
Focus on Low SES Students' Achievement in Reading Literacy

Results from PISA 2000



OVERVIEW

Students come from many different social backgrounds, and their family circumstances can have a bearing on educational outcomes. Socio-economic status (SES) can influence students' occupational aspirations and expectations and, in turn, their commitment to learning. Students from higher socio-economic backgrounds will likely have greater access to resources, greater awareness of options and higher parental expectations for academic success.

Yet, results from the Programme for International Students Assessment (PISA) show that, while low SES students may not share these advantages, not all perform poorly and some achieve to a high level. After reviewing educational outcomes for low SES 15-year-olds from the PISA 2000 study, the current report focuses on reading literacy and the factors associated with high achievement among low SES students. By highlighting the differences between high and low achievers within the low SES category, this report should assist in identifying some of the factors that may mitigate the effects of socio-economic disadvantage on educational achievement.

About the Programme for International Student Assessment

The first PISA survey was conducted in 2000 across 28 OECD countries including New Zealand. Its primary focus was reading literacy, with mathematical and scientific literacy assessed as minor domains. The study aims to provide reliable internationally comparable measures of educational achievement using a pencil-and-paper based assessment. In New Zealand, the language of assessment is English. As in other countries, New Zealand results are based on a representative sample of secondary school students aged from 15 years 3 months to 16 years 2 months. As most were aged 15 they are generally referred to as 15-year-olds for brevity.

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The term “literacy” is used to signify that PISA examines more than students’ mastery of the school curriculum. It focuses on how well young adults at age 15 are able to apply the knowledge and skills they have learned to meet the challenges they will face in life. This emphasis on what students can do with what they have learned, rather than simply on whether they have learned it, reflects recent trends in the goals and objectives of school curricula. Students’ knowledge is still assessed, but their ability to reflect on and apply that knowledge and experience to real life situations is also examined.

Age 15 is a crucial time to assess the outcomes of the education process. Students are reaching school-leaving age, and their current academic abilities represent the culmination of a decade of compulsory education. PISA provides a gauge of the cumulative impact of all the learning experiences in a country from early childhood up to age 15. Its findings reflect not only the effectiveness of schools, but the effects of all learning, which begins well before school age and continues in both formal and out-of-school settings.

In addition to the content-specific literacy measures, PISA collects data on general outcomes of learning such as the different strategies students use to learn. These have particular relevance in considering whether students are developing the capacity to continue learning throughout life. Part 1 of this report examines both the content-specific and general outcomes of learning for low SES students in PISA. PISA gathers further contextual information on student, family and school-related factors that can help explain differences in student achievement. Part 2 of this report is concerned with the relationships found between these factors and different levels of reading literacy among low SES students.

Parental Occupation and Socio-Economic Status

The socio-economic status of students in PISA is determined using the International Socio-Economic Index of Occupational Status (ISEI). This index rates occupations on a scale that reflects differences in earnings between occupation groups. The index captures the attributes of occupations that convert education into income, and was derived by the optimal scaling of occupation groups to maximise the indirect effect of education on income through occupation and to minimise the direct effect of education on income, net of occupation, e.g., higher pay for higher qualifications in the same job (both effects being net of age). The occupation groups are based on the International Standard Classification of Occupations (ISCO). For more information on the methodology see Ganzeboom *et al.* (1992).

In PISA, ISEI scores were assigned to students based on their responses to questions on parental occupation (including most recent occupation for those not working at the time). Each student’s score is based on either mother’s or father’s occupation, whichever is higher.

In this report, low SES students have been defined as the lowest quartile (25 percent) of students on the ISEI scale. The second, third and highest quartiles are defined as medium-low, medium-high and high SES respectively. In practice, the division of students into quartiles is only approximate because of the grouping of index scores around the boundaries between quartiles. In order for all students with the same ISEI rating to be assigned to the same SES category these boundaries had to be moved to the next highest, or next lowest index number. The resulting proportions in each SES category are as follows. (This section draws on Tables 1-3 and 9 in the Appendix.)

	(%)
High SES.....	25.3
Medium-High SES.....	22.2
Medium-Low SES.....	26.5
Low SES.....	22.1
Not Known.....	3.9
TOTAL.....	100.0

Comparing the parental occupations of low SES students with other SES categories at the major group level shows that parental occupations for low SES students are spread across a number of non-professional occupation groups and are most concentrated in the trades. By contrast, for high SES students parental occupations tend to be concentrated in the professions. The breakdowns, shown below, will not be representative of the entire work force of parents with children aged 15, as only the occupation of the parent in the highest SES category is included.

	High SES	Medium-High SES	Medium-Low SES	Low SES
	(%)	(%)	(%)	(%)
1 Legislators, senior officials & managers	22.5	15.0	37.7	-
2 Professionals	74.8	24.1	19.3	-
3 Technicians & associate professionals.....	2.7	35.9	14.1	5.9
4 Office clerks	-	24.9	13.4	3.9
5 Service workers & shop & market sales workers.....	-	0.2	15.0	18.4
6 Skilled agricultural & fishery workers.....	-	-	-	15.6
7 Craft & related trades workers	-	-	0.5	30.6
8 Plant & machine operators & assemblers.....	-	-	-	14.1
9 Elementary occupations [e.g., cleaners, labourers].....	-	-	-	11.5
TOTAL	100.0	100.0	100.0	100.0

In the low SES category there are approximately equal proportions of girls (51.7 percent) and boys (48.3 percent). The educational backgrounds of these students' mothers range from those who have completed education at the upper secondary (31.1 percent) or tertiary levels (19.3 percent), to those who have not completed upper secondary education (26.2 percent). Maternal education is not known for 23.4 percent. Māori and Pasifika students are over-represented in the low SES category, forming 27.2 and 11.7 percent of the group respectively (compared to 17.5 and 7.7 overall in the PISA sample, which is closely representative of the proportions of these students among 15-year-olds in the general school population). The majority of low SES students have parental occupations falling into 15 specific types of occupation, as follows.

	(%)
Dairy & livestock producers [e.g., farmers, shearers].....	10.6
Cooks.....	4.8
Heavy truck & lorry drivers.....	4.2
Teaching associate professionals [e.g., teacher aides].....	4.1
Waiters, waitresses & bartenders	4.0
Motor vehicle mechanics & fitters	3.8
Builders traditional materials.....	2.6
Carpenters & joiners	2.5
Helpers & cleaners in offices, hotels and other establishments	2.4
Building and related electricians	2.3
Institution-based personal care workers [e.g., nurse aides, rest home caregivers].....	2.2
Farm-hands & labourers	2.1
Plumbers & pipe fitters	2.0
Agricultural or industrial machinery mechanics & fitters	1.9
Gardeners, horticultural & nursery growers	1.9
SUBTOTAL	51.4

1. EDUCATIONAL OUTCOMES FOR LOW SES STUDENTS IN PISA 2000

PISA measures two types of educational outcome. This section looks first at achievement for low SES students in the content-specific domains of reading, mathematical and scientific literacy that provide students with knowledge and skills for life. It then examines the general outcomes of education that form the basis of lifelong learning. Achievement in the three literacy domains is viewed from several different perspectives that highlight different aspects of the overall picture. This section draws on Tables 4-8 in the Appendix.

Statistics from the PISA study are **estimates** of national performance based on a sample of students rather than values that could be calculated if every student had answered every question. Consequently there is a degree of uncertainty associated with each result, which is expressed in the Appendix tables through a standard error. Often attention focuses on whether a given value for a particular group is different from a second value for another group, e.g., whether low SES girls perform better than low SES boys, given the degree of uncertainty surrounding the results for each. In this report, the significance tests used to determine if the difference between two values is statistically significant meet $\alpha=0.05$ (i.e., the 5% level).

Socio-Economic Differences in Reading, Mathematical and Scientific Literacy

Reading, mathematical and scientific literacy are defined in Box 1. Across the three domains, a consistent pattern of differences is found in the average achievement levels of the SES categories in PISA. The average scale scores for New Zealand students in each category and the mean for OECD countries are shown below. Results are scaled in each literacy domain so that the OECD mean equals 500 points, with about two thirds of students across OECD countries scoring between 400 and 600 points. The resulting numerical scale scores cannot be compared directly among the three domains. **Bold** type indicates that the mean scale score is statistically significantly different from the score for low SES students in this domain ($\alpha=0.05$).

	High SES	Medium-High SES	Medium-Low SES	Low SES	OECD Countries
Reading Literacy.....	574	548	520	490	500
Mathematical Literacy.....	581	556	528	499	500
Scientific Literacy.....	574	546	517	490	500

Average achievement in the high, medium-high and medium-low SES categories is better than for low SES students and consistently above the OECD mean (the differences are statistically significant in all of the three domains) which, to the extent that it foreshadows the development of a highly skilled workforce, will likely give these groups a considerable economic and social advantage in later life.

For low SES students, achievement is comparable to the OECD mean in mathematical and scientific literacy, i.e., the difference is not statistically significant, but significantly lower than the OECD mean in reading literacy.

Gender differences in average reading literacy levels are found within all SES categories. Among low SES students, the average level of reading literacy is higher for girls than boys, but in mathematical and scientific literacy average achievement levels for girls and boys are not statistically different. The pattern is similar in other SES categories except the high SES category where girls also outperform boys in scientific literacy.

Box 1: Definitions of the Literacy Domains

Reading literacy is the ability to understand, use and reflect on written texts in order to achieve one's goals, to develop one's knowledge and potential, and to participate effectively in society.

Mathematical literacy is the capacity to identify, understand and engage in mathematics, and to make well founded judgements about the role mathematics plays in an individual's current and future private life, social life with peers and relatives, and life as a constructive, concerned and reflective citizen.

Scientific literacy is the capacity to use scientific knowledge, to identify questions, and to draw evidence-based conclusions in order to understand and help make decisions about the natural world and the changes made to it through human activity.

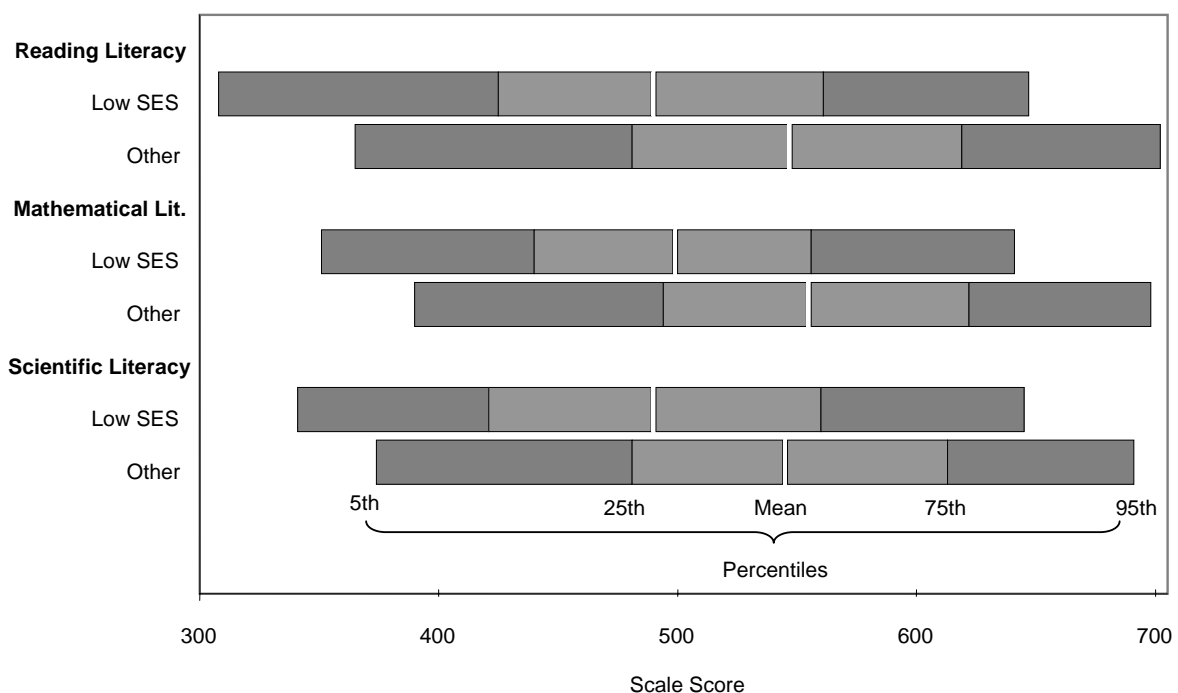
(OECD 2001: 21-23)

Distribution of Literacy among Low SES Students

Average scores are a useful way to summarise differences among different groups. To highlight the range of achievement within the low SES category, this subsection examines the distribution of results for low SES students in PISA. For purposes of comparison, similar distributions are shown for "Other" students, comprising all other SES categories.

