	532	7.0	23
NSW	554	5.5	530	6.3	24
SA	544	5.8	514	6.4	31
NT	544	10.9	507	18.0	36
Australia	**555**	**2.6**	**534**	**3.0**	**22**
International Avg.	520	0.4	501	0.5	19

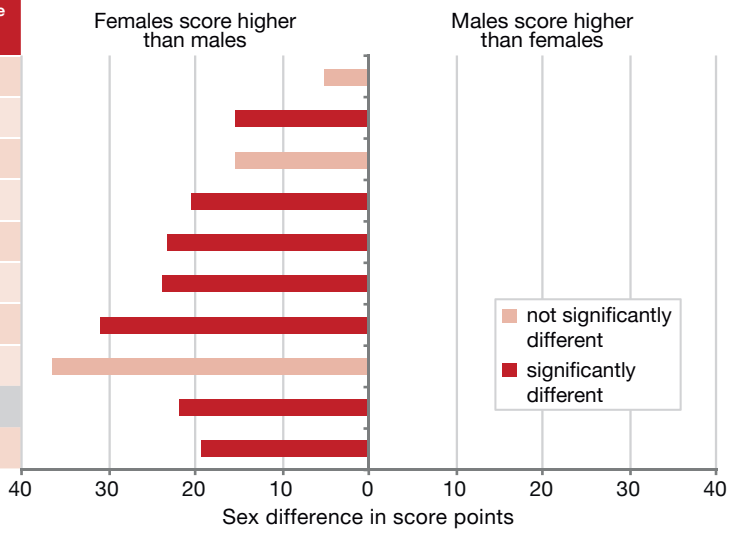


FIGURE 2.14 Sex differences in Year 4 reading achievement within Australia, by jurisdiction and international comparisons

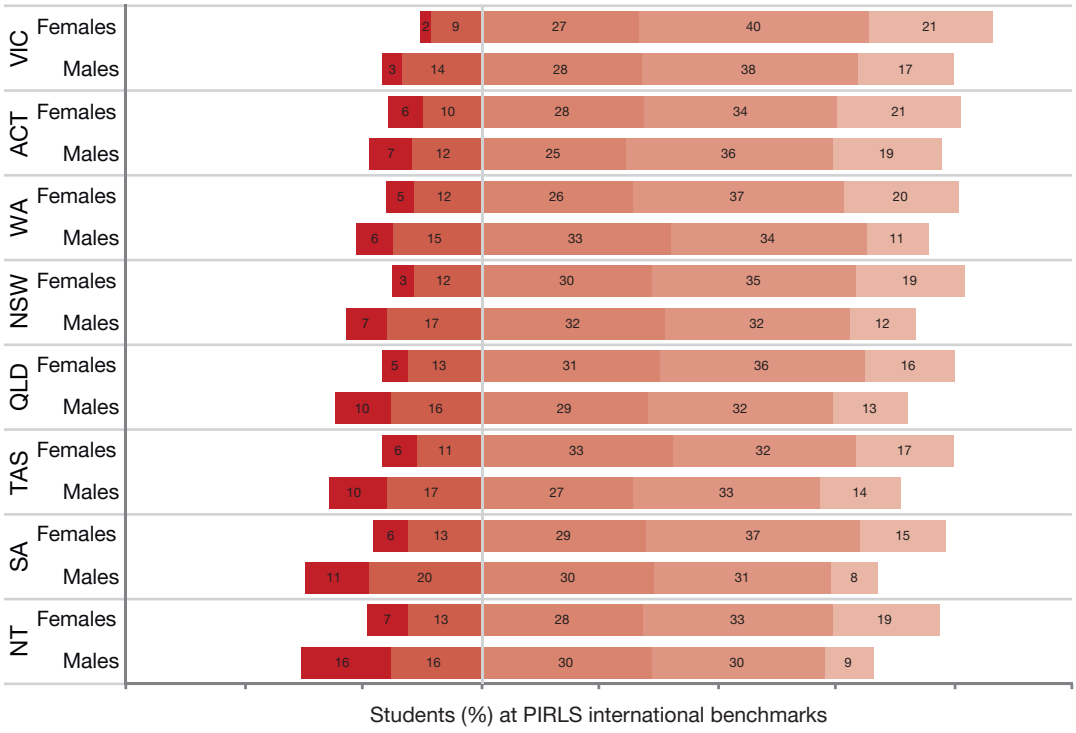


FIGURE 2.15 Percentage of Australian students at the international benchmarks for Year 4 reading, by sex within jurisdiction

Figure 2.15 shows the percentages of students at each of the international benchmarks in reading in each jurisdiction, by sex.

In New South Wales and the Northern Territory, the proportion of males who were below the Low benchmark was significantly higher than the proportion of female students, while the proportion of female students at the Advanced benchmark was significantly greater than the corresponding proportion of male students at this level.

In Queensland, there was a significant gender difference in the proportion of students below the Low benchmark, while in South Australia and Western Australia, there was a gender difference (in favour of females) at the Advanced benchmark. The proportions of male and females students at each of the international reading benchmarks were similar in the Australian Capital Territory.

In the Northern Territory and South Australia, over 30 per cent of male students did not reach the Intermediate benchmark (the proficient standard for Australia). In Victoria and New South Wales, only 11 and 15 per cent of females did not reach the Intermediate benchmark.

Year 4 reading achievement by Indigenous background

The education attainment of Indigenous students in core subject areas such as reading is an important issue, and the previous PIRLS cycle provided an initial picture of Indigenous achievement in this area. This section presents Australian students' reading achievement according to Indigenous background. For more information about this variable, please refer to the Reader's Guide.

As shown in Figure 2.16, 6 per cent of the PIRLS Year 4 sample identified as having an Indigenous background. These students attained an average score of 483 points in reading, which is 67 points lower than the average score for non-Indigenous students of 550. The mean score for Indigenous students is within the range of the Intermediate benchmark, while the average reading score of non-Indigenous students is at the High benchmark (set at 550 points).

Figure 2.16 also presents the distribution of Year 4 achievement scores for Indigenous and non-Indigenous students. The spread of scores between the 5th and 95th percentiles was slightly wider for Indigenous students, at 304 points, compared to 263 for non-Indigenous students. This difference is driven largely by the longer 'tail' among Indigenous students.

Indigenous background	Students (%)	Mean	SE	Range 5th-95th percentiles	Reading achievement distribution
Non-Indigenous	94	550	2.5	263	
Indigenous	6	483	6.0	304	

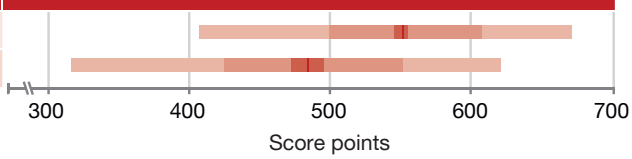


FIGURE 2.16 Mean scores and distribution of Year 4 reading achievement within Australia, by Indigenous background

Figure 2.17 adds to the picture of reading performance by providing the percentages of Indigenous and non-Indigenous students at each of the international benchmarks, with differences being apparent at both ends of the achievement scale. Seventeen per cent of non-Indigenous students reached the Advanced benchmark compared to four per cent of Indigenous students.

At the lower levels of performance, the differences are just as stark, with 18 per cent of Indigenous students not reaching the Low benchmark, compared to just four per cent of non-Indigenous students.

Fifty-seven per cent of Indigenous students reached the Intermediate benchmark (the proficient standard), while the comparable figure for non-Indigenous students was 83 per cent.

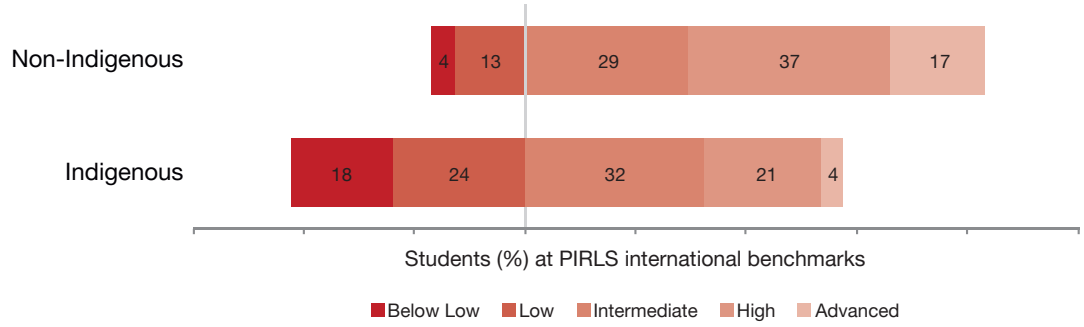


FIGURE 2.17 Percentage of Australian students at the international benchmarks for Year 4 reading, by Indigenous background

Figure 2.18 presents trends in reading performance at Year 4 by Indigenous background for the two cycles of PIRLS in which Australia participated. As noted earlier, the average score for all Australian students has increased significantly between 2011 and 2016, and this seems due to changes among non-Indigenous students, the larger group of students. There was no significant change in the average score of Indigenous students between 2011 (475 points) and 2016 (483 points).

The gap in average reading performance of Indigenous and non-Indigenous Year 4 students has changed little over this time – from 57 points in 2011 to 67 points in 2016.

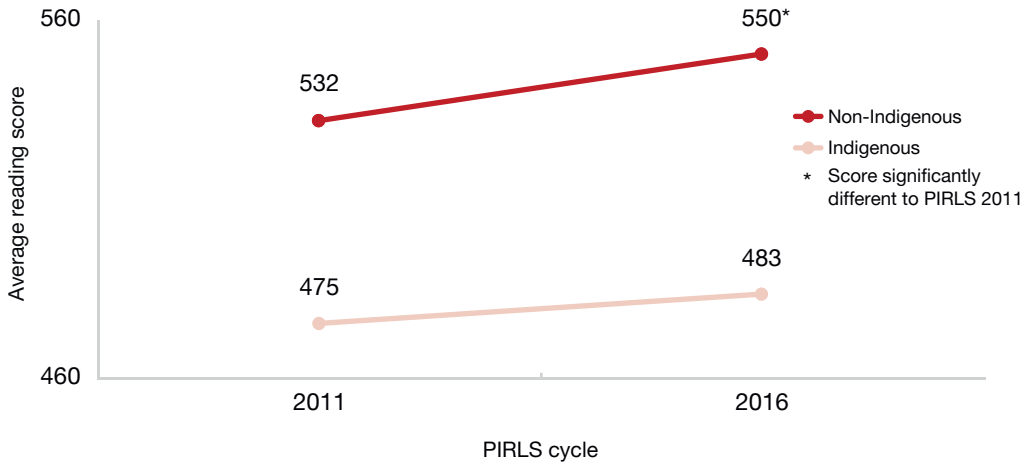


FIGURE 2.18 Trends in Year 4 reading achievement within Australia, 2011-2016, by Indigenous background

Year 4 reading achievement by language spoken at home

Learning to read is dependent on a person's early language experiences, thus the language or languages spoken at home and how they are used are important factors in the development of reading literacy (Bialystok, 2006). If students are not fluent in the language of instruction there can be learning gaps because they must learn the content of the curriculum through a new language, and language learners are most disadvantaged in subjects with higher language demand, such as reading lessons (Abedi, 2002). How often English is spoken at home is a factor that was associated with performance in PIRLS 2011 and in Year 4 science performance in TIMSS 2011.

This section presents Australian students' reading performance grouped by students' reports of whether a language other than English is spoken as the main language at home. For more information about this variable, please refer to the Reader's Guide.

Figure 2.19 shows that 15 per cent of students in the PIRLS Year 4 sample indicated that they did not speak English at home *always* or *almost always*, which is the same proportion reported in TIMSS 2015. Students who spoke English at home *always* or *almost always* scored 15 points higher, on average, than students who spoke a language other than English most of the time, a statistically significant difference.

Figure 2.19 also shows the distribution of reading scores for students by their language background. The spread of scores between the 5th and 95th percentiles was similar for both groups, at just over 270 points.

	Students (%)	Mean	SE	Range 5th-95th percentiles	Reading achievement distribution
English	85	547	2.6	272	
LBOTE	15	532	5.0	273	

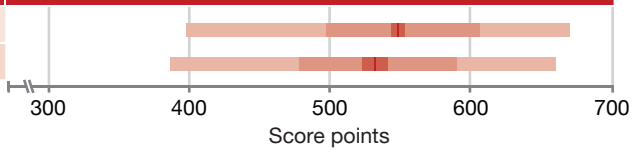


FIGURE 2.19 Mean scores and distribution of Year 4 reading achievement within Australia, by language spoken at home

The proportions of students at each of the international reading benchmarks, grouped by the language they spoke most frequently at home, is presented in Figure 2.20. These proportions did not differ significantly, except at the highest level of performance. Seventeen per cent of students who spoke English at home *always* or *almost always* reached the Advanced benchmark, compared to 12 per cent of students who spoke English at home less frequently.

Over 80 per cent of English-speaking students managed to reach the Intermediate benchmark, while 76 per cent of non-English speaking students reached this level.

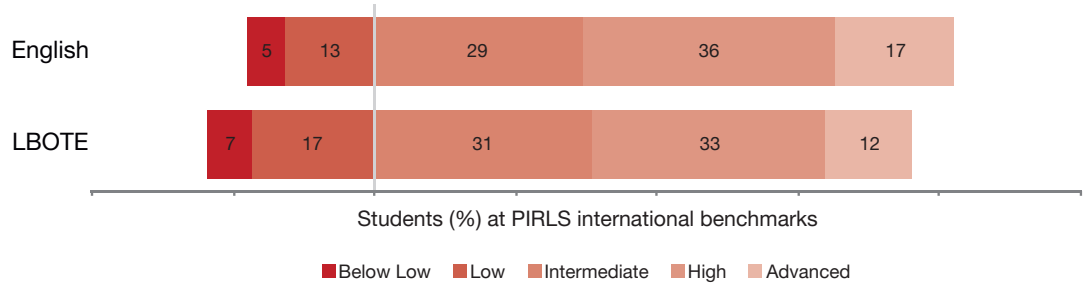


FIGURE 2.20 Percentage of Australian students at the international benchmarks for Year 4 reading, by language spoken at home

Year 4 reading achievement by books in the home

Socioeconomic status has been found (in PIRLS and other studies) to be related to achievement (Schagen, 2004, Shiel & Eivers, 2009). In PIRLS, the number of books in the home is used as a proxy for socioeconomic status. This section presents Australian students' reading achievement according to the number of books in the home. For more information about this variable, please refer to the Reader's Guide.

As shown in Figure 2.21, the majority of Australian students (56%) reported having *an average number of books* and only 19 per cent reported having *many books* at home. Students who have *many books* in the home recorded the highest reading performance, scoring, on average, 22 points higher than students with *an average number of books* in the home, and 80 points higher than those with a *few books* in the home. This is consistent with previous cycles of PIRLS and TIMSS that have shown that students from homes with more literacy resources achieve, on average, at higher levels in Year 4 reading, mathematics and science than students from less well-resourced homes.

Figure 2.21 also shows the spread of scores in reading for students according to their report of the number of books in the home. The spread of scores for students with *many books* in the home was similar to that for students with *a few books* in the home, over 260 points. The range between the 5th and 95th percentiles was slightly narrower for students in the group who reported having *an average number of books* in the home (248 points).

	Students (%)	Mean	SE	Range 5th– 95th percentiles	Reading achievement distribution
Many books	19	578	4.3	261	
Avg. no. of books	56	556	2.3	248	
A few books	26	498	3.3	268	

FIGURE 2.21 Mean scores and distribution of Year 4 reading achievement within Australia, by number of books in the home

Figure 2.22 presents the proportions of students at each of the international benchmarks for reading, grouped by the number of books they reported having in the home. Of those students who reported having *many books* in the home, 28 per cent reached the Advanced benchmark, compared to 17 per cent for students in the *average number of books* category and just 4 per cent for those with *a few books* in the home.

At the other end of the achievement scale, 11 per cent of students in the group who reported having *many books* in the home did not reach the Intermediate benchmark, with 8 per cent reaching only the Low benchmark and only 3 per cent not performing at even this very basic level. Of those students with *an average number of books* in the home, 14 per cent did not reach the Intermediate benchmark. This comprised 11 per cent who achieved the Low benchmark and 3 per cent who did not reach this level.

In contrast, 35 per cent of the students who reported having *a few books* in the home did not achieve the Intermediate benchmark, which included 12 per cent falling below the Low benchmark – four times as many as in the groups of students with *many* and *an average number of books* in the home.

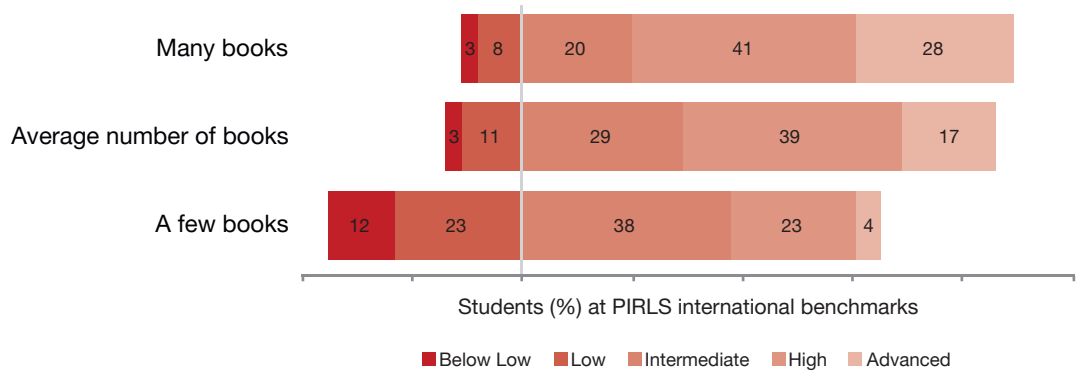


FIGURE 2.22 Percentage of Australian students at the international benchmarks for Year 4 reading, by number of books in the home

Year 4 reading achievement by school socioeconomic composition

While the number of books students report having at home can act as an indicator of their individual levels of socioeconomic status, it is also possible in PIRLS to examine student performance by school-level socioeconomic composition, by using the principals' responses to questions about the socioeconomic make-up of the school (please see the Readers' Guide for further information about this variable).

In PIRLS 2016, principals' reports on the socioeconomic composition of their school were used to create three categories:

- *more affluent*
- *more disadvantaged*
- *neither more affluent nor more disadvantaged*.

As shown in Figure 2.23, Australian students attending schools that were categorised as being *more affluent* (35% of students) scored 25 points higher, on average, than students attending schools that were *neither more affluent nor more disadvantaged*. Around 25 per cent of Australian students attended a school that was described by their principal as being *more disadvantaged.* The average performance of these students was 36 points lower than that of students in *neither more affluent nor more disadvantaged* schools and 61 points lower than that of students in *more affluent* schools.

The range of scores from the 5th to 95th percentiles was larger for *more disadvantaged* schools as well, with a longer 'tail' of reading performance (i.e. lower scores among the lower performing students) among students in these schools than was the case for schools that were not as disadvantaged.

	Students (%)	Mean	SE	Range 5th–95th percentiles
More affluent	35	570	4.6	251
Neither more affluent nor more disadvantaged	38	545	3.2	264
More disadvantaged	26	509	4.3	287

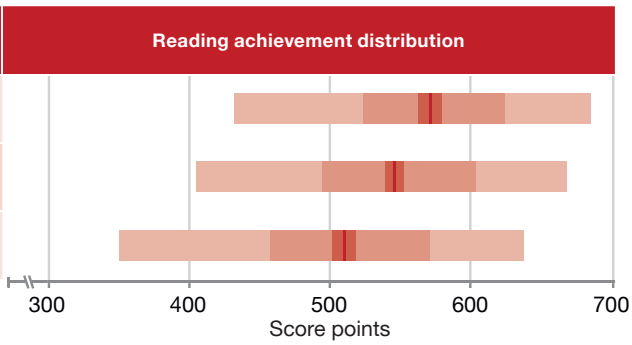


FIGURE 2.23 Mean scores and distribution of Year 4 reading achievement within Australia, by school socioeconomic composition

Figure 2.24 shows the percentages of Year 4 students at each of the international benchmarks in reading, by school socioeconomic composition. The longer 'tail' in reading among students in *more disadvantaged* schools is evident again here, with 31 per cent of students in these schools not reaching the Intermediate benchmark, including 11 per cent who did not reach the Low benchmark. In contrast, only 5 per cent of students from *neither more affluent nor more disadvantaged* schools and 2 per cent from *more affluent* schools were performing at a level below that of the Low international benchmark.

At the other end of the performance scale, there were also stark differences associated with school-level advantage, with 24 per cent of students in *more affluent* schools reaching the Advanced benchmark, compared to 15 per cent of students in *neither more affluent nor more disadvantaged* schools and only 7 per cent of students in *more disadvantaged schools.*

Sixty-nine per cent of students in *more disadvantaged* schools were performing at or above the Intermediate benchmark (the proficient standard), compared to over 80 per cent of students in other schools.

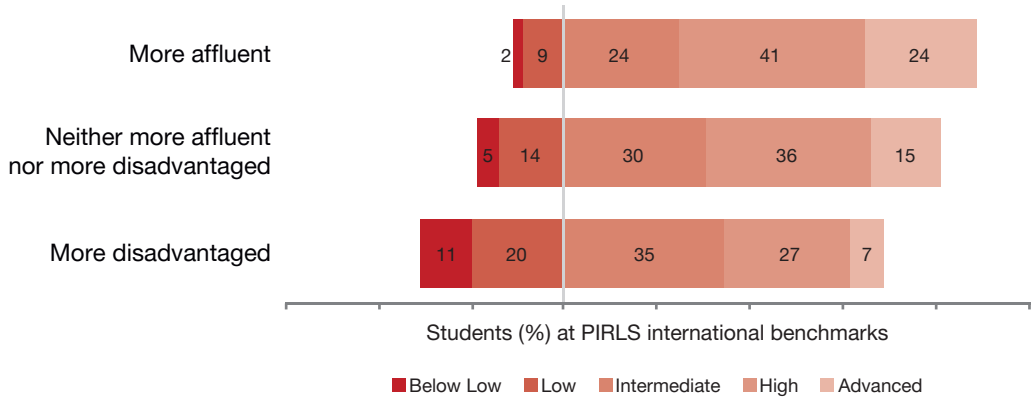


FIGURE 2.24 Percentage of Australian students at the international benchmarks for Year 4 reading, by school socioeconomic composition

Year 4 reading achievement by school geographic location

Research, including past cycles of PIRLS and TIMSS, has found that students attending schools in remote or regional areas of Australia are often at an educational disadvantage compared to students attending metropolitan schools (e.g. Panizzon & Pegg, 2007; Thomson et al, 2012, Thomson, De Bortoli & Underwood, 2017). This section presents Year 4 students' reading performance according to the geographic location of the school. For more information about this variable, please refer to the Reader's Guide.

As shown in Figure 2.25, students attending school in remote areas made up only 2 per cent of the PIRLS sample, while those attending school in metropolitan areas made up 78 per cent of the sample. Students attending schools in metropolitan areas scored, on average, 13 points higher than students attending schools in provincial areas, and 21 points, on average, higher than students attending schools in remote areas. All of these differences are statistically significant.

The range of scores from the 5th to 95th percentiles was larger for provincial than metropolitan schools (286 and 269 points, respectively). The spread for remote schools was larger again, at 299 points. While the average scores of the top 5 per cent of students in metropolitan, provincial and remote schools were very similar, there was a longer 'tail' of reading performance (i.e. lower scores among the lower performing students) among students in remote schools.

	Students (%)	Mean	SE	Range 5th–95th percentiles
Metropolitan	78	547	2.9	269
Provincial	20	534	5.0	286
Remote	2	526	9.0	299

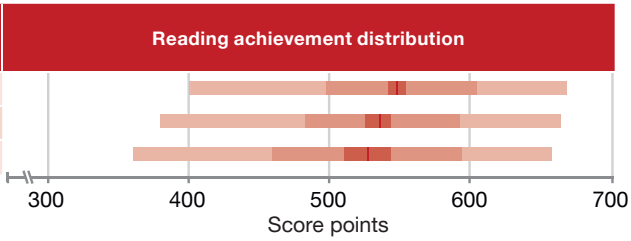


FIGURE 2.25 Mean scores and distribution of Year 4 reading achievement within Australia, by geographic location

Figure 2.26 shows the percentages of Year 4 students at each of the international benchmarks in reading, by geographic location. The longer 'tail' in reading among students in remote schools is evident again here, with 30 per cent of students in remote schools not reaching the Intermediate benchmark, including 9 per cent who did not reach the Low benchmark. Seven per cent of students from provincial schools and 5 per cent from metropolitan schools were performing at a level below that of the Low international benchmark.

There were no significant differences in the proportions of students reaching the Advanced benchmark according to the geographic location of their school. Twelve per cent of students in remote schools were reading at the Advanced benchmark, along with 14 per cent from provincial schools and 16 per cent from metropolitan schools.

The proportion of students from remote schools who attained the Intermediate benchmark was 70 per cent, compared to 82 and 77 per cent of students from metropolitan and provincial schools, respectively.

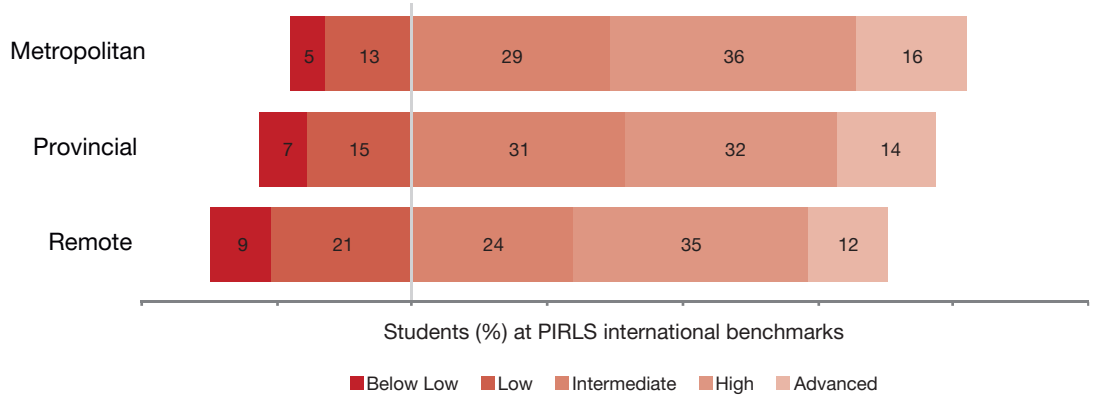


FIGURE 2.26 Percentage of Australian students at the international benchmarks for Year 4 reading, by geographic location

Australia's results in the reading purposes and processes

As noted in Chapter 1, the PIRLS reading assessment can be described in terms of reading purposes and processes. These purposes (or reasons for reading) account for most of the reading done by young people at school and outside of school – for literary experience (that is, reading for interest and pleasure) and in order to acquire and use information (reading to learn). The reading processes detail the thinking processes that students need in order to respond to the assessment items, but also to interact with texts in general.

Each prompt text is categorised as either *literary* or *informational*, and the accompanying questions address that purpose – questions regarding theme, plot events, characters and setting for literary texts, and questions about the information contained in the passages for informational texts.

The processes assessed – focus on and retrieve explicitly stated information; make straightforward inferences; interpret and integrate ideas and information; and examine and evaluated content, language, and textual elements – are evaluated across both reading purposes. Each assessment question is thus categorised according to one reading purpose and one reading process. The reading processes are summarised on two scales – retrieving and inferencing (combining responses to retrieving and making straightforward inferences) and integrating (combining interpreting and integrating items with examining and evaluating items).

Overall, Australian students showed a relative strength in the Literary reading purpose, with a mean score of 547 (compared to an overall mean of 544), but no relative weakness in the Informational purpose (mean score of 543). This was different to other English-speaking comparison countries (Canada, England, New Zealand and the United States) who all displayed relative strengths in the Literary purpose accompanied by relative weaknesses in the Informational purpose. In contrast, the Russian Federation and Hong Kong both showed relative strengths in the Informational purpose. Hong Kong also had a relative weakness in the Literary purpose, while Singapore showed no difference in performance on the two purpose sub-scales.

Tables 2.3 and 2.4 present the average achievement in each of the Year 4 reading purposes and processes for Australia as a whole, for each of the Australian jurisdictions, for males and females, and for Indigenous and non-Indigenous students, while Table 2.5 presents trends for Australia in the reading purposes and processes since 2011.

The relative strength in Literary reading purposes shown at the national level was also evident in each of the Australian jurisdictions (to varying degrees), across Indigenous background and among female students. Interestingly, male students showed no relative strength in Literary texts (Table 2.3).