In reading literacy, the whole distribution for low SES students is shifted to the left compared to the "Other" SES category, indicating generally lower achievement levels. However, a substantial proportion, approximately a quarter, perform above the mean for "Other" students. Similar patterns are seen in mathematical and scientific literacy. (Figure 1)

Figure 1: Distribution of Literacy among Low SES and Other Students, from the PISA 2000 Study



Results are scaled in each literacy domain so that the OECD mean equals 500 points, with about two thirds of students across OECD countries scoring between 400 and 600 points. The resulting numerical scale scores cannot be compared directly among the three domains.

A wide range of achievement is found among both low SES and other students in PISA. The results indicate that the difference in scale scores from the twenty-fifth to the seventy-fifth percentile, i.e., across the middle 50 percent of each subpopulation (some 116-139 score points depending on the domain), is twice as wide as the differences in average literacy levels between the two groups (approximately 55-57 score points). This suggests that disparities in achievement are greater within than between the low SES and other SES categories.

The larger proportion of low SES students at the lower end of the reading literacy scale is potentially a concern. For example, school leavers with lower literacy skills may have poorer prospects of employment. To understand how the distribution of scale scores translates into concrete competencies, the next subsection examines the proportion of low SES students who reach varying levels of proficiency in reading literacy.

Low SES Students' Achievement in Reading Literacy Proficiency Levels

The reading literacy scale in PISA comprises three subscales, each measuring a particular aspect of reading literacy. The subscales report on student abilities in:

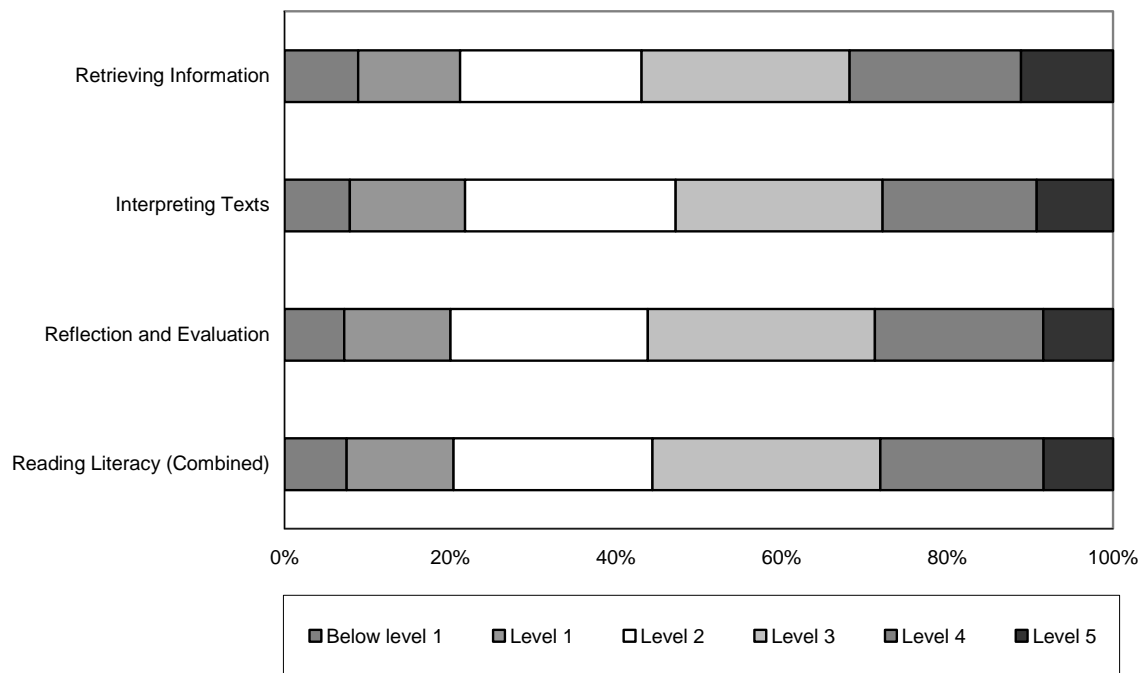
- retrieving information,
- interpreting texts,
- reflection and evaluation.

In each subscale, the assessment tasks are divided into five levels of difficulty. The extent to which students are capable of completing tasks at each level determines which of five proficiency levels they have reached. Level 1 indicates competency in the simplest tasks, and Level 5 competency in the most complex tasks.

Students at each level are able to answer at least half of the items at that level correctly, and have demonstrated proficiency at each of the lower levels. The subscales and the difficulty of tasks at each proficiency level are described in Box 2.

The results suggest that the proportions of low SES students at each proficiency level are quite similar across the three subscales. The overall (combined) reading literacy scale summarises the results from the three subscales. Approximately eight percent of low SES students reach Level 5 on the combined reading scale, and 28 percent are proficient at Level 4 or above. Fifty-two percent are in the mid range of achievement (Levels 2 and 3), while another 20 percent are at or below Level 1. (Figure 2)

Figure 2: Distribution of Low SES Students across Reading Literacy Proficiency Levels, from the PISA 2000 Study



The 8.4 percent of low SES students at Level 5 are capable of completing sophisticated reading tasks. Tasks at Level 4 are complex and difficult. Approximately 19.7 percent of low SES students are at this level.

At Level 1, students are competent in only the simplest tasks. Many of the 12.9 percent of low SES students at Level 1 may not be acquiring the necessary skills and knowledge to benefit fully from educational opportunities at school and in later life.

The 7.5 percent of low SES students below Level 1 are unable to complete at least half of the easiest questions in the PISA assessment correctly. It must be emphasised that reading literacy is defined at a level well above the most basic reading skills. The focus is on reading to learn. Those students below Level 1 may technically be able to read, but are severely limited in the skills required to fully utilise written texts and documents in the learning process.

These results show a huge gap between the top and bottom eight percent of low SES students. Those students below Level 1 will likely have serious difficulty using their reading literacy skills to gain knowledge and skills in other areas, increasing the risk that as school leavers they will lack qualifications and have difficulty finding work.

Box 2: What the Proficiency Levels Measure

Retrieving information	Interpreting texts	Reflection and evaluation
What is being assessed on each of the reading literacy scales:		
Retrieving information is defined as locating one or more pieces of information in a text.	Interpreting texts is defined as constructing meaning and drawing inferences from one or more parts of a text.	Reflecting and evaluation is defined as relating a text to one's experience, knowledge and ideas.
Characteristics of the tasks associated with increasing difficulty on each of the reading literacy scales:		
Task difficulty depends on the number of pieces of information that need to be located. Difficulty also depends on the number of conditions that must be met to locate the requested information, and on whether what is retrieved needs to be sequenced in a particular way. Difficulty also depends on the prominence of information, and the familiarity of the context. Other relevant characteristics are the complexity of the text, and the presence and strength of competing information.	Task difficulty depends on the type of interpretation required, with the easiest tasks requiring identifying the main idea in a text, more difficult tasks requiring understanding relationships that are part of the text, and the most difficult requiring either an understanding of the meaning of language in context, or analogical reasoning. Difficulty also depends on how explicitly the text provides the ideas or information the reader needs in order to complete the task; on how prominent the required information is; and on how much competing information is present. Finally, the length and complexity of the text and the familiarity of its content affect difficulty.	Task difficulty depends on the type of reflection required, with the easiest tasks requiring simple connections or explanations relating the text to external experience, and the more difficult requiring an hypothesis or evaluation. Difficulty also depends on the familiarity of the knowledge that must be drawn on from outside the text; on the complexity of the text; on the level of textual understanding demanded; and on how explicitly the reader is directed to relevant factors in both the task and the text.
Level		
5 Locate and possibly sequence or combine multiple pieces of deeply embedded information, some of which may be outside the main body of the text. Infer which information in the text is relevant to the task. Deal with highly plausible and/or extensive competing information.	Either construe the meaning of nuanced language or demonstrate a full and detailed understanding of a text.	Critically evaluate or hypothesise, drawing on specialised knowledge. Deal with concepts that are contrary to expectations and draw on a deep understanding of long or complex texts.
4 Locate and possibly sequence or combine multiple pieces of embedded information, each of which may need to meet multiple criteria, in a text with unfamiliar context or form. Infer which information in the text is relevant to the task.	Use a high level of text-based inference to understand and apply categories in an unfamiliar context, and to construe the meaning of a section of text by taking into account the text as a whole. Deal with ambiguities, ideas that are contrary to expectation and ideas that are negatively worded.	Use formal or public knowledge to hypothesise about or critically evaluate a text. Show accurate understanding of long or complex texts.
3 Locate, and in some cases recognise, the relationship between pieces of information, each of which may need to meet multiple criteria. Deal with prominent competing information.	Integrate several parts of a text in order to identify a main idea, understand a relationship or construe the meaning of a word or phrase. Compare, contrast or categorise taking many criteria into account. Deal with competing information.	Make connections or comparisons, give explanations, or evaluate a feature of text. Demonstrate a detailed understanding of the text in relation to familiar, everyday knowledge, or draw on less common knowledge.
2 Locate one or more pieces of information, each of which may be required to meet multiple criteria. Deal with competing information.	Identify the main idea in a text, understand relationships, form or apply simple categories, or construe meaning within a limited part of the text when the information is not prominent and low-level inferences are required.	Make a comparison or connections between the text and outside knowledge, or explain a feature of the text by drawing on personal experience and attitudes.
1 Take account of a single criterion to locate one or more independent pieces of explicitly stated information.	Recognise the main theme or author's purpose in a text about a familiar topic, when the required information in the text is prominent.	Make a simple connection between information in the text and common, everyday knowledge.

General Outcomes of Learning

Once they leave school, people have to manage most of their own learning. The ability to add to the knowledge and skills learned in reading, mathematics, science and other curriculum areas will be enhanced by a positive disposition toward learning and a grasp of the different ways to approach learning itself. An important goal of education is to foster these outcomes that prepare students to continue learning throughout life. In PISA they are referred to as general outcomes of learning, and are measured by constructing indices that summarise student responses to a series of related questions. As these measures rely on self-reporting by students they may be influenced by cross-cultural differences in response behaviour or the social desirability of certain responses.

Motivation and Engagement

On average, low SES students express less *interest in reading* than high and medium-high SES students.

The index of interest in reading is derived from students' level of agreement or disagreement with the following statements: because reading is fun, I wouldn't want to give it up; I read in my spare time; and, when I read, I sometimes get totally absorbed.

They also report lower *engagement in reading*...

The index of engagement in reading is derived from students' level of agreement or disagreement with the following statements: I read only if I have to; reading is one of my favourite hobbies; I like talking about books with other people; I find it hard to finish books; I feel happy if I receive a book as a present; for me reading is a waste of time; I enjoy going to a bookstore or a library; I read only to get information that I need; and, I cannot sit still and read for more than a few minutes.

... and participation in more limited recreational *reading activities*.

The index of reading activities is derived from students' indication of whether they 'never or hardly ever', 'a few times a year', 'about once a month', 'several times a month', or 'several times a week' read because they wanted to: magazines, comic books, fiction (novels, narratives, stories), non-fiction books, e-mails and web pages or newspapers.

Low SES students tend to report a similar level of *interest in mathematics* to other SES categories...

The index of interest in mathematics is derived from students' level of agreement or disagreement with the following statements: when I do mathematics, I sometimes get totally absorbed; mathematics is important to me personally; and because doing mathematics is fun, I wouldn't want to give it up.

... and a similar level of *engagement with school*.

The PISA index of engagement with school is derived from students' level of agreement or disagreement with the following statements prefaced with 'My school is a place where': I feel like an outsider (or left out of things); I make friends easily; I feel like I belong; I feel awkward and out of place; other students seem to like me; I feel lonely; I do not want to go; I often feel bored.

While it appears that interest in mathematics and engagement with school are not influenced by socio-economic status, the low average index scores for low SES students in respect to both interest and engagement in reading will affect the quality of learning and the ongoing level of engagement in this domain.

Learning Strategies

On average, low SES students report lower use of *control strategies* than other SES categories.