TABLE 2.3 Relative achievement in the Year 4 reading purposes, for Australia and by jurisdiction, sex and Indigenous background

	Reading purpose							
	Literary		Difference between reading overall and literary		Informational		Difference between reading overall and informational	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Australia	**547**	**2.4**	**3**	**1.3**	**543**	**2.6**	**-2**	**1.0**
ACT	555	5.0	4	2.9	549	5.6	-2	3.0
NSW	546	5.3	4	2.3	541	5.9	-1	2.1
VIC	561	4.2	2	3.0	559	4.3	0	2.8
QLD	539	5.7	2	2.0	534	5.7	-3	2.3
SA	529	5.4	2	2.0	523	6.2	-4	2.5
WA	548	5.8	4	2.5	542	6.0	-2	1.6
TAS	540	7.7	4	3.8	535	8.0	-2	2.3
NT	531	12.6	4	3.8	522	14.0	-5	4.0
Females	561	2.7	6	1.9	552	2.8	-3	1.0
Males	533	2.9	0	2.1	533	2.9	0	1.7
Non-Indigenous	553	2.4	3	1.4	548	2.5	-2	1.2
Indigenous	488	6.5	4	3.0	478	7.0	-5	3.6

Table 2.4 shows that Australia had a relative strength in the interpreting, integrating and evaluating processes scale, with a mean of 549 points, and a relative weakness in the retrieving and straightforward inferencing scale, with a mean of 541 points. This pattern was also evident in the scores of Canada, England and the United States. New Zealand recorded a relative strength in the interpreting, integrating and evaluating scale but no difference between the retrieving and straightforward inferencing score and their overall mean achievement. The top performing countries (Russian Federation, Singapore and Hong Kong) showed no differences in their scores for the comprehension processes sub-scales.

The national pattern of a relative weakness in the retrieving and straightforward inferencing scale combined with a relative strength in the interpreting, integrating and evaluation scale was found among male and female students, students with and without an Indigenous background, and across most jurisdictions.

TABLE 2.4 Relative achievement in the Year 4 reading processes, for Australia and by jurisdiction, sex and Indigenous background

	Reading processes							
	Retrieving and straightforward inferencing		Difference between reading overall and retrieving		Interpreting, integrating and evaluating		Difference between reading overall and interpreting	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Australia	**541**	**2.6**	**-4**	**1.4**	**549**	**2.4**	**5**	**1.0**
ACT	548	5.6	-4	3.2	556	5.2	5	3.0
NSW	539	5.6	-3	2.0	548	5.2	6	1.5
VIC	556	4.0	-3	3.0	563	4.0	4	3.0
QLD	533	5.7	-5	2.3	543	5.6	5	2.1
SA	523	5.8	-5	2.4	531	5.5	4	1.9
WA	542	5.9	-3	2.5	549	5.7	5	2.3
TAS	533	7.9	-3	2.7	542	7.8	5	2.3
NT	520	13.3	-7	2.9	529	13.8	2	2.6
Females	552	2.7	-3	1.3	561	2.6	5	1.2
Males	530	3.0	-4	1.9	538	2.7	4	1.7
Non-Indigenous	546	2.5	-4	1.4	555	2.3	5	1.1
Indigenous	480	7.0	-3	4.6	490	6.6	6	4.0

As shown in Table 2.5, in 2011, there was no difference in the reading purpose sub-scale scores for Australia overall, while there was small (but still significant) difference in the comprehension process sub-scales, which favoured the interpreting, integrating and evaluating sub-scale. As we have seen previously, this difference increased in 2016, and a difference in the purpose sub-scale also appeared. While performance in all sub-areas of PIRLS reading achievement has improved in Australia, work needs to be done particularly focussing on improving skills in the area of Informational reading, in which the top performing countries tend to excel.

TABLE 2.5 Trends in Australian achievement in the Year 4 reading purposes and processes

	Reading purpose				Reading processes			
	Literary		Informational		Retrieving and straightforward inferencing		Interpreting, integrating and evaluating	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
2011	527	2.4	528	2.3	527	2.6	529	2.2
2016	547	2.4	543	2.6	541	2.6	549	2.4

Who are Australia's poorer readers?

The results for Australian students suggest some positive changes in the average reading performance of students since PIRLS 2011, with an increase in the overall average score, and increased proportions of students reading at or above the Intermediate benchmark (the proficient standard for Australian students). However, they also highlighted the existence of a group of students for whom reading comprehension, at least as measured in PIRLS, is an area of great difficulty. Around 7 per cent of students in Year 4 did not manage to reach the Low benchmark in PIRLS 2016, and this proportion remains unchanged from PIRLS 2011.

This group of students had difficulty locating and reproducing information, actions or ideas that were explicitly stated in the texts they read (or in accompanying charts or diagrams) and making straightforward inferences about events, reasons for characters' actions, or explanations. They were also unable to interpret story events or central ideas or give simple explanations.

Not being able to read at this minimal level places these students at great risk, particularly as this is the time when students move on from the stage of learning to read, to the stage of reading to learn. Research in the last century called the notion of 'late blooming' readers into question (e.g. Francis, Shaywitz, Stuebing, Shaywitz & Fletcher, 1996 and Juel, 1988) and debate reigns as to what aspects of reading can be improved with targeted interventions and when (see Torgeson & Hudson, 2006) but the fact remains that if a student is not able to glean what is required from a text, and more and more of their learning is text-based, then they are unlikely to be able to keep up with what they are supposed to be learning, regardless of the subject.

The composition of the group of students who performed below the Low international benchmark for reading was examined using logistic regression, which calculates the odds of Year 4 students with particular demographic characteristics being in the 'poor reader' group (that is, scoring below the Low benchmark cut-off of 400 points). Further details about interpreting odds ratios and the results of the logistic regression are presented in Appendix B.

The results of the analysis were as follows:

- Year 4 boys had two times the odds of being a poor reader than Year 4 girls (with a predicted probability of 0.10 compared to 0.05).
- Students with an Indigenous background had almost four times the odds of being a poor reader compared to non-Indigenous students (predicted probability of 0.38 compared to 0.10).
- There was no significant difference in the odds of being a poor reader for students who mainly used a language other than English at home compared to students who spoke English *always or almost always* (0.05 compared to 0.03).
- Students who reported having only a *few books* at home had over three times the odds of being a poor reader compared to students with more books at home (predicted probability of 0.27 compared to 0.08)
- Students who attended a remote school had almost three times the odds of being a poor reader compared to students in other schools (predicted probability of 0.19 compared to 0.07)
- Students who attended schools that were categorised as *more disadvantaged* by their principals had more than two times the odds of being a poor reader compared to students in other schools (predicted probability of 0.14 compared to 0.06).

Findings for schools and the learning environment in Australia

Chapter 3

Key findings

- Forty-one per cent of students attended schools in which the principal had completed a postgraduate university degree, and about 30 per cent had a principal with between 10 and 20 years of experience.
- Thirty-five per cent of students attended schools categorised by their principals as having a *more affluent* student population, 26 per cent as having a *more disadvantaged* student population and the remainder were in schools that were *neither more affluent nor more disadvantaged*.
- Students attending *more affluent* schools scored 61 points higher, on average, than students attending *more disadvantaged* schools.
- Students in schools whose principals indicated that 90 per cent or more of the students had English as their first language tended to have higher average achievement than students in schools whose principals indicated that less than 90 per cent of the student population had English as their first language.
- Students attending *more affluent* schools were more likely than those attending *more disadvantaged* schools to be in an environment where most students spoke English as their first language.
- In *more affluent* schools, achievement was high for all students, regardless of the proportion of second language learners in the school. In *more disadvantaged* schools, however, a higher proportion of students who spoke English as their first language conferred a benefit, with students in such schools scoring higher, on average, than students in schools with proportionally fewer English-speaking students.
- Students who attended schools where less than 25 per cent of students had literacy skills upon entry to school had significantly lower achievement, on average, than students who attended schools where more than 25 per cent of students had literacy skills upon entry to school.

- Of those students at *more affluent* schools, 7 per cent attended schools in which more than 75 per cent of students entered school with literacy skills, compared to none in *more disadvantaged* schools. In contrast, 81 per cent of students in *more disadvantaged schools* were in schools in which fewer than 25 per cent of students entered with literacy skills, compared to 42 per cent of students in *more affluent* schools.
- Sixty-four per cent of students attended schools where reading instruction was *not affected* by resource shortages, and average reading scores were significantly higher in these schools compared those in which instruction was affected by resource shortages.
- A greater proportion of students in *more disadvantaged* schools than in *more affluent* schools were affected by reading resource shortages (58% and 26%, respectively)
- More than half of Australian Year 4 students were categorised as having a *high* sense of school belonging, 33 per cent had *some sense* of belonging and 10 per cent had *little* sense of school belonging. Students with a *high* sense of school belonging scored 37 points higher, on average, than students with *little* sense of school belonging.
- There was a clear relationship between Australian students' reading achievement and their principals' and teachers' reports of school emphasis on academic success, with a higher emphasis on academic success associated with higher average achievement.
- Only 4 per cent of students in *more disadvantaged* schools were in environments with a *very high* emphasis on academic success, as rated by their principals, compared to 26 per cent of students at *more affluent* schools.
- Job satisfaction was relatively high among Australian teachers, with only 2 per cent of Year 4 students being taught by a teacher who was *less than satisfied*, and 58 per cent taught by a teacher who was *very satisfied*. There was no difference in the average job satisfaction scores of teachers in *more affluent* schools and *more disadvantaged* schools.
- There was a clear relationship between Australian students' reading achievement and their principals' reports of school discipline problems – with fewer discipline problems associated with higher achievement. Students who attended *more disadvantaged* schools were far more likely than those in *more affluent* schools to face *moderate to severe problems* regarding school discipline.
- Higher teacher ratings on the Safe and Orderly Schools scale were associated with higher student achievement, on average. While 60 per cent of students at *more disadvantaged* schools and 86 per of students at *more affluent* schools had teachers who classified the school as being *very safe and orderly*, it is disturbing that 7 per cent of students in *more disadvantaged schools* were in environments deemed by their teachers to be l*ess than safe and orderly*.
- Nineteen per cent of Australian Year 4 students reported being bullied *about weekly*. Students who reported *almost never* being bullied had average reading scores more than 30 points higher than students who reported being bullied *about weekly*. Fifteen per cent of students who attended *more affluent* schools, compared to 23 per cent of students who attended *more disadvantaged* schools, reported being bullied *about weekly*. This difference was statistically significant, thought not as large as may have been expected.

The contexts in which teaching and learning occur constitute an important component of the PIRLS framework. To examine this issue, this chapter, and the two following, present the findings from the PIRLS contextual questionnaires. This chapter focuses on schools and the school environment for learning. Chapter 4 examines the teachers and the teaching of reading, while Chapter 5 reports on student attitudes to learning reading.

In each of these chapters the results are presented in figures and in the text without the associated standard errors. The same data are presented in tables that show the standard errors, along with the data for the international average, in the online tables available from https://www.acer.org/pirls.

It should also be noted that, because PIRLS focuses on student outcomes, the results from the school and teacher questionnaires are presented with regard to students. That is, each result is reported as the percentage of students attending a school that has a certain characteristic or the percentage of students that have a teacher that responded in a particular way.

School contexts for teaching and learning

Principals' qualifications

Principals of participating schools were asked about their level of formal education, and this is presented in Table 3.1, along with the average responses across participating countries.

Forty-one per cent of Australian students attended schools in which principals had completed a postgraduate university degree, which was significantly lower than the international average of 48 per cent. Of course, the international average obscures variation across the participating countries. For the 10 highest-scoring countries the average was almost 70 per cent of students managed by a principal with a postgraduate qualification, including 90 per cent of students in the Russian Federation, 89 per cent of those in Finland, 99 per cent of those in Poland and 95 per cent of those in Chinese Taipei.

In a number of participating countries, including 6 of the 10 highest-scoring countries (Russian Federation, Singapore, Hong Kong SAR, Finland, Northern Ireland and Chinese Taipei), completion of a specialised school leadership program is mandatory for principals. This is not the case in Australia.

Almost all remaining Australian students attended schools in which the principal had completed an undergraduate degree.

TABLE 3.1 Principals' formal education, Australia and the international average

	Principals' educational level					
	Completed a postgraduate university degree		Completed bachelor's degree or equivalent but not a postgraduate degree		Did not complete bachelor's degree	
	Students (%)	SE (%)	Students (%)	SE (%)	Students (%)	SE (%)
Australia	41	3.3	59	3.3	1	0.4
International average	48	0.4	45	0.4	7	0.2

Principals' years of experience

On average, Australian principals have 10 years of experience as a principal, the same as the international average. About one-third of students have a principal with between 10 and 20 years of experience, about one-quarter with between 5 and 10 years of experience, and a little more than one-quarter with less than five years of experience. These proportions are all similar to the international averages.

Only in a few countries were there large proportions of students with relatively new principals. In the United States, 44 per cent of students had a principal with less than 5 years' experience, this was similar in Norway (40%), Trinidad and Tobago (46%), Italy (41%), Kazakhstan (41%), Egypt (59%) and Bahrain (44%).

TABLE 3.2 Principals' years of experience, Australia and the international average

	Principals' years of experience								Average years of experience as a principal	
	20 years or more		At least 10 but less than 20 years		At least 5 but less than 10 years		Less than 5 years			
	Students (%)	SE (%)	Students (%)	SE (%)	Students (%)	SE (%)	Students (%)	SE (%)	Average years of experience	SE
Australia	15	2.9	32	3.8	25	2.9	27	3.1	10	0.5
International average	14	0.4	31	0.5	27	0.5	28	0.5	10	0.1

School socioeconomic composition

The school, as the heart of the educational system, can contribute to equity and inclusion by providing all students with the opportunity to learn and succeed. In many countries, student achievement is typically lower in schools where most students come from a disadvantaged background. Unfortunately, research identifies the primary reasons for this as the strong negative impact of the students' own socioeconomic background on performance, exacerbated by the inability of many disadvantaged schools to counter this impact (OECD, 2012, p. 104).

While students' own socioeconomic background has the greatest effect on their achievement, the socioeconomic composition of schools also has a substantial effect. For example, in the 2015 Australian PISA report, data were presented to show that disadvantaged students attending affluent schools (schools with a high proportion of affluent students), scored at a level almost two years higher than disadvantaged students attending disadvantaged schools (Thomson, De Bortoli & Underwood, 2017).

As presented in the Readers' Guide and Chapter 2, Australian schools were categorised as being *more affluent*, *more disadvantaged* or *neither more affluent nor more disadvantaged* according to their principals' responses to items on the school questionnaire. Figure 3.1 presents the proportions of students in schools in each of these categories, along with their average reading score.

At Year 4, 35 per cent of Australian students attended *more affluent* schools, 38 per cent attended schools that were neither advantaged nor disadvantaged, and 26 per cent of students attended schools that were *more disadvantaged*. These proportions were not different to the international averages.

As can be seen in Figure 3.1, and as seen in myriad other studies, there is a clear relationship between the composition of the student body and average achievement in reading at Year 4. A substantial gap can be seen between those students attending schools with a *more affluent* student body than those students attending schools with a *more disadvantaged* student body. This gap, 61 points on average, is larger than the gap seen between *more disadvantaged* and *more affluent* schools internationally of 43 points. In terms of the PIRLS benchmarks, the average Australian student attending a *more affluent* school is achieving at a clear High benchmark level, those in *neither more affluent nor more disadvantaged* schools at a level just under the High international benchmark, and those in *more disadvantaged* schools at the Intermediate international benchmark (further information about the benchmarks and school socioeconomic composition is presented in Figure 2.24 in Chapter 2).

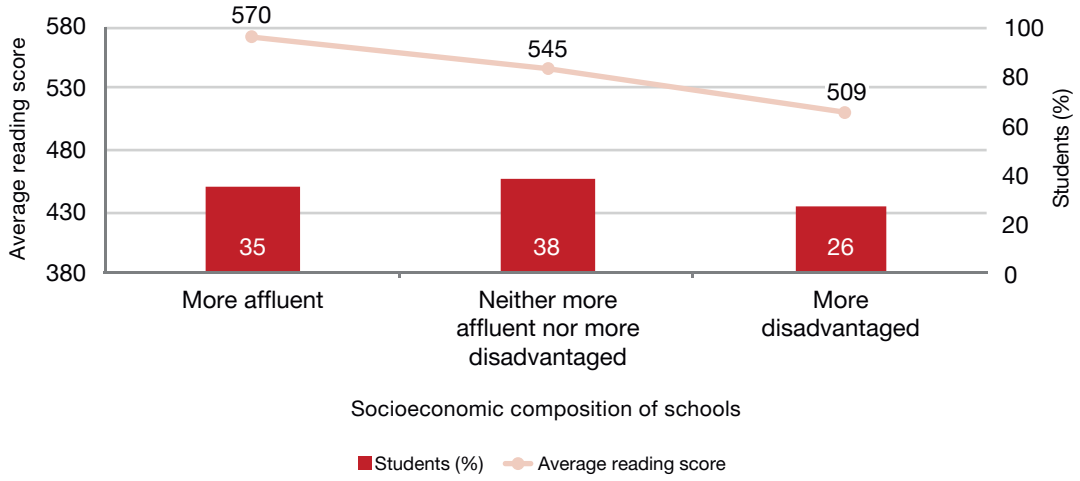


FIGURE 3.1 Socioeconomic composition of schools and Australian student achievement in reading

Language background of school populations

As mentioned in Chapter 2, language spoken at home is an important factor in the development of reading literacy. When a student body is composed predominantly of students who do not have the language of instruction as a native language, educational and cultural complexities may challenge schools and teachers. The PIRLS 2016 school questionnaire asked principals what proportion of the student body had English as their first language.

On average internationally, 63 per cent of students attended schools where most students (more than 90%) spoke the language of the PIRLS assessment as their first language, and another 20 per cent were in schools where the majority of students (51–90%) spoke the language of assessment as their first language.[1] Both of these groups of students had higher average reading achievement than the 18 per cent of students attending schools where less than half the student body spoke the language of assessment as their first language (512 points and 515 points compared to 493 points).

Figure 3.2 presents the proportion of Australian students in each of the three language group categories, along with their average reading scores. According to Australian principals, around half of the Australian Year 4 students were attending schools in which more than 90 per cent of the student population spoke English as their first language, while almost 25 per cent of students attended schools in which less than 50 per cent of the student body spoke English as a first language.

Average reading scores were significantly higher for students attending schools where almost all students (more than 90%) spoke English than for students in either of the other two categories of schools, however, unlike the international findings, there was no significant difference between the scores for Australian students in schools where more than half the students spoke English and those in schools where less than half the students spoke English.

1 The language in which the PIRLS assessment is conducted obviously varies across the participating countries. In Australia, English was the language of assessment.

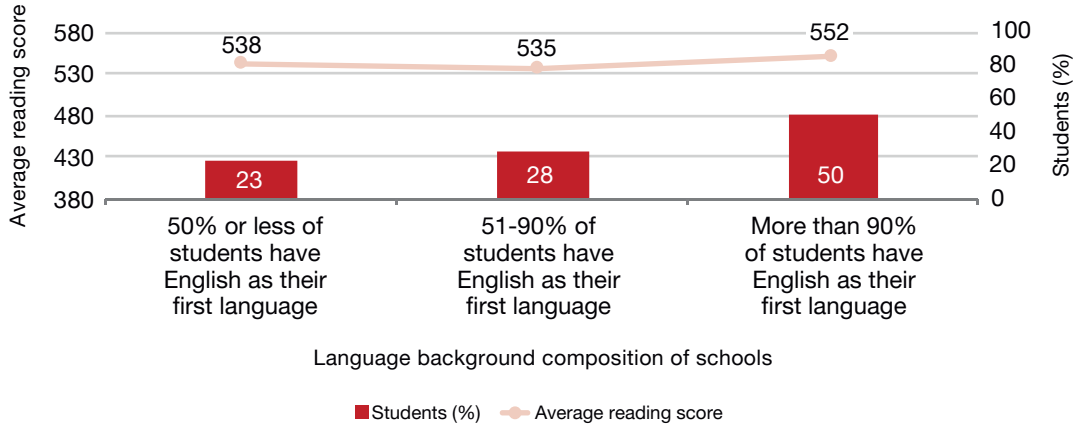


FIGURE 3.2 Language background of Australian schools' populations and student achievement in reading

In many other countries, particularly Western countries, there are proportionally fewer students attending schools in which less than 50 per cent of the student population speaks the language of the test. For example, in Canada (19%), United States (15%), Ireland (11%) and New Zealand (16%) this group of students is smaller than in Australia. In England, however, it is slightly larger, at 27 per cent of students.

The relationship between language background of students and socioeconomic background of schools

Given the relationship between aspects of the composition of school populations and student achievement, it is important from a policy perspective to gain a better understanding of the relationship between the proportion of students at a school who do not have English as their first language and the proportion of disadvantaged students at schools.

Figure 3.3 shows the differences and similarities in enrolments by language background in *more affluent* and *more disadvantaged* schools in Australia. It shows that students attending *more affluent* schools are far more likely than those attending *more disadvantaged schools* to be in an environment where most students speak English as their first language (58% compared to 31%). However, there is no significant difference between the percentage of students attending schools in which 50% or less of the student body has English as a first language in *more affluent* schools and *more disadvantaged* schools. It could be hypothesised that this reflects the different types of students in Australian schools whose first language is other than English – international fee-paying students, many of whom may attend private fee-paying schools or higher socioeconomic background government schools, and less wealthy immigrants and refugees, who may be more likely to attend *more disadvantaged* government schools based on the area in which they live (Australian Bureau of Statistics, 2014).

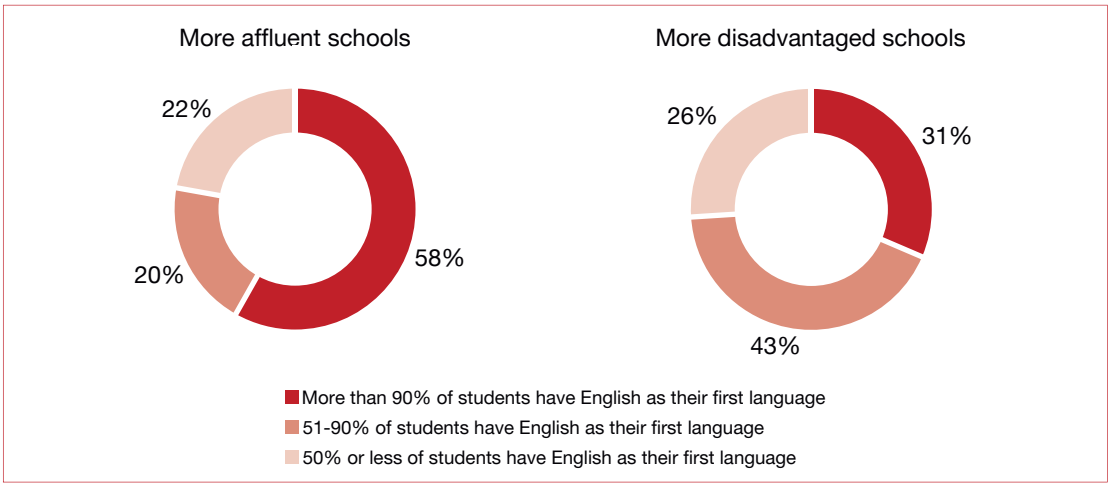


FIGURE 3.3 Language background of school Australian populations and school socioeconomic background

Figure 3.4 presents achievement scores in PIRLS for students in each of the three school language groups for *more affluent* schools and for *more disadvantaged* schools. This tends to reinforce the discussion presented for Figure 3.4. In cases where a school is classified as *more affluent*, the proportion of students in the school for whom English is a second language is irrelevant – achievement is high for students across each language grouping. Perhaps this is because while English is not a first language, it is a well-understood second language.

In the *more disadvantaged* schools, however, a higher proportion of the student body speaking English confers a benefit, with students in these schools scoring higher, on average, than students in schools with proportionally fewer English-speakers. For students who have migrated as refugees and would be more likely to be attending *more disadvantaged* schools, it is possible that English is still being learned and proficiency not high, and so only those students attending schools in which there are few of these students are likely to have high achievement.

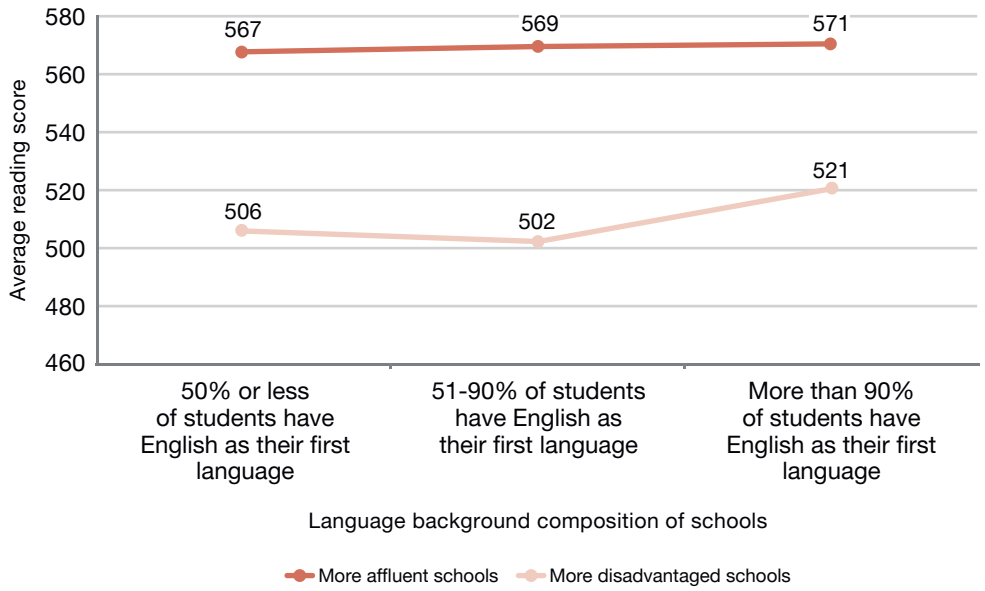


FIGURE 3.4 Reading achievement by language background and school socioeconomic background

Students entering school with literacy skills

Literacy does not begin when children start school. Most children are exposed to written language in the years before they start school, through participating in language activities in the home and during pre-primary education and care. Research has proposed a number of factors that facilitate a successful transition from pre-literacy to literacy, including language development, letter and word identification and recognition and phonological awareness (Whitehurst & Lonigan, 1998).

School principals were asked to comment on the percentage of students in their school ('more than 75 per cent', '51–75 per cent', '25–50 per cent' or 'less than 25 per cent') who begin the first year of primary school with the six key skills:

- recognise most of the letters of the alphabet
- read some words
- read sentences
- read a story
- write letters of the alphabet
- write some words.

Principals' responses to these items were combined to create the Schools Where Students Enter the Primary Grades with Literacy Skills scale. Students were then assigned to three groups based on their principal's scale score.

Year 4 students who attended *schools where more than 75 per cent enter with skills* had a score on the scale of at least 12.6, which corresponds to principals reporting that over 75 per cent of the students have three of the skills and 51–75 per cent of the students have the other three of the skills, on average. Students who attended *schools where less than 25 per cent enter with skills* had a score no higher than 9.2, which corresponds to principals reporting that less than 25 per cent of the students have three of the skills and 25–50 per cent of the students have the other three skills, on average. All other students attended *schools where 25 per cent to 75 per cent enter with skills*.

Internationally, there was a great deal of variation in the highest category – more than 75 per cent of students entering with literacy skills – from 96 per cent in Ireland where most students start pre-primary school after they turn four, to 0 per cent in Slovak Republic, Slovenia, Czech Republic and Germany. On average, 22 per cent of students attended *schools where more than 75 per cent enter with skills*, and another 47 per cent attended *schools where 25–75 per cent enter with skills*. Both groups of students had higher average reading achievement than the 31 per cent of students attending *schools where less than 25 per cent enter with skills* (516 and 512 points compared to 491 points).

In Australia (Figure 3.5), only around 6 per cent of students attended a primary *school where more than 75 per cent enter with skills*. A further 42 per cent of students attended *schools where 25–75 per cent enter with skills*, and more than 50 per cent of students attended *schools where less than 25 per cent enter school with skills.* The average reading scores differed significantly across these groupings.

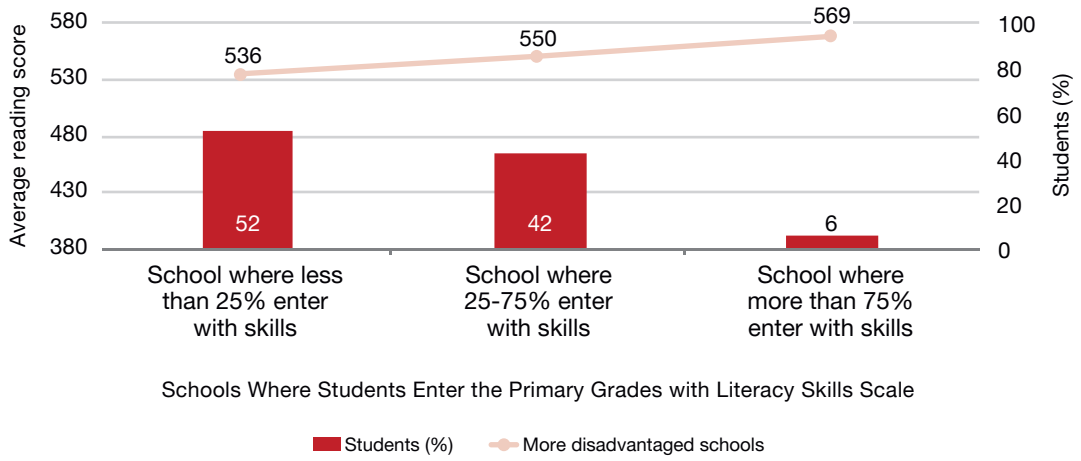


FIGURE 3.5 Schools Where Students Enter the Primary Grades with Literacy Skills scale and Australian student achievement in reading

Obviously, not all children come to school with the same experiences, and some are equipped to develop literacy skills at school better than others. Access to materials such as books, alphabet materials, crayons and paper, local libraries, and language rich environments are important factors in literacy development (DEST, 2005). Studies that explored literacy in disadvantaged families found that such homes were often limited in their provision of these materials (Teale & Sulzby, 1986). There is a great deal of evidence showing that, on average, students from disadvantaged homes disproportionately experience reading difficulties (e.g. Australian Bureau of Statistics, 1996; Freebody & Ludwig, 1995), and that these students tend to get left behind once they do start school.

Figure 3.6 presents the proportion of students in each of the three early literacy categories for *more affluent* schools and *more disadvantaged* schools. Of those at *more affluent* schools, 22 per cent attend a *school where more than 75 per cent enter with skills*, compared to none in *more disadvantaged* schools. At the other end of the scale, the vast majority (96%) of students at *more disadvantaged* schools are in *schools where less than 25 per cent enter with skills*, compared to 30 per cent of those attending *more affluent* schools. The provision of school resources to facilitate the language development and growth of students at schools in which the majority of students have few literacy skills is critical in ensuring that all students have equal opportunities to develop their skills.

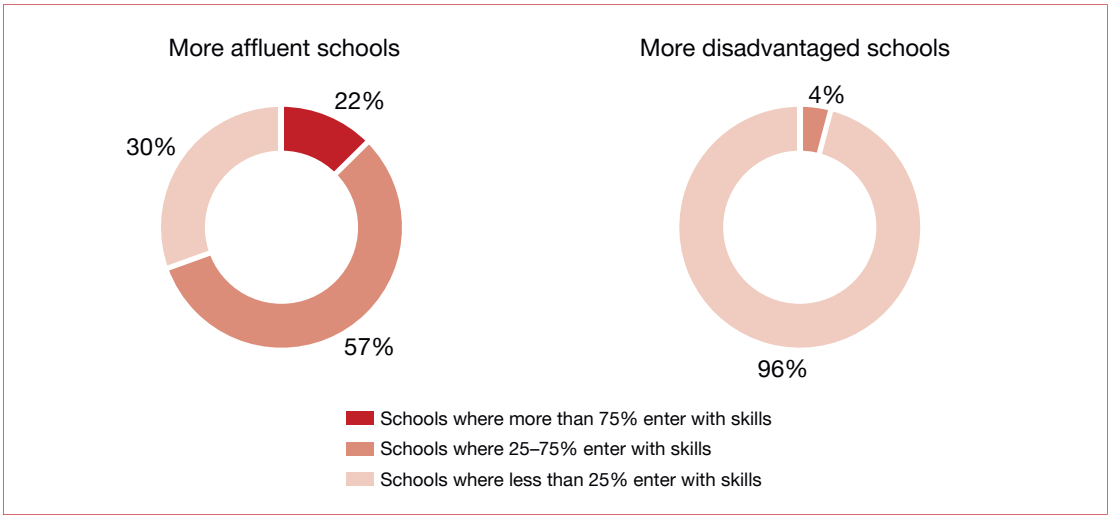


FIGURE 3.6 Schools Where Students Enter the Primary Grades with Literacy Skills scale and Australian school socioeconomic background

Instruction affected by reading resource shortages

The extent and quality of school resources is also critical for quality instruction, and results from previous PIRLS cycles have shown that students in schools that are well resourced generally have higher levels of achievement than schools in which principals deem that shortages of resources affect the school's capacity to provide instruction.

Principals were asked to comment on how much their school's capacity to provide instruction ('not at all', 'a little', 'some' or 'a lot') was affected by a shortage of – or inadequacy in – the following general and reading instruction resources:

General school resources

- instructional materials (e.g. textbooks)
- supplies (e.g. papers, pencils, materials)
- school buildings and grounds
- heating/cooling and lighting systems
- instructional space (e.g. classrooms)
- technologically competent staff
- audio-visual resources for delivery of instruction (e.g. interactive white boards, digital projectors)
- computer technology for teaching and learning (e.g. computers or tablets for student use).

Resources for reading instruction

- teachers with a specialisation in reading
- computer software for reading instruction
- library resources (books, ebooks, magazines etc.)
- instructional materials for reading (e.g. reading series, textbooks).

Principals' responses to these items were combined to create the Reading Resource Shortages scale. Students were then assigned to groups based on their principal's scale score.

Students in schools where instruction was *not affected* by resource shortages had a score of at least 10.8, which is the point on the scale that corresponded to their principals indicating that shortages affected instruction 'not at all' for six of the twelve resources and 'a little' for the other six, on average. Students in schools where instruction was *affected a lot* by resource shortages had scores no higher

than 7.1, which is the scale point that corresponded to their principals indicating that the capacity to provide instruction was affected 'a lot' for six of the twelve resources and 'some' for the other six, on average. All other students were in schools that were categorised as *somewhat affected* by resource shortages.

Internationally, on average, 31 per cent of the Year 4 students attended schools in which instruction was *not affected* by resource shortages, and these students had the highest reading achievement (521 points). Most students (62%) attended schools that were *somewhat affected* by resource shortages and 6 per cent of students were in schools that were *affected a lot*. Average reading scores for these two groups was 507 and 474 points, respectively.

Figure 3.7 presents the proportions of Australian students in each of these resource shortage categories, along with their average reading scores.

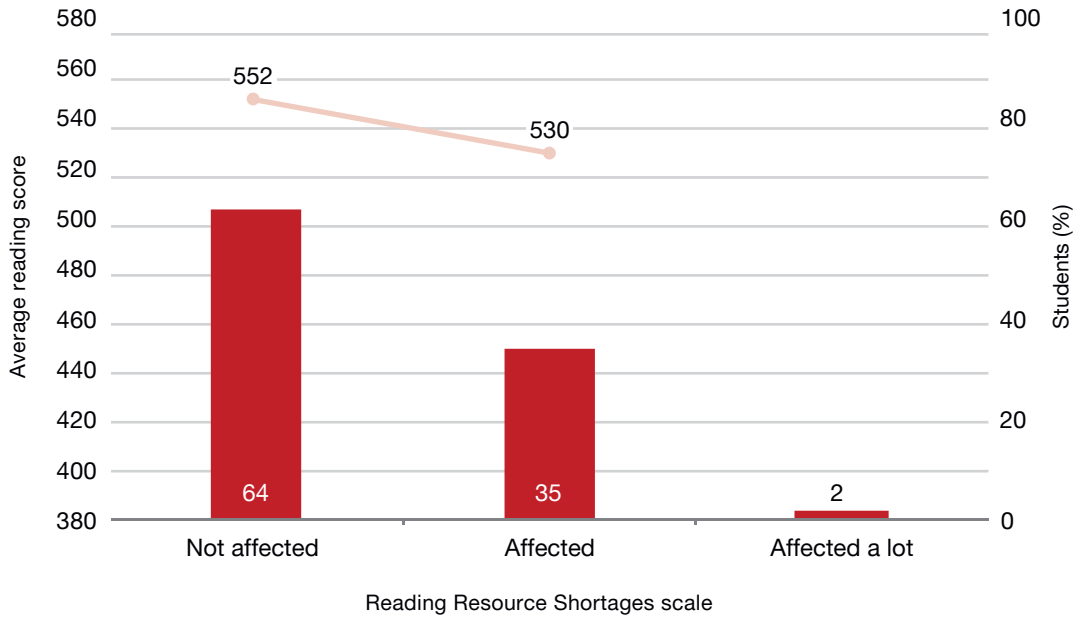


FIGURE 3.7 The Reading Resource Shortages scale and Australian student achievement in reading

In Australia, most students (64%) attended schools that were *not affected* by resource shortages, and these students scored an average of 552 points. Thirty-five per cent of students attended schools that were *somewhat affected* by resource shortages, and these students scored a significantly lower 530 points. Just 2 per cent of Australian Year 4 students attended schools where instruction was deemed to be *affected a lot* by resource shortages. There were too few of these students to accurately calculate a mean reading score.

Average school socioeconomic background was also related to the level of resourcing available to students, as shown in Figure 3.8. While very few students attended schools in which the principal reported that instruction was *affected a lot* by resource shortages, the proportion of students who were *somewhat affected* was far greater in *more disadvantaged* schools than in *more affluent* schools (56% compared to 23%). The instruction of 74 per cent of students attending *more affluent* schools was *not affected* at all by resource shortages, compared to 42 per cent of students in *more disadvantaged* schools.

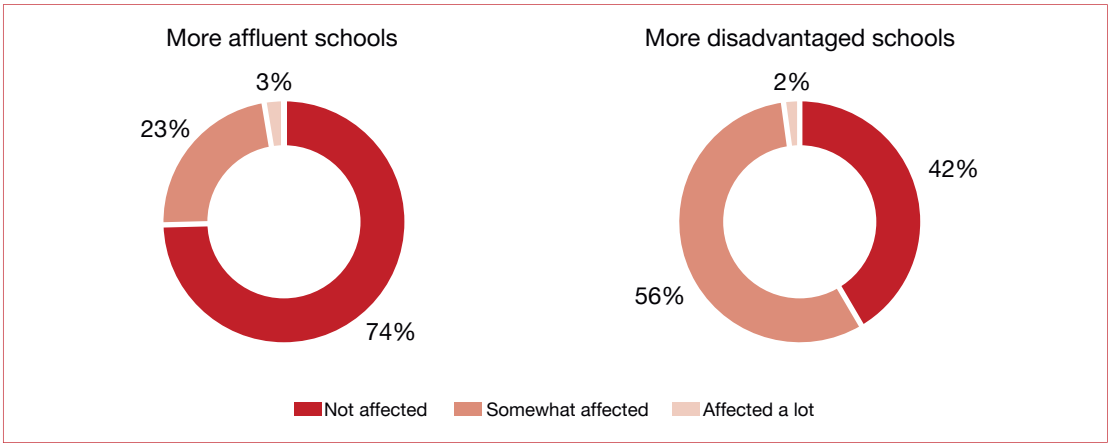


FIGURE 3.8 The Reading Resource Shortages scale and school socioeconomic background

School climate

Along with the structural and physical environment of the school captured in the resourcing items, two other important aspects of the school context in which students find themselves is the emotional and academic environments. These are explored in the following sections from the perspectives of the students themselves, their teachers, and their principals.

Students' sense of belonging

Students were asked to comment on how they felt about being at school. Students indicated how much they agreed ('agree a lot', 'agree a little', 'disagree a little' or 'disagree a lot') with the following five statements:

- I like being in school.
- I feel safe when I am at school.
- I feel like I belong at this school.
- Teachers at my school are fair to me.
- I am proud to go to this school.

Responses to these items were combined to create the Students' Sense of School Belonging scale, and scale scores were used to classify students according to three response groups. Students with a *high* sense of school belonging had a score on the scale of at least 9.7, which corresponds to their 'agreeing a lot' with three of the five statements and 'agreeing a little' with each of the other two statements, on average. Students with *little* sense of school belonging had a score no higher than 7.3, which corresponds to their 'disagreeing a little' with three of the five statements and 'agreeing a little' with each of the other two statements, on average. All other students had *some* sense of school belonging.

Internationally, on average, most students had a strong sense of belonging. More than half (59%) had a *high* sense of belonging, 33 per cent had *some*, and only 8 per cent of the Year 4 students had *little* sense of belonging. In general, a higher sense of belonging was related to higher academic achievement (518, 505 and 495 points, respectively).

Figure 3.9 presents the proportions of Australian Year 4 students in each of the three school belonging categories, along with their average reading performance.

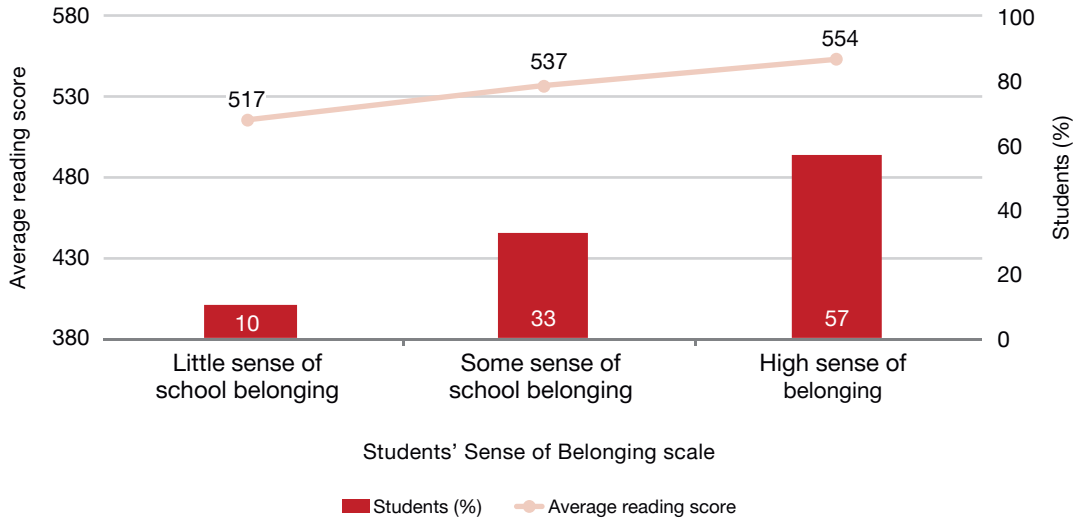


FIGURE 3.9 The Students' Sense of Belonging scale and Australian student achievement in reading

On average in Australia, more than half of the students (57%) had a *high* sense of school belonging, 33 per cent had *some* sense of belonging and only 10 per cent of the Year 4 students had *little* sense of belonging. These proportions were very similar to the international averages. In Australia, and internationally, a higher sense of school belonging was reflected in significantly higher than average reading achievement (554, 537 and 517 points respectively for Australian students).

There were some differences evident between *more affluent* and *more disadvantaged* schools in terms of students' sense of belonging at their schools (see Figure 3.10). A significantly higher proportion of students at *more affluent* schools than at *more disadvantaged* schools reported a *high* sense of belonging, while a significantly higher proportion of students at *more disadvantaged* schools compared to students in *more affluent* schools had *little* sense of belonging.

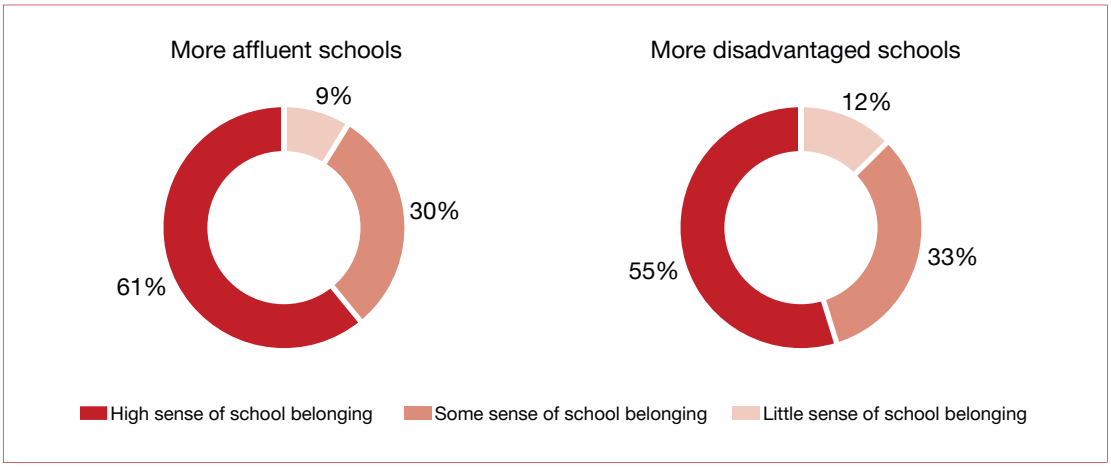


FIGURE 3.10 The Students' Sense of Belonging scale by school socioeconomic background

School emphasis on academic success – principals' reports

One of the keys to the success of a school is its emphasis on academic success. Hattie (2008) suggests that expectations are essentially self-fulfilling prophesies, and that they are a powerful influence on learning. In PIRLS 2016, both principals and teachers were asked about the extent to which the school emphasises academic success.

The views of principals regarding the academic climate of their schools, that is, the degree to which a school supports and encourages academic success, were collected using principals' ratings (of 'very high', 'high', 'medium', 'low' or 'very low') of the following 12 aspects:

- teachers' understanding of the school's curricular goals
- teachers' degree of success in implementing the school's curriculum
- teachers' expectations for student achievement
- teachers' ability to inspire students
- collaboration between school leadership and teachers to plan instruction
- parental involvement in school activities
- parental commitment to ensure that students are ready to learn
- parental expectations for student achievement
- parental support for student achievement
- students' desire to do well in school
- students' ability to reach school's academic goals
- students' respect for classmates who excel academically.

The principals' responses were combined to create the School Emphasis on Academic Success scale. Students were then assigned to three groups based on their principal's scale score. Students attending schools whose principals reported a *very high emphasis* on academic success had a score on the scale of at least 12.9, which corresponds to principals characterising six of the 12 aspects as 'very high' and the other six as 'high', on average. Students attending schools with a *medium emphasis* on academic success had a score no higher than 9.2, which corresponds to principals characterising six of the 12 aspects as 'medium' and the other six as 'high', on average. All other students attended schools with a *high emphasis* on academic success.

Internationally, around 8 per cent of Year 4 students attended schools where the principal reported a *very high* emphasis on academic success, 54 per cent were at schools with *high* emphasis, and 38 per cent of students were in schools with *medium* emphasis. Higher emphasis on academic success was related to higher achievement (531, 518 and 494 points, respectively).

Figure 3.11 presents the percentages and mean scores for Australian students. The findings were similar to the international results, with 14 per cent of Australian Year 4 students attending schools in which the principal rated the emphasis on academic success as *very high*, 49 per cent in schools with *high* emphasis, and 36 per cent with *medium* emphasis. While there was little difference between the average achievement of Australian students at *high* and *very high* academic emphasis schools, the average score for students at schools with only *medium* emphasis on academic success was substantially and significantly lower than for students in the other groups.

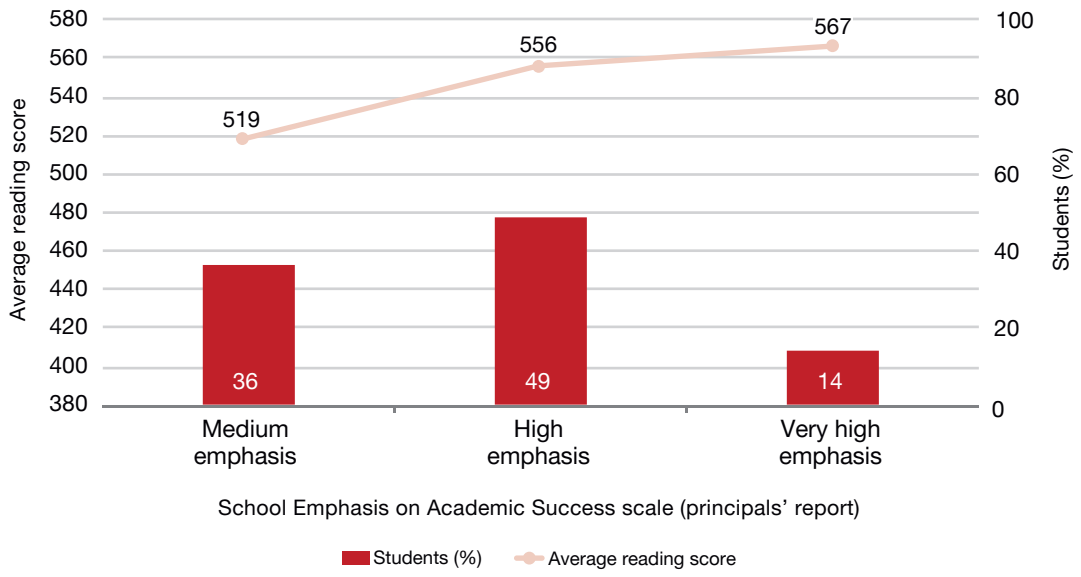


FIGURE 3.11 The School Emphasis on Academic Success scale (principals' reports) and Australian student achievement in reading

Substantial differences between *more affluent* and *more disadvantaged* schools were evident on the School Emphasis on Academic Success scale (see Figure 3.12). Only 4 per cent of students attending *more disadvantaged* schools were in schools with a *very high* emphasis on academic success, compared to 26 per cent of students in *more affluent* schools. Conversely, just 15 per cent of students in *more affluent* schools and 70 per cent of students in *more disadvantaged* schools attended schools that had only a *medium* emphasis on academic success.

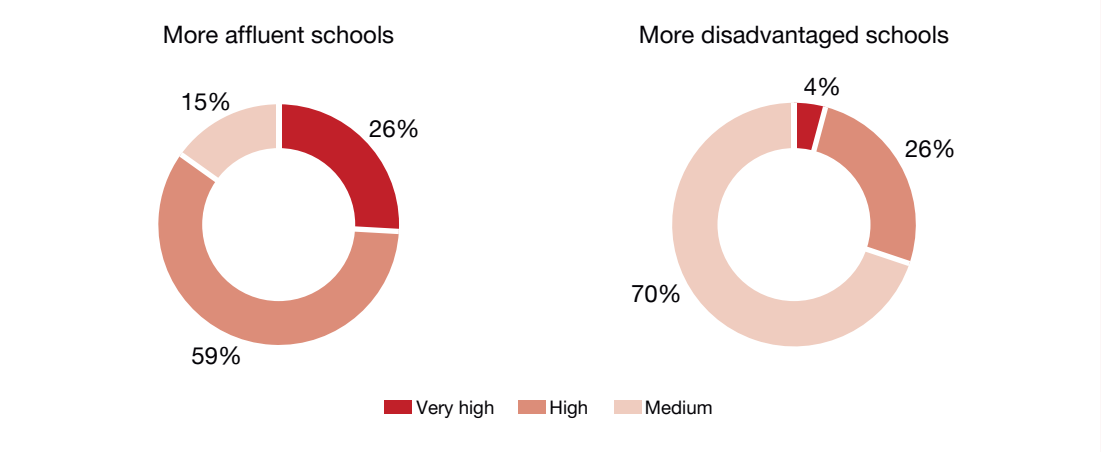


FIGURE 3.12 The School Emphasis on Academic Success scale (principals' reports) and school socioeconomic background

School emphasis on academic success – teachers' reports

The views of teachers regarding the academic climate of their schools, that is, the degree to which a school supports and encourages academic success, were collected using teachers' ratings (of 'very high', 'high', 'medium', 'low' or 'very low') of the following 12 aspects:

- teachers' understanding of the school's curricular goals
- teachers' degree of success in implementing the school's curriculum
- teachers' expectations for student achievement
- teachers' ability to inspire students
- collaboration between school leadership and teachers to plan instruction
- parental involvement in school activities
- parental commitment to ensure that students are ready to learn
- parental expectations for student achievement
- parental support for student achievement
- students' desire to do well in school
- students' ability to reach school's academic goals
- students' respect for classmates who excel academically.

The teachers' responses were combined to create the School Emphasis on Academic Success (teachers' reports). Students were then assigned to three groups based on their teacher's scale score. At Year 4, students attending schools whose teachers reported a *very high emphasis* on academic success had a score on the scale of at least 12.8, which corresponds to teachers characterising six of the 12 aspects as 'very high' and the other six as 'high', on average. Students attending schools with a *medium emphasis* on academic success had a score no higher than 9.2, which corresponds to teachers characterising six of the 12 aspects as 'medium' and the other six as 'high', on average. All other students attended schools with a *high emphasis* on academic success.

Fifteen per cent of Australian Year 4 students were taught by teachers that reported a *very high emphasis* on academic success; 59 per cent were taught by teachers that reported a *high emphasis*;

and 27 per cent were taught by teachers that reported a *medium emphasis* on academic success (see Figure 3.13). In comparison, internationally, on average, 8 per cent of students were taught by teachers that reported a *very high emphasis* on academic success; 55 per cent were taught by teachers that reported a *high emphasis*; and 37 per cent were taught by teachers that reported a *medium emphasis* on academic success.

As can be seen in Figure 3.13, there is a clear relationship between the achievement of Australian students and teachers' reports of school emphasis on academic success, with a higher school emphasis on academic success generally associated with higher achievement. The difference between the average achievement of Australian students who were taught by teachers reporting a *very high* emphasis on academic success and the average achievement of students who were taught by teachers reporting a *high* emphasis on academic success was a significant and substantial 38 points, while the difference between students who were taught by teachers reporting a *high* emphasis on academic success and those being taught by teachers reporting a *medium emphasis* was also significant at 23 points.

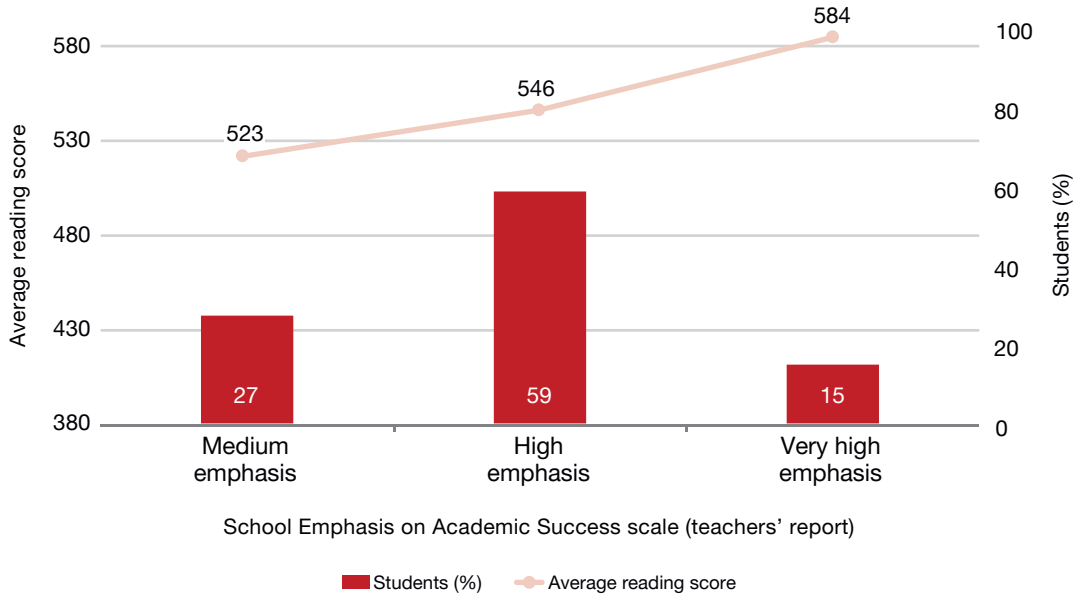


FIGURE 3.13 The School Emphasis on Academic Success scale (teachers' reports) and Australian student achievement in reading

The responses of teachers at *more affluent* and those at *more disadvantaged* schools follow a similar pattern to that of the principals' responses (see Figure 3.14). The teachers of 27 per cent of students at *more affluent* schools reported a *very high* emphasis on academic success compared to just 3 per cent of those who attended *more disadvantaged* schools. Conversely, teachers of more than 50 per cent of the students at *more disadvantaged* schools reported a *medium* emphasis on academic success compared to 13 per cent of those students at *more affluent* schools.

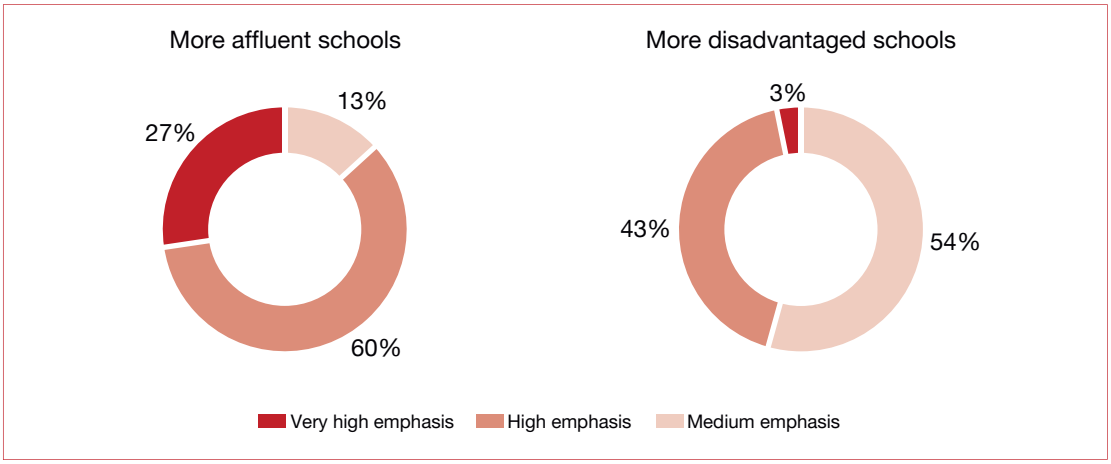


FIGURE 3.14 The School Emphasis on Academic Success scale (teachers' reports) and school socioeconomic background

Teacher job satisfaction

Teachers' satisfaction with their careers may be an important element in the classroom and school environment, and could well impact on students' own attitudes towards learning, the classroom and their achievement.