The PISA index of control strategies is derived from the frequency with which students used the following strategies when studying: I start by figuring out what exactly I need to learn; I force myself to check to see if I remember what I have learned; I try to figure out which concepts I still haven't really understood; I make sure that I remember the most important things; and, when I study and I don't understand something, I look for additional information to clarify this.

They generally report lower use of *memorisation strategies* than high SES students...

The index of memorisation strategies is derived from the frequency with which students used the following strategies when studying: I try to memorise everything that might be covered; I memorise as much as possible; I memorise all new material so that I can recite it; and practise by saying the material to myself over and over.

...and the same is true for *elaboration strategies*.

The index of elaboration strategies is derived from the frequency with which students used the following strategies when studying: I try to relate new material to things I have learned in other subjects; I figure out how the information might be useful in the real world; I try to understand the material better by relating it to things I already know; and, I figure out how the material fits in with what I have already learned.

Low SES students express greater strength in *co-operative learning* situations than high SES students...

The index co-operative learning is derived from students' level of agreement or disagreement with the following statements: I like to work with other students; I learn the most when I work with other students; I do my best work when I work with other students; I like to help other people do well in a group; and, it is helpful to put together everyone's ideas when working on a project.

but are lower on the *competitive learning* index than both high and medium-high SES students.

This index is derived from the students' level of agreement or disagreement with the following statements: I like to try to be better than other students; trying to be better than others makes me work well; I would like to be the best at something; and, I learn things faster if I'm trying to do better than the others.

Low SES students report less average *time spent on homework* than all other SES categories.

Students' investment in homework is summarised in an index of time spent on homework that combines the weekly time students spent on homework for language (i.e., English for New Zealand), science and mathematics classes.

Low average index scores for the use of control strategies and time spent on homework may indicate that low SES students are not acquiring sufficient skills to manage their own learning process and workload to the same extent as other SES categories. Note that both co-operating with others and competing against others can be appropriate and effective learning styles in different situations.

Student Self-Concepts

On average, low SES students report a lower *self-concept in reading* than high SES students...

The PISA index of self-concept in reading is derived from students' level of agreement or disagreement with the following statements: I'm hopeless in English classes; I learn things quickly in English class; and, I get good marks in English.

...and a lower *self-concept in mathematics* than all other SES categories.

The index of self-concept in mathematics is derived from students' level of agreement or disagreement with the following statements: I get good marks in mathematics; mathematics is one of my best subjects; and, I have always done well in mathematics.

They tend to express a lower self-concept in overall academic ability than high SES students...

The index of self-concept in academic ability is derived from students' level of agreement or disagreement with the following statements: I learn things quickly in most school subjects; I'm good at most school subjects; and, I do well in tests in most school subjects.

...and lower comfort with and perceived ability to use computers than all other SES categories.

The index of comfort with and perceived ability to use computers is derived from students' responses to the following questions: How comfortable are you with using a computer?; How comfortable are you with using a computer to write a paper?; How comfortable are you with taking a test on a computer?; and, If you compare yourself with other 15-year-olds, how would you rate your ability to use a computer?

The general outcomes examined here are important in providing students with a foundation for lifelong learning, but are they also linked to success at school? Among low SES students, several of the indices are related to higher attainment in reading literacy, as will be seen in Part 2.

2. FACTORS ASSOCIATED WITH LOW SES STUDENTS' ACHIEVEMENT IN READING LITERACY

Socio-economic status based on parental occupational status is a powerful predictor of student proficiency at age 15 in each of the PISA literacy domains. In all countries examined, students with higher family socio-economic status tended to have higher achievement than students with lower socio-economic status. In this country the gap is relatively large. In each domain, approximately one proficiency level separates average achievement for high and low SES students. However, the results also show that not all students from low socio-economic backgrounds perform poorly. This section investigates the relationships between achievement levels in reading literacy and a range of student, family and school-related factors that may be associated with these differences in performance.

The analysis focuses on reading literacy for two main reasons. First, because it was the major domain assessed in PISA 2000, the study provides more information about reading literacy than the other domains. This includes information on students' reading proficiency levels that are used here to define high and low achievers. Second, there are also more student responses to the reading literacy assessment, allowing more detailed analysis to be undertaken.

The reading proficiency levels allow us to define high achievers in absolute terms, based on what they can do. For the purposes of this report, students reaching Level 4 and above are considered high achievers. Tasks at Levels 4 and 5 are complex and difficult, as described in the previous section. (See Box 2 for further details.) Approximately 28 percent of low SES students reach Level 4 or above, and are considered high achievers.

Another consideration in defining high achievers at this level, rather than at Level 5 which includes eight percent of low SES students, is that the larger sample size facilitates more detailed analysis. Where comparisons are made with medium and low achievers, these are defined as students at Levels 2 and 3 (medium achievers) and those at or below Level 1 (low achievers).

Caution is advised in the interpretation of causality in the following results. While the analysis seeks to identify factors associated with high achievement, such statistical relationships do not in themselves establish a causal link. Nor is a particular direction of causation necessarily implied. For instance, interest in reading and performance may be mutually reinforcing.

This section draws on Tables 9-13 in the Appendix. The differences described in the text and shown in the charts between demographic subgroups, and between high and low achievers, should be read as statistically significant unless otherwise indicated. This can be confirmed by referring to the Appendix tables, which include significance tests for these comparisons.

Demographic Characteristics

Across all of the low SES students in PISA approximately 28 percent are defined as high achievers, 52 percent as medium achievers and 20 percent as low achievers. When the results are examined for specific groups, such as girls and boys, this distribution of students across achievement levels can vary considerably indicating that in some demographic subgroups low SES students are more likely to be high achievers than in others.

Gender

Among the low SES students in PISA, girls are more likely to be high achievers than boys. The results show that 36 percent of low SES girls are high achievers, compared to 20 percent of low SES boys. Low SES girls are

also less likely to be low achievers (13 percent) than their male counterparts (29 percent). This pattern of girls outperforming boys in reading literacy reflects the general trend for all countries in PISA.

Ethnic Identification

Low SES Pakeha students are more likely to be high achievers than low SES Māori students. PISA found that 38 percent of Pakeha students from low SES backgrounds are high achievers compared to 20 percent of low SES Māori students. Low SES Pakeha students are also less likely to be low achievers (14 percent) than their Māori counterparts (28 percent).

The students sampled in PISA can identify with more than one ethnic group. Statistics New Zealand's 1996 hierarchy is applied to assign students to only one ethnic group. Using this hierarchy, ethnicity is prioritised in the following order: Māori, Pasifika, Asian, Other and Pakeha, e.g., if a person identifies as both Māori and Pasifika then they are counted as Māori. Due to the constraints of sample size, similar comparisons are not available for low SES students in the Pasifika, Asian or "Other" ethnic group.

Family Type

PISA did not find evidence of a statistically significant difference in the percentage of low SES students who are high achievers whether, at age 15, they come from single-parent or nuclear families. While the proportions from each family type are 24 and 32 percent respectively, the difference between them is not large enough to be statistically significant. However, the results show that those from nuclear families are less likely to be low achievers (17 percent) than those from single-parent families (26 percent), and that this difference is statistically significant.

In PISA, single-parent families are defined as including only one parent or other guardian (e.g., a step-parent or foster parent). Nuclear families include both of the student's parents. A third category includes "Other" family arrangements such as living with one parent and another guardian (e.g., a step-parent), living with two other guardians (e.g., foster parents) or living with other family members (e.g., grandparents). Due to the constraints of sample size, comparable estimates are not available for the "Other" family type.

Mother's Education

PISA results do not show evidence of a statistically significant difference in the percentage of low SES 15-year-olds who are high achievers whether their mothers have completed upper secondary education, tertiary education, or neither. Between 27 and 36 percent of students were found to be high achievers in each category. Similarly, no statistical relationship was found between maternal education and low achievers among low SES students in PISA. However, the results do show that low SES students whose mothers had not completed upper secondary education were more likely to be medium achievers (57 percent) than those whose mothers had completed tertiary education (43 percent).

Number of Siblings

Low SES students with fewer than three siblings are more likely to be high achievers than those with three or more siblings. PISA found that 33 percent of low SES students with fewer than three brothers and sisters are high achievers, compared to 23 percent of those from larger families.

School Decile

Low SES students at high decile schools are more likely to be high achievers than those at medium decile schools, who are, in turn, more likely to be high achievers than those at low decile schools. PISA found that 40 percent of low SES students at decile 8-10 schools are high achievers compared to 29 percent at decile 4-7 schools and 18 percent at decile 1-3 schools. Furthermore, low SES students at medium decile schools are less likely to be low achievers (19 percent) than those at low decile schools (29 percent). Comparative figures for high decile schools are not available due to the limitations of sample size.

A school's decile indicates the extent to which the school draws its students from low socio-economic communities. Decile 1 schools are the 10 percent of schools with the highest proportion of students from low socio-economic communities, whereas decile 10 schools are the 10 percent of schools with the lowest proportion of these students.

The measure of socio-economic status used in the decile rating differs from that used in PISA. PISA measures the socio-economic background of students based on the information they provide about parents occupations. By contrast, the decile ranking applies to schools, and takes into account census information on household income, occupation, household crowding, educational qualifications and income support for households with school-aged children in the areas where the school's students live, as well as school ethnicity data on the percentage of Māori and Pasifika students and students who are refugees at a school.

School Gender

Low SES students at single sex schools are more likely to be high achievers than those at co-educational institutions. PISA found that 35 percent of low SES students at single sex schools are high achievers compared to 26 percent of those at co-ed schools. Among low SES students the percentage of high achievers is particularly high at girls' schools (42 percent) but the percentage at boys schools (26 percent) was not significantly different from that at co-ed schools.

School Locality

PISA found no statistical difference in the likelihood that low SES students would be high achievers whether they attend school in main and secondary urban areas or in minor urban and rural areas. The results indicate that 28 percent of low SES students are high achievers at schools in main and secondary urban areas, compared to 29 percent of those enrolled in minor urban and rural areas. Similarly, no statistical difference was found in the likelihood that low SES students enrolled in these area types would be low achievers.

Area types are defined according to Statistics New Zealand's classification of urban and rural areas. Main urban areas are the largest centres with a population of 30,000 or more. Secondary urban areas have a population between 10,000 and 29,999 and are centred on the largest regional centres. Minor urban areas are settlements with a population between 1,000 and 9,999 centred on smaller towns. Rural areas comprise the remaining areas including townships with a population of less than 1,000.

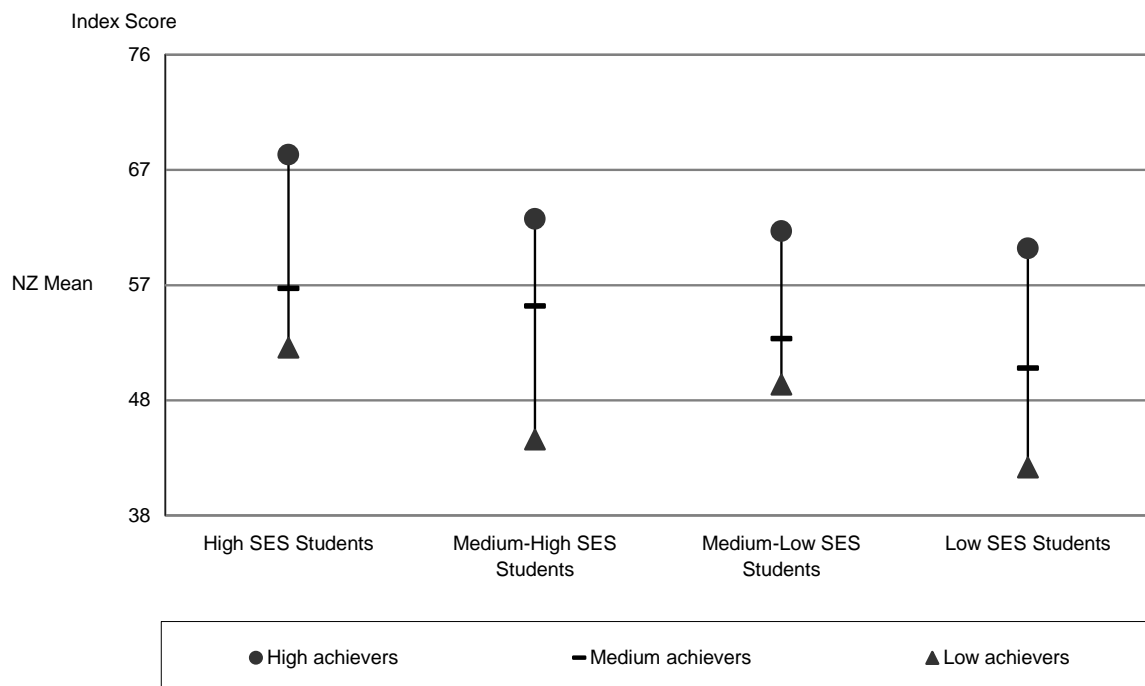
Occupational Expectations

In addition to recording parental occupations, the PISA survey also asked students what kind of job they expected to have at age 30. Approximately four out of five students were able to provide a response that could be classified according to the ISCO-based system used in PISA. This response rate was fairly consistent across all SES categories. The occupational expectations of these students were then given an equivalent ISEI score.