Teachers were asked to indicate how often ('very often', 'often', 'sometimes' or 'never or almost never') they agreed with the following five statements:

- I am content with my profession as a teacher.
- I find my work full of meaning and purpose.
- I am enthusiastic about my job.
- My work inspires me.
- I am proud of the work I do.

The teachers' responses were combined to create the Teacher Job Satisfaction scale. Students were then assigned to three groups based on their teacher's scale score.

At Year 4, students with *very satisfied* teachers had a score on the scale of at least 10.2, which corresponds to teachers responding 'very often' to three of the five statements and responding 'often' to the other two, on average. Students with *less than satisfied* teachers had a score no higher than 6.2, which corresponds to teachers responding 'sometimes' to three of the five statements and 'often' to the other two, on average. All other students had *satisfied* teachers.

Internationally, most students were taught by teachers who were *very satisfied* (57%) or *satisfied* (37%) with their profession, and just 6 per cent had teachers who were *less than satisfied.* Achievement was similar for students whose teachers were *somewhat satisfied* or *very satisfied* (508 and 513 points, respectively).

Figure 3.16 presents the results on this scale for Australia. Similar to the international averages, the vast majority of Australian students were taught by teachers who were *satisfied* or *very satisfied* with their profession, and the average scores of these groups of students were statistically similar. Only 2 per cent of teachers, overall, were less than satisfied with their profession, and the size of this group precluded estimation of average achievement for this group of students.

Interestingly, there was no difference in the average teacher job satisfaction scores of teachers in *more affluent* than *more disadvantaged* schools.

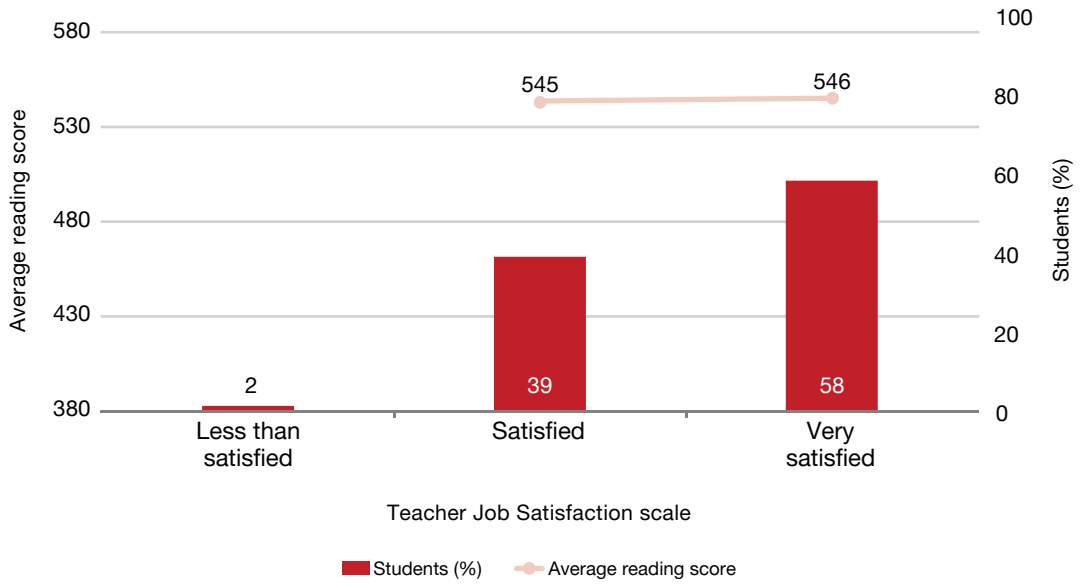


FIGURE 3.15 The Teacher Job Satisfaction scale and Australian student achievement in reading

Safety and discipline

A critical part of the school climate is the extent to which discipline problems in the school impede learning. A general lack of discipline, especially if teachers or students are concerned about their safety, is associated with lower levels of academic achievement.

Principals' reports of school discipline problems

Principals were asked to indicate the degree to which ('not a problem', 'minor problem', 'moderate problem', or 'serious problem') each of the following behaviours and issues was problematic among Year 4 students in their school:

- arriving late at school
- absenteeism (i.e. unjustified absences)
- classroom disturbance
- cheating
- swearing
- vandalism
- theft
- intimidation or verbal abuse among students (including texting, emailing etc.)
- physical fights among students
- intimidation or verbal abuse of teachers or staff (including texting, emailing, etc).

The principals' responses were combined to create the School Discipline Problems scale. Students were then assigned to three groups based on their principal's scale score.

At Year 4, students in schools with *hardly any* problems had a score on the scale of at least 9.9, which corresponds to principals reporting 'not a problem' for five of the 10 issues and 'minor problem' for the other five, on average. Students in schools with *moderate to severe problems* had a score no higher than 7.7, which corresponds to principals reporting 'moderate problem' for five of the 10 issues and 'minor problem' for the other five, on average. All other students attended schools with *minor* problems.

On average internationally, 62 per cent of students attended schools whose principals reported that there were *hardly any* problems with school discipline, another 30 per cent attended schools in which

there were *minor* problems, and 8 per cent attended schools in which there were *moderate to severe* problems. Average reading achievement was higher for students in schools with *hardly any* problems than for those in schools with *minor* problems (518 points compared to 503 points), however, it was substantially lower – by 48 points – for students in schools with *moderate to severe* problems.

Figure 3.17 presents these data for Australian schools. The same pattern emerges as for the international data, however, fewer Australian students attend schools with substantial problems in these areas. More than 65 per cent of Australian students attended schools in which there were *hardly any* problems, while just 4 per cent attended schools with *moderate to severe* problems. The score differences between the groups were substantial – 31 points difference between the average reading scores of students attending schools with *hardly any* problems and those with *minor* problems, and then 50 points difference between those students in schools with *minor* problems and those with *moderate to severe* problems.

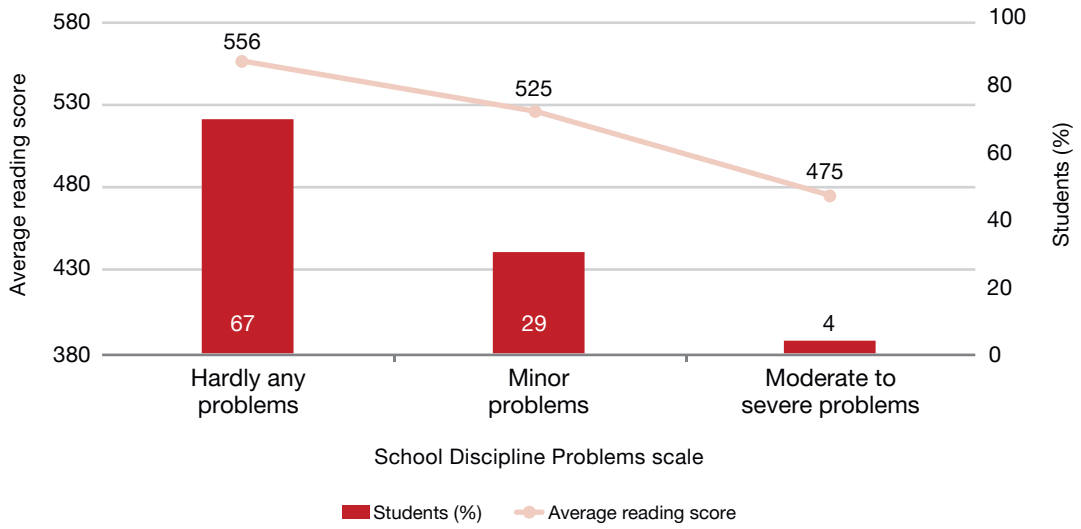


FIGURE 3.16 The School Discipline Problems scale and Australian student achievement in reading

The differences between *more affluent* and *more disadvantaged* schools on this scale were quite stark. As shown in Figure 3.18, 82 per cent of Australian Year 4 students in *more affluent* schools are in environments in which there are *hardly any* problems with school discipline, compared with 44 per cent of students attending *more disadvantaged* schools. At the other end of the spectrum, no principal of a *more affluent* school reported that their school suffered from *moderate to severe problems*; however, 11 per cent of students attending *more disadvantaged* schools had principals who rated their school as having *moderate to severe problems* with discipline.

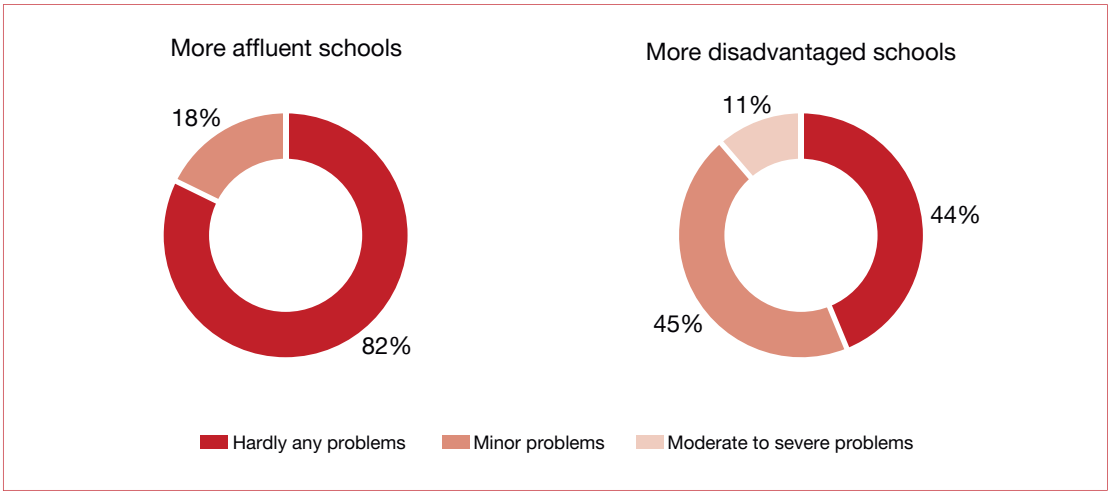


FIGURE 3.17 The School Discipline Problems scale and school socioeconomic background

To understand more closely where these differences lie, Table 3.2 shows the percentage responses on each of the items that comprise the School Discipline Problems scale for *more affluent* and *more disadvantaged* schools.

Many of the behaviours listed in this table are present, to some extent, in most schools. However, the extent of some of the problems in some schools, particularly as this is Year 4 level, is quite disturbing. Arriving late to school is reported by the principals of 4 per cent of students at *more affluent* schools as a *moderate to severe problem*, but this soars to 31 per cent for students at *more disadvantaged* schools. Similarly, absenteeism is a *moderate to severe problem* for almost half the students at *more disadvantaged* schools but only for 7 per cent of students at *more affluent* schools. Even behaviours that do not occur as frequently – swearing, vandalism, theft, intimidation or verbal abuse among students, physical fighting amongst students, and intimidation or verbal abuse of teachers – are more prevalent at *more disadvantaged* schools than *more affluent* schools.

TABLE 3.2 Principals' reports on School Discipline Problems scale items, by school socioeconomic background

	More affluent schools		More disadvantaged schools	
	Not a problem %	Moderate to severe problem %	Not a problem %	Moderate to severe problem %
arriving late at school	35	4	5	31
absenteeism	50	7	6	48
classroom disturbance	48	6	26	34
cheating	94	0	69	0
swearing	72	3	34	24
vandalism	90	0	77	5
theft	89	0	67	2
intimidation or verbal abuse among students	69	3	44	14
physical fights among students	77	3	47	10
intimidation or verbal abuse of teachers or staff	91	0	67	4

Teachers' reports of safe and orderly schools

Teachers' perceptions of school safety were also considered and investigated as part of the PIRLS contexts framework. Teachers were asked to indicate the extent to which they agreed ('agree a lot', 'agree a little', disagree a little' or 'disagree a lot' with the following eight statements:

- This school is located in a safe neighbourhood.
- I feel safe at this school.
- This school's security policies and practices are sufficient.
- The students behave in an orderly manner.
- The students are respectful of the teachers.
- The students respect school property.
- This school has clear rules about student conduct.
- This school's rules are enforced in a fair and consistent manner.

Responses to these items were combined to form the Safe and Orderly School scale and scale scores were used to create three categories of responses. Students assigned to the *very safe and orderly* category had a scale score of at least 9.9, which corresponded to their teachers 'agreeing a lot' with four of the eight qualities of a safe and orderly school and 'agreeing a little' with the other four items, on average. The *less than safe and orderly* category (associated with a scale score no higher than 6.6) was formed for students whose teachers, on average, 'disagreed a little' with four of the eight qualities and 'agreed a little' with the other four, on average. All other students were assigned to the *safe and orderly* category.

Internationally, most (62%) Year 4 students attended schools judged by their teachers as *very safe and orderly*. Almost all the rest (35%) were in schools that teachers thought were *safe and orderly*. Only 3 per cent, on average, were attending schools felt to be *less than safe and orderly*. There was a direct positive relationship found between scores on the safe and orderly schools scale and average reading achievement (517, 502 and 466 points for *very safe, safe* and *less than safe and orderly* schools, respectively).

More than three-quarters (78%) of Australian Year 4 students attended schools that were judged by their teachers as *very safe and orderly* (Figure 3.18). A further 20 per cent attended schools their teachers judged as *safe and orderly*, with only 2 per cent of students in schools that were deemed *less than safe and orderly*. Student achievement was not estimated for the small group of students whose teachers reported that the school was *less than safe and orderly*, but a positive relationship was found between scores on the Safe and Orderly Schools scale and average reading achievement for Australian Year 4 students in *very safe and orderly* and *safe and orderly schools* (551 and 526 points, respectively).

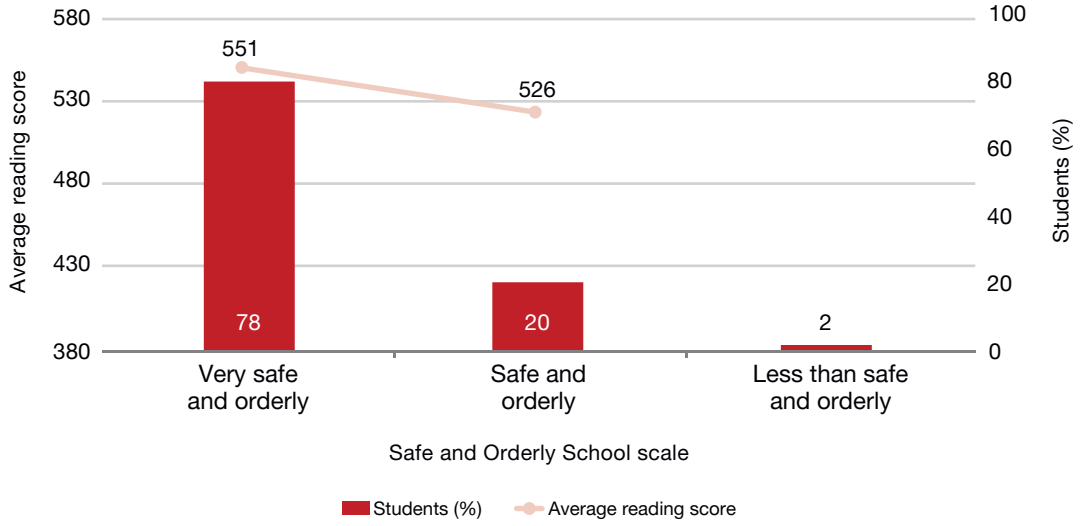


FIGURE 3.18 The Safe and Orderly School scale and Australian student achievement in reading

Differences were evident on this scale between the teachers of Australian students attending *more affluent* and of those attending *more disadvantaged* schools (Figure 3.19). Of some concern, given that the international average was just 3 per cent, the teachers of 7 per cent of Australian students attending *more disadvantaged* schools indicated that their school was *less than safe and orderly*, while no students at *more affluent* schools had teachers in this category. The overwhelming majority of students (86%) at *more affluent* schools had teachers who categorised their schools as *very safe and orderly,* along with 60 per cent of students at *more disadvantaged* schools.

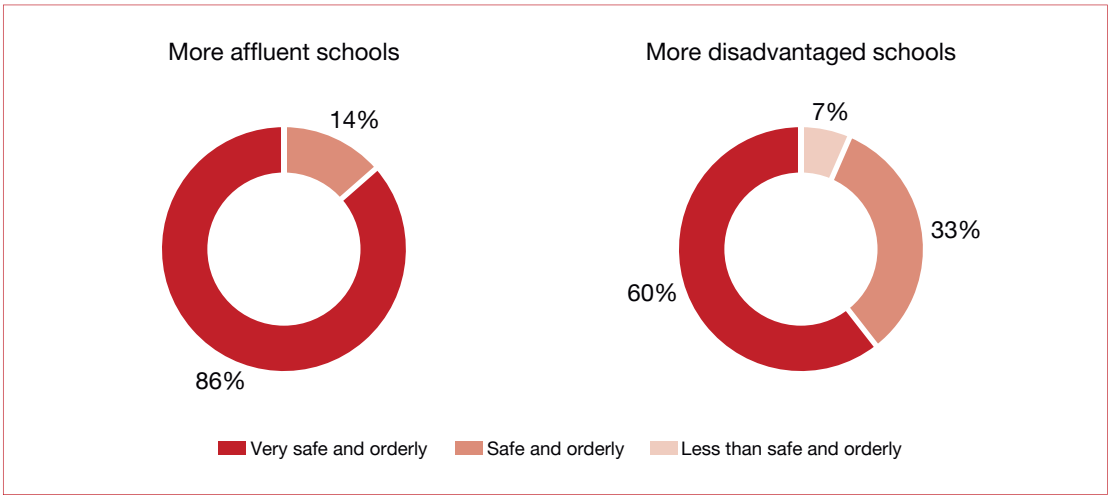


FIGURE 3.19 The Safe and Orderly School scale and school socioeconomic background

Student reports of bullying

Students' views of their personal safety at school were collected using items that focused on their experiences of bullying behaviours. Students were asked to indicate how often ('never', 'a few times a year', 'once or twice a month', or 'at least once a week') another student had:

- teased or called me names
- left me out of their games or activities
- spread lies about me
- stolen something from me
- hit or hurt me (e.g. shoved, hit, kicked)
- made me do things I didn't want to do
- shared embarrassing information about me
- threatened me.

The Student Bullying scale was created by combining the responses to these items, and all students were assigned to one of three groups based on their Student Bullying score. Students assigned to the *almost never* category had a scale score of at least 9.5, which corresponded to 'never' experiencing four of the eight bullying behaviours and experiencing each of the other four behaviours 'a few times a year', on average. Students bullied *about weekly* had a score no higher than 7.9, which corresponds to their experiencing each of the four of the eight behaviours 'once or twice a month' and each of the other four 'a few times a year', on average. All other students were bullied *about monthly*.

On average across the PIRLS 2016 countries, the majority (57%) of Year 4 students reported *almost never* being bullied. However, 29 per cent reported that they were bullied on an *about monthly* basis, and 14 per cent on an *about weekly* basis. Students' reports about being bullied were negatively related to their average reading achievement, with each increase in the frequency of bullying related to a decrease in average reading achievement (with scores of 521 points for *almost never*, 507 points for *about monthly*, and 482 points for *about weekly*).

The averages for Australian Year 4 students are shown in Figure 3.21. Fewer Australian students (46%) than on average internationally reported that they are *almost never* bullied. Around one-third (35%) reported being bullied *about monthly* and almost one in five (19%) were bullied *about weekly*. Reading achievement scores were negatively related to bullying, with students who are bullied *about weekly* scoring on average 38 points lower than those who are *almost never* bullied.

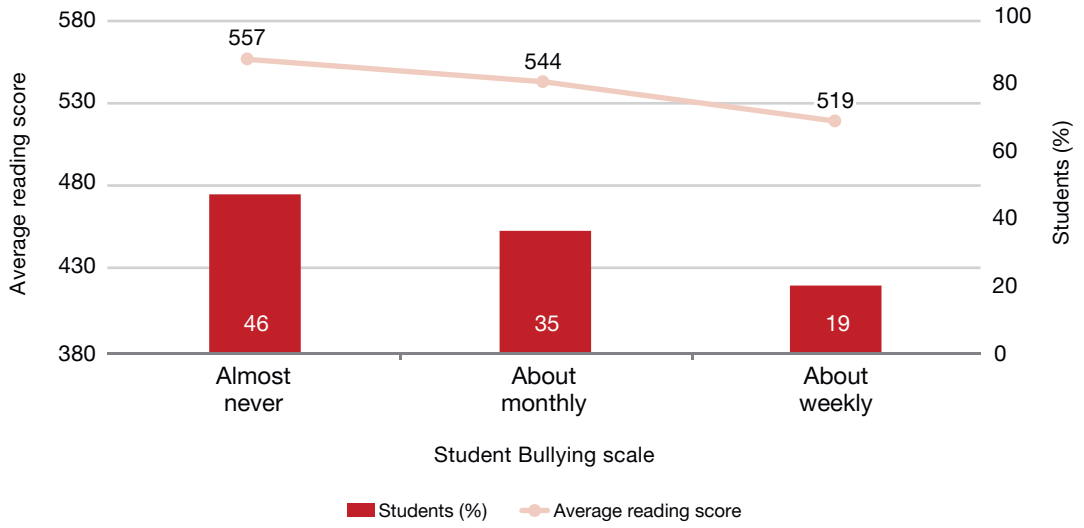


FIGURE 3.20 The Student Bullying scale and Australian student achievement in reading

It is notable that while there are differences between *more advantaged* and *more disadvantaged* schools on this measure, they are not as large as might be expected, showing that bullying is a more widespread issue than many of the others examined in this chapter. Figure 3.22 shows that half of the students attending *more affluent* schools said that they were *almost never* bullied, compared to 43 per cent of students attending *more disadvantaged* schools. At the other end of the scale, 15 per cent of students attending *more affluent* schools felt that they were bullied *about weekly*, compared to 23 per cent of those attending *more disadvantaged* schools. These differences were statistically significant.

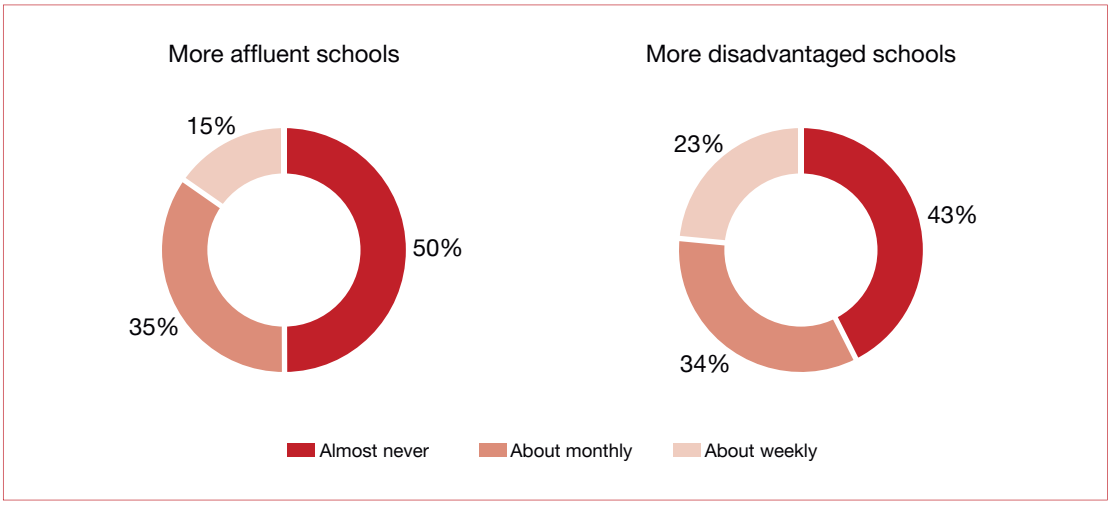


FIGURE 3.21 The Student Bullying scale and school socioeconomic background

How does bullying manifest itself in Australian schools?

Table 3.3 provides the students' responses to each of the bullying items in order to identify the behaviours most prevalent in Australian schools. It is evident that behaviours such as teasing, leaving other students out, or spreading lies are the most commonly reported forms of bullying for these Year 4 students. Physical violence, however, is not uncommon, being reported as occurring *about weekly* to more than 10 per cent of students, which is of concern.

TABLE 3.3 Percentage of Australian students' responses to items on the Student Bullying scale

	Almost never	About monthly	About weekly
teased or called me names	71	12	17
left me out of their games or activities	71	16	13
spread lies about me	76	13	11
stolen something from me	85	9	6
hit or hurt me	75	14	11
made me do things I didn't want to do	80	11	9
shared embarrassing information about me	82	10	8
threatened me	85	8	7

Findings for teachers and the teaching of reading in Australia

Chapter 4

Key findings

- The majority of Year 4 students (84%) were taught reading by a female teacher.
- Nearly 50 per cent of students were taught reading by a teacher aged in their forties or fifties.
- Over 80 per cent of Year 4 students were being taught by a teacher with a bachelor's degree or equivalent, with a further 12 per cent of students being taught by a teacher with a postgraduate degree.
- The relationship between the amount of time teachers reported spending in professional development and Australian student performance on the PIRLS assessments ran counter to what may have been expected – students whose teachers had spent 16 or more hours in professional development scored *lower* (544 points) on average than students whose teachers had spent less than six hours on professional development (556 points).
- A far greater proportion of Australian Year 4 students, compared to the international average, had computers available for use during reading lessons.
- There was a clear relationship between the reading achievement of Australian students and teachers' reports that their teaching was limited by student needs, with fewer limitations associated with higher reading achievement.
- There was a clear relationship between the reading achievement of Australian students and the frequency of student absences, with fewer absences associated with higher reading achievement.

Teachers

This section presents information about the teachers of students who participated in PIRLS 2016 in Australia, including teachers' background characteristics such as age, gender, qualifications and years of experience. Teachers can be an important influence on the learning outcomes of students, not just in their achievement in assessments such as PIRLS, but in other, less tangible areas, such as attitudes and behaviours towards learning in general and reading, in case of PIRLS, in particular.

A note about nomenclature:
In Australia, Year 4 students do not usually have separate reading lessons, as reading is embedded in other subjects such as English or Language. Along with this, many students are taught all or most of their subjects by a single teacher or a small team of co-teachers, rather than subject specialists. For these reasons, it is uncommon for Australian Year 4 students to have 'a reading teacher', or 'reading teachers' per se. However, this is the term that is used internationally, and is used throughout this chapter for ease of comparison.

Age and gender

Figure 4.1 shows the percentages of Australian Year 4 students grouped according to the age of their reading teacher. Close to half of the Year 4 students (49%) were taught reading by a teacher aged in their forties or fifties, with another 34 per cent being taught reading by a teacher aged between 25 and 39 years. Only 6 per cent of students had a reading teacher under 25 years old and 12 per cent had a reading teacher over 60 years old.

There was some variation across the jurisdictions in the ages of the teaching force – for example, 8 per cent of Year 4 students in NSW were being taught reading by a teacher under the age of 25, whereas no Western Australian students had reading teachers in this age group. In Tasmania, 40 per cent of students were being taught reading by a teacher in their fifties, while only 15 per cent of students in the ACT had reading teachers in this age group. In South Australia, the proportion of students being taught reading by a teacher over the age of 60 has increased substantially since the last cycle of PIRLS, from 4 per cent in 2011 to 28 per cent in 2016. In the Northern Territory, however, no students were being taught reading by a teacher over the age of 60.

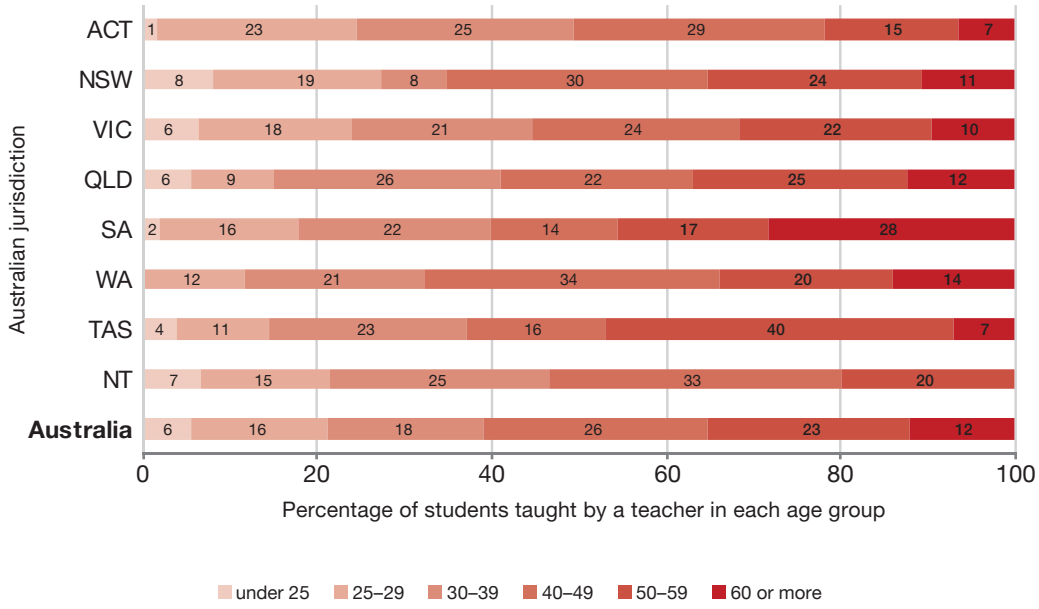


FIGURE 4.1 Percentage of Australian Year 4 students by the age of their reading teachers, by jurisdiction

Figure 4.2 shows the percentages of Year 4 students taught reading by female or male teachers. Unsurprisingly, 84 per cent were taught reading by a female teacher, which is similar to the percentage in the previous cycle of PIRLS.