The results, shown in Figure 3, give an indication of the different tendencies in the occupational expectations of high, medium and low achieving students in each SES category.

The ISEI index has values ranging from 0 to 90. Low values represent low socio-economic status and high values represent high socio-economic status. The average occupational expectation for low SES students on the ISEI scale (52) is lower than for students in the other SES categories (see Appendix Table 10). Figure 3 shows that high achievers tend to have higher occupational expectations than low achievers in all SES categories. Among low SES students, the difference between high and low achievers in future expectations of occupational status is 18 points on the ISEI scale, or approximately one standard deviation for New Zealand students.

Figure 3: Average Scores for Students' Expected Occupations at Age 30 on the International Socio-Economic Index of Occupational Status, from the PISA 2000 Study



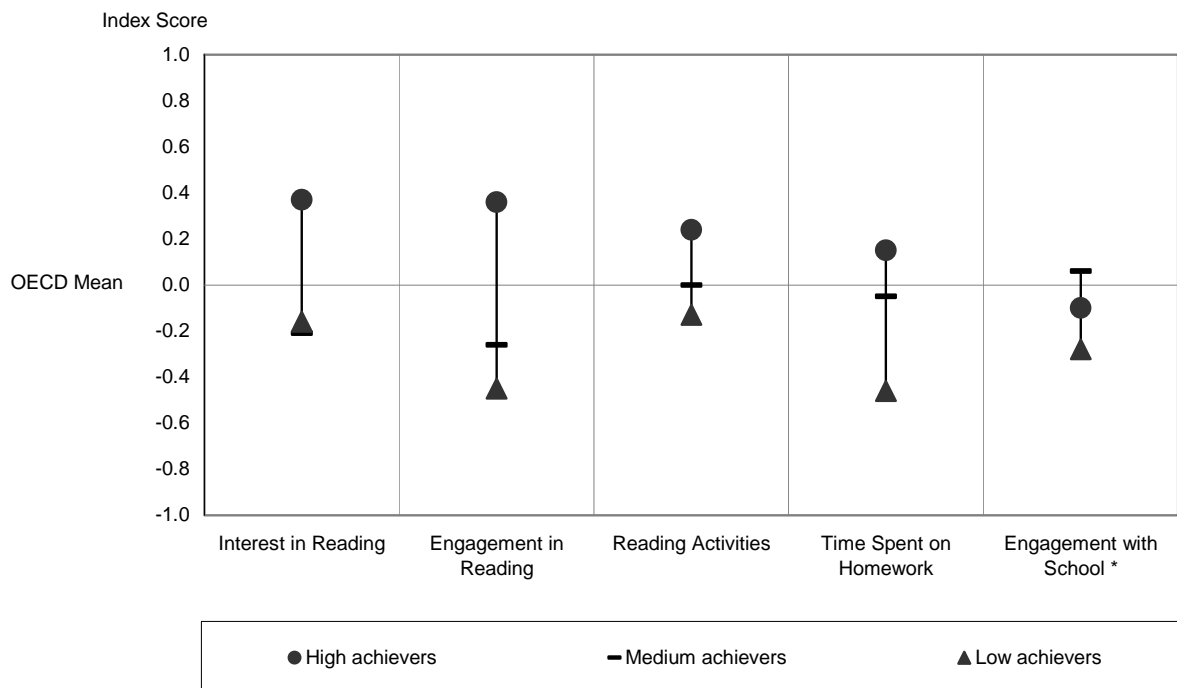
Of those low SES students (based on parental occupation) who effectively responded to the question, approximately 59 percent of low achievers expect to be in low SES occupations themselves at age 30, while 83 percent of high achievers expect to be in a higher SES occupational category.

Student Motivation and Engagement

Figure 4 presents the mean index scores for low SES students who are high, medium and low achievers in PISA on indices relating to motivation and engagement in learning. These indices (and those presented in Figures 5 and 6) are described above under General Outcomes of Learning.

The indices presented in this and subsequent charts are constructed so that the mean for OECD countries equals zero, and the scores for two thirds of students across the OECD fall between the values of 1 and -1. A negative value on an index does not necessarily mean that students responded negatively to the underlying questions; it simply indicates that they are less positive than all students on average across the OECD. Numerical index scores cannot be compared directly among indices.

Figure 4: Low SES Students' Average Index Scores for Motivation and Engagement in Learning, from the PISA 2000 Study



* The difference between high and low achievers is not statistically significant.

On the three reading-related measures, the mean index scores for high achievers are generally high relative to the OECD mean. The difference between high and low achievers is particularly large in respect to both interest and engagement in reading (more than half a standard deviation) and also statistically significant for reading activities. The results for engagement in reading and reading activities suggest a linear relationship, i.e., as engagement increases so too does performance, whereas for interest in reading high achievers tend to report greater interest than medium and low achievers, who both tend to express a relative lack of interest in reading.

The difference between high and low achievers in time spent on homework is also sizeable (more than half a standard deviation). High achievers report spending on average significantly more time on homework, while low achievers report spending significantly less time on homework, than the OECD mean.

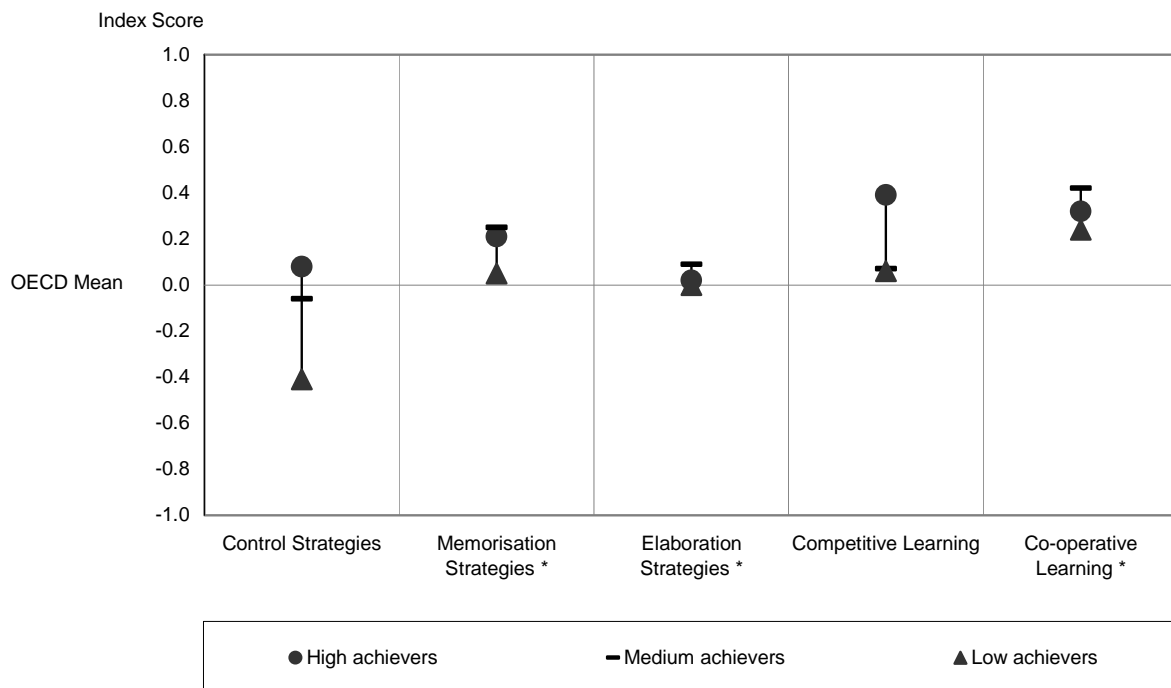
The difference between high and low achievers in average levels of engagement with school is not statistically significant, suggesting that this is not a key factor associated with reading literacy performance for these students.

Use of Learning Strategies

In PISA, the difference between low SES students who are high and low achievers in the reported use of control strategies is large (nearly half a standard deviation) suggesting a strong link between students' ability to manage the learning process and achievement in reading literacy. This is not so much because high achievers score highly on this index (their mean score is not significantly higher than the OECD mean) but rather because low achievers score on average well below the OECD mean.

By contrast, the difference between high and low achievers in the use of both memorisation and elaboration strategies is not statistically significant. (Figure 5)

Figure 5: Low SES Students' Average Index Scores for Use of Learning Strategies, from the PISA 2000 Study



* The difference between high and low achievers is not statistically significant.

Relative to the OECD mean, high achievers tend to report strength in both competitive and co-operative learning styles. In relation to competitive learning, the difference between high and low achievers is substantial and high achievers tend to report greater strength than both medium and low achievers whose mean index scores are close to the OECD mean. In relation to co-operative learning the difference between high and low achievers is not statistically significant, suggesting this is not a key area for improvement among low achieving students from low SES backgrounds.

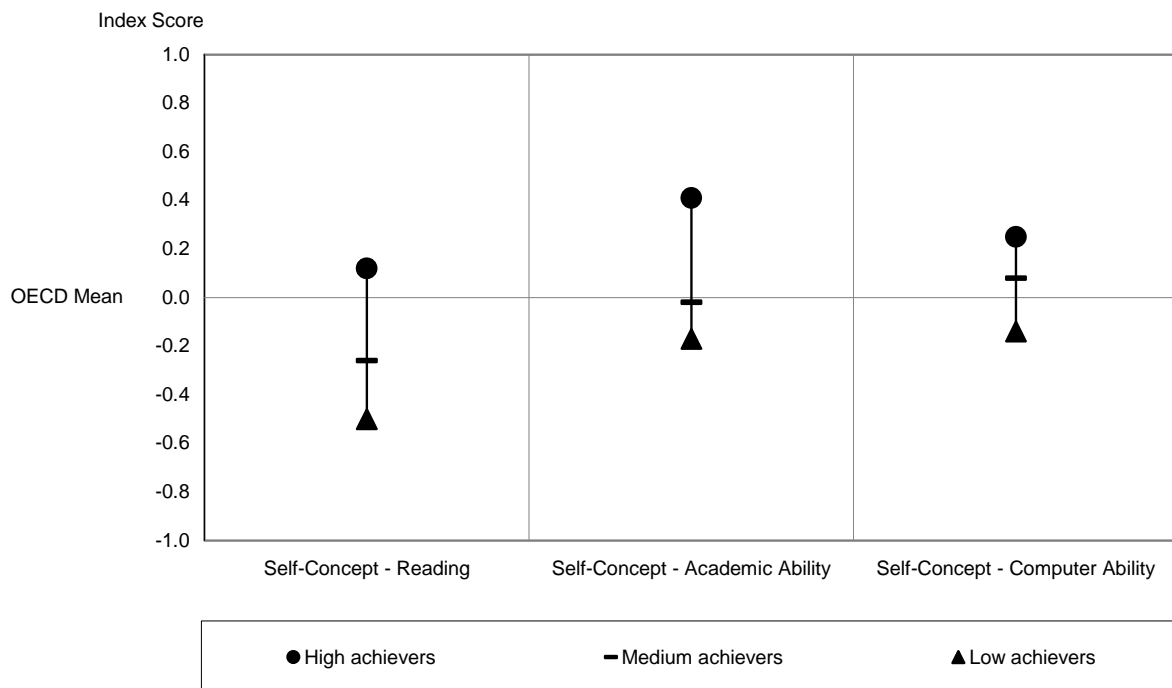
Student Self-Concepts

Figure 6 shows mean index scores from PISA on indices of students' reported self-concepts in reading, general academic ability, and comfort with and perceived ability to use computers. All of these measures indicate that low SES high achievers tend to be generally much more confident in their own abilities than low achievers.