There was some variation across the jurisdictions, however, with the proportion of students being taught reading by a male teacher somewhat larger in Western Australia, South Australia and Tasmania than in other jurisdictions.

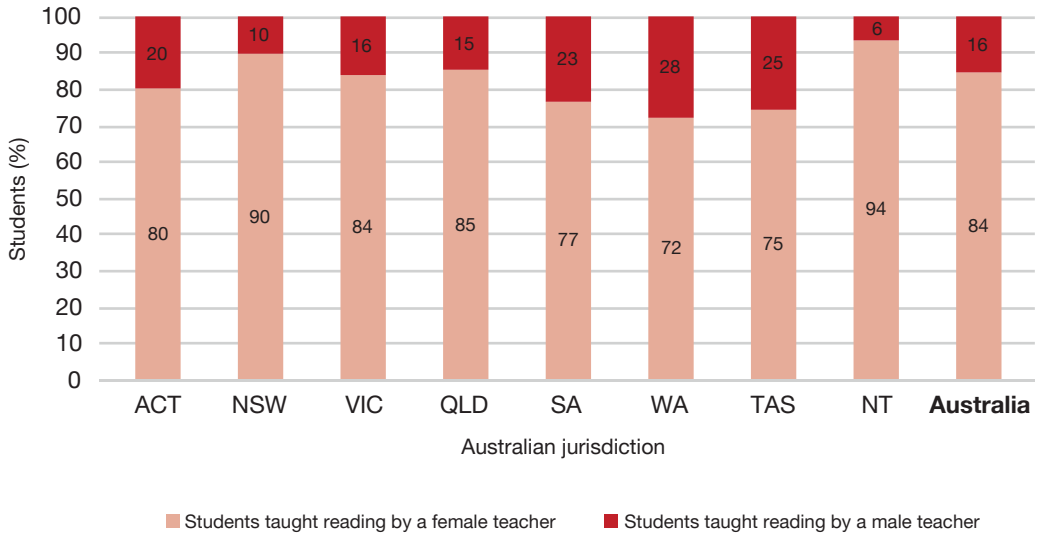


FIGURE 4.2 Percentage of Australian Year 4 students by the sex of their reading teachers, by jurisdiction

Qualifications

The general qualifications of the Year 4 reading teachers in Australia are presented in Table 4.1, along with the averages across countries participating in PIRLS 2016.

Over 80 per cent of Year 4 students were being taught by a teacher with a bachelor's degree or equivalent, with a further 12 per cent of students being taught by a teacher with a postgraduate degree. The proportion of Australian students who had a reading teacher with postgraduate qualifications, such as a master's degree or a doctorate, was less than half that of the average proportion across countries participating in PIRLS – 12 per cent compared to 26 per cent.

TABLE 4.1 Qualifications held by Year 4 reading teachers, Australia and the international average

	Completed a master's degree, PhD or Doctorate		Completed bachelor's degree or equivalent*		Completed post-secondary education (TAFE or college diploma)		No further than upper secondary education	
	Students (%)	SE (%)	Students (%)	SE (%)	Students (%)	SE (%)	Students (%)	SE (%)
Australia	12	2.3	82	2.8	7	2.0	0	0.0
International average	26	0.3	60	0.4	11	0.3	3	0.1

Note: Due to rounding, totals may not add to 100%
* This category includes teachers who completed a graduate diploma of education after completing an undergraduate degree.

Emphasis on language and reading areas in teachers' formal education

Table 4.2 presents the percentages of students whose teachers had various areas of specialisation in their formal education. The proportions of students being taught reading by teachers who reported an emphasis on pedagogy, teaching reading, or reading theory were similar in Australia and across countries participating in PIRLS, on average. More Australian students had teachers who had focused on language during their studies, compared to the international average – around eight in every ten Australian students compared to seven in ten internationally.

TABLE 4.2 Emphasis on language and reading areas in teachers' formal education, Australia and the international average

	Area emphasised : Language					
	Students (%)	SE (%)	Average achievement			
			Area emphasised		Area not emphasised	
			Mean	SE	Mean	SE
Australia	81	2.8	547	3.1	539	6.7
International average	70	0.4	512	0.5	510	1.1

	Area emphasised: Pedagogy/Teaching reading					
	Students (%)	SE (%)	Average achievement			
			Area emphasised		Area not emphasised	
			Mean	SE	Mean	SE
Australia	68	3.2	544	3.1	547	4.8
International average	64	0.5	512	0.6	509	0.9

	Area emphasised: Reading theory					
	Students (%)	SE (%)	Average achievement			
			Area emphasised		Area not emphasised	
			Mean	SE	Mean	SE
Australia	38	3.1	548	4.0	544	3.5
International average	32	0.5	511	0.8	511	0.6

In terms of Australian students' performance in the PIRLS reading assessment, the results do not show a relationship between emphasis on these specialisations and students' average reading achievement, as there were no significant differences between the average scores of students whose teachers had focused on the different areas in their training and those students whose teacheers had not focused on these areas in their training.

Years of experience

The years of teaching experience teachers have is, for the most part, related to their age. Given the average age of Year 4 teachers in Australia, we might expect to find that the Year 4 teaching force has quite a deal of experience. The level of experience for teachers of Year 4 reading is presented in Table 4.3.

TABLE 4.3 Year 4 reading teachers' years of experience, Australia and the international average

	Percentage of students by reading teachers' years of experience								Average years of experience as a teacher	
	20 years or more		At least 10 but less than 20 years		At least 5 but less than 10 years		Less than 5 years			
	Students (%)	SE (%)	Students (%)	SE (%)	Students (%)	SE (%)	Students (%)	SE (%)	Students (%)	SE (%)
Australia	40	3.3	23	2.9	15	2.7	22	2.8	17	0.8
International average	42	0.5	30	0.5	15	0.4	13	0.3	17	0.1

At Year 4, 40 per cent of Australian students were taught reading by a teacher who had 20 years or more of experience, 23 per cent were taught by a reading teacher who had at least 10 but less than 20 years' experience, 15 per cent were taught reading by a teacher who had at least five but less than 10 years' experience and 22 per cent of students were taught reading by a teacher who had less than five years' experience. On average, Australian reading teachers had 17 years of experience, which is the same as the international average.

Within Australia there were no significant differences in average reading achievement according to the years of experience of reading teachers. However, internationally, there appears to be small but statistically significant difference in favour of more experienced teachers.

Professional development

Many education systems, including Australia's, require registered teachers to participate in ongoing professional development – supplementary to their initial qualifications – to ensure that students receive up-to-date instruction methods and information.

Figure 4.3 shows that close to 30 per cent of Year 4 students in Australia were taught by teachers who had spent some time in the past two years in professional development focused on reading (27%), while a further 49 per cent had teachers who spent a substantial period of time (16 or more hours) in such professional development.

Interestingly, the relationship between the amount of time teachers reported spending in professional development and student performance on the PIRLS assessments ran counter to what may have been expected for Australian students. Students whose teachers had spent 16 or more hours in professional development scored *lower* on average than students whose teachers had spent less than six hours on professional development, 544 points compared to 556 points.

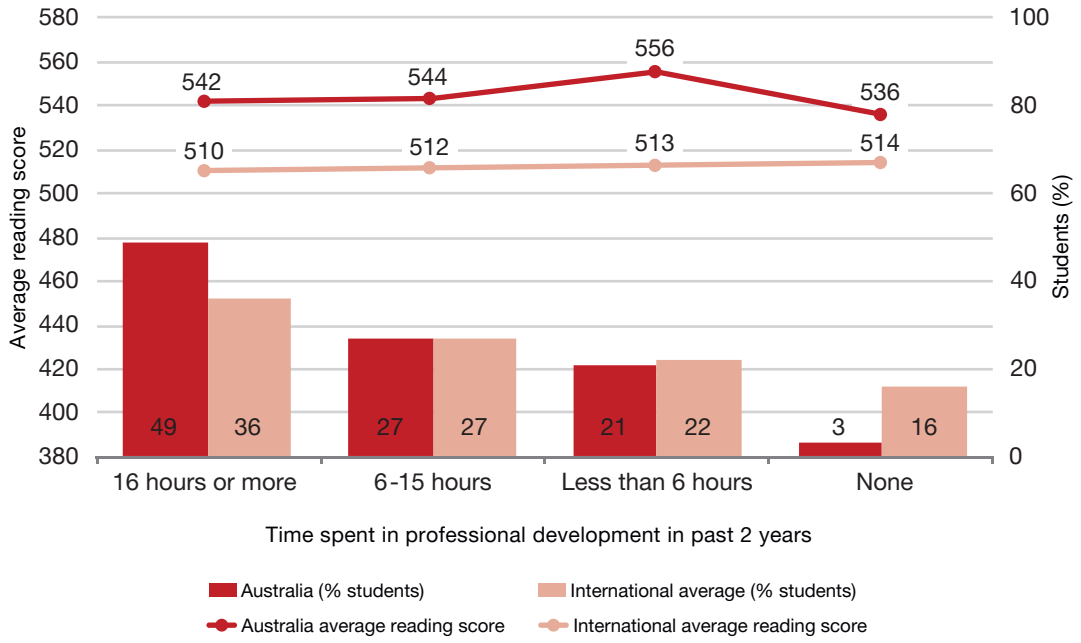


FIGURE 4.3 Percentage of Year 4 students by reading teachers' time spent on professional development, Australia and the international average

The teaching of reading

Instructional time

Based on teachers' reports of weekly instructional time for language and reading and principals' reports of how many days the school is open for instruction (weekly and yearly), an estimation was made of the average hours per year spent on language and reading instruction.

In Australia, the average time spent on language instruction was 336 hours per year. Internationally, the average time spent on language instruction was 242 hours per year, around 27 per cent of total instruction time.

As can be seen in Table 4.4, there was quite a deal of variation across countries in the amount of time dedicated to language instruction, and it did not seem to relate to reading performance in any straightforward manner. The top performers in PIRLS spent less time on language instruction than Australia – Singapore reported 278 hours per year, on average, and the Russian Federation reported an average of 263 hours per year spent on language instruction.

Internationally, the average time spent on reading instruction, including reading across the curriculum, was 157 hours per year (18% of total instruction time). In Australia, the average time spent on reading instruction was 199 hours per year. The United States spent the most time on reading instruction, with 327 hours per year, but the average reading score was not significantly different to Australia's. In England, the Russian Federation and Singapore, less time was spent on reading instruction than in Australia, yet average reading scores were higher.

TABLE 4.4 Instruction time spent on language and reading, Australia and comparison countries

Country	Total instruction hours per year (all subjects)	Language instruction (including reading, writing, speaking, literature and other language skills)		Reading instruction (including reading across the curriculum)		Average PIRLS 2016 reading score
		Hours per year	% of total instruction time	Hours per year	% of total instruction time	
Australia[n]	1 001	336	34	199	19	544
Canada[n]	952	292	31	206	22	541
England[n]	993	273	28	125	12	559
New Zealand[n]	926	340	37	215	24	523
United States[n]	1 061	301	30	327	32	549
Russian Federation	652	263	41	171	27	581
Singapore	1 040	278	27	124	12	575

[n] Data are available for at least 70% but less than 85% of the students

Organisation of students for reading instruction

Table 4.5 presents information about how often teachers' use different types of grouping for reading instruction. The most commonly reported grouping method in Australia was same-ability grouping, with 34 per cent of Australian students 'always or almost always' taught this way and another 62 per cent taught this way 'often or sometimes'.

TABLE 4.5 Organisation of students for reading instruction, Australia and the international average

	Teaching reading as a whole-class activity						Create same-ability groups					
	Always or almost always		Often or sometimes		Never		Always or almost always		Often or sometimes		Never	
	Students (%)	SE (%)	Students (%)	SE (%)	Students (%)	SE (%)	Students (%)	SE (%)	Students (%)	SE (%)	Students (%)	SE (%)
Australia	14	2.5	83	2.9	3	1.2	34	3.3	62	3.2	3	1.2
International average	32	0.4	65	0.5	3	0.2	11	0.3	74	0.4	15	0.2

	Create mixed-ability groups						Have students work independently on an assigned plan or goal					
	Always or almost always		Often or sometimes		Never		Always or almost always		Often or sometimes		Never	
	Students (%)	SE (%)	Students (%)	SE (%)	Students (%)	SE (%)	Students (%)	SE (%)	Students (%)	SE (%)	Students (%)	SE (%)
Australia	7	1.9	87	2.5	6	1.5	13	2.4	84	2.6	2	0.9
International average	13	0.3	79	0.4	8	0.3	14	0.4	81	0.4	5	0.2

Assignment of literary texts for reading instruction

As presented in Chapter 2, most countries demonstrated a relative strength in one of the purposes for reading (literary or informational), often accompanied by a relative weakness in the other purpose. Teachers were asked how frequently they asked students to read various types of literary and informational texts.

Internationally, short stories were by far the most popular type of literary texts, assigned at least weekly for 78 per cent of students, on average (see Table 4.6). Longer fiction books with chapters were assigned to 41 per cent of the students on a weekly basis, and a few students were assigned plays (9%). In Australia, literary purpose was a relative strength, on average, and this was reflected in the types of literary texts that were most utilised (on a weekly basis) by teachers – short stories and longer fiction books with chapters – with 85 per cent and 80 per cent of students assigned these types of texts, respectively, and a further 7 per cent of students assigned plays on a weekly basis.

For Australian Year 4 students, in the process of moving from learning to read to reading to learn, there appeared to be benefit associated with the regular assignment (at least weekly) of longer fiction books with chapters. Students who were assigned such texts weekly scored a statistically significant 20 points higher, on average, than students whose teachers assigned longer books for reading less often than once a week. While this difference may not be as large as those associated with other factors, it is certainly a factor that is within the control of reading teachers.

TABLE 4.6 Types of literary texts assigned for reading instruction, Australia and the international average

	Short stories							
	Once a week or more				Less than once a week			
	Students (%)	SE (%)	Average achievement	SE	Students (%)	SE (%)	Average achievement	SE
Australia	85	2.4	544	2.9	15	2.4	553	6.7
International average	78	0.4	512	0.5	22	0.4	508	1.2

	Longer fiction books with chapters							
	Once a week or more				Less than once a week			
	Students (%)	SE (%)	Average achievement	SE	Students (%)	SE (%)	Average achievement	SE
Australia	80	2.4	549	2.8	20	2.4	529	6.5
International average	41	0.4	516	0.9	59	0.4	508	0.6

	Plays							
	Once a week or more				Less than once a week			
	Students (%)	SE (%)	Average achievement	SE	Students (%)	SESE (%)	Average achievement	SE
Australia	7	1.8	549	7.7	93	1.8	545	2.7
International average	9	0.3	501	2.0	91	0.3	512	0.4

Assignment of informational texts for reading instruction

Table 4.7 shows that, internationally, nonfiction subject area books were the most commonly assigned informational texts, assigned at least weekly for 71 per cent of students. Less than half of the students were assigned nonfiction articles (39%) or longer nonfiction books with chapters (24%) at least weekly.

In Australia, 83 per cent of students were assigned nonfiction subject area books weekly, 50 per cent of students were assigned longer nonfiction books with chapters weekly, and 67 per cent were assigned

nonfiction articles to read weekly. There were no differences in average performance on the PIRLS assessment according to the regularity with which different types of informational texts were assigned to students, either on average internationally or in Australia.

TABLE 4.7 Types of informational texts assigned for reading instruction, Australia and the international average

	Nonfiction subject area books							
	Once a week or more				Less than once a week			
	Students (%)	SE (%)	Average achievement	SE	Students (%)	SE (%)	Average achievement	SE
Australia	83	2.6	546	2.9	17	2.6	541	8.4
International average	71	0.4	512	0.5	29	0.4	508	1.0

	Longer nonfiction books with chapters							
	Once a week or more				Less than once a week			
	Students (%)	SE (%)	Average achievement	SE	Students (%)	SE (%)	Average achievement	SE
Australia	50	3.3	550	3.2	50	3.3	540	4.1
International average	24	0.4	513	1.0	76	0.4	510	0.5

	Nonfiction articles							
	Once a week or more				Less than once a week			
	Students (%)	SE (%)	Average achievement	SE	Students (%)	SE (%)	Average achievement	SE
Australia	67	3.4	545	3.1	33	3.4	546	5.4
International average	39	0.5	513	0.8	61	0.5	510	0.6

Reading comprehension skills and strategies

Figure 4.4 presents teachers' reports about the reading skills and strategies that they emphasise in their reading instruction on at least a weekly basis. In Australia, almost all students were asked to either locate information within a text, identify the main ideas, and explain or support their understanding of what they read in their lessons at least weekly. This was similar to the international average. Substantial proportions of Australian students have lessons that cover how to compare what they have read to experiences or other things they have read on at least a weekly basis (89% and 87%, respectively). Weekly lessons that cover describing text style or structure, or determining an author's perspective were less common.

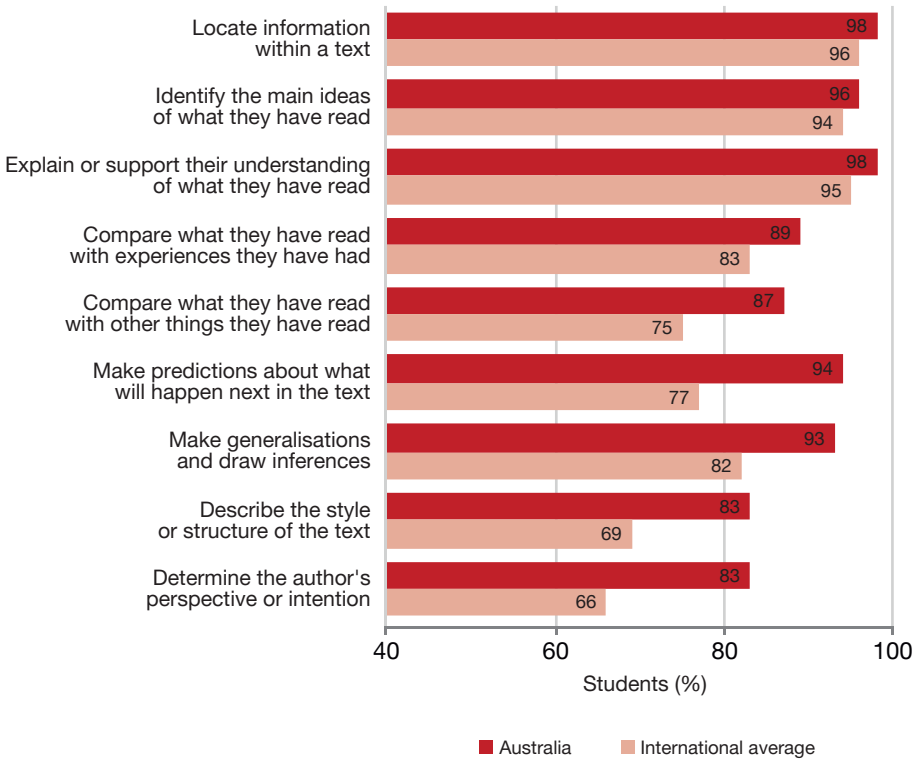


FIGURE 4.4 Reading skills and strategies emphasised by teachers on at least a weekly basis, Australia and the international average

Access to school and classroom libraries

According to their principals, 32 per cent of students, on average across participating countries, were in schools where the library had more than 5 000 book titles and only 13 per cent were in schools with no book titles. The average reading score in schools with the largest libraries was 525 points, compared to 494–501 points for schools with a smaller or no central library. In Australia, 57 per cent of students were in schools where the library had more than 5 000 book titles and only 1 per cent were in schools with no book titles.[1]

In Australia, 88 per cent of Year 4 students were in classrooms with a library, with 56 per of students in classrooms with libraries that had 50 books or more. Internationally, on average, 72 per cent of Year 4 students were in classrooms with libraries, with 33 per cent in classrooms with libraries that had 50 books or more.

Across the PIRLS countries, 61 per cent of students, on average, were given class time to use their library and 55 per cent of students had access to classroom libraries with borrowing facilities. In Australia, 87 per cent of students, on average, were given class time to use their library and 54 per cent of students had access to classroom libraries with borrowing facilities.

Access to computers and computer activities in reading lessons

A far greater proportion of Australian Year 4 students, compared to the international average, had computers available for use during reading lessons (according to their teachers). There were no significant differences in the reading performance of students who did have access to computers

1 It should be noted however, that some countries have well-resourced classroom libraries, rather than a larger central library, and vice versa.

during their reading lessons and those who did not. Australian students were more likely to use the computers to look up information than to use instructional software that focused on developing reading skills and strategies (see Table 4.8). Teaching of skills specific to digital reading, such as being critical when reading on the internet and strategies for reading digital texts, was more common for Australian students than for students in other countries, on average.

TABLE 4.8 Computer activities during reading lessons and Year 4 student achievement in reading, Australia and the international average

	Weekly use of computers during reading lessons											
	To read digital texts		Teach students strategies for reading digital texts		Teach students to be critical when reading on the internet		To look up information (e.g, facts, definition etc)		To research a particular topic or problem		To write stories or other texts	
	Students (%)	SE (%)	Students (%)	SE (%)	Students (%)	SE (%)	Students (%)	SE (%)	Students (%)	SE (%)	Students (%)	SE (%)
Australia	57	3.1	39	3.4	43	3.2	59	3.4	50	3.4	51	3.4
International average	19	0.4	13	0.3	17	0.4	25	0.4	19	0.4	17	0.4

Limitations to classroom instruction

Teachers of the PIRLS classes were asked their opinion on the extent to which instruction at their school was limited ('a lot', 'some', or 'not at all') by the following seven student needs:

- students lacking prerequisite knowledge or skills
- students suffering from lack of basic nutrition
- students suffering from not enough sleep
- students absent from class
- disruptive students
- uninterested students
- students with mental, emotional or psychological disabilities.

Teachers' responses to these items were combined to create the Students Limit Classroom Instruction scale. Scores on this scale were then used to assign students to one of three categories. Year 4 students with reading teachers who felt that their teaching was limited *very little* by student needs had a score on the scale of at least 11.0, which corresponds to their teachers feeling 'not at all' limited by four of the seven needs and to 'some' extent limited by the other three needs, on average. Students with teachers who felt limited *a lot* by student needs had a score no higher than 6.2, which corresponds to their teachers reporting feeling limited 'a lot' by four of the seven needs and to 'some' extent limited by the other three needs, on average. All other students had teachers who felt their teaching was limited *to some extent* by student needs.

Figure 4.5 presents the percentages of Australian Year 4 students in each of these categories, along with their average achievement in reading. The majority of students had teachers who reported that they were limited to *some extent* by student needs (65% of students). There is a clear relationship between the achievement of Australian students and teachers' reports that teaching in reading was limited by student needs – fewer limitations were associated with higher achievement. Students who were taught reading by teachers who reported that they limited *very little* by student needs (31%) scored 40 points higher, on average, than students who were taught reading by teachers who reported being limited *a lot* by student needs (4%).

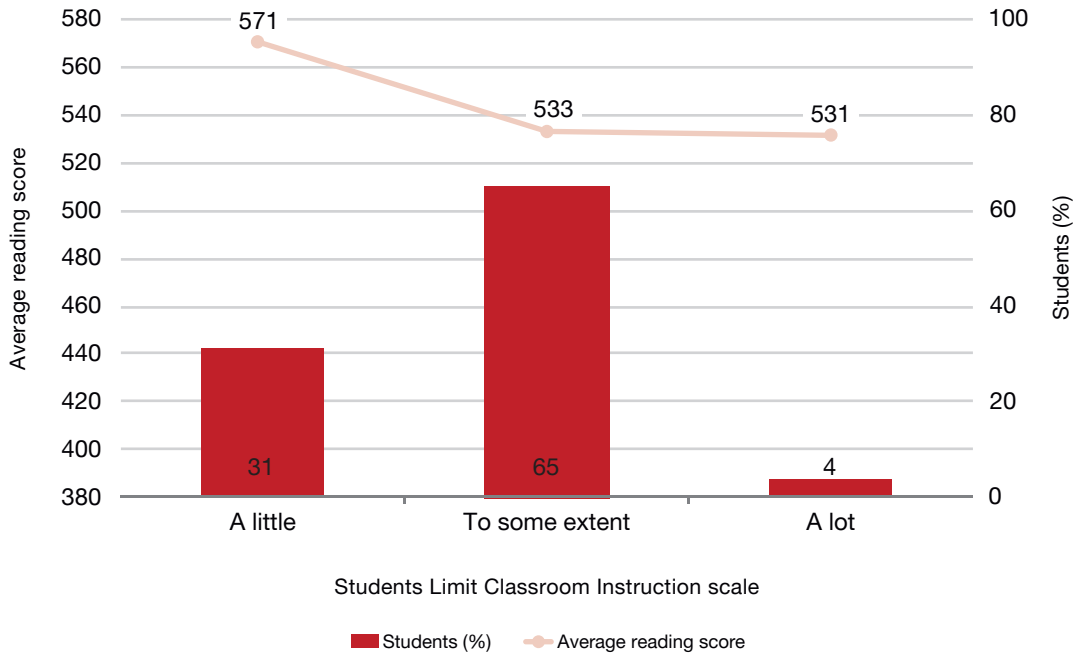


FIGURE 4.5 Students Limit Classroom Instruction scale and Australian student achievement in reading

Limitations to classroom instruction by school socioeconomic composition

As discussed in Chapters 2 and 3, the socioeconomic composition of schools has a substantial effect on students' achievement. Figure 4.6 shows the differences and similarities in teachers' reports that teaching in reading was limited by student needs for *more affluent* schools and *more disadvantaged* schools.

For students in *more affluent* schools, 51 per cent of Australian Year 4 students, on average, had teachers who reported that they were limited *very little* by student needs, compared with only 2 per cent in *more disadvantaged* schools. However, what is striking is the massive difference in the proportions of students whose teachers reported that they were limited *to some extent* by student needs – 91 per cent of students in *more disadvantaged* schools compared to 47 per cent in *more affluent schools.*

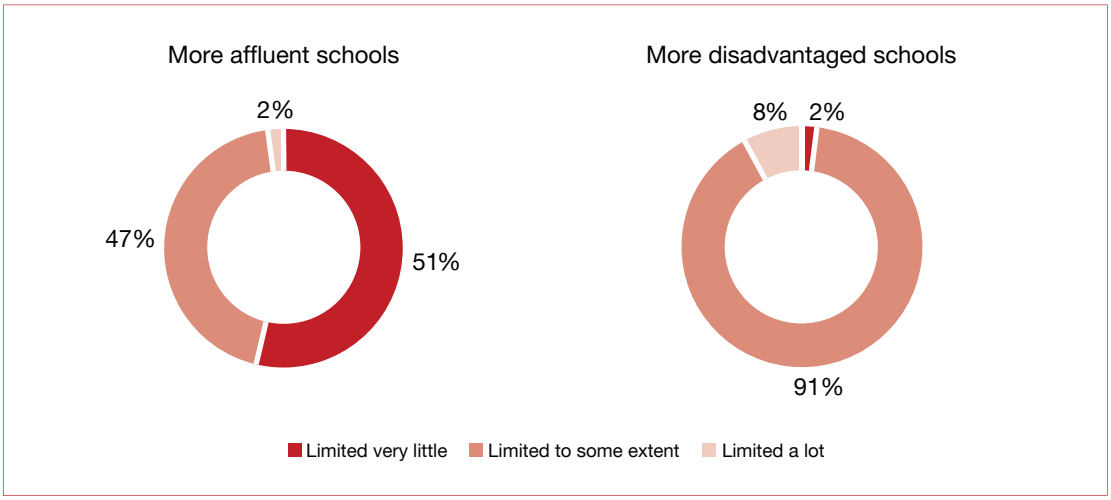


FIGURE 4.6 Students Limit Classroom Instruction scale by school socioeconomic background

Figure 4.7 presents achievement scores in PIRLS for students in each of the three categories of the Students Limit Classroom Instruction scale for *more affluent* schools and for *more disadvantaged* schools. The data presented in Figure 4.7 show that students in *more disadvantaged* schools had lower reading achievement, on average, across the Students Limit Classroom Instruction categories compared to students from *more affluent* schools. For example, in *more disadvantaged* schools, students who were taught reading by teachers who were limited *to some extent* by student needs scored 49 points lower than those students in *more affluent* schools whose teachers also were *limited to some extent*, a substantial and statistically significant difference.