This is perhaps least surprising in relation to reading, as high achievers have been defined in terms of their reading proficiency. However, the results show that such students are also on average more confident in their general academic ability, and in their ability to use computers.

On the index of self-concept in reading, low achievers score significantly below the OECD mean, while on the other two indices high achievers score significantly above the OECD mean.

Figure 6: Low SES Students' Average Index Scores for Student Self-Concepts, from the PISA 2000 Study



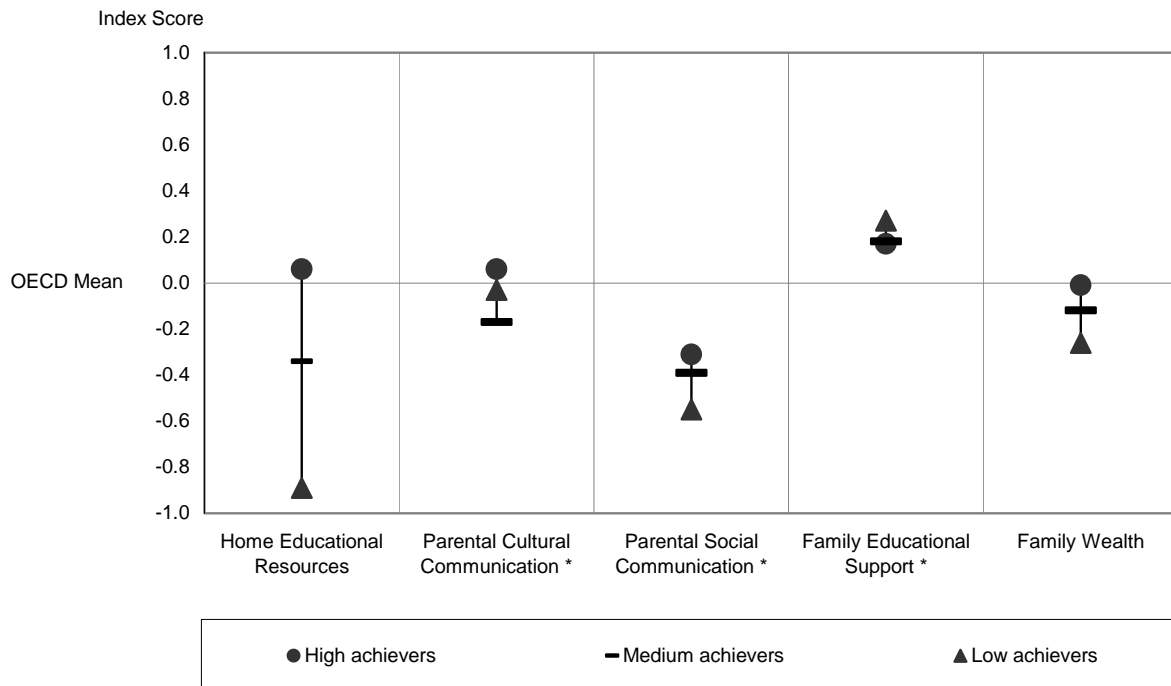
Family Background

The largest difference between low SES high and low achievers in PISA on the family background factors examined is in the availability of educational resources in the home. The index of *home educational resources* is derived from students' reports on the availability in their home of a dictionary, a quiet place to study, a desk for study, textbooks and the number of calculators.

Among high achievers, 99 percent report having a dictionary in the home compared to 87 percent of low achievers, 88 percent have a quiet place to study compared to 74 percent of low achievers, 91 percent have text books compared to 69 percent of low achievers, 86 percent have a desk for study compared to 71 percent of low achievers, and 77 percent have more than 3 calculators compared to 51 percent of low achievers.

The mean score for high achievers is close to the OECD mean on the index of home educational resources, and nearly one standard deviation higher than the average for low achievers. The mean for medium achievers is in an intermediate position suggesting a strong linear relationship between achievement in reading literacy and home educational resources. (Figure 7)

Figure 7: Low SES Students' Average Index Scores for Family Background Factors, from the PISA 2000 Study



* The difference between high and low achievers is not statistically significant.

Low SES high achievers did not tend to report more frequent communication with parents on social and cultural topics than low achievers. To assess parental interaction, students were asked about the frequency of communication and interaction with their parent(s) or guardian(s). From their responses two indices were derived. The first is an index of *cultural communication* based on responses to questions about: discussing social and political issues; discussing books, films or television programs; and listening to music together. The second is an index of *social communication* based on responses to questions about: discussing how well the student was doing at school; eating the main meal together and spending time just talking.

On both measures there is no significant difference in the mean scores for low SES high and low achievers. Both high and low achievers scored close to the OECD mean on the index of cultural communication, and below the OECD mean on the index of social communication.

Mean scores for high and low achievers are not statistically different on the index of *family educational support*. This measures the extent to which immediate family members (mothers, fathers and siblings) help students with their schoolwork. Both groups tend to receive a high level of support compared to the OECD mean. Internationally, family educational support is negatively associated with achievement in nearly all countries in PISA, indicating that students with lower academic achievement, and therefore perhaps a greater need of assistance, tend to receive more help from family members than students with higher achievement.

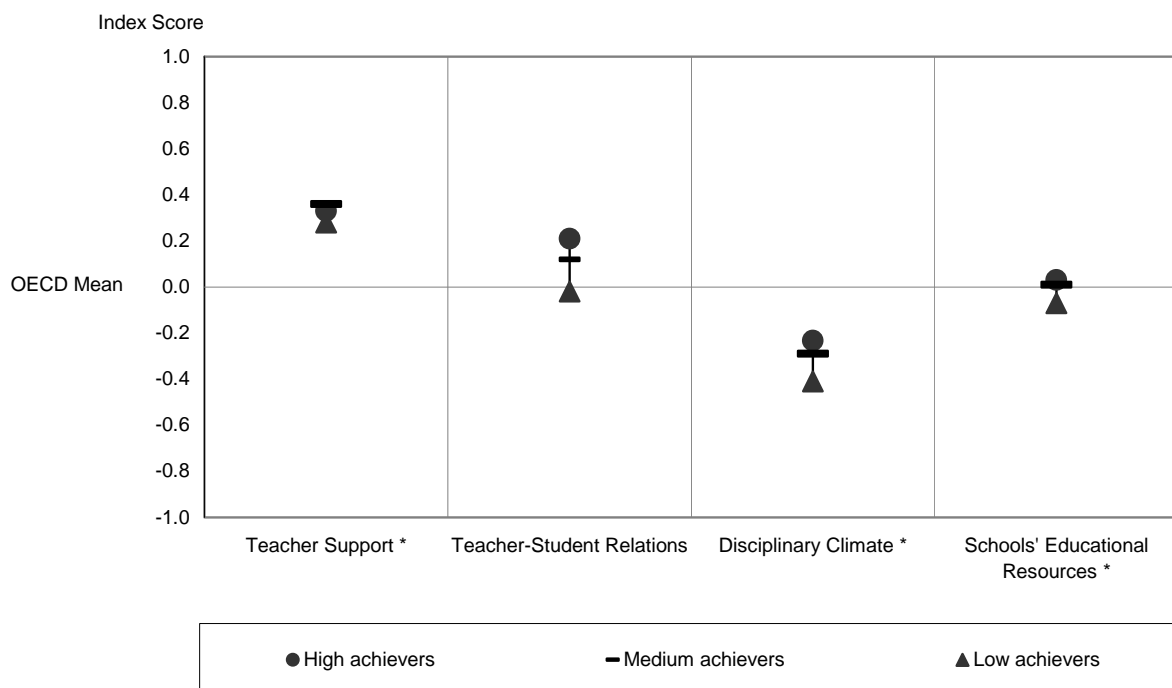
High achievers tend to come from more affluent families than low achievers. The index of *family wealth* is derived from students' reports on: i) the availability, in their home, of a dishwasher, a room of their own, educational software, and a link to the Internet; and ii) the number of cellular phones, television sets, computers, motor cars and bathrooms at home. The mean score for high achievers is close to the OECD mean, and significantly higher than that for low achievers.

Within the low SES category, two of the demographic characteristics examined above may help explain how high and low achievers of similar SES, based on highest parental occupation, can have different levels of the assets specified in the PISA index of family wealth available in the home. Family type and number of siblings are related to student achievement as well as family wealth. Students from nuclear families are less likely to be low achievers, and tend to report greater family wealth than those from single-parent families. This seems likely to reflect greater earnings potential where there are two adults in the family. Students from smaller families (0-2 siblings) are more likely to be high achievers, and tend to report greater family wealth than those from larger families (3 or more siblings). This may reflect the greater potential for families with fewer children to meet basic living costs and have a surplus for additional consumption.

In the Classroom

In PISA, low SES high achievers tend to report a similar level of *teacher support* in the classroom as low SES low achievers. To provide an indicator of this aspect of the classroom practice, PISA derived an index from students' reports on the frequency with which, in English lessons: the teacher shows an interest in every student's learning; the teacher gives students an opportunity to express opinions; the teacher helps students with their work; the teacher continues teaching until the students understand; the teacher does a lot to help students; and, the teacher helps students with their learning. (In non-English speaking countries students are asked about classes in their own language of assessment.) The mean score for high achievers is high compared to the OECD mean. (Figure 8)

Figure 8: Low SES Students' Average Index Scores for Classroom Factors, from the PISA 2000 Study



* The difference between high and low achievers is not statistically significant.

Low SES high achievers tend to report better *teacher-student relations* than low achievers do. This index is derived from students' reports on their level of agreement or disagreement with the following statements: students get along well with most teachers; most teachers are interested in students' well-being; most of my

teachers really listen to what I have to say; if I need extra help, I will receive it from my teachers; and most of my teachers treat me fairly. The mean score for high achievers is above the OECD mean.

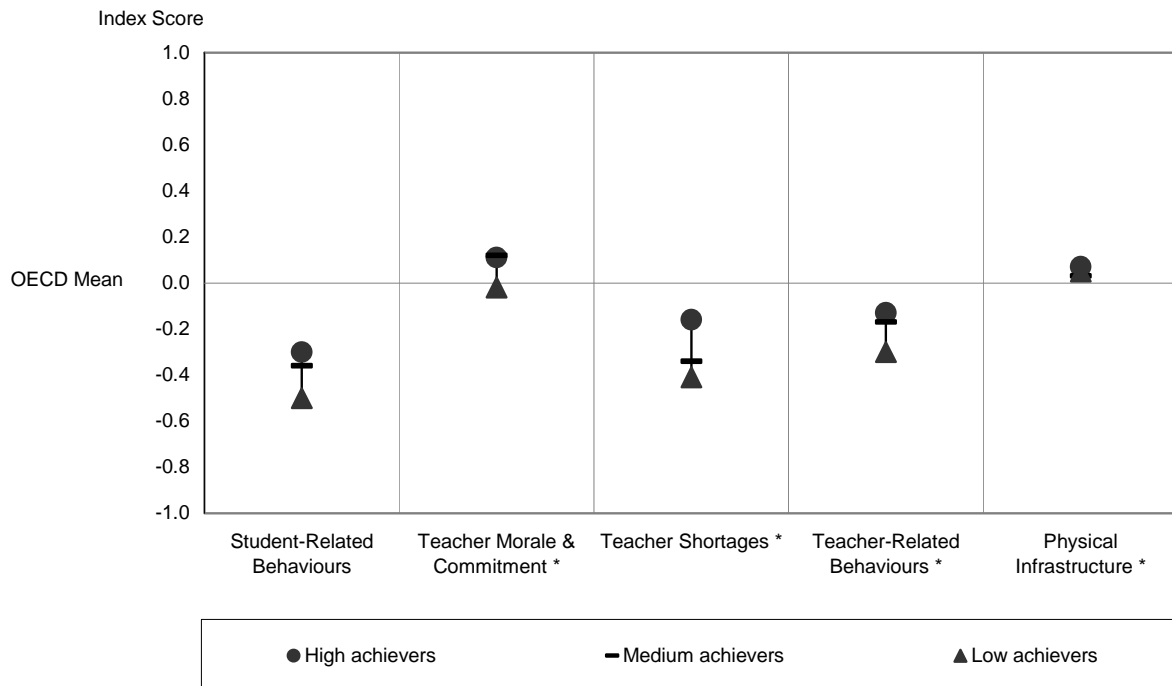
On average, low SES high achievers report a similar *disciplinary climate* in their English classes as low SES low achievers. This index summarises students' reports on the frequency with which, in their English class: the teacher has to wait a long time for students to quiet down; students cannot work well; students don't listen to what the teacher says; students don't start working for a long time after the lesson begins; there is noise and disorder; and, at the start of class, more than five minutes are spent doing nothing. (The index is inverted so that lower values tend to indicate a poorer disciplinary climate. In non-English speaking countries students are asked about classes in their own language of assessment.) The mean score for high achievers is below the OECD mean.

On average, high and low achievers in the low SES category differ little in the *quality of schools' educational resources* reported by principals at their schools. This index is an indicator of the quality of educational resources at each student's school, derived from principals' reports of the extent to which learning by 15-year-olds is hindered by: not enough computers for instruction; lack of instructional materials in the library; lack of multi-media resources for instruction; inadequate science laboratory equipment; and inadequate facilities for the fine arts. (The index is inverted so that lower values tend to indicate greater hindrance.) The mean index score for high achievers is close to the OECD mean and not significantly different from the average for low achievers.

Wider School Issues

Compared to low SES low achievers, the low SES high achievers in PISA tend to come from schools where principals report problematic *student-related behaviours* as being less of a hindrance to learning. The index of student-related factors affecting school climate summarises principals' reports of the extent to which learning by 15-year-olds at each student's school is hindered by: student absenteeism; disruption of classes by students; students skipping classes; students lacking respect for teachers; the use of alcohol or illegal drugs; and students intimidating or bullying other students. (The index is inverted so that lower values tend to indicate greater hindrance.) The mean score for high achievers is below the OECD mean. (Figure 9)

Figure 9: Low SES Students' Average Index Scores for Wider School Factors, from the PISA 2000 Study



* The difference between high and low achievers is not statistically significant.

On average, high and low achievers do not differ in the *teacher morale and commitment* reported by principals at their schools, or in the impact, as gauged by school principals, that *teacher shortages* have on learning at their schools. Nor on average are there significant differences between high and low achievers in the degree to which principals see problematic *teacher-related behaviours* or the poor quality of *schools' physical infrastructure* as a hindrance to learning at their schools. On all four measures, the mean score for high achievers is close to the OECD mean and not statistically different from the average for low achievers. These factors are measured as follows:

- The index of teacher morale and commitment is derived from the extent to which principals at each student's school agree or disagree with the following statements: the morale of the teachers in this school is high; teachers work with enthusiasm; teachers take pride in this school; and teachers value academic achievement.
- The index of teacher shortage is derived from the principals' view on how much learning by 15-year-old students is hindered by the shortage or inadequacy of teachers in English, mathematics or science. (The index is inverted so that lower values tend to indicate greater hindrance. In non-English speaking countries principals are asked about teachers in their own language of assessment.)
- The index of the principals' perceptions of teacher-related factors affecting school climate was derived from principals' reports on the extent to which learning by 15-year-olds was hindered by: the low expectations of teachers; poor student-teacher relations; teachers not meeting individual students' needs; teacher absenteeism; staff resisting change; teachers being too strict with students; and students not being encouraged to achieve their full potential. (The index is inverted so that lower values tend to indicate greater hindrance.)

- The index of the quality of a school's physical infrastructure was derived from principals' reports on the extent to which learning by 15-year-olds in their school was hindered by: poor condition of buildings; poor heating and cooling and/or lighting systems; and lack of instructional space (e.g., classrooms). (The index is inverted so that lower values tend to indicate greater hindrance.)

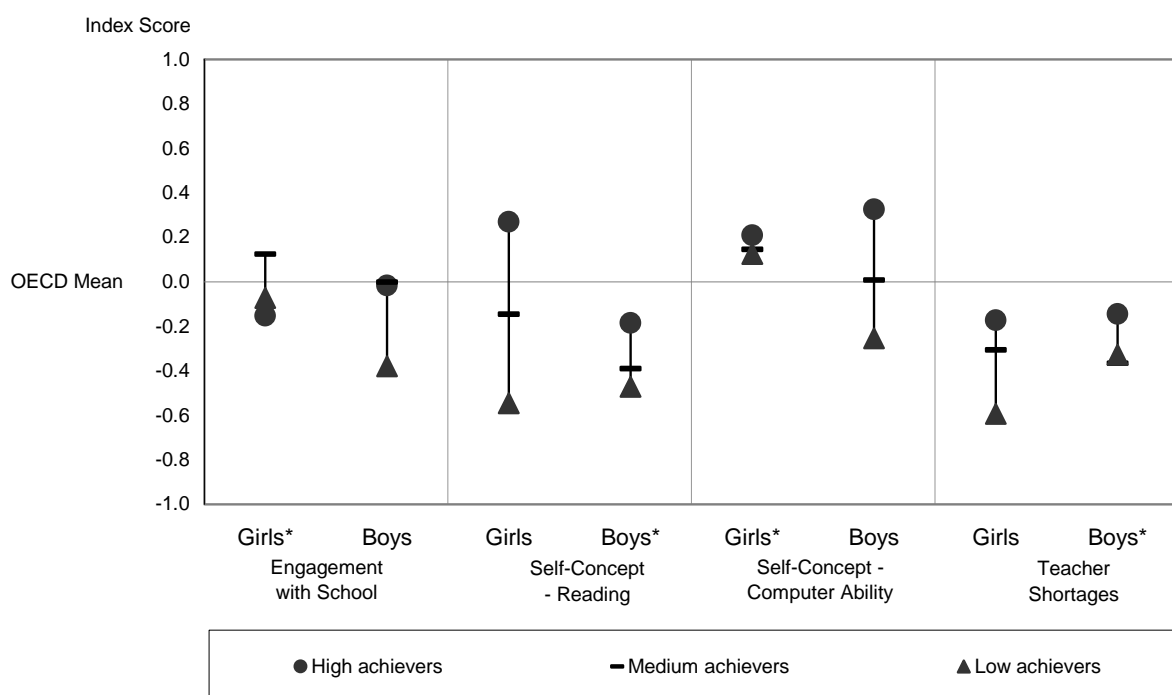
Mean Index Scores for High and Low Achievers Disaggregated by Gender

For most of the PISA 2000 indices examined above, the difference in the overall mean scores of high and low achieving low SES students is broadly reflective of the trend for both girls and boys. In some cases, however, when the overall score is disaggregated by gender the difference between high and low achievers does not follow the same pattern for girls that it does for boys.

Figure 10 highlights the most disparate of these gender comparisons. On the index of self-concept in reading the difference between low SES high and low achievers is very large for girls, yet relatively small and not statistically significant for boys. This suggests a strong association between this factor and achievement for girls in contrast to no apparent relationship for boys. The disaggregated index of self-concept in computer ability, on the other hand, suggests a strong association between this factor and achievement for boys but no apparent relationship for girls.

No statistical difference was observed between high and low achieving low SES students overall on the index of engagement with school, but when disaggregated by gender the results suggest an association between this factor and achievement for boys. Conversely, while no overall difference was found between high and low achieving low SES students on the index of teacher shortages, when disaggregated by gender the results suggest an association between this factor and achievement for girls. (This index has been inverted so that lower values correspond to less positive reports from principals on this factor.)

Figure 10: Low SES Students' Average Index Scores for Selected Indices by Gender, from the PISA 2000 Study



* The difference between high and low achievers is not statistically significant.

CONCLUSION

The findings presented in this report indicate that while achievement for low SES students in reading, mathematical and scientific literacy as assessed by PISA is on average poorer than for students in other SES categories, achievement levels vary widely within the low SES student population. In reading literacy, the major domain in PISA 2000, a substantial proportion of low SES students (28 percent) achieve a high level of proficiency.

The proportion of low SES students who are high achievers varies across demographic subgroups: girls, Pakeha (as opposed to Māori), those with fewer than 3 siblings, those from high decile schools or single sex schools are more likely to be high achievers than their counterparts. PISA did not find any significant difference in the likelihood that low SES students would be high achievers whether at age 15 they come from single-parent or nuclear families, whether their mothers have completed upper secondary education, tertiary education or neither, or whether they attend school in a larger urban area or a minor urban/rural area.

High achievement among low SES students was found to be associated with 13 of the 27 PISA indices investigated. In particular, large differences are observed between high and low achievers in a number of student-related factors including both interest and engagement in reading, time spent on homework, and student self-concepts in both reading and academic ability. However, the largest difference relates to the availability of educational resources in the home. For boys, a significant difference was found on the index of engagement with school. The results also suggest an association between high achievement and higher occupational expectations.

The associations found in PISA do not prove that these factors are responsible for high achievement. Such statistical relationships, while often very clear in this study, cannot in themselves establish a causal link. Furthermore, while the study examines a range of key factors relating to students, their families and the learning environment, it provides only a partial picture of the possible determinants of educational achievement. However, when seen in conjunction with existing research, knowledge and experience the findings should assist educators, policy-makers, parents and students to recognise the role these factors may take in mitigating the effects of socio-economic disadvantage in shaping student outcomes, not only at secondary level but also in the earlier years.

In making such judgements, due consideration should be given to the subjective element in these indices, which are based on self-reports by students or principals. The index scores must be read in conjunction with the definitions provided in the report. In some cases the PISA definition of a factor may differ from the meaning generally understood in this country. The way in which PISA assesses achievement may also differ to a degree from that used in the school system.

Although PISA shows that poor performance in school does not automatically follow from a disadvantaged socio-economic background, it has been reported internationally to be one of the most powerful factors influencing performance on the PISA reading, mathematical and scientific literacy scales. This report provides a baseline for tracking trends in low SES achievement at age 15 through the successive cycles of the PISA study. While mathematical literacy was the major domain in 2003, and scientific literacy will be the major domain in 2006, in each cycle the study will enable progress to be measured in all of the three PISA literacy domains.

APPENDIX : PISA 2000 DATA TABLES

The tables presented in this appendix use bold face type to indicate statistically significant differences, as noted under the relevant tables. The significance tests used here and throughout the report meet $\alpha=0.05$ (i.e., the 5% level). The symbol *S.E.* stands for standard error, which is included in the tables as an indicator of the uncertainty associated with each estimate. Numerical scale and index scores cannot be directly compared among the different domains or indices.

Table 1: Percentage Breakdown of New Zealand Students by SES Category, from the PISA 2000 Study

(Results based on students' self-reports)

Socio-Economic Status	%	S.E.
High SES	25.3	(0.9)
Medium-High SES	22.2	(0.7)
Medium-Low SES	26.5	(0.8)
Low SES	22.1	(0.8)
Not Known	3.9	(0.4)
TOTAL	100.0	-

Table 2: Percentage Breakdown of New Zealand Students by Highest Parental Occupation in Major Groups, from the PISA 2000 Study

(Results based on students' self-reports)

Highest Parental Occupation (Major Group)	High SES		Medium-High SES		Medium-Low SES		Low SES		New Zealand	
	%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.
1 Legislators, senior officials & managers	22.5	(1.5)	15.0	(1.4)	37.7	(1.3)	-	-	19.0	(0.7)
2 Professionals	74.8	(1.6)	24.1	(1.8)	19.3	(1.3)	-	-	29.4	(0.8)
3 Technicians & associate professionals	2.7	(0.7)	35.9	(1.8)	14.1	(1.2)	5.9	(0.8)	13.7	(0.7)
4 Office clerks	-	-	24.9	(1.5)	13.4	(1.0)	3.9	(0.6)	9.9	(0.4)
5 Service workers & shop & market sales workers	-	-	0.2	(0.2)	15.0	(1.0)	18.4	(1.5)	8.1	(0.4)
6 Skilled agricultural & fishery workers	-	-	-	-	-	-	15.6	(1.5)	3.4	(0.4)
7 Craft & related trades workers	-	-	-	-	0.5	(0.3)	30.6	(1.4)	6.9	(0.4)
8 Plant & machine operators & assemblers	-	-	-	-	-	-	14.1	(1.2)	3.1	(0.3)
9 Elementary occupations [e.g., cleaners, labourers]	-	-	-	-	-	-	11.5	(1.2)	2.5	(0.3)
Not Known	-	-	-	-	-	-	-	-	3.9	(0.4)
TOTAL	100.0	-	100.0	-	100.0	-	100.0	-	100.0	-

Due to rounding figures may not sum exactly to 100 percent.