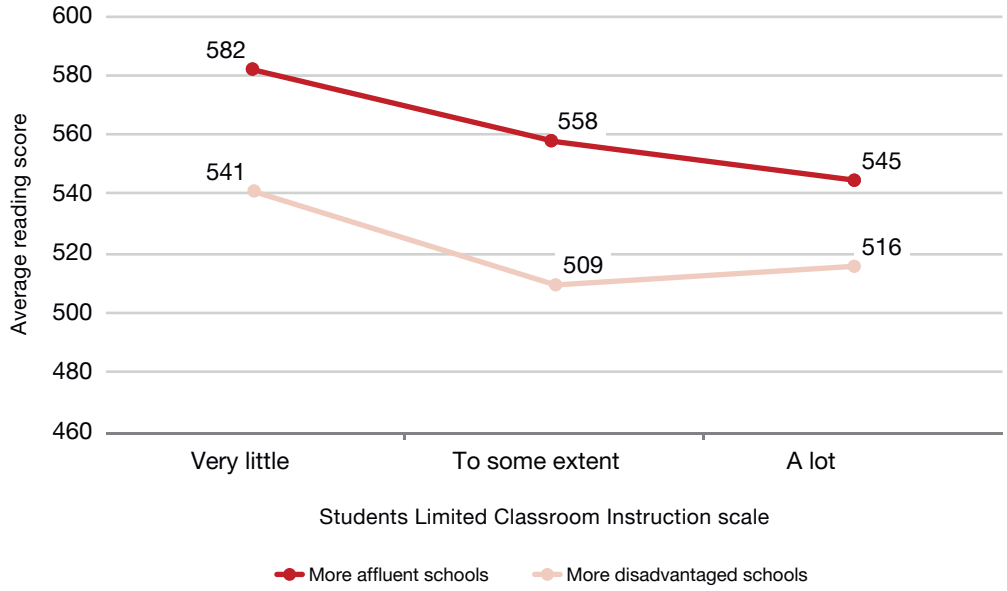


FIGURE 4.7 Students Limit Classroom Instruction scale and Australian student achievement in reading by school socioeconomic background

Students' reports of behaviours that could limit instruction

The next sections take three of the student behaviours that could limit instruction previously presented to reading teachers – absenteeism, and arriving at school overtired or hungry – and present students' own reports of the frequency with which these behaviours occur.

Student absenteeism

Students were asked how often they were absent from school ('never or almost never', 'once a month', 'once every two weeks' or 'once a week or more').

Figure 4.8 presents the percentages of Australian students according to how often they were absent from school, along with their average achievement in reading.

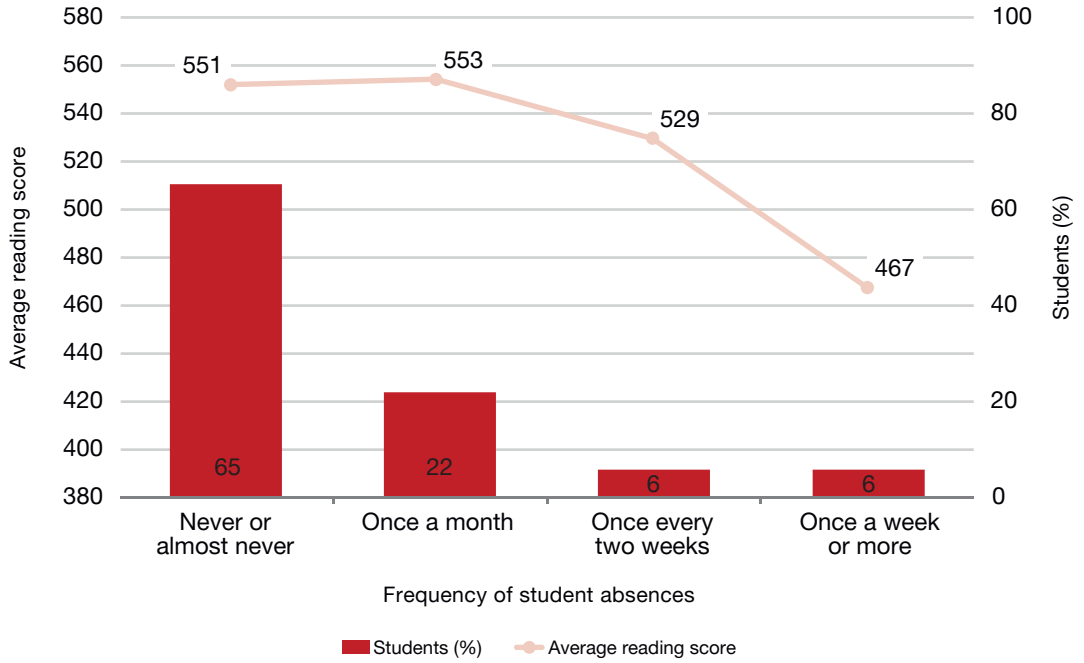


FIGURE 4.8 Frequency of student absences and Australian student achievement in reading

Figure 4.8 shows that 65 per cent of Australian Year 4 students were *never or almost never* absent from school, and 6 per cent were absent *once a week or more.* In comparison, internationally, 68 per cent of Year 4 students were *never or almost never* absent from school, and 10 per cent were absent *once a week or more.*

As can be seen in Figure 4.8, there was a clear relationship between the achievement of Australian students and the frequency of student absences, with fewer absences being associated with higher average achievement. Australian students who were *never or almost never* absent scored 84 score points higher, on average, than those who were absent *once a week or more.* Internationally, on average, the difference between these two groups of students was around 62 score points.

Socioeconomic composition of the school and student absenteeism

Figure 4.9 shows the differences and similarities in the frequency of student absences for *more affluent* schools *and more disadvantaged* schools. Frequent absenteeism (at least once a week) was more commonly reported by students in *more disadvantaged* school than by students in *more affluent* schools – 11 per cent compared to 3 per cent of students.

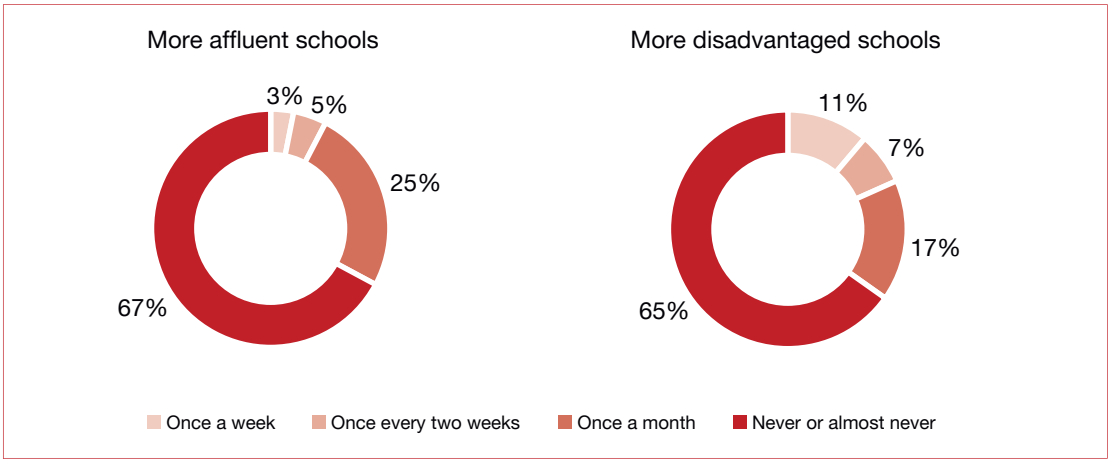


FIGURE 4.9 Frequency of student absences, by school socioeconomic background

Figure 4.10 presents achievement scores in PIRLS and the frequency for student absences for *more affluent* schools and for *more disadvantaged* schools. As previously reported, students in *more disadvantaged* schools had lower reading achievement, on average, than students in *more affluent* schools, regardless of how often the students were absent. Even among students who were frequently absent (at least once a week), those in *more affluent* schools scored higher than those in *more disadvantaged* schools, although the gap was not as great as among students who were absent less frequently.

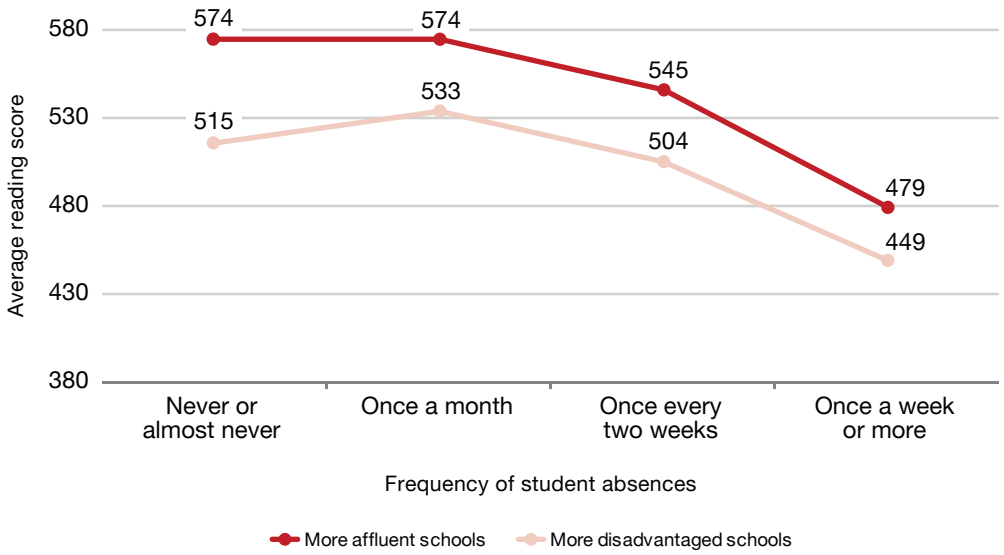


FIGURE 4.10 Frequency of student absences and Australian student achievement in reading, by school socioeconomic background

Students arrive at school feeling tired or hungry

Figure 4.11 presents students' reports about arriving at school feeling tired or hungry. Over half of Australian Year 4 students reported being tired at school *sometimes* and a further 31 per cent reported arriving at school tired *every day or almost every day*. This was similar to the international average, but still of concern. Despite being tired, the average reading score of students who *sometimes* arrived at school tired was significantly higher than that of students who arrived at school tired *every day or almost every day*. Interestingly, those students who *never* arrived tired also scored lower on average than students who *sometimes* arrived at school tired.

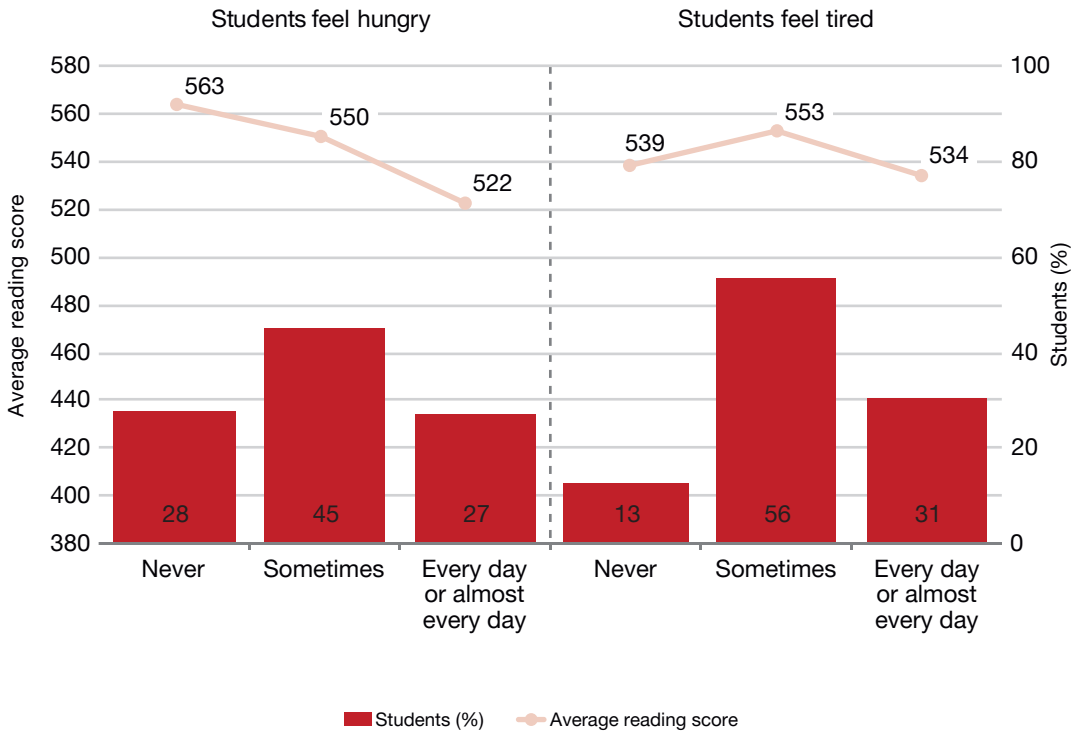


FIGURE 4.11 Students arrive at school feeling tired or hungry and Australian student achievement in reading

Unfortunately, 27 per cent of Australian students reported that they arrive at school hungry *every day or almost every day*. This was similar to the proportion recorded across countries, on average, but is a concerning trend given the relationship between nutrition, concentration and learning. In Australia, there was a relationship between the frequency of arriving at school hungry and average reading achievement, with students who reported arriving at school hungry *every day or almost every day* scoring 41 points lower, on average, than students who *never* arrived at school hungry.

Socioeconomic composition of the school and students arriving tired and hungry

Figure 4.12, shows that the proportions of students that arrived at school hungry for *more affluent* schools *and more disadvantaged* schools were quite similar.

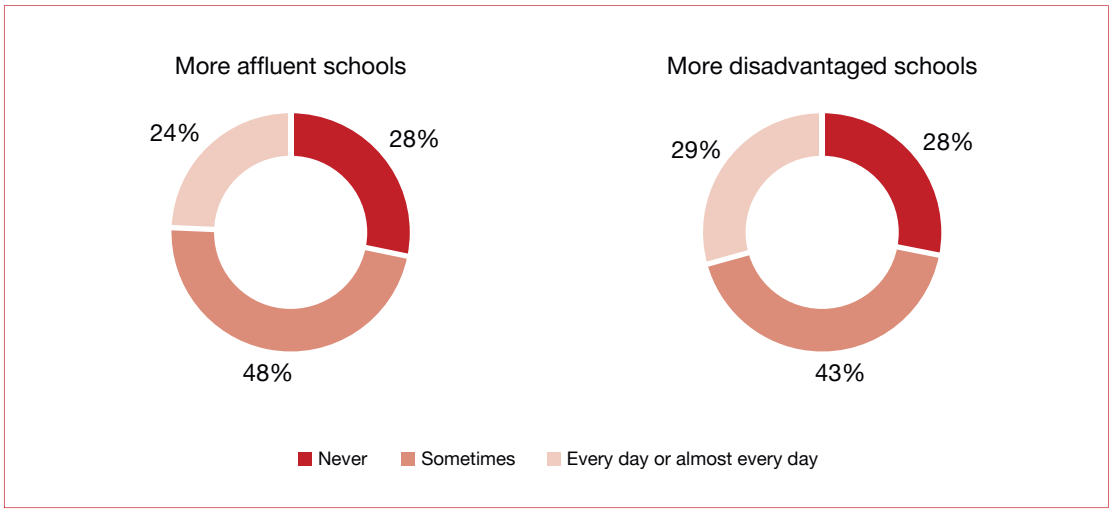


FIGURE 4.12 Students arrive at school feeling hungry, by school socioeconomic background

Similarly, Figure 4.13 also shows that the proportions of students that arrived at school tired did not vary greatly between *more affluent* schools and *more disadvantaged* schools.

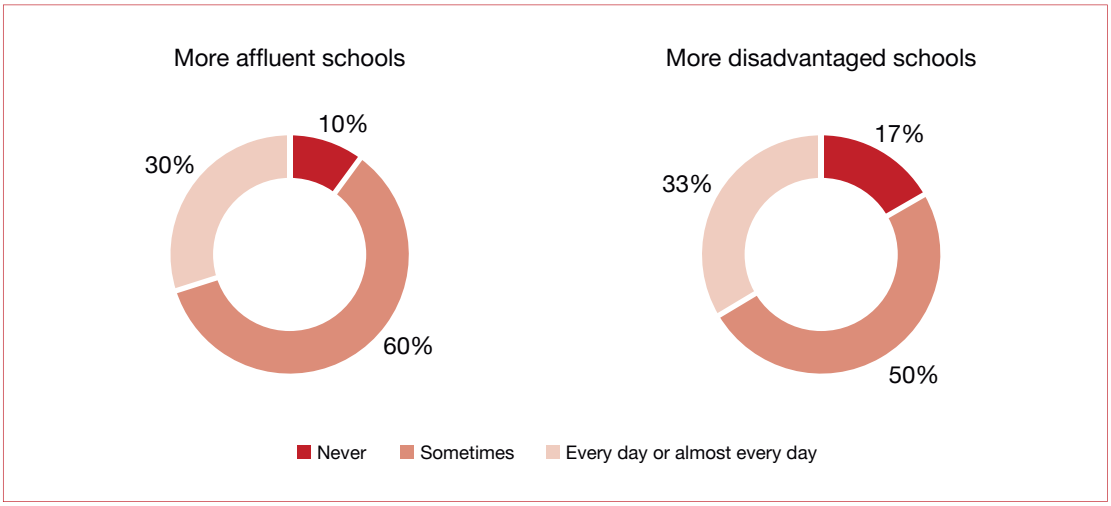


FIGURE 4.13 Students arrive at school feeling tired, by school socioeconomic background

Chapter 5
Student attitudes and engagement

Key findings

- Students who reported enjoying reading *very much* scored significantly higher, on average, in reading than students who *somewhat like reading*, who in turn scored higher, on average, than students who *do not like* reading.
- Higher levels of student confidence in reading were also associated with higher scores on the PIRLS reading assessment.
- Students who were *less than engaged* during their reading lessons, according to their own report, scored significantly lower, on average, than other students.
- Among Indigenous students, there were no significant differences in the average reading scores of students who *very much like reading* and those who *somewhat like reading*. Students in both of these groups, however, scored higher in reading than students who *do not like reading*.
- There were no differences in the average reading scores of Indigenous students who were *less than engaged*, *somewhat engaged* or *very engaged* during their reading lessons.
- For students with *a few books* in the home, according to their own estimation, there were no significant differences in reading achievement associated with enjoyment of reading.
- The proportion of students with *a few books* in the home who were classified as *not confident* readers was more than twice the proportion of students with either *an average number of books* or *many books* at home who were *not confident* in their reading abilities.

This chapter presents information about students' attitudes towards reading – the level of enjoyment they feel towards reading and their level of confidence with reading – and their levels of engagement in their reading lessons.

Students' attitudes towards reading

Considerable research over many years has shown that positive attitudes and achievement are related, and that the influence runs in both directions: attitudes influence achievement and achievement reinforces (or perhaps alters) attitudes. The importance of establishing strong positive attitudes towards learning, and particularly towards reading, which underlie so much of students' learning, is undeniable. It has also proven to be an interesting, if complicated, point for intervention. PIRLS recognises the important role of student attitudes in reading achievement by collecting responses to two attitude scales – the Students Like Reading scale (a measure of participation and enjoyment of reading), and the Students' Confidence in Reading (a measure of their self-rated ability in reading). The average scores of Australian students on these scales are presented alongside student achievement in reading and a measure of the strength of relationship between these attitudes and achievement.

Students like reading

The Students Like Reading scale summarises students' responses to eight questions about how often they participate in and how much they enjoy reading. Students were asked to indicate their level of agreement ('agree a lot', 'agree a little', 'disagree a little' or 'disagree a lot') with each of the following eight statements:

- I like talking about what I read with other people.
- I would be happy if someone gave me a book as a present.
- I think reading is boring (reverse scored).
- I would like to have more time for reading.
- I enjoy reading.
- I learn a lot from reading.
- I like to read things that make me think.
- I like it when a book helps me imagine other words.

Students were also asked how often ('every day or almost every day', 'once or twice a week', 'once or twice a month' or 'never or almost never') they did the following activities outside of school time:

- I read for fun.
- I read to find out about things I want to learn.

Responses to these two sets of questions were combined to create the Students Like Reading scale. Students who *very much like reading* had a score of at least 10.3. This is the point on the scale corresponding to 'agreeing a lot' with four of the eight statements and 'agreeing a little' with the other four, as well as reporting that they read for fun and read things they choose themselves 'every day or almost every day', on average. Students who *do not like reading* had scores no higher than 8.3. This is the scale point corresponding to 'disagreeing a little' with four of the eight statements and 'agreeing a little' with the other four, as well as reporting that they read for fun and read things they choose themselves only 'once or twice a month', on average. All other students were assigned to the *somewhat like reading* category.

Figure 5.1 shows that 43 per cent of Australian students were in the *very much like reading* group, 41 per cent in the *somewhat like reading* group and 16 per cent in the *do not like reading* group (see Figure 5.1). The same distribution was found across all participating countries, on average. Those students who *very much like reading* scored significantly higher in reading, on average, than did those who *somewhat like reading*, who in turn scored higher on average than students who *do not like reading.* Despite this, the relationship between liking reading and achievement was not very strong, with a correlation of only 0.12, indicating that there are students who enjoy reading but did not perform well on the PIRLS reading assessment, and that there are students who performed very well but do not appear to enjoy reading.

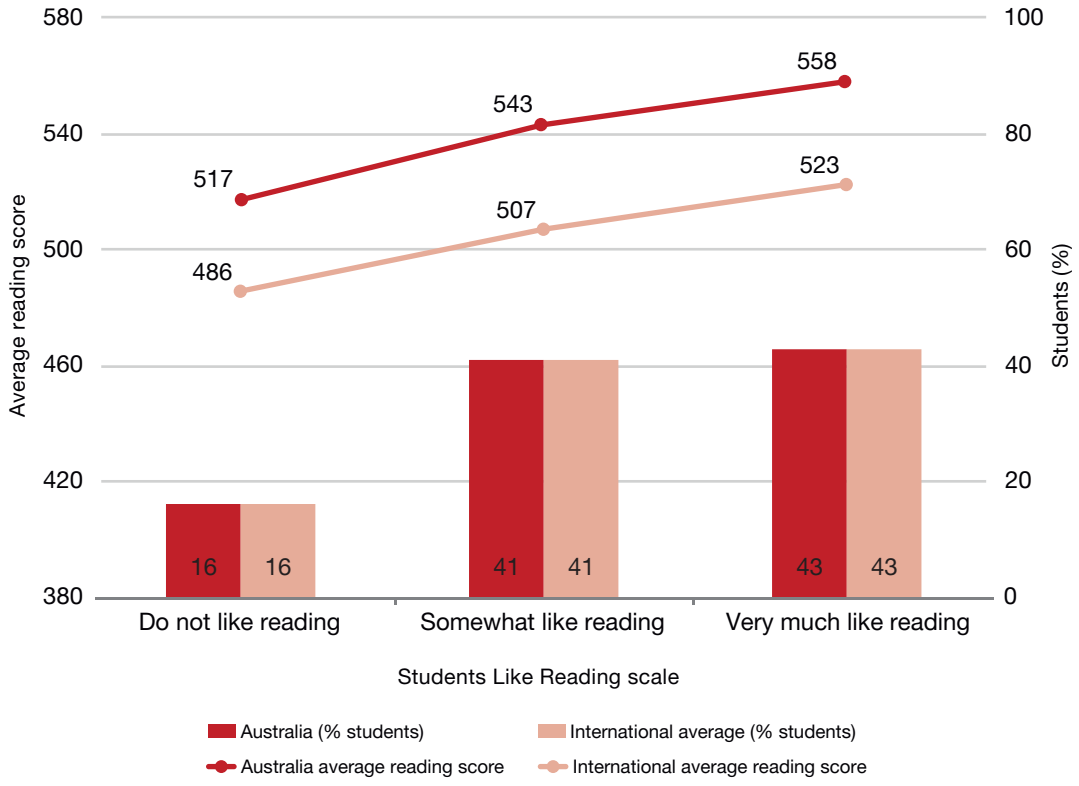


FIGURE 5.1 The Students Like Reading scale and Year 4 student achievement in reading, Australia and the international average

Figure 5.2 shows that the same pattern, of stronger reading performance by students who reported that they liked reading *very much* compared to their peers who like reading less, was found among male and female students.

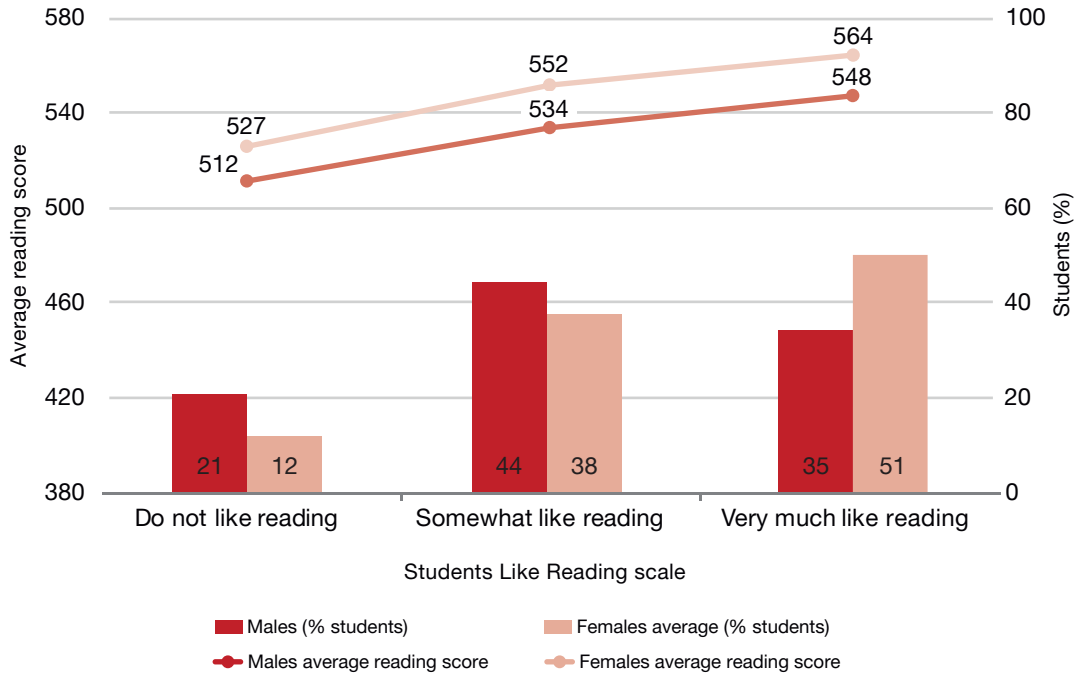


FIGURE 5.2 The Students Like Reading scale and Year 4 student achievement in reading, by sex

Interestingly, the positive relationship between students' reported level of enjoyment of reading and their performance on the PIRLS tasks was not as clear for Indigenous students as it was their non-Indigenous peers. As shown in Figure 5.3, the relationship among non-Indigenous students appeared to be linear, with average performance improving in line with levels of enjoyment of reading, such that students who liked reading *very much* scored higher than students who liked reading *somewhat*, who in turn scored higher than those students who *do not like* reading. Among Indigenous students, however, there was no significant difference in the average reading scores of students who *very much like reading* and those who *somewhat like reading*, although students who *somewhat like reading* did score significantly higher than students who *did not like reading*.

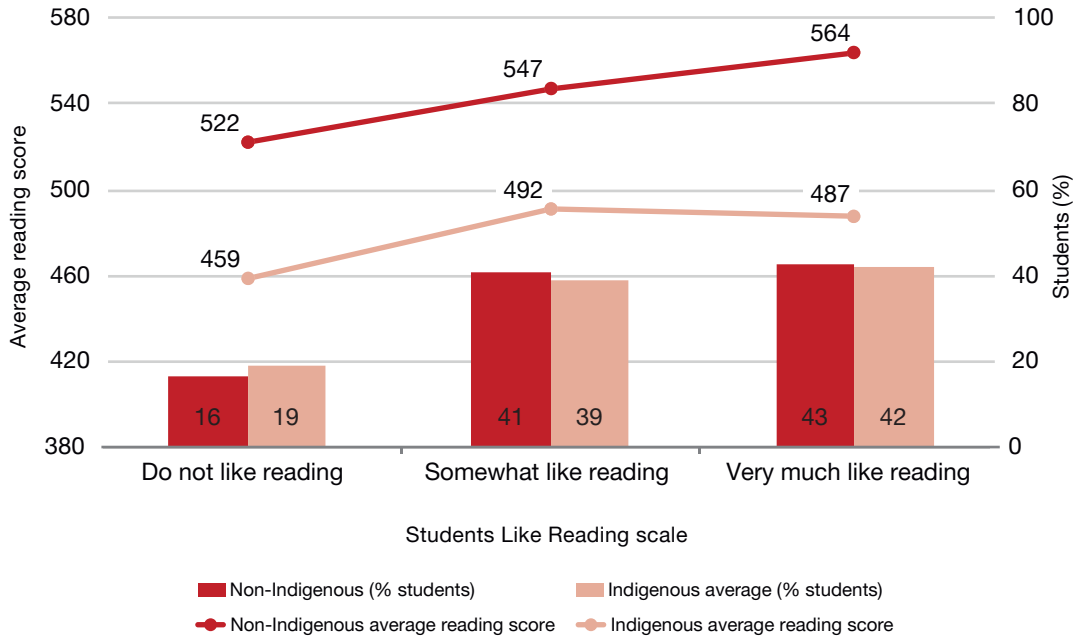


FIGURE 5.3 The Students Like Reading scale and Year 4 student achievement in reading, by Indigenous background

As Figure 5.4 shows, there were few students with *many books* at home who reported that they *do not like reading* (9%), the majority of these students reported that they liked reading *very much*. Among students with *many books* or *an average number of books*, there again appeared to be a linear relationship between how much they reported enjoying reading and their performance on the PIRLS assessment. Students who *very much like reading* scored higher, on average, than those who *somewhat like reading*, and those who liked reading *somewhat* scored higher, in turn, than students who *do not like reading*. However, among students with few reading resources at home, there were no significant differences in performance associated with enjoyment of reading. For this group of students, enjoyment of reading conferred no advantage in terms of performance. Without access to reading materials, a positive attitude alone is not sufficient for these students to develop their reading abilities.

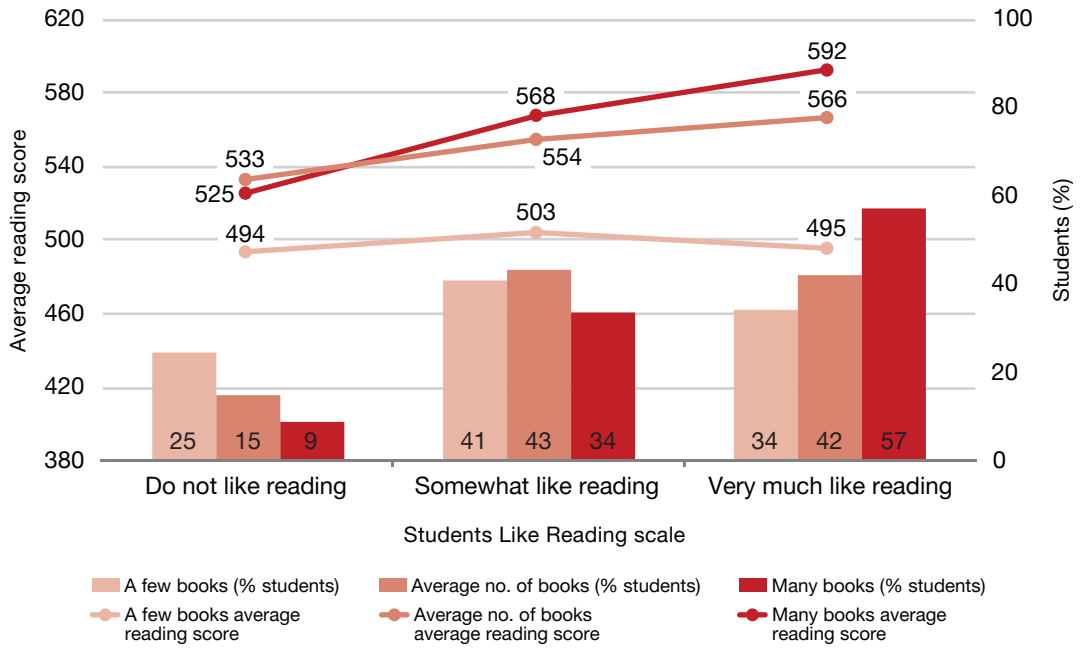


FIGURE 5.4 The Students Like Reading scale and Year 4 student achievement in reading, by number of books in the home

Student confidence with reading

Students were asked to indicate their level of agreement ('agree a lot', 'agree a little', 'disagree a little' or 'disagree a lot') with each of the following six statements:

- I usually do well in reading.
- Reading is easy for me.
- I have trouble reading stories with difficult words (reverse scored).
- Reading is harder for me than for many of my classmates (reverse scored).
- Reading is harder for me than any other subject (reverse scored).
- I am just not good at reading (reverse scored).

Responses to these items were combined to create the Student Confidence in Reading scale. Students who were categorised as *very confident in reading* had a score of at least 10.3 on this scale, which is the point that corresponded to 'agreeing a lot' with the first three of the six statements and 'agreeing a little' with the other three, on average. Students who were *not confident in reading* had scores no higher than 8.2, which is the scale point corresponding to 'disagreeing a little' with the first three of the six statements and 'agreeing a little' with the other three, on average. All other students were categorised as *somewhat confident in reading*.

The average scale score for Australian students was 10.0, placing them in the *somewhat confident in reading* group. Just under 50 per cent of the students were in the *very confident in reading* group, with a further 34 per cent in the *somewhat confident in reading* group. Sixteen per cent were categorised as *not confident in reading*, which was similar to the proportion who *do not like reading*, although it is interesting to note that these two groups did not overlap perfectly. That is, there were students who were *not confident in reading*, but enjoyed it (*somewhat* or *very much*) while there were also students who *did not enjoy reading* but were at least *somewhat confident* in their reading abilities.

The overlap of these groups of students is presented in Figure 5.5. The majority of students who were *very confident in reading* liked reading *very much* (54%), while the proportions of students who were *somewhat* or *not confident* readers but enjoyed reading to the same extent were smaller – 35 per cent and 23 per cent, respectively. Thirty-four per cent of students who were *not confident* readers indicated that they *did not like* reading.

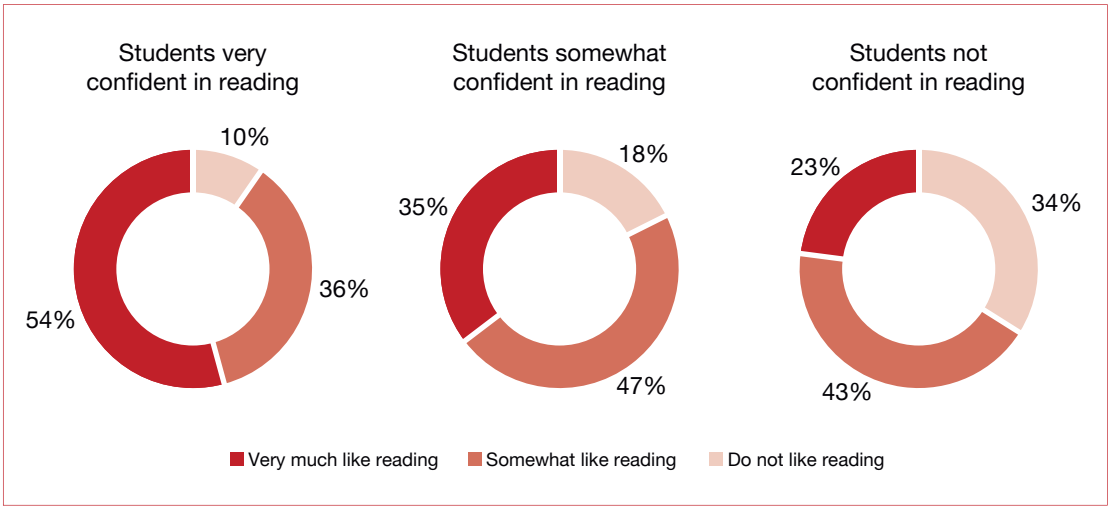


FIGURE 5.5 The Student Confidence in Reading scale, by the Students Like Reading Scale, Australian Students

As may be expected, students who were *very confident in reading* scored higher, on average, in the PIRLS reading assessment than did students who were *somewhat confident in reading*. Students who were *not confident in reading* scored significantly lower, on average, than other students (see Figure 5.6).

Analysis revealed a moderate linear relationship between the Student Confidence in Reading scale score and reading achievement of Australian students, with a correlation of 0.55.

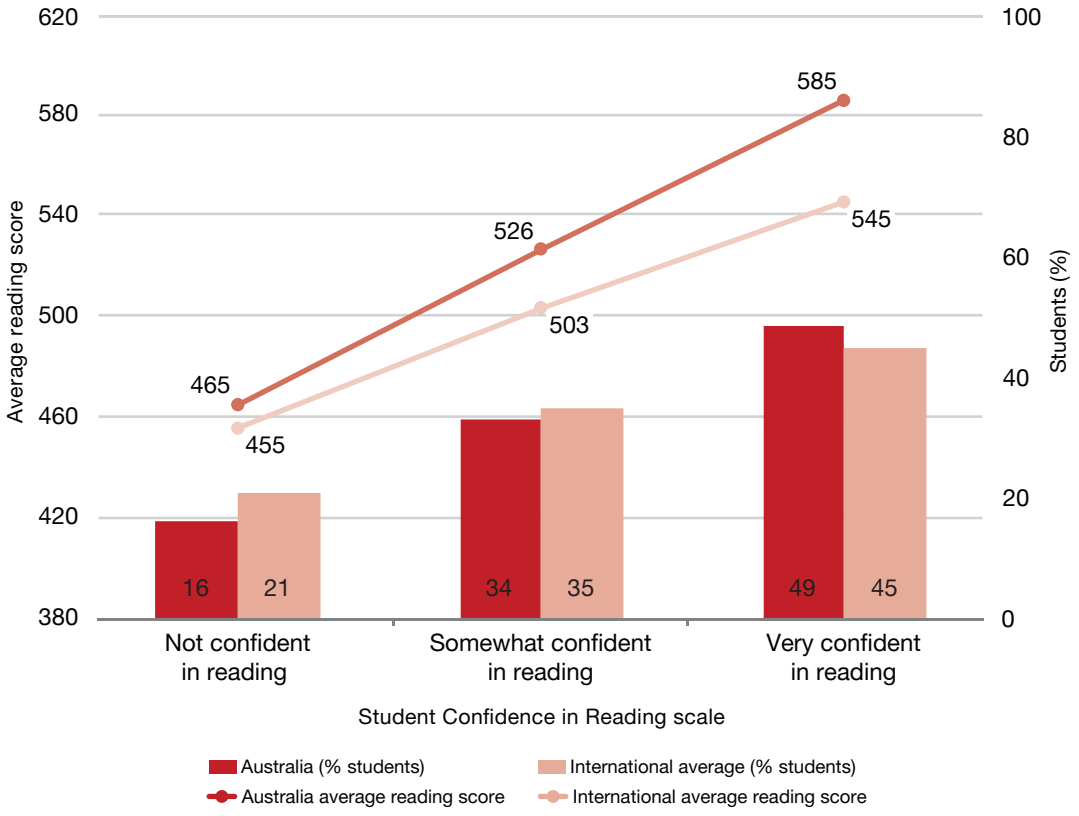


FIGURE 5.6 The Student Confidence in Reading scale and Year 4 student achievement in reading, Australia and the international average

The same linear pattern, with more confident students scoring higher, on average, than less confident students was found among male and female students. As Figure 5.7 shows, in each group of students, females scored higher on average than their male peers, with the difference in scores being greatest among students who were *not confident in reading* (26 points).

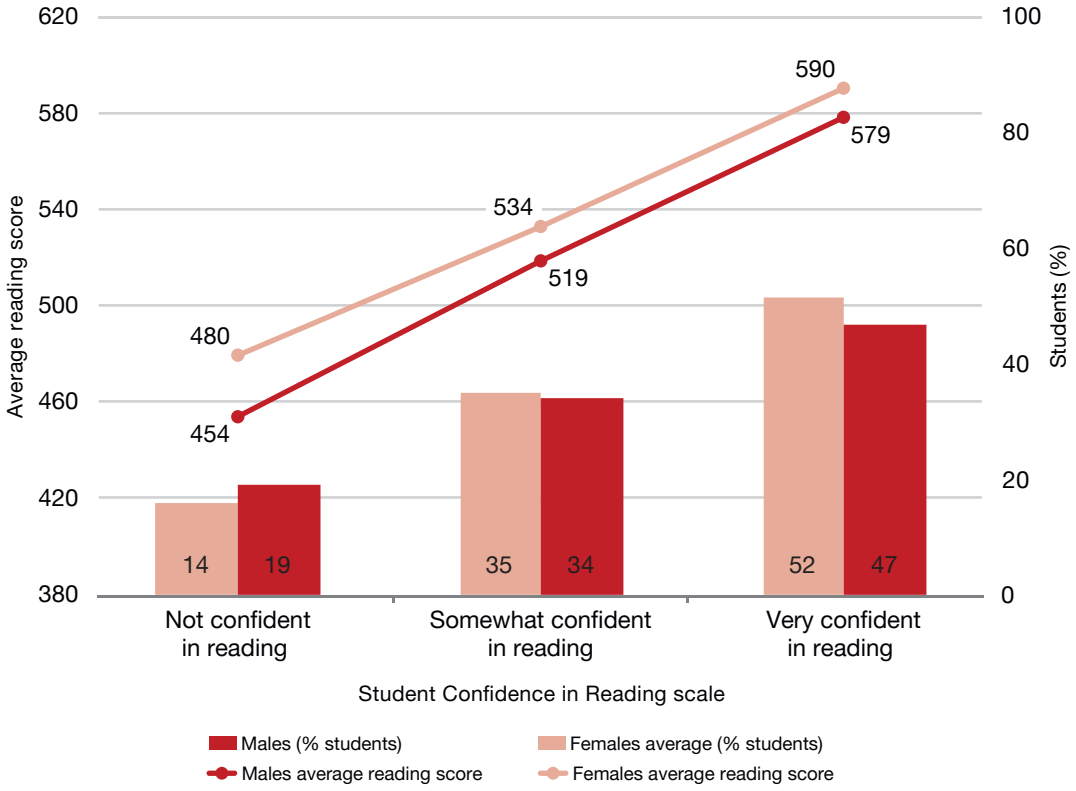


FIGURE 5.7 The Student Confidence in Reading scale and Year 4 student achievement in reading, by sex

Figure 5.8 shows that just over half of the non-Indigenous students (51%) were categorised as *very confident* readers, compared to 28 per cent of their Indigenous peers. The relationship between confidence in reading and student performance was similar for Indigenous and non-Indigenous students, with more confident readers outperforming students who were less confident, on average.

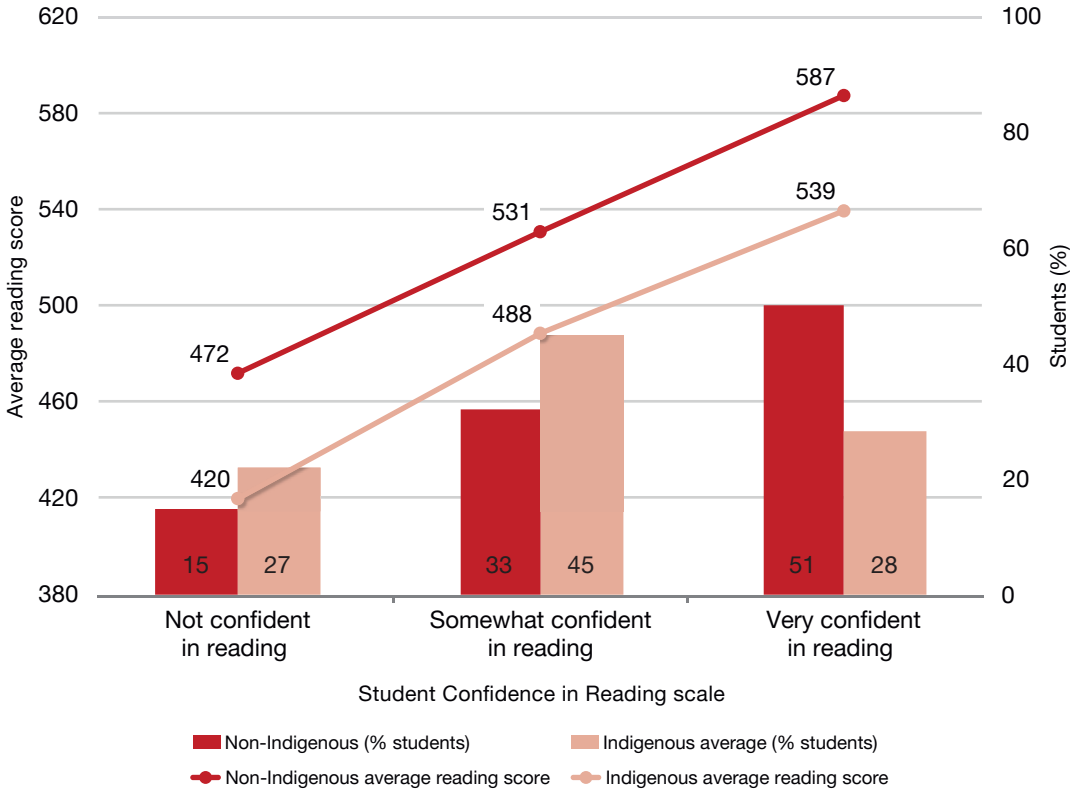


FIGURE 5.8 The Student Confidence in Reading scale and Year 4 student achievement in reading, by Indigenous background

Greater levels of confidence in reading were associated with stronger performance in the PIRLS assessment regardless of the number of books students reported having at home. As shown in Figure 5.9, the highest reading scores, on average, were recorded among students who were *very confident in reading* and who had *many books* at home (604 points, well above the High benchmark cut-off of 550 points) and the lowest scores, on average, were among students who were *not confident in reading* with only *a few books* at home (446 points, above the Low benchmark of 400 points).

Figure 5.9 also shows that the proportion of students with *a few books* who were *not confident in reading* was more than twice the proportion of students with either an *average number of books* or *many books* who were *not confident* readers. Students with *many books* were more likely to be *very confident* readers than students who reported having fewer books at home. It would seem that exposure to more books at home – whether this is representative of higher socioeconomic status, greater value placed on reading, or even modelling of reading in families – is positively related to students' confidence in their abilities as readers.

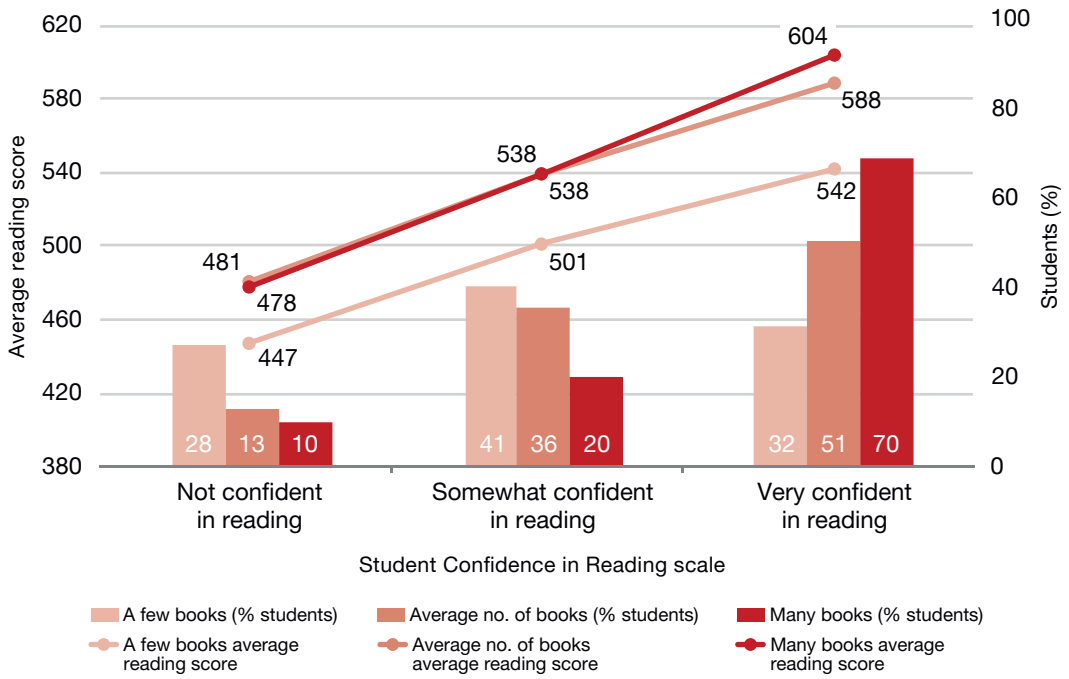


FIGURE 5.9 The Student Confidence in Reading scale and Year 4 student achievement in reading, by books in the home

Student engagement in reading lessons

In the PIRLS 2016 assessment, students' views of how engaged (i.e. interested) they were in their reading lessons were collected using their level of agreement to the following nine items about what happens during class time:

- I like what I read about in school.
- My teacher gives me interesting things to read.
- I know what my teacher expects me to do.
- My teacher is easy to understand.
- I am interested in what my teacher says.
- My teacher encourages me to say what I think about what I have read.
- My teacher lets me show what I have learned.
- My teacher does a variety of things to help us learn.
- My teacher tells me how to do better when I make a mistake.

Students' responses to these items were combined to create the Student Engagement in Reading Lessons scale. Scores on this scale were then used to categorise students into three groups representing their level of engagment in reading lessons. Students who were *very engaged in reading lessons* had a scale score of at least 9.5, which is the point on the scale corresponding to 'agreeing a lot' with five of the nine statements and 'agreeing a little' with the other four, on average. Students who were *less than engaged in reading* had scores no higher than 7.1, which is the scale point corresponding to 'disagreeing a little' with five of the nine statements and 'agreeing a little' with the other four, on average. All other students were categorised as *somewhat engaged in reading lessons.*

Happily for teachers of Australian students, the average score on this scale of 9.8 indicates that Australian students are, on average, *very engaged in reading lessons*. Figure 5.10 shows that over 50 per cent of Australian students were *very engaged in reading lessons*, and a further 39 per cent were *somewhat engaged*. Only 5 per cent of students were classified as being *less than engaged in reading lessons*. Students who were *less than engaged in reading lessons* scored much lower, on average,

on the reading assessment than students who were *very engaged* or *somewhat engaged in reading lessons*, but there was no significant difference in the average reading scores of these latter two groups of students (547 and 545 points, respectively).

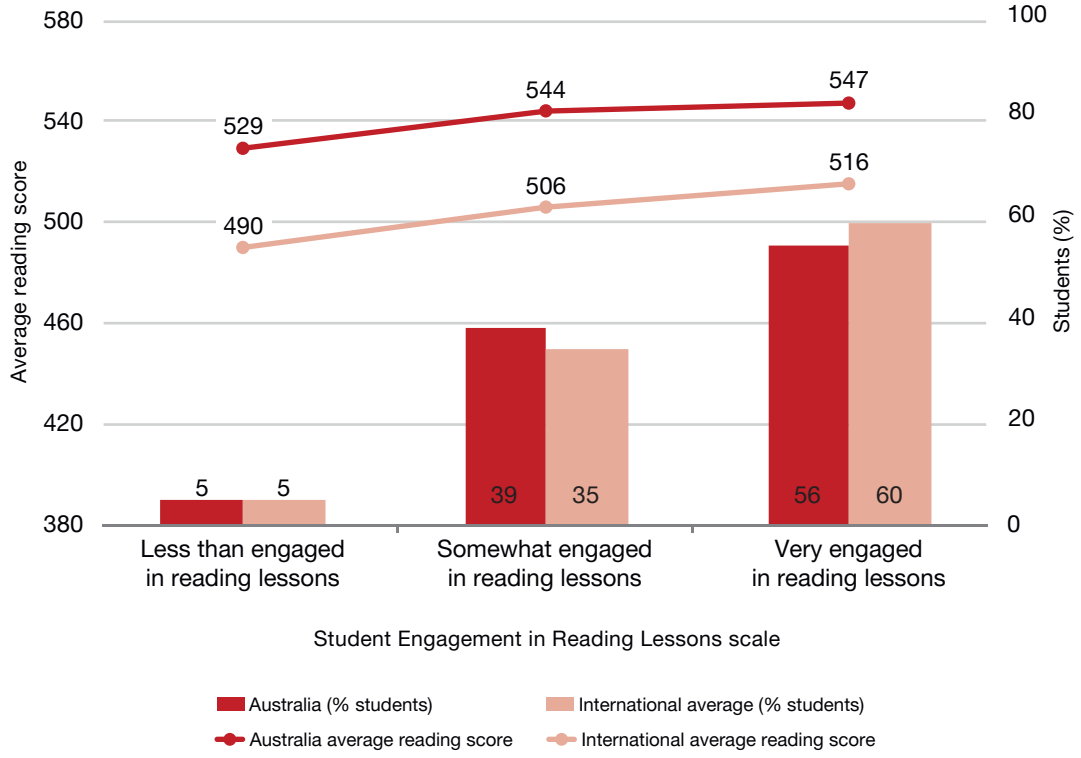


FIGURE 5.10 The Student Engagement in Reading Lessons scale and Year 4 student achievement in reading, Australia and the international average

The correlation between the Student Engagement in Reading Lessons scale scores and reading achievement was quite small, at 0.02. Given the lack of difference in scores of students who were *somewhat* or *very engaged in reading lessons*, it is possible that there is a ceiling effect for the influence of engagement on achievement, or that the relationship is simply not linear. In contrast, higher scores on the Student Engagement on Reading Lessons scale were positively related to higher scores on the Students Like Reading scale, with a correlation of 0.55.

As shown in Figure 5.11, among male students, there were no differences in average reading scores across the three levels of engagement in reading lessons. Among female students, however, those who were *somewhat* or *very engaged in reading lessons* scored higher, on average, than those who were *less than engaged* in their reading lessons. Proportionally more female students were categorised as *very engaged in reading lessons*, while more male students were *somewhat engaged in reading lessons*.

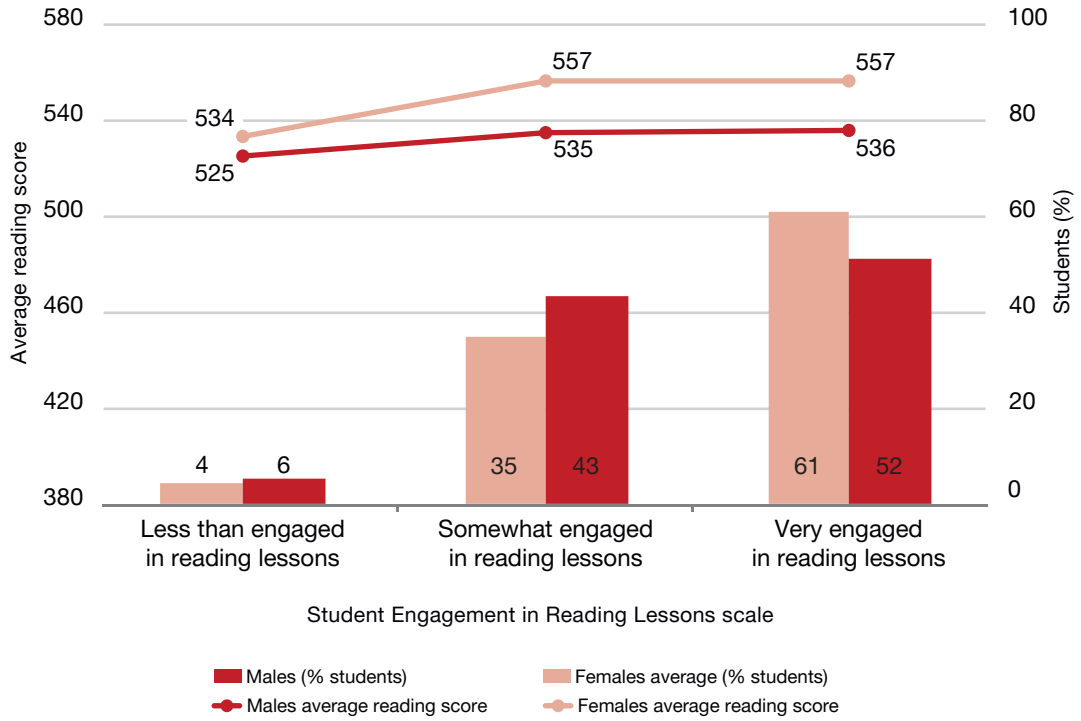


FIGURE 5.11 The Student Engagement in Reading Lessons scale and Year 4 student achievement in reading, by sex

Figure 5.12 shows that there were no significant differences in the average reading scores of Indigenous students who were *less than engaged*, *somewhat engaged* or *very engaged in reading lessons*. In contrast, for non-Indigenous students there was a small benefit associated with higher levels of engagement in reading lessons – students from a non-Indigenous background who were *somewhat* or *very engaged in reading lessons* scored around 11 points higher, on average, than non-Indigenous students who were *less than engaged* in their reading lessons.