Table 3: Percentage Breakdown of Low SES New Zealand Students by Highest Parental Occupation in 15 Largest Unit Groups, from the PISA 2000 Study
(Results based on students' self-reports)

Highest Parental Occupation (Unit Group)	%	S.E.
Dairy & livestock producers [e.g., farmers, shearers]	10.6	(1.4)
Cooks	4.8	(0.8)
Heavy truck & lorry drivers	4.2	(0.7)
Teaching associate professionals [e.g., teacher aides]	4.1	(0.7)
Waiters, waitresses & bartenders	4.0	(0.8)
Motor vehicle mechanics & fitters	3.8	(0.8)
Builders traditional materials	2.6	(0.6)
Carpenters & joiners	2.5	(0.6)
Helpers & cleaners in offices, hotels and other establishments	2.4	(0.7)
Building and related electricians	2.3	(0.4)
Institution-based personal care workers [e.g., nurse aides, rest home caregivers]	2.2	(0.5)
Farm-hands & labourers	2.1	(0.6)
Plumbers & pipe fitters	2.0	(0.5)
Agricultural or industrial machinery mechanics & fitters	1.9	(0.5)
Gardeners, horticultural & nursery growers	1.9	(0.5)
SUBTOTAL	51.4	-

Table 4: Average Scale Scores for Reading, Mathematical and Scientific Literacy, from the PISA 2000 Study

Domain	New Zealand Students								OECD Countries	
	High SES		Medium-High SES		Medium-Low SES		Low SES		Mean Scale Score	S.E.
	Mean Scale Score	S.E.	Mean Scale Score	S.E.	Mean Scale Score	S.E.	Mean Scale Score	S.E.		
Reading Literacy	574	(4.4)	548	(3.5)	520	(3.5)	490	(4.4)	500	(0.6)
Mathematical Literacy	581	(4.7)	556	(4.3)	528	(4.7)	499	(6.2)	500	(0.7)
Scientific Literacy	574	(4.0)	546	(3.9)	517	(3.7)	490	(5.3)	500	(0.7)

Bold type indicates that the mean scale score is statistically significantly different from the score for low SES students in this domain ($\alpha=0.05$).

Table 5: Average Scale Scores for New Zealand Students by Socio-Economic Status and Gender, from the PISA 2000 Study

Domain/Gender	High SES		Medium-High SES		Medium-Low SES		Low SES		New Zealand	
	Mean Scale Score	S.E.	Mean Scale Score	S.E.	Mean Scale Score	S.E.	Mean Scale Score	S.E.	Mean Scale Score	S.E.
READING LITERACY										
Girls	598	(5.5)	568	(5.1)	544	(5.2)	513	(5.4)	553	(3.8)
Boys	551	(5.2)	528	(5.9)	497	(5.6)	465	(6.2)	507	(4.2)
MATHEMATICAL LITERACY										
Girls	583	(6.8)	554	(6.6)	526	(6.9)	503	(7.8)	539	(4.1)
Boys	580	(6.6)	557	(6.7)	530	(6.7)	494	(8.2)	536	(5.1)
SCIENTIFIC LITERACY										
Girls	585	(5.9)	550	(5.1)	527	(6.8)	492	(6.8)	535	(3.8)
Boys	563	(6.7)	542	(6.6)	509	(6.4)	489	(8.5)	523	(4.6)

Bold type indicates a statistically significant difference between girls and boys in this domain and socio-economic category ($\alpha=0.05$).

Table 6: Scale Scores at Selected Percentiles for New Zealand Students by Socio-Economic Status, from the PISA 2000 Study

Domain/SES Category	5 th Percentile		25 th Percentile		Mean		75 th Percentile		95 th Percentile	
	Scale Score	S.E.	Scale Score	S.E.	Mean Scale Score	S.E.	Scale Score	S.E.	Scale Score	S.E.
READING LITERACY										
Low SES	308	(9.6)	425	(6.2)	490	(4.4)	561	(5.9)	647	(9.3)
Other SES Category	365	(4.9)	481	(3.9)	547	(2.7)	619	(3.1)	702	(6.8)
New Zealand	337	(7.2)	459	(3.9)	529	(2.8)	606	(3.0)	692	(5.7)
MATHEMATICAL LITERACY										
Low SES	351	(11.2)	440	(11.1)	499	(6.2)	556	(8.6)	641	(10.0)
Other SES Category	390	(7.8)	494	(4.2)	555	(3.0)	622	(4.3)	698	(6.1)
New Zealand	364	(6.7)	472	(4.0)	537	(3.1)	607	(4.2)	689	(5.1)
SCIENTIFIC LITERACY										
Low SES	341	(13.2)	421	(8.0)	490	(5.3)	560	(9.5)	645	(11.1)
Other SES Category	374	(6.3)	481	(3.9)	545	(2.4)	613	(3.2)	691	(5.7)
New Zealand	357	(5.4)	459	(3.8)	528	(2.4)	600	(3.3)	683	(4.3)

Bold type indicates that the mean scale score is statistically significantly different from the score for low SES students in this domain ($\alpha=0.05$). Significance tests have not been applied to the percentile scale scores.

Table 7: Low SES New Zealand Students: Percentage Distribution across Reading Proficiency Levels, from the PISA 2000 Study

Proficiency Level	Retrieving Information		Interpreting Texts		Reflection and Evaluation		Reading Literacy (Combined)	
	%	S.E.	%	S.E.	%	S.E.	%	S.E.
Below Level 1	8.9	(1.2)	7.9	(1.0)	7.2	(1.0)	7.5	(1.3)
Level 1	12.3	(1.6)	13.9	(1.4)	12.8	(1.3)	12.9	(1.7)
Level 2	21.9	(2.0)	25.4	(2.0)	23.8	(2.3)	24.0	(1.8)
Level 3	25.1	(2.1)	25.0	(1.9)	27.4	(2.8)	27.5	(2.6)
Level 4	20.7	(1.7)	18.6	(1.7)	20.3	(2.0)	19.7	(1.9)
Level 5	11.1	(1.7)	9.2	(1.2)	8.4	(1.2)	8.4	(1.2)
TOTAL	100.0	-	100.0	-	100.0	-	100.0	-

Due to rounding figures may not sum exactly to 100 percent.

Table 8: Mean Index Scores for General Outcomes of Learning, from the PISA 2000 Study
(Results based on students' self-reports)

Index	New Zealand Students								OECD Countries	
	High SES		Medium-High SES		Medium-Low SES		Low SES			
	Mean Index Score	S.E.	Mean Index Score	S.E.	Mean Index Score	S.E.	Mean Index Score	S.E.	Mean Index Score	S.E.
MOTIVATION & ENGAGEMENT										
Interest in Reading	0.21	(0.04)	0.07	(0.04)	0.03	(0.03)	-0.03	(0.03)	0.00	(0.00)
Engagement in Reading	0.17	(0.04)	0.03	(0.04)	-0.04	(0.03)	-0.12	(0.03)	0.00	(0.00)
Reading Activities	0.24	(0.03)	0.18	(0.04)	0.10	(0.03)	0.04	(0.03)	0.00	(0.0) i
Interest in Mathematics	0.15	(0.04)	0.05	(0.04)	0.07	(0.04)	0.11	(0.03)	0.00	(0.00)
Time Spent on Homework	0.19	(0.04)	0.11	(0.04)	0.03	(0.03)	-0.07	(0.04)	0.00	(0.00)
Engagement with School	0.02	(0.04)	0.01	(0.03)	-0.02	(0.03)	-0.05	(0.03)	0.00	(0.0) i
LEARNING STRATEGIES										
Control Strategies	0.24	(0.05)	0.10	(0.04)	0.01	(0.04)	-0.08	(0.03)	0.00	(0.01)
Memorisation Strategies	0.30	(0.03)	0.28	(0.04)	0.20	(0.03)	0.20	(0.04)	0.00	(0.00)
Elaboration Strategies	0.20	(0.04)	0.08	(0.03)	0.07	(0.03)	0.05	(0.03)	0.00	(0.00)
Competitive Learning	0.44	(0.04)	0.31	(0.03)	0.23	(0.04)	0.16	(0.03)	0.00	(0.00)
Co-operative Learning	0.25	(0.04)	0.27	(0.03)	0.30	(0.03)	0.36	(0.04)	0.00	(0.00)
STUDENT SELF-CONCEPTS										
Reading	0.04	(0.04)	-0.10	(0.04)	-0.17	(0.04)	-0.20	(0.04)	0.00	(0.0) i
Mathematics	0.37	(0.04)	0.21	(0.04)	0.13	(0.04)	0.02	(0.04)	0.00	(0.0) i
Academic Ability	0.42	(0.04)	0.18	(0.04)	0.16	(0.04)	0.08	(0.03)	0.00	(0.0) i
Computer Ability	0.36	(0.03)	0.36	(0.03)	0.18	(0.03)	0.09	(0.04)	0.00	(0.00)

Bold type indicates that the mean index score is statistically significantly different from the score for low SES students on this index ($\alpha=0.05$).

i indicates that the standard error has been imputed.

Table 9: Low SES New Zealand Students: Percentage Breakdown of High and Low Achievers by Selected Demographic Characteristics, and Percentage Distribution of Subgroups across Achievement Levels, from the PISA 2000 Study

Characteristic/Subgroup	BREAKDOWN								DISTRIBUTION					
	Composition of low SES students who are high achievers		Composition of low SES students who are medium achievers		Composition of low SES students who are low achievers		Composition of all low SES students		Percentage of subgroup who are high achievers		Percentage of subgroup who are medium achievers		Percentage of subgroup who are low achievers	
	%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.
ALL LOW SES STUDENTS									28.1	(2.3)	51.5	(2.5)	20.4	(1.6)
GENDER														
Girls	65.2	(4.1)	52.2	(3.1)	31.9	(4.3)	51.7	(2.3)	35.5	(2.8)	52.0	(2.9)	12.6	(1.9)
Boys	34.8	(4.1)	47.8	(3.1)	68.1	(4.3)	48.3	(2.3)	20.3	(3.1)	51.0	(3.6)	28.7	(2.5)
Not Known	0.0	-	0.0	-	0.0	-	0.0	-						
TOTAL	100.0	-	100.0	-	100.0	-	100.0	-						
ETHNIC IDENTIFICATION														
Pakeha	71.8	(3.6)	51.2	(3.1)	36.3	(4.9)	54.0	(2.1)	37.5	(3.1)	48.8	(3.6)	13.7	(2.2)
Māori	18.9	(3.1)	28.1	(2.6)	36.7	(5.3)	27.2	(1.8)	19.5	(3.0)	53.0	(4.5)	27.5	(3.5)
Pasifika	c	c	13.9	(1.6)	c	c	11.7	(1.6)	<i>c</i>	<i>c</i>	<i>60.9</i>	<i>(6.4)</i>	<i>c</i>	<i>c</i>
Asian	c	c	c	c	c	c	6.0	(0.8)	<i>c</i>	<i>c</i>	<i>c</i>	<i>c</i>	<i>c</i>	<i>c</i>
Other	c	c	c	c	c	c	c	c	<i>c</i>	<i>c</i>	<i>c</i>	<i>c</i>	<i>c</i>	<i>c</i>
Not Known	c	c	0.0	-	c	c	c	c						
TOTAL	100.0	-	100.0	-	100.0	-	100.0	-						
FAMILY TYPE														
Single-Parent	17.8	(2.9)	20.5	(2.1)	26.3	(3.2)	20.9	(1.4)	23.9	(3.9)	50.4	(4.3)	25.7	(3.6)
Nuclear Family	69.4	(3.7)	60.9	(2.5)	52.0	(4.2)	61.5	(1.5)	31.8	(3.0)	51.0	(3.2)	17.2	(1.9)
Other	c	c	17.2	(2.0)	c	c	15.8	(1.1)	<i>c</i>	<i>c</i>	<i>56.2</i>	<i>(5.8)</i>	<i>c</i>	<i>c</i>
Not Known	c	c	c	c	c	c	c	c						
TOTAL	100.0	-	100.0	-	100.0	-	100.0	-						
MOTHER'S EDUCATION														
Completed Tertiary	22.8	(3.3)	16.3	(2.1)	22.3	(3.3)	19.3	(1.4)	33.2	(4.6)	43.3	(4.4)	23.5	(3.6)
Completed Upper Secondary	39.3	(4.0)	29.7	(2.7)	23.0	(4.0)	31.1	(1.8)	35.7	(4.7)	49.3	(4.7)	15.1	(2.7)
Not Completed Upper Secondary	25.2	(3.3)	29.0	(2.5)	20.7	(3.6)	26.2	(1.5)	27.1	(4.1)	56.9	(4.8)	16.1	(2.9)
Not Known	c	c	25.0	(2.1)	34.1	(3.8)	23.4	(1.5)						
TOTAL	100.0	-	100.0	-	100.0	-	100.0	-						
NUMBER OF SIBLINGS														
Fewer Than Three	63.9	(3.5)	52.7	(2.5)	49.4	(4.2)	55.2	(1.8)	32.6	(2.7)	49.2	(3.0)	18.3	(2.1)
Three or More	35.4	(3.5)	46.2	(2.5)	48.2	(4.1)	43.6	(1.8)	22.9	(2.9)	54.6	(3.1)	22.5	(2.3)
Not Known	c	c	c	c	c	c	c	c						
TOTAL	100.0	-	100.0	-	100.0	-	100.0	-						
SCHOOL DECILE														
High (8-10)	30.9	(3.6)	19.9	(2.4)	c	c	21.5	(1.9)	40.5	(4.5)	47.7	(4.6)	c	c
Medium (4-7)	51.6	(4.2)	51.3	(3.0)	47.6	(5.1)	50.6	(2.2)	28.7	(2.2)	52.2	(2.6)	19.1	(2.4)
Low (1-3)	17.1	(3.6)	28.0	(3.3)	38.7	(5.5)	27.1	(2.2)	17.8	(4.6)	53.1	(6.1)	29.1	(3.7)
Not Known	c	c	c	c	c	c	c	c						
TOTAL	100.0	-	100.0	-	100.0	-	100.0	-						
SCHOOL GENDER														
Single Sex Schools	28.4	(4.5)	22.9	(3.7)	c	c	22.7	(3.3)	35.1	(3.6)	51.9	(3.6)	c	c
Co-educational Schools	71.2	(4.5)	76.3	(3.8)	84.2	(3.7)	76.5	(3.4)	26.2	(2.7)	51.3	(2.9)	22.4	(1.9)
Not Known	0.0	-	c	c	c	c	c	c						
TOTAL	100.0	-	100.0	-	100.0	-	100.0	-						
SCHOOL LOCALITY														
Main & Secondary Urban Areas	71.6	(4.3)	72.7	(3.5)	71.3	(4.3)	72.1	(2.9)	27.9	(2.6)	51.9	(2.9)	20.2	(1.9)
Minor Urban & Rural Areas	28.4	(4.3)	27.3	(3.5)	28.7	(4.3)	27.9	(2.9)	28.7	(3.7)	50.4	(4.1)	20.9	(3.1)
Not Known	0.0	-	0.0	-	0.0	-	0.0	-						
TOTAL	100.0	-	100.0	-	100.0	-	100.0	-						

In the breakdowns, **bold** type indicates that the percentage is statistically significantly different from the percentage for low SES high achievers in this subgroup ($\alpha=0.05$). In the distributions, **bold** type indicates a statistically significant difference between the subgroups shown for a given characteristic, e.g., girls versus boys, at that achievement level ($\alpha=0.05$). Where there are more than two subgroups shown, e.g., single-parent, nuclear and other family type, *grey italic* type indicates that this category is not included in the significance test.

c indicates that there are too few observations to provide reliable estimates (i.e., fewer than 30 students with valid data for this cell).

Due to rounding figures may not sum exactly to 100 percent.

Table 10: Mean Index Scores for New Zealand Students' Expected Occupations at Age 30 on the International Socio-Economic Index of Occupational Status, from the PISA 2000 Study*(Results based on students' self-reports)*

PISA Achievement Level	High SES		Medium-High SES		Medium-Low SES		Low SES	
	Mean Index Score	S.E.	Mean Index Score	S.E.	Mean Index Score	S.E.	Mean Index Score	S.E.
High Achievers	67.7	(0.9)	62.5	(1.0)	61.5	(1.0)	60.0	(1.2)
Medium Achievers	56.7	(1.2)	55.3	(1.2)	52.6	(1.0)	50.1	(1.1)
Low Achievers	51.8	(3.0)	44.3	(3.5)	48.8	(2.1)	42.0	(1.8)
All New Zealand Students	63.1	(0.7)	58.2	(0.7)	55.9	(0.6)	51.5	(0.8)

Response rate % (sum of weights)	(79.1)	(82.1)	(79.3)	(79.9)
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Table 11: Mean Index Scores for Selected Indices, from the PISA 2000 Study*(Results based on students' self-reports or reports from school principals)*

Index	New Zealand Students								OECD Countries	
	Low SES High Achievers		Low SES Medium Achievers		Low SES Low Achievers		All Low SES Students		Mean Index Score	S.E.
	Mean Index Score	S.E.	Mean Index Score	S.E.	Mean Index Score	S.E.	Mean Index Score	S.E.		
MOTIVATION & ENGAGEMENT										
Interest in Reading	0.37	(0.06)	-0.21	(0.05)	-0.16	(0.07)	-0.03	(0.03)	0.00	(0.00)
Engagement in Reading	0.36	(0.06)	-0.26	(0.04)	-0.45	(0.07)	-0.12	(0.03)	0.00	(0.00)
Reading Activities	0.24	(0.07)	0.00	(0.05)	-0.13	(0.10)	0.04	(0.03)	0.00	(0.0) i
Time Spent on Homework	0.15	(0.06)	-0.05	(0.05)	-0.46	(0.09)	-0.07	(0.04)	0.00	(0.00)
Engagement with School	-0.10	(0.07)	0.06	(0.05)	-0.28	(0.09)	-0.05	(0.03)	0.00	(0.0) i
LEARNING STRATEGIES										
Control Strategies	0.08	(0.06)	-0.06	(0.05)	-0.41	(0.10)	-0.08	(0.03)	0.00	(0.01)
Memorisation Strategies	0.21	(0.07)	0.25	(0.05)	0.05	(0.09)	0.20	(0.04)	0.00	(0.00)
Elaboration Strategies	0.02	(0.06)	0.09	(0.04)	0.00	(0.09)	0.05	(0.03)	0.00	(0.00)
Competitive Learning	0.39	(0.08)	0.07	(0.06)	0.06	(0.10)	0.16	(0.03)	0.00	(0.00)
Co-operative Learning	0.32	(0.06)	0.42	(0.05)	0.24	(0.11)	0.36	(0.04)	0.00	(0.00)
STUDENT SELF-CONCEPTS										
Reading	0.12	(0.09)	-0.26	(0.07)	-0.50	(0.09)	-0.20	(0.04)	0.00	(0.0) i
Academic Ability	0.41	(0.07)	-0.02	(0.05)	-0.17	(0.10)	0.08	(0.03)	0.00	(0.0) i
Computer Ability	0.25	(0.09)	0.08	(0.07)	-0.14	(0.10)	0.09	(0.04)	0.00	(0.00)
FAMILY BACKGROUND										
Home Educational Resources	0.06	(0.10)	-0.34	(0.06)	-0.89	(0.11)	-0.34	(0.05)	0.00	(0.0) i
Parental Cultural Communication	0.06	(0.07)	-0.17	(0.05)	-0.03	(0.09)	-0.08	(0.03)	0.00	(0.00)
Parental Social Communication	-0.31	(0.07)	-0.39	(0.06)	-0.55	(0.10)	-0.40	(0.04)	0.00	(0.00)
Family Educational Support	0.17	(0.08)	0.18	(0.05)	0.27	(0.09)	0.20	(0.04)	0.00	(0.0) i
Family Wealth	-0.01	(0.06)	-0.12	(0.05)	-0.26	(0.08)	-0.12	(0.03)	0.00	(0.00)
CLASSROOM FACTORS										
Teacher Support	0.33	(0.08)	0.36	(0.06)	0.28	(0.09)	0.34	(0.03)	0.00	(0.01)
Teacher-Student Relations	0.21	(0.07)	0.12	(0.06)	-0.02	(0.08)	0.11	(0.03)	0.00	(0.0) i
Disciplinary Climate *	-0.23	(0.08)	-0.29	(0.06)	-0.41	(0.06)	-0.29	(0.03)	0.00	(0.01)
Schools' Educational Resources *	0.03	(0.10)	0.01	(0.07)	-0.07	(0.09)	0.00	(0.07)	0.00	(0.02)
WIDER SCHOOL ISSUES										
Student-Related Behaviours *	-0.30	(0.07)	-0.36	(0.09)	-0.50	(0.11)	-0.37	(0.07)	0.00	(0.01)
Teacher Morale and Commitment	0.11	(0.10)	0.12	(0.10)	-0.02	(0.14)	0.09	(0.09)	0.00	(0.01)
Teacher Shortages *	-0.16	(0.11)	-0.34	(0.10)	-0.41	(0.12)	-0.30	(0.09)	0.00	(0.01)
Teacher-Related Behaviours *	-0.13	(0.08)	-0.17	(0.10)	-0.30	(0.13)	-0.18	(0.08)	0.00	(0.01)
Schools' Physical Infrastructure *	0.07	(0.09)	0.03	(0.08)	0.05	(0.12)	0.04	(0.07)	0.00	(0.01)

Bold type indicates the mean index score is statistically significantly different from the score for low SES high achievers on this index ($\alpha=0.05$).

* indicates that the index has been inverted so that lower values correspond to less positive reports on the factor being measured.

i indicates that the standard error has been imputed.

Table 12: Low SES New Zealand Students: Percentage with Selected Educational Resources in the Home by Achievement Level, from the PISA 2000 Study
(Results based on students' self-reports)

Educational Resource	Low SES High Achievers		Low SES Medium Achievers		Low SES Low Achievers		All Low SES Students	
	%	S.E.	%	S.E.	%	S.E.	%	S.E.
A Dictionary	98.6	(1.0)	96.2	(0.9)	87.4	(2.8)	95.1	(0.8)
A Quiet Place to Study	87.9	(2.6)	86.7	(1.8)	74.4	(3.7)	84.5	(1.2)
A Desk for Study	86.3	(2.6)	77.1	(2.2)	70.5	(3.9)	78.3	(1.6)
Text Books	91.1	(2.5)	86.0	(1.8)	68.7	(3.5)	83.9	(1.3)
Three or More Calculators	77.1	(3.9)	61.5	(2.7)	51.1	(4.0)	63.8	(1.7)

Bold type indicates that the percentage is statistically significantly different from the percentage of low SES high achievers with this resource ($\alpha=0.05$).

Table 13: Low SES New Zealand Students: Mean Index Scores for Selected Indices Disaggregated by Gender, from the PISA 2000 Study
(Results based on students' self-reports or reports from school principals)

Gender/Index	Low SES High Achievers		Low SES Medium Achievers		Low SES Low Achievers		All Low SES Students	
	Mean Index Score	S.E.	Mean Index Score	S.E.	Mean Index Score	S.E.	Mean Index Score	S.E.
GIRLS								
Engagement with School	-0.15	(0.10)	0.12	(0.08)	-0.07	(0.18)	0.00	(0.05)
Self Concept – Reading	0.27	(0.11)	-0.15	(0.09)	-0.55	(0.16)	-0.04	(0.07)
Self Concept – Computer Ability	0.21	(0.09)	0.15	(0.07)	0.13	(0.17)	0.17	(0.04)
Teacher-Student Relations	0.20	(0.09)	0.15	(0.07)	0.03	(0.12)	0.15	(0.04)
Teacher Shortages *	-0.17	(0.12)	-0.31	(0.12)	-0.59	(0.17)	-0.29	(0.10)
BOYS								
Engagement with School	-0.02	(0.11)	0.00	(0.08)	-0.38	(0.08)	-0.11	(0.05)
Self Concept – Reading	-0.18	(0.16)	-0.39	(0.09)	-0.47	(0.09)	-0.37	(0.05)
Self Concept – Computer Ability	0.33	(0.14)	0.01	(0.09)	-0.25	(0.10)	0.00	(0.06)
Teacher-Student Relations	0.23	(0.10)	0.08	(0.08)	-0.05	(0.09)	0.07	(0.05)
Teacher Shortages *	-0.14	(0.16)	-0.37	(0.12)	-0.33	(0.14)	-0.31	(0.11)

Bold type indicates the mean index score is statistically significantly different from the score for low SES high achievers for this index and gender ($\alpha=0.05$).

* indicates that the index has been inverted so that lower values correspond to less positive reports on the factor being measured.

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