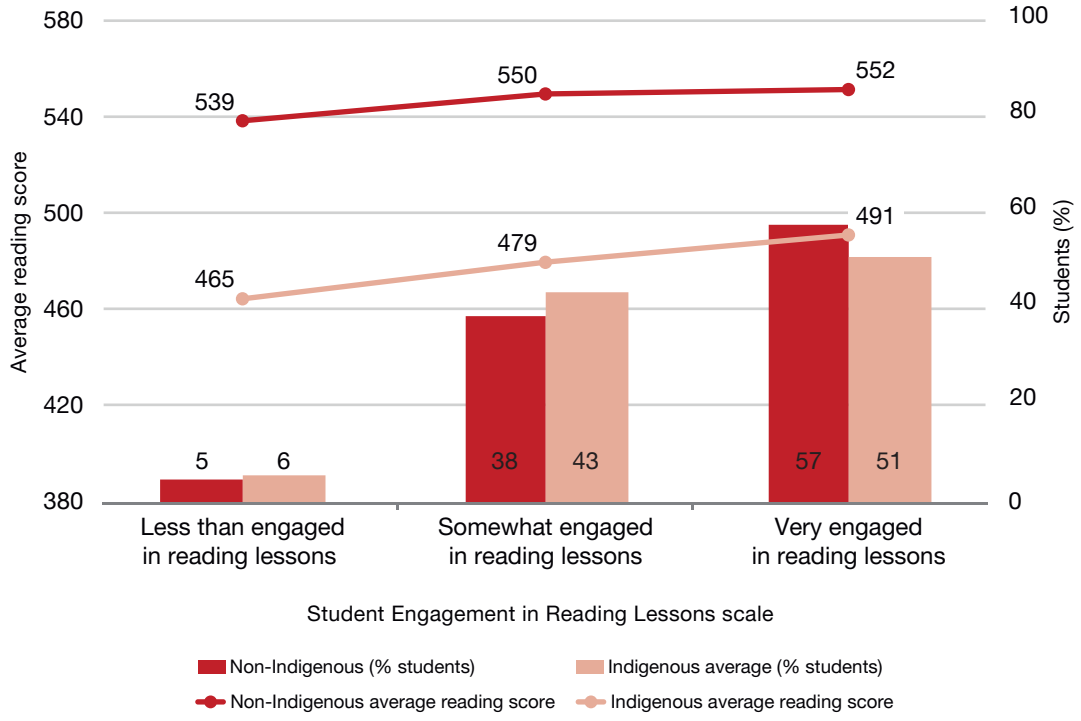


FIGURE 5.12 The Student Engagement in Reading Lessons scale and Year 4 student achievement in reading, by Indigenous background

When the relationship between scores on the PIRLS assessment and engagement in reading lessons was examined by the number of books reported at home, a benefit was found only among students who reported *an average number of books* at home (see Figure 5.13). For these students, being *somewhat* or *very engaged in reading lessons* was associated with higher average reading scores – similar scores, in fact, to those students with *many books* at home who were *less than engaged* in reading lessons.

For those students with only *a few books* and those with *many books*, levels of engagement in reading lessons had no influence on average reading scores. Those with *a few books* scored lower, on average, than other students, regardless of how engaged they were during their reading lessons.

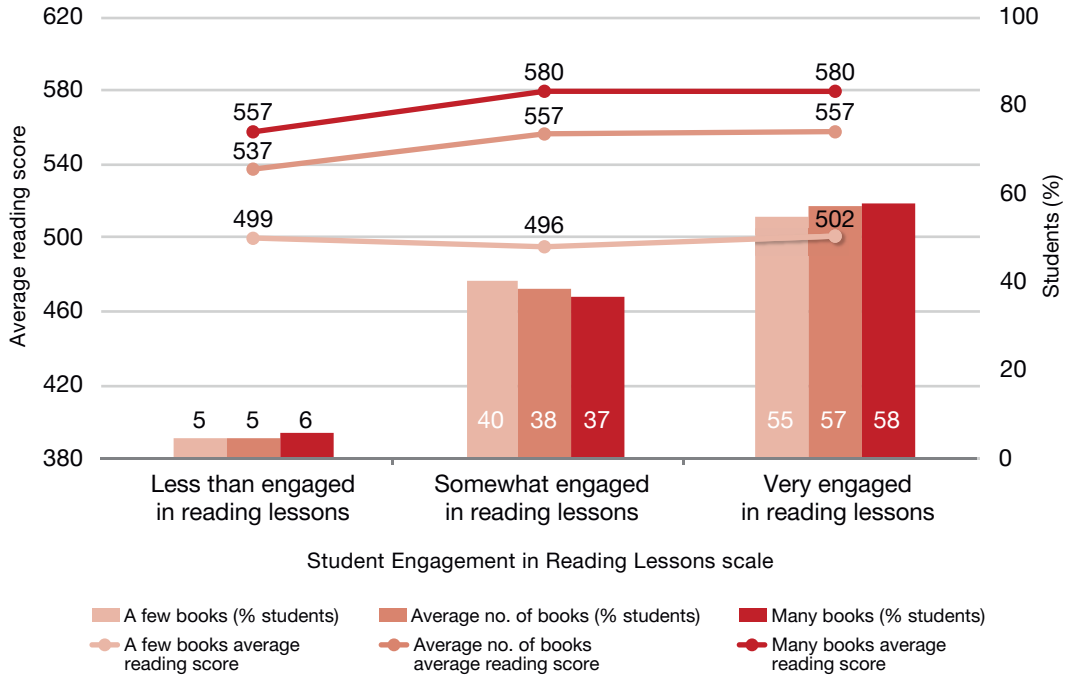


FIGURE 5.13 The Student Engagement in Reading Lessons scale and Year 4 student achievement in reading, by books in the home

References

Abedi, J. (2002). Assessment and accommodation of English language learners: Issues, concerns and recommendations. *Journal of School Improvement, 3*(1), 83-89.

Australian Bureau of Statistics. (1996). *Aspects of literacy: Profiles and perceptions, Australia.* ABS Catalogue No. 4226.0, Australian Bureau of Statistics, Canberra.

Australian Bureau of Statistics. (2014). Australian social trends. Available http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/4102.0main+features102014.

Australian Curriculum, Assessment and Reporting Authority (2015). Measurement Framework for Schooling in Australia 2015. Sydney: ACARA. Retrieved from http://www.acara.edu.au/_resources/Measurement_Framework_for_Schooling_in_Australia_2015.pdf.

Bialystok, E. (2006). Second-language acquisition and bilingualism at an early age and the impact on early cognitive development. In R.E. Tremblay, M. Boivin, & R.D. Peters (Eds.), *Encyclopedia on early childhood development* [online]. Montreal, Quebec: Centre of Excellence for Early Childhood Development and the Strategic Knowledge Cluster on ECD. Retrieved from http://child-encyclopedia.com/ pages/PDF/BialystokANGxp_rev.pdf.

Department of Education, Science and Training (DEST). (2005). *Literacy and numeracy: A review of the literature*. Canberra, Australia.

Eunice Kennedy Shriver National Institute of Child Health and Human Development, NIH, DHHS. (2000). *Report of the National Reading Panel: Teaching children to read*: Reports of the Subgroups (00-4754). Washington, DC: U.S. Government Printing Office.

Francis, D. J., Shaywitz, S. E., Stuebing, K. K., Shaywitz, B. A., and Fletcher, J. M. (1996). Developmental lag versus deficit models of reading disability: A longitudinal, individual growth curves analysis. *Journal of Educational Psychology*, *88*(1), 3-17.

Freebody, P. & Ludwig, C. (1995). *Everyday literacy practices in and out of schools in low socioeconomic urban communities (Vol 1).* Department of Employment, Education and Training Centre for Literacy Education Research, Queensland, Australia.

Hattie, J. (2008). *Visible learning*. London & New York: Routledge.

Juel, C. (1988). Learning to read and write: A longitudinal study of 54 children from first to fourth grades. *Journal of Educational Psychology*, *80*(4), 437-447.

Ministerial Council for Education, Employment, Training and Youth Affairs (MCEETYA) (2008). Melbourne Declaration on Educational Goals for Young Australians. Melbourne, Curriculum Corporation. Retrieved from http://www.curriculum.edu.au/verve/_resources/National_Declaration_on_the_Educational_Goals_for_Young_Australians.pdf.

Mullis, I. V. S., Martin, M. O., Foy, P. & Hooper, M. (2017). PIRLS 2016 International Results in Reading. Retrieved from http://timssandpirls.bc.edu/pirls2016/international-results.

OECD (2010). *PISA 2009 Results: What Students Know and Can Do – Student Performance in Reading, Mathematics and Science* (Volume I). Paris: OECD.

OECD (2012). *Equity and quality in education: Supporting disadvantaged students and schools*. Paris: OECD.

Panizzon, D. & Pegg, J. (2007). Chasms in student achievement: Exploring the rural-metropolitan divide [online]. *Education in Rural Australia*, *17* (2), 3-20. Retrieved from: https://search.informit.com.au/fullText;dn=287612265364606;res=IELHSS accessed August 2, 2017.

Schagen, I. (2004). *Multi-level analysis of PIRLS data for England*. Paper presented at the First IEA International Research Conference. May 11–13, Lefkosia: University of Cyprus

Shiel, G. & Eivers, E. (2009). International comparisons of reading literacy: What can they tell us? *Cambridge Journal of Education. 69 (3),* 345-360.

Teale, W. H., & Sulzby, E. (Eds.). (1986). *Emergent literacy: Writing and reading*. Norwood, NJ: Ablex

Thomson, S., De Bortoli, L. & Underwood, C. (2017). *PISA 2015: Reporting Australia's results*. Camberwell: ACER.

Thomson, S., Hillman, K., Wernert, N., Schmid, M., Buckley, S. and Munene, A. (2012). *Monitoring Australian Year 4 student achievement internationally: TIMSS and PIRLS 2011.* Camberwell: ACER.

Thomson, S., Wernert, N., O'Grady, E. and Rodrigues, S. (2017). *TIMSS 2015: Reporting Australia's results.* Camberwell: ACER.

Torgesen, J.K. & Hudson, R. (2006). Reading fluency: critical issues for struggling readers. In S.J. Samuels and A. Farstrup (Eds.). Reading fluency: The forgotten dimension of reading success. Newark, DE: International Reading Association.

Whitehurst G. J, & Lonigan C. J. (1998). Child development and emergent literacy. *Child Development. 69*, 848-72.

Appendix A

PIRLS methods and procedures

To assist readers to understand the scope and operations of PIRLS, a brief account of some of its procedures is provided in this appendix. A thorough account is available in *Methods and Procedures in PIRLS 2016* (http://timssandpirls.bc.edu/publications/timss/2015-methods.html). As most of the operational procedures have both international and national components, this appendix will provide details specific to Australia, where appropriate.

Operationalisation of PIRLS

Procedures for administering the test were determined by the TIMSS & PIRLS International Study Center so that data from all students from all schools in all countries could be considered equivalent.

These were operationalised by National Centres in each country, such as ACER in Australia. School Coordinators, nominated by the principal of each participating school, assisted the National Centre with the management of PIRLS within the school. The PIRLS test and student questionnaires were administered by a Test Administrator, who, in most cases, was a teacher from the school.

The Test Administrator followed strict guidelines and was required to complete a report about any situation that constituted a deviation from these guidelines. National Quality Control Observers (employed by the National Centre) visited 10 per cent of schools to observe the test administration. An International Quality Control Observer (employed by the IEA) visited a further 15 schools as well as examining the operations of the National Centre.

Sampling

The PIRLS 2016 assessment was administered to carefully drawn random samples of students from the target population in each country. Given that the accuracy of the PIRLS results depends on the quality of the national samples, the PIRLS sampling experts worked with participating countries on all phases of sampling to ensure efficient sampling design and implementation.

National Centre staff were trained in how to select the school and student samples, and in how to use the sampling software provided by the IEA Data Processing Center. Staff from Statistics Canada reviewed the national sampling plans, sampling data, sampling frames and sample selections. The

sampling documentation was used by the TIMSS & PIRLS International Study Center (in consultation with Statistics Canada and the sampling referee) to evaluate the quality of the samples.

Internationally, the target population of fourth grade (Year 4) students is defined as all students enrolled in the grade that represents four years of schooling counting from the first year of Level 1 of the International Standard Classification of Education (ISCED), providing the mean age at the time of testing is at least 9.5 years.

All students enrolled in the target grade, regardless of their age, belong to the international target population and should be eligible to participate in PIRLS. If the national target population differs from the international target population, this was annotated in the international reports. In Australia, the target population was Year 4 students.

Within the target population, countries could define a population that excluded a small percentage (no more than 5%) of certain kinds of schools or students that would be very difficult or resource intensive to test (e.g. schools for students with special needs or schools that were very small or located in remote areas). In Australia, school-level exclusions included very small schools (fewer than five students in the target year level), non-mainstream schools (such as schools for students with special needs) and very remote schools. Within-school exclusions consisted of students with intellectual disabilities, students with functional disabilities and non-native language speakers (with less than one year of exposure to English). Table A.1 provides the rates of exclusion in Australia.

TABLE A.1 Rates of exclusion from the Australian national target population for PIRLS 2016

	School-level exclusions	Within-school exclusions	Overall exclusions
Year 4 students	2.3%	2.4%	4.7%

The basic design of the sample used in PIRLS 2016 was a two-stage stratified cluster design. The first stage consisted of a sampling of schools, and the second stage of a sampling of intact classrooms from the target year level in the sampled schools. Schools were selected with probability proportional to size, and classrooms with equal probabilities. Most countries sampled 150 schools and one or two intact classrooms from each school. This approach was designed to yield a representative sample of at least 4500 students in each country. For information about this approach to sampling, please refer to Chapter 3 of *Methods and Procedures in PIRLS 2016* (https://timssandpirls.bc.edu/publications/pirls/2016-methods.html).

In Australia, a larger sample of schools and students participated in PIRLS to produce reliable estimates representative of:

- Each of the Australian jurisdictions – In order for comparisons to be made between jurisdictions, it was necessary to oversample the smaller jurisdictions, since a random sample proportionate to jurisdiction populations would not yield enough students in the smaller jurisdictions to give a result of sufficient precision.
- Indigenous students – A sufficiently large sample of Australia's Indigenous students was required so that valid and reliable separate analyses could be conducted.

At the school level, in Australia, the planned sample was 286 schools. In order to produce the representative sample, this sample was stratified in the following manner:

- explicit stratification (where a separate sample was drawn for each stratum) – by jurisdiction
- implicit stratification (where the schools were sorted according to the stratification variables within each of the explicit strata) – by geographic location (metropolitan, provincial, remote), school type (Catholic, government, independent) and socioeconomic index (low socioeconomic status, high socioeconomic status).

Table A.2 shows the designed school sample and the distribution of schools across the jurisdictions.

Following sampling, some schools were withdrawn from the sample, either because they were ineligible (lacking students from the target population) or because all of their students fell into an exclusion category. In addition, some schools were replaced – by schools that had been identified as suitable replacements during the sampling process – as they were unable to participate for reasons other than

ineligibility or exclusion. Where a school was withdrawn too late for replacement, they were recorded as a 'refusal'. Table A.2 summarises these changes to the sample.

TABLE A.2 Allocation of school sample in Australia for PIRLS 2016

	School participation status						
			Participating schools				
Jurisdiction	Total sampled schools	Ineligible schools	Original schools	1st repl.	2nd repl.	Refusal schools	Excluded schools
ACT	30	0	29	1	0	0	0
NSW	45	0	42	2	1	0	0
NT	15	0	15	0	0	0	0
QLD	45	0	45	0	0	0	0
SA	41	0	41	0	0	0	0
TAS	27	0	27	0	0	0	0
VIC	44	0	43	1	0	0	0
WA	39	0	39	0	0	0	0
Total	**286**	**0**	**281**	**4**	**1**	**0**	**0**

After school sampling, class sampling was undertaken. The usual process was for each school to have only one reading or English class sampled. However, in cases where the classes were small (such as multi-year or composite classes), at least two classes were sampled in order to allow the total number of students more closely to approximate the average class size. In addition, in Australia, any student in the target year that identified as Indigenous was invited to participate in PIRLS.

Within-school exclusions of students were allowed where disability or language barriers prevented the students' full participation in the PIRLS assessment. These exclusions were either of full classes (where any such class comprised students with special needs) or of individual students within sampled classes.

Table A.3 shows the student sample sizes achieved, as well as the numbers of excluded, absent and withdrawn students (withdrawn students were students that had left the school between the sampling of the class and the assessment date).

TABLE A.3 Student sample sizes in Australia for PIRLS 2016

	Number of sampled students in participating schools	Number of students withdrawn from class/ school	Number of students excluded	Number of eligible students	Number of students absent	Number of students assessed
Year 4	7105	174	156	6775	430	6345

To ensure accurate and unbiased data, the TIMSS & PIRLS International Study Center set minimum participation rates of 85 per cent of sampled schools and 85 per cent of sampled students (or a combined school and student participation rate of 75%). Non-participating sampled schools could be replaced by replacement schools that had been matched according to strata and size. However, countries that achieved these requirements only by the use of replacement schools are annotated in the international reports. Countries with less than 50 per cent of sampled schools participating are segregated in the international reports. Table A.4 shows that Australia achieved the minimum participation rate for PIRLS 2016.

TABLE A.4 PIRLS 2016 participation rates (weighted) for Australia

	School participation				Overall participation	
	Before replacement	After replacement	Class participation	Student participation	Before replacement	After replacement
Year 4	97	100	100	95	92	94

The structure of the PIRLS assessment

PIRLS 2016 reports student outcomes by reading processes (literary and informational) and procedures (retrieving explicitly stated information, making straightforward inferences, interpreting and integrating ideas and information, and examining and evaluating content, language and textual elements). In order to cover all of the subdomains thoroughly, there are more texts and more questions in the assessment than can be answered by a student in the amount of testing time available. Accordingly, PIRLS uses a matrix-sampling approach that involves packaging the entire assessment pool of reading texts (six literary and six informational) and items into a set of 16 student-achievement booklets, with each student completing just one booklet. Each text and its accompanying items appears in two booklets (apart from the texts that were included in the magazine-style booklet), providing a mechanism for linking together the student responses from the various booklets.

Booklets are distributed among students in participating classrooms so that the groups of students completing each booklet are approximately equivalent in terms of student ability. Using item response theory (IRT) scaling techniques, a comprehensive picture of the achievement of the entire student population is assembled from the combined responses of individual students to the booklets they are assigned. This approach reduces to manageable proportions what would otherwise be an impossible student burden (albeit at the cost of greater complexity in booklet assembly, data collection and data analysis).

Following the 2011 assessment, three of the literary texts and three of the informational texts were secured for use in measuring trends in 2016. The remaining texts were released into the public domain for use in publications, research and teaching, to be replaced by six newly developed texts and items in the PIRLS 2016 assessment. Two of these new texts were also used in PIRLS Literacy (a simplified version of PIRLS) in order to extend the scaling of achievement to cover both studies.

Countries participating in PIRLS aim for a sample of at least 4500 students to ensure that there are sufficient respondents for each item. The 16 student booklets are distributed among the students in each sampled class according to a predetermined order, so that approximately equal proportions of students respond to each booklet.

Question types and scoring the responses

Two question formats are used in the PIRLS assessment – multiple-choice and constructed-response. At least half of the total number of score points that can be accrued in the assessment will come from multiple-choice questions. Each multiple-choice question is worth one score point.

Multiple-choice questions

Multiple-choice questions provide four response options, of which only one is correct. These questions can be used to assess any of the behaviours in the procedures domain. However, as they do not allow for students' explanations or supporting statements, multiple-choice questions may be less suitable for assessing students' ability to make more complex interpretations or evaluations.

It is important that linguistic features of the questions be developmentally appropriate. Therefore, the questions are written clearly and concisely. The response options are also written succinctly in order to minimise the reading load of each question. The options that are incorrect are written to be plausible, but are not intended to deceive. For students who may be unfamiliar with this test question format, the instructions given at the beginning of the test include a sample multiple-choice item that illustrates how to select and mark an answer.

Constructed-response questions

For this type of test item, students are required to construct a written response, rather than select a response from a set of options. Constructed-response questions require scoring by trained scorers. The scoring guide for each constructed-response question describes the essential features of appropriate and complete responses. The guides point to evidence of the type of behaviour that a given question is designed to assess. They describe evidence of partially correct and completely correct responses. In addition, sample student responses at each level of understanding provide important guidance to those who will be rating the students' responses. In scoring students' responses to constructed-response questions, the focus is solely on students' achievement with respect to the reading process being assessed, not on their ability to write well. However, students need to communicate their response in a manner that will be clear to scorers.

For more information about the items and their development, please refer to Chapter 1 of *Methods and Procedures in PIRLS 2016* (https://timssandpirls.bc.edu/publications/pirls/2016-methods.html).

Translation and adaptation of materials

Experts in translation procedures ensured that translated materials were as equivalent in meaning and level of complexity as possible. Translation of the assessment booklets, questionnaires and manuals involved development and implementation of extensive and rigorous processes. Materials from the TIMSS & PIRLS International Study Center were provided to countries in both English and Arabic. Countries whose principal language is neither English nor Arabic were thus required to translate the assessment materials. These translations were then reviewed for accuracy by a team of expert translators. For more information about the translation processes, please refer to Chapter 7 of *Methods and Procedures in PIRLS 2016* (https://timssandpirls.bc.edu/publications/pirls/2016-methods.html). In Australia, while a full translation was not necessary, adaptation of the materials from American English to Australian English was required and was undertaken in accordance with the PIRLS translation-verification process. The assessment materials, along with all questionnaires, manuals and documentation, were adapted to suit local linguistic usages and educational circumstances.

Appendix B

TABLE B.1 Mean scores for Year 4 reading achievement, 2011–2016 by country

	2016		2011	
Country	**Mean**	**SE**	**Mean**	**SE**
Australia	544	2.5	527	2.3
Austria	541	2.4	529	1.9
Azerbaijan	470	4.4	462	3.3
Belgium (Flemish)	525	1.9	~	~
Belgium (French)	497	2.6	506	2.9
Bulgaria	552	4.2	532	4.1
Canada	543	1.8	548	1.6
Chinese Taipei	559	2.0	553	1.8
Czech Republic	543	2.1	545	2.2
Denmark	547	2.1	554	1.7
England	559	1.9	552	2.6
Finland	566	1.8	568	1.8
France	511	2.2	520	2.7
Georgia	488	2.8	488	3.1
Germany	537	3.2	541	2.3
Hong Kong SAR	569	2.7	571	2.3
Hungary	554	2.9	539	2.8
Iran, Islamic Rep. of	428	4.0	457	2.9
Ireland	567	2.5	552	2.3
Israel	530	2.5	541	2.7
Italy	548	2.2	541	2.2
Latvia	558	1.7	~	~
Lithuania	550	2.8	528	2.0
Malta	452	1.8	457	1.4
Morocco	358	3.9	310	3.9

Netherlands	545	1.7	546	2.0
New Zealand	523	2.2	531	1.9
Northern Ireland	565	2.2	558	2.3
Norway (4)	517	2.0	507	2.0
Oman	418	3.3	391	2.8
Portugal	528	2.3	541	2.5
Qatar	442	1.8	425	3.6
Russian Federation	581	2.2	568	2.7
Saudi Arabia	430	4.2	430	4.3
Singapore	576	3.2	567	3.3
Slovak Republic	535	3.1	535	2.7
Slovenia	542	2.0	530	2.0
South Africa	320	4.4	323	4.3
Spain	528	1.7	513	2.3
Sweden	555	2.4	542	2.1
Trinidad and Tobago	479	3.3	471	3.8
United Arab Emirates	450	3.2	439	2.2
United States	549	3.1	556	1.6

~ Did not participate in 2011 cycle

TABLE B.2 Mean scores for Year 4 reading achievement, 2011–2016 by Australian jurisdiction

	2016		2011	
Jurisdiction	**Mean**	**SE**	**Mean**	**SE**
ACT	552	5.2	558	5.5
NSW	542	5.4	535	5.0
VIC	560	4.2	539	4.2
QLD	537	5.4	511	5.1
SA	527	5.6	518	4.4
WA	544	6.0	516	4.6
TAS	537	8.0	525	7.3
NT	527	13.5	509	9.9

Table B.3 presents the odds ratios associated with certain demographic characteristics (or attributes) and a student performing below the Low benchmark in PIRLS 2016 (i.e. being a poorer reader).

The odds ratio, is a measure of relative risk telling us how much more likely it is that someone who has a certain attribute will have a certain outcome (in this case, being a poor reader) as compared to someone who does not have that attribute.[1] In this way, the odds ratio is also a measure of effect size, as it describes the strength of association between the attribute and the outcome. The predicted probability is calculated as probability = odds /(1+odds).

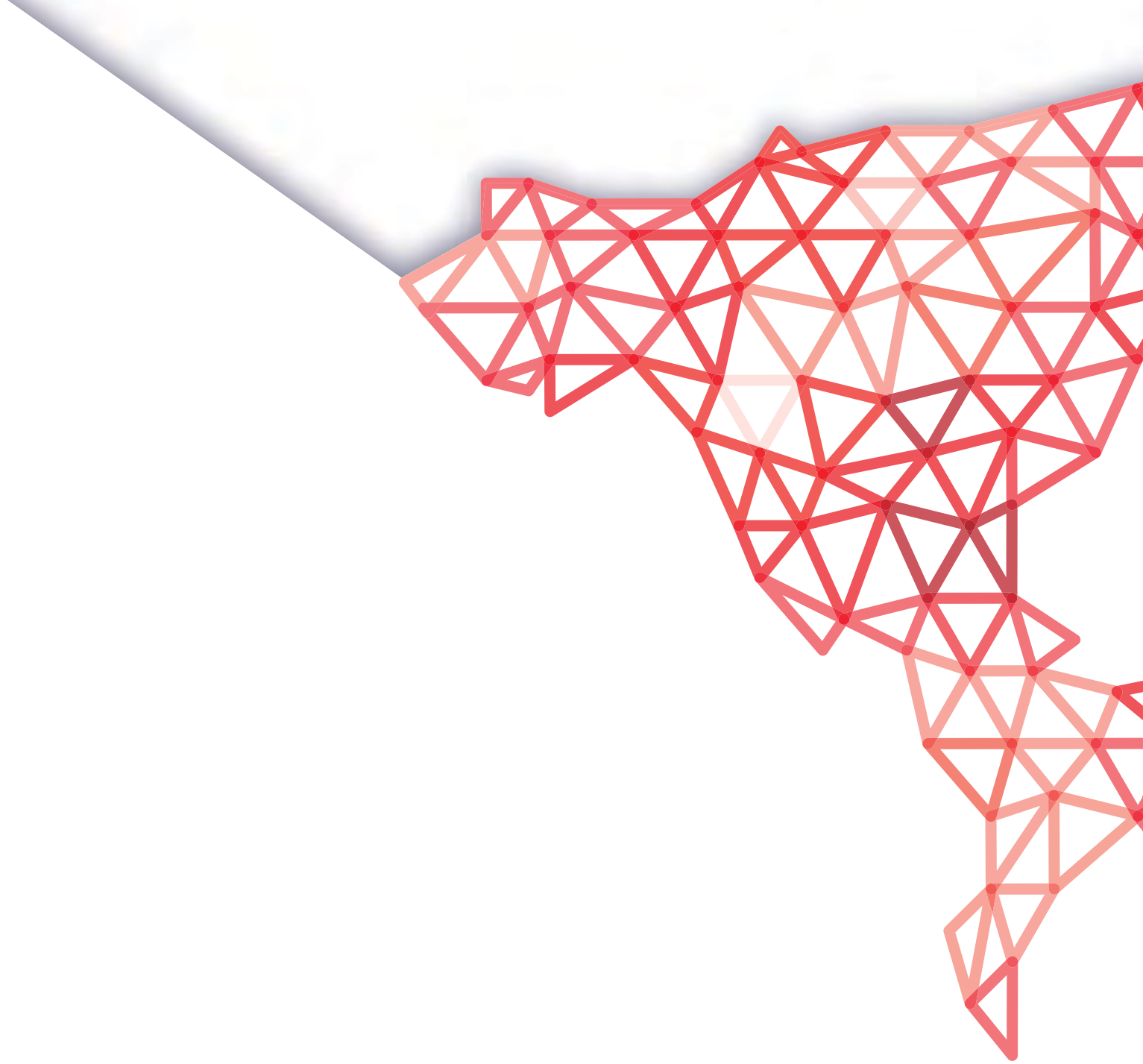
If the value of the odds ratio is greater than 1 and statistically significant, the chance of a student with that attribute being a poor reader is more likely than them not being a poor reader. If the odds ratio is less than 1 and statistically significant, then they are less likely to be a poor reader, particularly as the odds ratio gets closer to zero. If the odds ratio is exactly 1 or non-significant, then there is no association between the attribute and being a poor reader.

1 This is calculated by dividing the odds of an *event* (e.g., having a demographic characteristic and being in the poor readers group) by the odds of the *control event* (e.g., not having the demographic characteristic and being in the poor readers group).

TABLE B.3 Demographic characteristics associated with being a poorer reader for Australian students in PIRLS 2016

EqVar	Beta	Standard error	Wald statistic	P value	Odds ratio
CONSTANT	-4.38	0.19	536.94	0.000	0.01
Reporting a *few books* at home	1.19	0.15	63.82	0.000	3.29
Attending a *more disadvantaged* school	0.88	0.19	21.90	0.000	2.40
Having an Indigenous background	1.36	0.20	48.22	0.000	3.89
Speaking a language other than English at home	0.32	0.17	3.61	0.057	1.37
Being male	0.67	0.16	16.70	0.000	1.95
Attending a remote school	0.96	0.47	4.13	0.042	2.61

The associations between the attributes and being a poor reader (scoring below the Low benchmark) that are summarised by the odds ratios in the table above are net of any other associations, that is, they are the association between that attribute and being a poor reader while all other associations are held constant. For example, the association between being male and being a poor reader has a *B* value of 0.67 and an odds ratio of 1.95, regardless of their Indigenous status or where their school is located.



Australian Council *for* Educational Research